NATIONAL INDEX
OF
AGRICULTURAL
FIELD
EXPERIMENTS
VOL. 11 PART 3
NORTH WESTERN REGION
HARYANA; HIMACHAL PRADESH; JAMMU & KASHMIR
AND PUNJAB
1966—65
THE COMPENDIUM PREPARED BY
P. N. Bhargava
H. V. L. Bathla Basant Lal P. R. Yeri
and M. P. Saksena
Under the overall guidance of D. Singh and K. S. Krishnan
Published by
INDIAN AGRICULTURAL STATISTICS RESEARCH INSTITUTE
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)
NEW DELHI-110012
The I. C. A. R. has adopted the 'Co-ordinated approach' to crop improvement as the strategy in agricultural research. This approach is based on the principle of giving high priority to problem solving research and for the purpose an intimate knowledge of research in progress and trends of results is very essential. To give impetus to this approach, I. C. A. R. started a scheme for collecting data of all field experiments conducted in the country. It was aimed at compilation of agronomic experiments in the country, with a view to indicate the gaps in the knowledge and to avoid duplication. The scheme entitled "National Index of Field Experiments" is running under the Institute of Agricultural Research Statistics which has rendered a very valuable service by preparing compendia of agricultural field experiments conducted in the country. Two series of the compendia containing results of about 7,200 and 12,000 experiments conducted during the periods 1948-53 and 1954-59 respectively have already been published by the Institute. The present is the third series of compendia and is expected to contain the results of about 18,000 experiments conducted during the period 1960-65.

The number and the types of experiments have been increasing at a fast rate. Further, many of the experiments were being repeated over a number of years. The conclusions drawn from such experiments should take into account the seasonal variations. For this purpose, it was necessary to carry out consolidated analysis of results over years. Thus the task of compilation, analysis and interpretation of results of experiments being covered in the third series became more formidable compared to those covered in the earlier two series.

The preparation of this compendium has been possible by the whole-hearted co-operation of State Departments of Agriculture, Agricultural Universities and Central Research Institutes who ungrudgingly made the results of their experimental research available. My thanks are due to various officers of these institutions for participating in this work.

I hope that the present series will be followed by periodical publications of similar compendia for later years in order that the availability of results of scientific experiments in agriculture in India may be maintained up-to-date in a consolidated form.

B. K. SONI
Deputy Director General (AS)
Indian Council of Agricultural Research
PREFACE

The present set of volumes forms Part III in the series of compendia of Agricultural Field Experiments being published under the project of National Index of Agri. Field Experiments. Volumes comprising in Parts I and II of the series pertaining to the periods 1948-53 and 1954-59 were published in 1962 and 1965 and contained the results of about 7,200 and 12,000 experiments respectively. The present volumes include results of experiments conducted during the period 1960-65. During the last decade there has been an enormous increase in agricultural research and experimentation, so much so that for the period 1960-66 to which the present volumes refer, results of about 18,000 experiments are available.

Like the earlier two series, the compendium for Part III is divided into 15 volumes, one each for (1) Andhra Pradesh, (2) North-Eastern Region (Assam, Manipur, Nagaland, Meghalaya, Tripura, Arunachal Pradesh and Mizoram), (3) Bihar, (4) Gujarat, (5) Kerala, (6) Madhya Pradesh, (7) Maharashtra, (8) Mysore, (9) Orissa, (10) North-Western Region (Punjab, Haryana, Rajasthan & Kashmir and Himachal Pradesh), (11) Rajasthan, (12) Tamil Nadu, (13) Uttar Pradesh, (14) West Bengal and (15) All Central Institutes. A departure has, however, been made in the presentation of the material contained in each volume. Whereas the results of individual experiments were presented in the volumes of previous series, the present series contain results of pooled statistical analysis of experiments that were conducted for two or more years and concluded during the period 1960-65. In respect of those experiments conducted for more than one year but were conducted beyond 1965, the results of individual experiments have been presented.

The work under the scheme was carried out at the Institute of Agricultural Research Statistics. Collection of data from different research stations, their scrutiny and preliminary analysis were carried out in successive periods under the charge of Shri T.P. Abraham, Assistant Statistical Adviser, now Additional Director, Central Statistical Organisation; Dr. B.N. Tyagi, Senior Statistician, now Additional Agriculture Census Commissioner to the Govt. of U.P., Lucknow and Shri M.G. Sardana, Senior Statistician, now Joint Director, Central Statistical Organisation, Dr. O.P. Kathuria, Shri R.K. Khola, Junior Statisticians, now Associate Professors, Shri P.P. Rao Statistical Investigator and now Assistant Professor and Shri D.P. Singh, Statistical Assistant, now Scientist were also associated with the scheme at the preparatory stage.

The final stage of analysis and printing was carried out under the guidance and supervision of Shri P.N. Bhargava and Shri K.S. Krishnan, Senior Scientists of this Institute duly assisted by Dr. Basant Lal, Jr. Scientist and Shri P.R. Yeri, P.K. Batra, M.P. Sakitana, Senior Research Assistants. Shri Onkar Swaroop, H.C. Jain, O.P. Sharma, G.L. Khurana, Prabhat Kumar, P.K. Arad, Ashok Kumar, N.K. Sharma and Kuldeep Singh, statistical staff of the Institute deserve special mention for their careful work in analysing the data and combining the results of similar experiments. The tabulation of the large volume of data involved was facilitated by the assistance rendered by the staff of the computer centre located at the Institute. Shri H.V.L. Bathe, Dr. Basant Lal, Jr. Scientists and Shri G.L. Khurana have done the most painstaking job of going through the proofs of this volume. It is not out of place to mention the names of Shri Narendra Kumar and Shri Sudeesh Sharma, typists in this Institute for their laborious work in typing the part of voluminous manuscript of this compendium.

The collection of data from various research stations, was done by the regional staff of the Institute placed in different States. They deserve to be congratulated for the hard work they have put in.

Thanks are due to the State Departments of Agriculture, the Central Institutes and the Agricultural Universities who made the data of the experiments conducted under their jurisdiction readily available to the staff of the Institute. The I. A. R. S. acknowledges with thanks their willing co-operation without which the consolidation of the results would not have been
possible. The Institute is also thankful to various officers in the state Departments of Agriculture and Agricultural Universities who worked as Regional Supervisors for the project from time to time and provided guidance to the regional staff working in the scheme. The list of the names of the Regional Supervisors and Regional Staff of the project is given on the following pages.

NEW DELHI.

D. SINGH
Director
I.A.S.R.I.
(I.C.A.R.) New Delhi
### Regional Supervisors and Regional Staff of the National Index of Field Experiments

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Region &amp; Headquarters</th>
<th>Statistical staff from the Institute of Agricultural Research Statistics</th>
<th>Regional Supervisor</th>
</tr>
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<td>2. Shri S. Vittal Rao, H. Q. Dy. Director (Research)</td>
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<td>Assam (Shillong)</td>
<td>1. Shri A. Sinha 2. Shri K. D. Saha</td>
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<td>2. Shri J. B. Trivedi, I/C. Dy. Director (Stat.)</td>
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<td>3. Shri R. L. Shah, Dy. Director of Agriculture (Stat.)</td>
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<td>Kerala (Trivandrum)</td>
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<td>1. Shri N. George John, Research Officer</td>
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<td>2. Shri G. Rama Chandran Nair, Research Officer</td>
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<td>Maharashtra (Poona)</td>
<td>1. Shri P. R. Yeri 2. Shri B. Ramakrishnan</td>
<td>1. Dr. N. P. Patil, Director of Research</td>
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<td>Mysore (Bangalore)</td>
<td>1. Shri K. A. Balakrishnan 2. Shri P. T. N. Nambiar</td>
<td>1. Shri B. Mishra, Dy. Director of Agri. (Hq.)</td>
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<td>Shri A. K. Mukherjee</td>
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<td>1. Shri P. S. Sahota,</td>
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<td>Director of Crop Insurance</td>
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<td>3. Shri M. S. Pannu,</td>
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<td>Prof. &amp; Head, Dept. of</td>
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<td>1. Shri K. R. Nagaraja Rao,</td>
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<td>Secretary, Research Council</td>
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<td>2. Dr. K. Ramakrishnan,</td>
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<td>1. Dr. K. Kishen, Jr. Director of Agriculture (Statistics)</td>
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ABBREVIATIONS COMMON TO EXPERIMENTS ON ANNUAL AND PERENNIAL CROPS AND EXPERIMENTS ON CULTIVATORS' FIELDS GIVEN IN EXPERIMENTAL DATA

Crop: In the top left corner, is given the name of the crop on which the experiment is conducted. Within brackets along side the crop, is mentioned the season wherever the information is available.

Ref: Against the sub-title ‘Reference’ is mentioned the name of the State, the year in which the experiment is conducted and the serial number of the experiment for that year is given in brackets.

Abbreviations adopted for States are as follows:

1. A.P. — Andhra Pradesh
2. As. — Assam
3. Bh. — Bihar
4. Gj. — Gujarat
5. H.P. — Himachal Pradesh
6. Hr. — Haryana
7. J.K. — Jammu & Kashmir
8. K. — Kerala
9. M.P. — Madhya Pradesh
10. Mh. — Maharashtra
11. Mn. — Manipur
12. Ms. — Mysore
13. N.L. — Nagaland
14. Or. — Orissa
15. Ph. — Punjab
16. Rj. — Rajasthan
17. T.N. — Tamil Nadu
18. Tr. — Tripura
19. U.P. — Uttar Pradesh
20. W.B. — West Bengal

For the experiments conducted under the schemes sponsored by the Indian Council of Agricultural Research, like the All India Co-ordinated Agronomic Experiments (Model Agronomic Experiments and Simple Fertilizer Trials) scheme, no serial number has been given at the source as the data of these experiments were collected at the headquarters (New Delhi). In such cases, the abbreviation MAE or SFT is given in the bracket against the year in which the experiment is conducted.

Site & Centre: — Name of the Research Station is mentioned along with the place where it is located, e.g. Agrl. Res. Stn., Vyara for Agricultural Research Station, Vyara.

For Central Institutes, the corresponding standard abbreviations have been adopted as given below:

C. P. R. I. — Central Potato Research Institute.
C. R. R. I. — Central Rice Research Institute.
C. T. C. R. I. — Central Tuber Crops Research Institute.
C. T. R. L. — Cotton Technological Research Laboratory.
I. A. R. I. — Indian Agricultural Research Institute.
I. H. R. — Institute of Horticultural Research.
I. L. R. I. — Indian Lac Research Institute.
J. T. R. L. — Jute Technological Research Laboratory.
S. B. I. — Sugarcane Breeding Institute.

In case of the experiments conducted on cultivators' fields, whether under an Indian Council of Agricultural Research scheme or by the State Government, the abbreviation (c.f.) is given along with the site or centre as, for example, Cuttack (c.f.).
Type: Abbreviations used against this item are one, or more than one, of the following:
C—Cultural; D—Control of Diseases and Pests; I—Irrigational; M—Manurial; R—Rotational; V—Varietal and X—Mixed cropping. In factorial experiments, the treatments will be abbreviated as, for example, Cultural-cum-Manurial as CM.

Object: A statement of the objective of the experiment is given indicating the main crop and the type of the experiment.

Results: Information under this heading should be read against the following items:
(i) General mean. (ii) S. E. per plot. (iii) Results of test of significance. (iv) Summary table(s), with critical differences for individual effect means which are significant.

Other abbreviations used in the Experimental Data

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
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<tr>
<td>Kg</td>
<td>Kilogram(s)</td>
</tr>
<tr>
<td>Kg/ha</td>
<td>Kilogram(s) per hectare</td>
</tr>
<tr>
<td>N</td>
<td>Nitrogen</td>
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<tr>
<td>P</td>
<td>Phosphate</td>
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<tr>
<td>K</td>
<td>Potash</td>
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<tr>
<td>Nitro. Phos.</td>
<td>Nitrogen Phosphate</td>
</tr>
<tr>
<td>Amm. Phos.</td>
<td>Ammonium Phosphate</td>
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<tr>
<td>A/S</td>
<td>Ammonium Sulphate</td>
</tr>
<tr>
<td>A/S/N</td>
<td>Ammonium Sulphate Nitrate</td>
</tr>
<tr>
<td>C/A/N</td>
<td>Calcium Ammonium Nitrate</td>
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<tr>
<td>A/N</td>
<td>Ammonium Nitrate</td>
</tr>
<tr>
<td>A/C</td>
<td>Ammonium Chloride</td>
</tr>
<tr>
<td>C/N</td>
<td>Chilean Nitrate</td>
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<tr>
<td>Mur. Pot.</td>
<td>Muriate of Potash</td>
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<tr>
<td>Pot. Sul.</td>
<td>Potassium Sulphate</td>
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<tr>
<td>Super.</td>
<td>Super Phosphate</td>
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</tbody>
</table>

The information regarding the particulars of research stations may be obtained under the respective items as given below:

PARTICULARS OF RESEARCH STATIONS

A. General Information:
(i) District and the nearest railway station with Latitude, Longitude and Altitude, if available. General topography of the experimental area. (ii) Type of tract it represents. (iii) Year of establishment. (iv) Cropping pattern. (v) Programme of research.

B. Normal Rainfall:
Average fortnightly rainfall, specifying the period on which the figures are based.

C. Irrigation and Drainage Facilities:
(i) (a) Whether available; if so, since when. (b) Type of facilities available. (ii) Whether there is a proper drainage system.

D. Soil type and Soil analysis:
(i) Broad soil type with depth, colour and structure etc. (ii) Chemical analysis. (iii) Mechanical analysis.

E. No. of Experiments:
No. of experiments conducted on different crops that have been included in the compendium.

Information under the following heads is to be read against the respective items under experimental data as given on next page.
BASAL CONDITIONS

A. For experiments on annual crops:
(i) (a) Crop rotation followed, if any. (b) Previous crop. (c) Manuring of previous crop (State amount and kind). (ii) Soil type. (iii) Date of sowing/planting. (iv) Cultural practices: (a) Preparatory cultivation. (b) Method of sowing. (c) Seed-rate. (d) Spacing. (e) No. of seedlings per hole. (v) Basal manuring given to the whole experiment with time and method of application. (vi) Variety (indicate also early, medium or late). (vii) Irrigated or un-irrigated. (viii) Important post-sowing/planting cultural operations such as weeding, etc. (ix) Rainfall during crop season. (x) Date of harvest.

B. For experiments on perennial crops:
(i) Previous history of the experimental area (Give manuring and other operations). (ii) Soil type. (iii) Method of propagation of plants. (iv) Variety. (v) Date and method of sowing/planting (including spacing). (vi) Age of seedlings at the time of planting. (vii) Basal manuring given to the whole experimental area. (viii) Important cultural operations during the experimental year. (ix) Inter-cropping, if any. (x) Irrigated or un-irrigated (If irrigated, give the source, number, interval and intensity of irrigation). (xi) Rainfall during the experimental year. (xii) Date(s) of harvest.

C. For experiments on cultivators' fields:
(i) (a) Crop rotation followed, if any. (b) Previous crop. (c) Manuring of previous crop (State amount and kind). (ii) Soil type and soil analysis, if available. (iii) Basal manuring (Give time and method of application). (iv) Variety. (v) Cultural Practices: (a) Preparatory cultivation. (b) Method of sowing. (c) Seed-rate. (d) Spacing. (e) No. of seedlings per hole. (vi) Date of sowing/planting. (vii) Irrigated or un-irrigated. (viii) Important post-sowing/planting cultural operations such as weeding, etc. (ix) Rainfall during crop season. (x) Date of harvest.

DESIGN

A. For experiments on annual crops:
(i) Abbreviations for designs: C. R. D.—Completely Randomised Design; R. B. D.—Randomised Block Design; L. Sq.—Latin Square; Fact.—Factorial; Conf.—Confounded; other designs and modifications of the above to be indicated in full. (indicate confounded effects, if any). (ii) (a) No. of plots per block (in a split-plot experiment, the number of main-plots per replication as well as the number of sub-plots per main-plot should be given). (b) Block dimensions. (iii) No. of replications. (iv) (a) Gross plot-size. (b) Net plot-size. (v) Border or guard rows kept. (vi) Whether treatments are randomised (independently in each block).

B. For experiments on perennial crops:
(i) Abbreviations for designs: C. R. D.—Completely Randomised Design; R. B. D.—Randomised Block Design; L. Sq.—Latin Square; Fact.—Factorial; Conf.—Confounded; other designs and modifications of the above to be indicated in full. (indicate confounded effects, if any) (ii) (a) No. of plots per block (in split-plot experiments, the number of main-plots per replication as well as the number of sub-plots per main-plot should be given). (b) Block dimensions. (iii) No. of replications. (iv) (a) Net plot-size. (b) No. of trees per plot (In case of experiments on grasses give plot-size). (v) Border or guard rows kept. (vi) Whether treatments are randomised (independently in each block).

C. For experiments on cultivators' fields:
(i) Design with No. of plots/block and No. of replications (In split-plot experiments, the number of main-plots per replication as well as the number of sub-plots per main-plot should be given). (ii) Method of selection of sites with number and distribution of experiments. (iii) (a) Gross plot-size. (b) Net plot-size. (iv) Whether treatments are randomised (independently in each block).
GENERAL INFORMATION

A. For experiments on annual crops:

(i) General crop condition during growth (if lodged, state date of lodging). (ii) Incidence of pests and diseases and control measures taken, if any. (iii) Types of quantitative observations taken. (iv) (a) If the experiment has continued for more than one year, indicate year of commencement and year of termination. (b) Whether treatments assigned to the same plots every year. (c) Reference to combined analysis, if any. (vi) Other centres, if any, where the same experiment has been conducted with reference numbers. (vi) Abnormal occurrences such as heavy rains, frost, storm, drought, etc. (vii) Any other important information.

B. For experiments on perennial crops:

(i) General crop condition during growth. (ii) Incidence of pests and diseases and control measures taken, if any. (iii) Types of quantitative observations taken. (iv) If the experiment has continued for more than one year, indicate year of commencement and year of termination (Give reference of previous years, if any). (v) Other centres, if any, where the same experiment has been conducted with reference numbers. (vi) Reference to combined analysis, if any. (vii) Abnormal occurrences such as heavy rains, frost, storm, drought, etc. (viii) Any other important information.

C. For experiments on cultivators' fields:

(i) General crop condition during growth. (ii) Incidence of pests and diseases and control measures taken, if any. (iii) Types of quantitative observations taken. (iv) In case of repetition in successive years. (a) Year of commencement and termination. (b) Whether treatments assigned to the same plots every year. (c) Reference to combined analysis, if any. (v) In case of repetition at other places, give names with references, if any. (vi) Abnormal occurrences such as heavy rains, drought, etc. (viii) Any other important information.
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<th>Name of Crop</th>
<th>Botanical Name</th>
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<th>Bengali</th>
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<th>Telugu</th>
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<th>Malayalam</th>
<th>Kannada</th>
<th>Marathi</th>
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<th>Hindi</th>
<th>Punjabi</th>
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<td>1</td>
<td>Paddy</td>
<td>Oryza sativa L.</td>
<td>Dhan</td>
<td>Dhan</td>
<td>Dhan</td>
<td>Vadh,</td>
<td>Nel</td>
<td>Nelu</td>
<td>Bhattu</td>
<td>Bhutte</td>
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<td>Wheat</td>
<td>Triticum sativum Lamk.</td>
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<td>Gam</td>
<td>Gaham</td>
<td>Godumal</td>
<td>Gothambu</td>
<td>Godhni</td>
<td>Gothambu</td>
<td>Godhi</td>
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<td>3</td>
<td>Maize</td>
<td>Zea mays L.</td>
<td>Gom dhan</td>
<td>Bhuia</td>
<td>Macca</td>
<td>Makka-cholen</td>
<td>Cholam</td>
<td>Muckkina Jola</td>
<td>Makka</td>
<td>Makkai</td>
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<td>Makkai</td>
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<td>Hordeum Vulgare L.</td>
<td>Ja’dhan</td>
<td>Juba</td>
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<td>Chola</td>
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<td>Bajre</td>
<td>Sajja</td>
<td>Kaulu</td>
<td>Kambu</td>
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<td>Urd</td>
<td>Phaseolus mungo Var.</td>
<td>Mashinah</td>
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<td>Vzbuendu</td>
<td>Uzhuenu</td>
<td>Uddu</td>
<td>Uddad</td>
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<td>Tobacco</td>
<td>Nicotiana tabacum L.</td>
<td>Dhopat</td>
<td>Tamak</td>
<td>Vanpatra</td>
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<td>Puga yila</td>
<td>Puba yila</td>
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<td>Hoge soppu</td>
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<td>Sugar cane</td>
<td>Saccharum Officinarum L.</td>
<td>Kuhir</td>
<td>Akh</td>
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<td>Karumbu</td>
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<td>Kabhu</td>
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<td>11</td>
<td>Ground nut</td>
<td>Arachis hypogaea L.</td>
<td>China Badam</td>
<td>Cheena Budam</td>
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<td>Nelahwa</td>
<td>Nilakka dada</td>
<td>Kedali Kay</td>
<td>Bhunug</td>
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<td>Castor</td>
<td>Ricinus Communis L.</td>
<td>Eri</td>
<td>Rahri</td>
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<td>Amanakku</td>
<td>Naralu</td>
<td>Erandi</td>
<td>Rehri</td>
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<td>13</td>
<td>Sarson</td>
<td>Brassica Campestis Var.</td>
<td>Sarisah</td>
<td>Sarisha</td>
<td>—</td>
<td>Ana</td>
<td>Kadugu</td>
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<td>Shiras</td>
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<td>Saroon</td>
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<td>Raya (Mustard)</td>
<td>Brassica Juncea Cost</td>
<td>Sarisah</td>
<td>RaiSrisah</td>
<td>Rai</td>
<td>Avalu</td>
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<td>Rai</td>
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<td>Napier grass</td>
<td>Pennisetum purpureum</td>
<td>Nolghal</td>
<td>Nepio ghas</td>
<td>Nepiar ghas</td>
<td>Napier Gaddi</td>
<td>Napier pul</td>
<td>—</td>
<td>Napier hulla</td>
<td>Hatti gatt</td>
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<td>Name of Crop (Botanical Name)</td>
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<td>Oriya</td>
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<td>Tamil</td>
<td>Malayalam</td>
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<td>16</td>
<td>Lucerne (Burdomer)</td>
<td><em>Medicago hirsuta</em></td>
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<td>—</td>
<td>No Known</td>
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<td><em>Zea mays</em></td>
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<td>Pea</td>
<td><em>Pisum arvense</em></td>
<td>Motor</td>
<td>Chota</td>
<td>Badh Chhala</td>
<td>Desh Badda</td>
<td>Patta ami</td>
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<td>Holada batasai</td>
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<td>Bendi Kai</td>
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<td>Benda Kayi</td>
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<td>21</td>
<td>Himalayan Wild Tobacco</td>
<td><em>Nicotiana rustica</em></td>
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<td>Binn</td>
<td>Baigan</td>
<td>Vankeya</td>
<td>Katha ribai</td>
<td>Vazhu thana</td>
<td>Badane Kayi</td>
<td>Vange</td>
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<td>22</td>
<td>Potato</td>
<td><em>Solanum tuberosum</em></td>
<td>Alooguti</td>
<td>Atu</td>
<td>Bilati Alu</td>
<td>Bangla phutupa</td>
<td>Uruzhai</td>
<td>Urala Kizangu</td>
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<td>Tomto Theyabu</td>
<td>Thakkali Theyali</td>
<td>Thakkali Theyala</td>
<td>Tomato Tea</td>
<td>Welwango Chha</td>
<td>Vitli Wargi Chah</td>
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<td>Bandha Kohli</td>
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<td>Yele Kosi</td>
<td>Kobi</td>
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<td>Bund Goby</td>
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<td>26</td>
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<td><em>Brassica oleracea</em></td>
<td>Pool Kahri</td>
<td>Fulkapi</td>
<td>Fula Kohli</td>
<td>Poogulu</td>
<td>Gospooova</td>
<td>Cauliflower</td>
<td>Kaspai</td>
<td>Kaspai</td>
<td>Phul Kabi</td>
<td>Fulkolin</td>
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<td>Salgum</td>
<td>Turnip</td>
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<td>Senna Muttanapi</td>
<td>Kaspai</td>
<td>Kaspai</td>
<td>Salgam</td>
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<td>Genglu</td>
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<td><em>Brassica rape</em></td>
<td>Gajar</td>
<td>Gajar</td>
<td>Gajar</td>
<td>Gajara sada</td>
<td>Kaspai</td>
<td>Carrot</td>
<td>Kampus malangi</td>
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<td>Kolin</td>
<td>Gajar</td>
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<td>29</td>
<td>Carrot</td>
<td><em>Daucus Carota</em></td>
<td>Desi urahi</td>
<td>Deshi Shum</td>
<td>Jhata Simha</td>
<td>Asapa</td>
<td>Mochheai</td>
<td>Ranocha</td>
<td>Ave</td>
<td>Wal</td>
<td>Wal</td>
<td>Sem</td>
<td>Lobis desi</td>
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<td>30</td>
<td>Beans (Indian)</td>
<td><em>Dolichos lablab</em></td>
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<td>Deshi Shum</td>
<td>Jhata Simha</td>
<td>Asapa</td>
<td>Mochheai</td>
<td>Ranocha</td>
<td>Ave</td>
<td>Wal</td>
<td>Wal</td>
<td>Sem</td>
<td>Lobis desi</td>
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<td>31</td>
<td>Sugar beet (Beetroot)</td>
<td><em>Beta vulgaris</em></td>
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<td>Sl. No.</td>
<td>Name of Crop</td>
<td>Botanical Name</td>
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<td>Bengali</td>
<td>Oriya</td>
<td>Telugu</td>
<td>Tamil</td>
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<td>32</td>
<td>Sesamum</td>
<td><em>Sesamum indicum</em> L.</td>
<td>Til</td>
<td>Til</td>
<td>Rasi</td>
<td>Nuwqil</td>
<td>Ellu</td>
<td>Yellu</td>
<td>Til</td>
<td>Tal</td>
<td>Til</td>
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<td>Linseed</td>
<td><em>Linum usitatissimum</em> L.</td>
<td>Tisi</td>
<td>Tisbi</td>
<td>Pethi</td>
<td>Avise</td>
<td>Alirithai</td>
<td>Chennachanavolu</td>
<td>Agare</td>
<td>Ahi</td>
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<td>Chilli</td>
<td><em>Capsicum frutescens</em> L.</td>
<td>Salabiya</td>
<td>Lanki</td>
<td>Lanker</td>
<td>Mirapabaya</td>
<td>Milu Kail</td>
<td>Mulaku</td>
<td>Menasindagi</td>
<td>Mirchi</td>
<td>Marche</td>
<td>Lainmarch</td>
<td>Lai</td>
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<td>Apple</td>
<td><em>Prunus malus</em> L.</td>
<td>—</td>
<td>Apel</td>
<td>Seo</td>
<td>Apple</td>
<td>Appal</td>
<td>Apple</td>
<td>Sebu</td>
<td>Apple</td>
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<td>37</td>
<td>Apricot</td>
<td><em>Prunus armeniaca</em> L.</td>
<td>Apricot</td>
<td>Khubani</td>
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<td>Apricot</td>
<td>Aabrikot</td>
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<td>Apricot</td>
<td>Akhrot</td>
<td>Khohani</td>
<td>Khurman</td>
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<td>38</td>
<td>Malta</td>
<td><em>Citrus sinensis</em></td>
<td>Malta</td>
<td>Mosammi</td>
<td>Mitha</td>
<td>Kanasa</td>
<td>Battayi</td>
<td>Sathuguli</td>
<td>Madurannarang</td>
<td>Sathkudi</td>
<td>Mosameri</td>
<td>Mosamni</td>
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<td>39</td>
<td>Sweet orange</td>
<td><em>Citrus sinensis</em> Osborne</td>
<td>Malta</td>
<td>Mosammi</td>
<td>Mitha</td>
<td>Kanasa</td>
<td>Battayi</td>
<td>Cheeni</td>
<td>Madurannarang</td>
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<td>Mandarin Orange</td>
<td><em>Citrus reticulata</em> Blanco</td>
<td>Kamala</td>
<td>Kamla lebu</td>
<td>Santro</td>
<td>Kamala phalamu</td>
<td>Kamla; Koorg</td>
<td>Angari</td>
<td>—</td>
<td>Saantra</td>
<td>Saattra</td>
<td>Saantra</td>
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<td>Plum</td>
<td><em>Prunus domestica</em> L.</td>
<td>Ahom</td>
<td>Bogori</td>
<td>Alubo-khara</td>
<td>Alubo-khara</td>
<td>All Pabda Puzhan</td>
<td>—</td>
<td>Abhakora</td>
<td>—</td>
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<td>Alucha</td>
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<td>Khol</td>
<td><em>Brassica oleracea</em> var</td>
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<td>Old kadi</td>
<td>Obhooli</td>
<td>Gadda Gobi</td>
<td>Knool Khol</td>
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<td>Nasulu koru</td>
<td>Nawal Kail</td>
<td>Wal Kokol</td>
<td>Knool Khol</td>
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<td><em>Allium cepa</em> L.</td>
<td>Piyas</td>
<td>Pijaj</td>
<td>Peas</td>
<td>Ulli</td>
<td>Vengayum</td>
<td>Ulli</td>
<td>Eerulli</td>
<td>Kanda</td>
<td>Dungli</td>
<td>Palz</td>
<td>Gaatha</td>
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<td>Safflower</td>
<td><em>Carthamus luteus</em> L.</td>
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<td>Kusama</td>
<td>Senthrooran</td>
<td>—</td>
<td>Kusum</td>
<td>Kardui</td>
<td>Kosami</td>
<td>Kusum</td>
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<td>Kesur</td>
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<td>Masoor or Lentil</td>
<td><em>Lens culinaris</em> L.</td>
<td>Maximah</td>
<td>Mosami</td>
<td>Musur</td>
<td>Masur passupa</td>
<td>Masur sabura</td>
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*Notes:* The table lists various crops and their botanical names along with their names in different languages. The columns represent the different languages such as Assamese, Bengali, Oriya, Telugu, Tamil, Malayalam, Kannada, Marathi, Gujarati, Hindi, Punjabi, and Kashmiri.
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NORTH—WESTERN REGION

(Salient Features of Experimentation)

The North-Western region comprises of the states of Haryana, Himachal Pradesh, Jammu & Kashmir and Punjab. The general information regarding the agro-climatic divisions, extent of irrigation, normal cropping pattern, etc., of this region is available in the volumes of the first and second series of the National Index of Agricultural Field Experiments already published for the periods 1948-53 and 1954-59 respectively.

This volume includes the results of 1009 experiments reported for the period 1960-65, as against 864 experiments for the period 1954-59 and 739 experiments for the period 1948-53. Besides these, results of experiments conducted under the All India Co-ordinated Agronomic Experiments Scheme of ICAR are also included in the present compendium.

The detailed discussions on the salient features of experimentation in these states is given below:

HARYANA

Table: Hr-1 (a)—Distribution of experiments Crop-wise and type-wise

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</table>
The results of 178 experiments, conducted on different crops during 1960-65 in the state of Haryana are presented in this volume. The crop-wise and type-wise distribution of the experiments is given in the table Hr. 1 (a). The experiments which had been conducted for more than one year have been grouped and the combined results of such experiments are presented in the group form. There are such 40 groups comprising of 81 experiments, the distribution of these are presented in the table Hr. 1 (b). From these tables, it can be seen that the experiments conducted on paddy, wheat, sugarcane, tobacco and cotton together contribute to 70% of the total experiments. A brief summary of results for these crops is given below:

**PADDY**:
Paddy crop covered about 192 thousand hectares i.e. 4.2% of the total cropped area in the state. 12 experiments were reported for this crop all under irrigated condition. The net plot size used for experimentation varied from 2.3 sq.m. to 44.5 sq.m. Most of the experiments were laid in RBD with 4 replications. All the experiments had manurial treatments as one of the factors under investigation and the levels of N, P, and K varied between 0 to 57Kg/ha, 0 to 28Kg/ha and 0 to 28Kg/ha respectively.

**WHEAT**:
Wheat crop covered 738 thousand hectares i.e. 16.0% of the total cropped area and nearly 12% of the reported experiments were on this crop. Out of these 10 experiments were such that those were conducted for more than a year and these formed five groups. All the experiments were under irrigated conditions. Important varieties of wheat used in experimentation were C-273 and C-591. Nearly 50% of the experiments were laid out in RBD and the rest were in split plot design. The number of replications varied from 3 to 8. The range of the net plot size was from 13sq.m. to 490sq.m.

13 experiments reported were of purely manurial type, nearly 89% of the experiments had manures as one of the factors. The nitrogen levels applied were of the order of 44.8 to 93.3Kg/ha of N while for P and K, the corresponding range was 0 to 22.3Kg/ha.

**SUGARCANE**:
Sugarcane crop covered 151 thousand hectares i.e. 3.28% of the total cropped area in the state. Out of the 16 experiments reported on this crop, 14 were conducted under irrigated conditions. The designs adopted to lay out these experiments were RBD and split plot with 3 to 4 replications. The plot size varied from 102.1 sq.m. to 135.2 sq.m. About 87% of the experiments were conducted with manures as one the factors under investigation. The doses of nitrogen varied from 0 to 200Kg/ha of N, while that of P and K varied from 0 to 36Kg/ha. In cultural type of experiments, the row spacing tried were 60 to 90cm. The important varieties included for the experimentation were Co.L.—29, Co.L.—92, Co.J.—114B and CoJ. 46.

**COTTON**:
This crop covered 183 thousand hectares i.e. 3.9% of the total cropped area. 50 experiments were reported on cotton for the period under report. In all the experiments the variety H—14 was used. The experiments were laid in RBD and Split plot with the number of replications varying from 2 to 6. The net plot size varied from 33.4 sq.m. to 606.7sq.m.

About 62% of the experiments conducted on cotton were either purely manurial or manures as one of the treatments. The manurial doses varied from 0 to 200Kg/ha of N and 0 to 67Kg/ha of P and K. 24% of the experiments were conducted on control measures for pests and diseases of cotton.
TOBACCO:

Tobacco was grown on one thousand hectares of land in the state and 23 experiments were reported for the period 1960-65. The experiments were conducted under irrigated conditions and the variety C-302 was most commonly used. The other varieties used were C-303, C-390, C-194, T-238 etc. The designs used were RBD and Split plot with 3 to 6 replications.

About 35% of the experiments were conducted as purely manurial type or manuring being one of the factors while 30% of the experiments were of cultural—cum—varietal type. The doses of nitrogen in manurial experiments varied from 167 to 334 Kg/ha of N. While those for P and K varied from 0 to 112 Kg/ha.

Besides the crops mentioned, this volume contains the results of experiments conducted as minor millets, pulses and oilseeds.

Table: H P-1(b)—Distribution of groups of experiments concluded during the period 1960-65, Crop-wise and type-wise

<table>
<thead>
<tr>
<th>Type</th>
<th>Crop</th>
<th>M</th>
<th>MV</th>
<th>C</th>
<th>CV</th>
<th>CM</th>
<th>CMV</th>
<th>IM</th>
<th>D</th>
<th>X</th>
<th>Total</th>
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<td></td>
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<td>5(10)</td>
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<td>1(2)</td>
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</table>

HIMACHAL PRADESH (H.P.)

This compendium volume contains the results of 233 experiments, conducted in H.P. during the period 1960—65. Out of these, 61 experiments were conducted for more than one season: 25 groups were formed for these experiments and pooled results of those experiments are presented in this volume. The type-wise and crop-wise distribution of these experiments are presented in Table—HP—2(a) and HP—2(b). A glance at these tables show that about 65% of the total experiments were conducted on the crops like paddy, wheat, maize, oilseeds, potato and tea. A study of these experiments is given below.

PADDY:

Paddy crop covered about 98 thousand hectares i.e. 11.28% of the total cropped area. 47 experiments were reported for this crop, all under irrigated conditions. 4 groups of experiments consisting of 11 experiments were conducted during the period under report.
Table: HP—2 (a)—Distribution of experiments, cropwise and type wise

<table>
<thead>
<tr>
<th>Crop</th>
<th>M</th>
<th>MV</th>
<th>C</th>
<th>CV</th>
<th>CM</th>
<th>CMV</th>
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<td>—</td>
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<tr>
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<td>3</td>
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<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>115</td>
<td>2</td>
<td>51</td>
<td>31</td>
<td>13</td>
<td>2</td>
<td>19</td>
<td>233</td>
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</tbody>
</table>

varieties used were China. 4—CH—4, CH—9008; Hy—23, 27, 51, 100 etc. The net plot size varied from 23 sq.m. to 34 sq.m. The designs adopted for the experiments were RBD in 4 experiments, Fact. RBD in 23 experiments, 32 confounded in 4 experiments and split plot in rest of the experiments. The replications varied from 2 to 4 but in two cases it was as high as 8 also.

About 25% of the experiments reported were of M type, 53.79% were of CV type and 4.1% of D type. In M type the doses for N varied from 0 to 67.5Kg/ha while that for P2O5 was from 0 to 22.4Kg/ha and for K2O, it varied from 0—50Kg/ha. In some of the experiments different sources of N, micro nutrients etc. were tried as treatments.

In case of CV type experiments, different cultural practices such as dates of transplanting, methods of sowing and spacing etc. were the treatments. In D type trials the treatments tried were different fungicides.
WHEAT:

This crop covered about 269 thousand hectares i.e. 30.9% of the total cropped area. 28 experiments were reported for this crop out of which, there were 3 groups comprising of 7 experiments. The varieties for this crop used were NP—770, NP—829 and C-273. The net plot size varied from 15 sq.m. to 24 sq.m. The design adopted were RBD and 3rd confounding. The number of replications varied from 1 to 6.

About 91.3% of the experiments reported were of M type. The nitrogen doses varied from 0 to 75Kg/ha and P₂O₅ 0—112Kg/ha. While for K₂O the range of the doses was 0—75 Kg/ha. In some of the experiments micro-nutrients were also included as treatments.

MAIZE:

This crop covered about 249 thousand hectares i.e. 27.6% of the total cropped area. 14 experiments were reported for this crop under un-irrigated conditions. 2 groups of experiments consisting of 4 experiments were concluded during the period under report. The variety mostly used was Ganga 101. The net plot size varied from 75 sq.m. to 185 sq.m. The designs adopted were RBD and split plot. The replications varied from 4 to 9 but mostly 4 replications were used.

About 57.1% of the experiments reported were of M type, 14.3% were of CM type and 21.4% were of D type. The nitrogen doses varied from 0 to 270Kg/ha and that of P₂O₅ from 0 to 44.5Kg/ha and for K₂O, 0 to 22.5Kg/ha. In some of the experiments micro-nutrients were also used.

POTATO:

Potato crop covered about 19 thousand hectares i.e. 2.19% of the total cropped area. 32 experiments were reported for this crop under irrigated and un-irrigated conditions. Mostly recently developed varieties were considered for experimentation purposes. The net plot size varied from 1 sq.m. to 16 sq.m. The designs adopted were RBD, fact RBD and Split plot. The number of replications varied from 1 to 4 but in one case it was 11 also.

About 31.2% of the experiments were of M type and 31.2% of C type and 25% on D type. The doses used for N, P and K varied from 0 to 168Kg/ha. In cultural trials treatments like different depth of ploughing, different spacing, method of sowing and dates of sowing etc. were used.

OILSEED:

Sesamum, Sarson and linseed constituted oilseed crops and these crops covered 21.3 thousand hectares i.e. 2.45% of the total cropped area. 11 experiments were reported for these oilseed crops. These trials were conducted under irrigated conditions. The net plot size varied from 13 sq.m. to 21 sq.m. The designs adopted were RBD, fact. in RBD and 3rd partially confounding.

About 54.5% of the experiments were of M type and 25.4% of CM type. The doses of N varied from 0 to 44.8 Kg/ha and in one case as high as 112Kg/ha, while those P and K varied from 0—44.8Kg/ha.
TEA:

This crop covered 0.42 thousand hectares, i.e., 0.05% of the total cropped area. 18 experiments were reported for this crop under unirrigated conditions. The variety used was China-Hyb. The net plot size varied from 24 bushes to 36 bushes. The design adopted for conducting the experiments was RBD and the replications varied from 3 to 4.

About 50.0% of the experiments reported were of M type while 50.0% of C type experiments. The doses used were 0 to 134 kg/ha of N. Under cultural practices different dates and times of pruning were tried.

Table: HP-2(b) - Distribution of groups of experiments, crop-wise and type wise

<table>
<thead>
<tr>
<th>Crop</th>
<th>M</th>
<th>C</th>
<th>CV</th>
<th>CM</th>
<th>Total</th>
</tr>
</thead>
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<td>3(6)</td>
<td>1(3)</td>
<td>4(11)</td>
</tr>
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</tr>
<tr>
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<td>16(35)</td>
<td>6(17)</td>
<td>3(8)</td>
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<td>26(63)</td>
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JAMMU AND KASHMIR

Table: J & K-3(a) Distribution of experiments crop-wise and type wise

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<tr>
<th>Crop</th>
<th>M</th>
<th>MV</th>
<th>C</th>
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The results of 107 experiments conducted in the state during the period 1960-65 have been reported in this compendium. Out of these 38 experiments have formed 22 groups as the results for those being available for more than one crop season. Most of the experiments were manurial trials. The crop-wise and type-wise distributions is presented below in tables JK-3 (a) and JK-3 (b). The tables show that most of the experiments were on the crops of Paddy, Maize, Potato. Other experiments were on vegetable crops and fruit crops.

**PADDY:**

Paddy crop covered about 224 thousand hectares i.e. 26.14% of the total cropped area. 27 experiments for this crop were reported all under irrigated conditions. 4 groups of experiments consisting of 11 experiments were concluded during the period under report. The varieties mostly used were CH-1039 and Basement 370. The net plot size varied from 5 sq.m. to 38 sq.m. The designs adopted were RBD, 3 confounded and split-plot. The replications tried varied from 3 to 4.

About 15% of the experiments were of M type. The doses of N used were from 22 to 150 kg/ha, that of P₂O₅ were 0 to 100 kg/ha and that for K₂O were 0 to 100 kg/ha. 11.1% of the experiments reported were of MV type. In 63% of the experiments, different type of weedicidal and seed treatments were used.

**MAIZE:**

Maize crop covered about 240 thousand hectares i.e. 28% of the total cropped area. 16 experiments were reported, all under unirrigated conditions on this crop. 3 groups of experiments consisting of 11 experiments were concluded during the period under report. In all the experiments local variety was used. The net plot size in most of the experiments was 38 sq.m. The layout adopted was RBD only. The replications mostly applied were 4.

**POTATO:**

Potato crop covered one thousand hectares i.e. 0.12% of the total cropped area. Most of the experiments were conducted under irrigated conditions. 22 experiments were reported for this crop. 4 groups of experiments consisting of 8 experiments were concluded during the period under report. The varieties used were S-4234, S-4215 and S-2434. The net plot size varied from 4 sq.m. to 11 sq.m. The designs adopted were RBD, Factorial in RBD, confounded and split plot. The replications varied from 3 to 6.

About 45.4% of experiments were of M type, 13.6% of M type and 22.7% of D type. The doses of N, P and K tried were 0 to 168 and 0 to 224 kg/ha respectively. The cultural practices adopted were different dates of sowing, methods of sowing, row spacing etc. In case of D types different insecticides and fungicides etc. were used.
Table: J & K—3 (b)—Distribution of group of experiments, crop-wise and type-wise

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PUNJAB
Table: Pb—4 (a)—Distribution of experiments crop-wise and type-wise

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The results of 483 experiments, conducted during the period 1900-65 and reported from the state of Punjab have been presented in this compendium. The cropwise and type-wise distribution of these experiments is presented in table No. Pb-4 (a). Out of these 483 experiments, 256 experiments continued for more than one season and hence the groups of such experiments are formed. The distribution of these 102 groups crop-wise and type-wise is shown in table No. Pb-4 (b). A glance at these table revealed that more than 55% of the total experiments were conducted on following crops viz. Paddy, Wheat, Sugarcane, Cotton and Tobacco. Apart from these experiments, results of the experiments on Pulses (Gram, Mash, Masoor and Pea), Oilseeds (Ground nut, Sesamum and Castor) and fruits were also available. A summary discussion of the results of the experiments on the major crops mentioned above is given below.

**PADDY**

Paddy crop covered 285 thousand hectares i.e. 5.5% of the total cropped area. 29 experiments were reported for this crop all under irrigated conditions. 4 groups of experiments consisting of 9 experiments were concluded during the period under report. The varieties used were C-27, Jhona 349 etc. The net plot size varied from 10 sq.m. to 100 sq.m. The experiments were laid out in RBD, Fact. RBD and split-plot. The replications varied from 4 to 6 mostly, but in one case it was 10 also.

About 51.7% of experiments reported were for M type, 10.4% on CM type, 20.8% on C type, while 13.9% on CV type. The doses of N, P, and K were 0 to 89.7 Kg/ha, 0 to 67.2 Kg/ha, and 0 to 5 Kg/ha respectively. The cultural practices were of the nature like depths of transplanting, earthing and date of transplanting etc.

**WHEAT**

Wheat crop covered 1615 thousand hectares i.e. 31.23% of the total cropped area. 91 experiments were reported for this crop, mostly under irrigated conditions. 11 groups of experiments consisting of 31 experiments were concluded during the period under report. The varieties used were C-273, 286, 285, 281, 303, 306. The net plot size varied from 100 sq.m. to 200 sq.m. The experiments were conducted in RBD, fact RBD and split-plot.

About 62.6% of the experiments were of M type, 7.7% were of MV type, 7.7% were of C type, 5.5% were of CV type, 3.2% were of CM type and rest others. In case of manurial trials, the doses of N, P, and K were 0 to 66.8 Kg/ha, 0 to 150 Kg/ha and 0 to 44.8 Kg/ha respectively. In other experiments, treatments applied were sources of manures and fertilizers, different number of ploughings and different depths of ploughing etc.

**SUGARCANE**

Sugarcane crop covered 156 thousand hectares i.e. 3% of the total cropped area. 67 experiments were reported for this crop all under irrigated conditions. 17 groups of experiments consisting of 39 experiments were concluded during the period under report. The varieties used for the experimentation were Co-312, Co J. 39, 29, 46, Co-976, Co J.36. The net plot size was of the order of 200 sq.m. The experiments on this crop were laid out in RBD, Fact. RBD, 3rd partially confounded and split-plot. The replications varied from 2 to 8.

About 46.2% of the experiments reported were of M type, 16.4% were of MV type, 17.5% were of C type and 9.0% were of CM type. The doses of N, P, and K varied from 0 to 247 Kg/ha, 0 to 36 Kg/ha and 0 to 124 Kg/ha respectively. In cultural trials different methods of sowing, spacing etc. were used.
COTTON:

Cotton crop covered 432 thousand hectares i.e. 8.35% of the total cropped area. 95 experiments were reported for this crop all under irrigated conditions. 23 groups of experiments consisting of 55 experiments were concluded during the period under report. The varieties used for experimentation were F-320, R-231. The net plot size used varied from 20sq.m. to 33sq.m. The designs used were RBD, Fact, RBD, and split-plot. The replications ranged from 2 to 6.

About 45.3% of the experiments were of M type, 16.8% were of C type, 11.5% were of CM type and 24.2% D type. The doses of N, P and K used were 0 to 120Kg/ha, 0 to 60Kg/ha and 0 to 60Kg/ha respectively. Different micro-nutrients, times of application and sources of N etc. were other types of treatments.

In cultural types of experiments, treatments like different spacing, times of ploughing, pruning etc. were used, aspidioti trials formed the D type experiments.

TOBACCO:

Tobacco crop covered 0.4 thousand hectare i.e. 0.01% of the total cropped area. 33 experiments were reported for this crop all under irrigated conditions, 8 groups consisting of 17 experiments were concluded during the period under report. The varieties used were T-17, N-Tobacco etc. The net plot size was 22sq.m. in most of the experiments. The designs adopted were RBD and split-plot. The replications varied from 4 to 6.

About 33.3% of the experiments were of M type, 3.3% were of CV type and 16.5% of D type. The doses of N used were 112 to 448Kg/ha. There were experiments with different trace elements as treatments.

Table: Pb-4(b)—Distribution of group experiments, Crop wise and type-wise

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<tr>
<td>Paddy</td>
<td></td>
<td>3(7)</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5(11)</td>
</tr>
<tr>
<td>Wheat</td>
<td></td>
<td>10(28)</td>
<td>-</td>
<td>1(2)</td>
<td>-</td>
<td>1(3)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12(33)</td>
</tr>
<tr>
<td>Maize</td>
<td></td>
<td>6(15)</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>6(15)</td>
</tr>
<tr>
<td>Bajra</td>
<td></td>
<td>2(6)</td>
<td>-</td>
<td>2(5)</td>
<td>-</td>
<td>2(6)</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>6(17)</td>
</tr>
<tr>
<td>Gram</td>
<td></td>
<td>-</td>
<td>-</td>
<td>2(5)</td>
<td>-</td>
<td>1(4)</td>
<td>-</td>
<td>1(2)</td>
<td>-</td>
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<td>4(9)</td>
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<td>2(4)</td>
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<td>1(2)</td>
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<td>17(39)</td>
</tr>
<tr>
<td>Cotton</td>
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<td>1(29)</td>
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<td>2(4)</td>
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<td>Groundnut</td>
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<td>3(7)</td>
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<td>1(2)</td>
<td>-</td>
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<td>6(15)</td>
</tr>
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<td>1(2)</td>
</tr>
<tr>
<td>Castor</td>
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<td>-</td>
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<td>Grasses</td>
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<td>-</td>
<td>-</td>
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<td>6(21)</td>
</tr>
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<td>Sweetlime</td>
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<td>-</td>
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</tr>
<tr>
<td>Sweet Orange</td>
<td></td>
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<td>1(3)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1(3)</td>
</tr>
<tr>
<td>Citrus</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1(2)</td>
</tr>
<tr>
<td>Grapefruit</td>
<td></td>
<td>-</td>
<td>1(2)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>1(2)</td>
</tr>
<tr>
<td>Mixed crops</td>
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</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>52(139)</td>
<td>5(12)</td>
<td>20(46)</td>
<td>2(3)</td>
<td>9(24)</td>
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<td>1(2)</td>
<td>1(2)</td>
<td>8(17)</td>
<td>3(7)</td>
<td>102(256)</td>
</tr>
</tbody>
</table>
PARTICULARS OF RESEARCH STATIONS AND SOIL ANALYSIS

HARYANA

1. Agricultural Farm, Ambala

A. General Information:
   (i) In Ambala tehsil of Ambala district. (ii) Plain tract. (iii) Established in 1945, (iv) and (v) N.A.

B. Normal Rainfall in cm.:

<table>
<thead>
<tr>
<th></th>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>—</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>31</td>
<td>24</td>
<td>26</td>
<td>1</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>108</td>
</tr>
</tbody>
</table>

(Av. is based on monthly rainfall data for the period 1960-62).

C. Irrigation and Drainage Facilities and D. Soil type and Soil analysis:
   Information :-N.A.

E. No. of Experiments:
   Wheat—7, Barley—1; Total=8

2. Regional Research Station, Gurgaon.

A. to D. : Information N.A.

E. No. of Experiments:
   Wheat—2, Barley—5, Tobacco—22, Castor—2, Sarson—7, Raya—5; Total=43

3. Govt. Agriculture Station, Hansi

A. General Information:
   (i) In Hansi tehsil of Hissar district, 7kms from Hansi Rly. Stn. (ii) Clay loam. (iii) Established in 1939. (iv) Cotton-fallow-Cotton; Gram or Wheat-Cotton, (v) Improvement of Cotton for south eastern tract of State. Newly developed strains are tested in replicated trials. In addition to this genetic collection is maintained for use in crossing programme.

B. Normal Rainfall in cm. : N.A.

C. Irrigation and Drainage Facilities:
   (i) (a) and (b) Irrigation facilities are available since the inception of the farm. (ii) Proper drainage system exists.

D. Soil type and Soil analysis:
   (i) Clay loam, very deep, blackish in colour. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments:
   Paddy—1, Wheat—2, Cotton—11; Total=14
4. Punjab Agricultural University, Hissar.

A. General Information:
   (i) In Hissar Taluka of District Hissar, 2kms. from Hissar Rly. Stn., with Lat. = 29.17°E, Long. = 75.7° N and Alt. = 215.2 meters above m.s.l. Even topography. (ii) Semi-arid tract. (iii) Established in 1962. (iv) Double cropping: Bajra-Wheat or Bajra-Gram; Maize-Wheat or Cotton-Wheat. (v) Res. Expts. on different aspects are conducted by M. Sc. (Agri.) & Ph. D. students.

B. Normal Rainfall: N.A.

C. Irrigation and Drainage Facilities:
   (i) (a) and (b): Yes, canals, irrigation, since the beginning of the University and tube-well irrigation from 1969, (ii) No proper drainage system exists.

D. Soil type and Soil analysis:
   (i) Sandy loam; Medium depth; (ii) Available N = 265.2Kg/ha; Available P2O5 = 18.5Kg/ha; Available K2O = 462.5Kg/ha. (iii) Sand = 62.2%; Salt = 20%; Clay = 17.8%.

E. No. of Experiments:
   Wheat = 1, Bajra = 3, Maize = 1, Urd = 1, Sugarcane = 2, Cotton = 27, Groundnut = 1, Raya = 1, Grass = 1; Total = 39.

5. Sugarcane Research Station, Jagadhari.

A. General Information:
   (i) In Ambala district, near Jagadhari Rly. Stn., with Long. = 75.5° E, Lat. = 30.5, Alt. = Approx. 454 meters above m.s.l. Khadder area, levelled. (ii) Sub-mountainous tract. (iii) Established in 1947. (1) Maize-Sainji-Sugarcane-Ratoon-Wheat; (2) Paddy-Sugarcane-Ratoon-Wheat. (v) (1) Development of improved sugarcane varieties for sub-mountainous tract. (2) Other agronomical experiments on Sugarcane. (3) Control of Sugarcane stalk borer.

B. Normal Rainfall in cm.:
   3.86 cm. based on 6 years (1960 to 1965) rainfall data. Maximum rains are received from July to September.

C. Irrigation and Drainage Facilities:
   (i) Available from 1947. (b) Tube well and canal. (ii) Drainage exists.

D. Soil type and Soil analysis:
   (j) Clay and Loam; 23 cm. deep; Grey in colour (ii) Chemical analysis: p.H. 7.6; E.C. = 0.46; Organic carbon = 0.64%; Av. N. 173.2Kg/ha; Av. P 18.9Kg/ha. (iii) Mechanical analysis, N.A.

E. No. of Experiments:
   Sugarcane = 6, Saron = 2; Total = 8

6. Agricultural Research Station, Karnal

A. General Information:
   (i) In Karnal district, 4.8Kms. from Karnal Railway Station. (ii) N.A. (iii) Established in 1929. (iv) Sugarcane, Cotton, Barley and Wheat are the major crops. (v) N.A.
A. General Information:
(i) In Karnal Taluka of Karnal district 3 kms, from Nilokheri Rly. Stn. with Lat.—
29.81° N, Long.—77.00° E; (ii) N.A. (iii) Established in 1965. (iv) and (v) N.A.

B, C and D : - Information N.A.

E. No. of Experiments:
Paddy—1; Total= 1

7. Govt. Reclamation Farm, Nilokheri

A. General Information:
(i) In Karnal Taluka of Karnal district 3 kms, from Nilokheri Rly. Stn. with Lat.—
29.81° N, Long.—77.00° E; (ii) N.A. (iii) Established in 1965. (iv) and (v) N.A.

B. Normal Rainfall in cm.:

<table>
<thead>
<tr>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
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<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>77</td>
</tr>
</tbody>
</table>

(Av. monthly rainfall is based on the data for period 1960—62).

C. Irrigation and Drainage Facilities:
(i) (a) and (b) Irrigation is done by canal. (ii) No proper drainage system exists.

D. Soil type and Soil analysis:
(i) Clay loam (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments:
Paddy 10; Wheat—3, Barley—3; Total= 16

8. Government Agricultural Farm, Rohtak.

A. General Information:
(i) In Rohtak tehsil of Rohtak district, Lat.—28.870° N; Long.—76.64° E; Normal
levelled fields, (ii) Arid brown soils. (iii) N.A. (iv) Bajra-Gram, Wheat-Fallow-Wheat, Jowar
(cheri)—Gram-Wheat. (v) To conduct manurial and micronutrient trials.

B. Normal Rainfall in cm.:

<table>
<thead>
<tr>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
</tr>
</thead>
<tbody>
<tr>
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<td>—</td>
</tr>
<tr>
<td>23</td>
<td>10</td>
<td>3</td>
<td>—</td>
<td>—</td>
<td>39</td>
<td></td>
</tr>
</tbody>
</table>

(Figure based on monthly rainfall data for the year 1965—66.)

C. Irrigation and Drainage Facilities:
(i) (a) and (b) Irrigation facilities are available since very long time. (ii) Natural
surface drainage system exists.

D. Soil type and Soil analysis:
(i) Sandy loam, very deep soil, light brown in colour, angular to subangular blocky.
(ii) Chemical analysis: pH—8.0; E.C.%—0.33; Organic carbon—0.27%; and available
P 2 O 5 —16.8kg/ha. (iii) Mechanical analysis :—N.A.
E. No. of Experiments:

Wheat—6, Bajra—1, Gram—2, Sugarcane—8, Cotton—12; Total=29.


A. General Information:

(i) In Sirsa tehsil of Hisar district, about 200m. away from Sirsa Rly. Stn. Area is divided into levelled fields of an acre each. (ii) Arid district of Punjab. (iii) Established in 1993. (iv) Fodder crops. (v) Evolution of improved varieties of fodder crop.

B. Normal Rainfall in cm.:

<table>
<thead>
<tr>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
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</thead>
<tbody>
<tr>
<td>12</td>
<td>14</td>
<td>12</td>
<td>3</td>
<td>6</td>
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<td>98</td>
<td>73</td>
<td>35</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

(Av. monthly rainfall is based on the data for the period 1951 to 60).

C. Irrigation and Drainage Facilities:

(i) (a) Irrigation facilities exist from the start. (b) Canal water—perennial but running by rotalie. (ii) Proper drainage system exists.

D. Soil type and Soil analysis:

(i) Medium loam soil, deep alluvial and grey in colour. (ii) Chemical analysis: Iron available—7.98%; CaO—2.5%; P₂O₅—0.227%; P₂O₅ (available)—0.067%; K₂O—0.725%; K₂O (available)—0.011%; Nitrogen—0.076%; (iii) Mechanical analysis CaCO₃—2.0%; Organic matter—0.68%; coarse sand—1.78%; fine sand—69.00%; silt—13.60%; clay—12.20%; and Olistre—6.74%.

E. No. of Experiments:

Oats—1, Gram—1, Grass—1, Berseem—4, Lucerne—3, Sweet Sudan—2, Teasinte—1; Mixed Crop—2; Total=15.

HIMACHAL PRADESH

I. Potato Development Station, Ahla

A. General Information:

(i) In Bhatiyat taluka of Chamba District, 85km. from Pathankot Rly, Stn., situated at about 2286m. above m.s.l. The general topography of the Experimental area is Terraced field. (ii) It represents High hill areas of H.P. (iii) Established in 1950. (iv) Potato in rotation after green manuring or Barley. (v) Arranging varietal and agronomic trials on potato, raising of disease free nucleus foundation seed stock of approved varieties.

B. Normal Rainfall in cm.:

<table>
<thead>
<tr>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3</td>
<td>13.7</td>
<td>34.3</td>
<td>14.7</td>
<td>2.5</td>
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</tr>
<tr>
<td>45.2</td>
<td>36.1</td>
<td>5.1</td>
<td>0.5</td>
<td>4.3</td>
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</tr>
</tbody>
</table>

...
### C. Irrigation and Drainage Facilities:

(i) (a) and (b) Irrigation facilities available. (ii) Natural drainage.

### D. Soil type and Soil analysis:

(i) Soil is grey brown to dark grey brown: Clay loam in texture. (ii) Chemical analysis and (iii) Mechanical analysis. Latest analysis of soil is not available.

### E. No. of Experiments:

- Potato—5; Total=5

#### 2. Maize Breeding Station, Bajama (Bhawta)

- A to D, Information N.A.

- E. No. of Experiments:
  - Maize—1; Total=1

#### 3. Vegetable Research Sub Station, Bihat.

### A. General Information

(i) In Chamba taluka of Chamba district, at a distance of 120 km from Pathankot Rly. Stn. is located at 900 m. m.s.l. (ii) N.A. (iii) Established in 1960 (iv) Root vegetable and fruit vegetable (v) Varietal seed production of vegetables.

### B. Normal Rainfall: N.A.

### C. Irrigation and Drainage Facilities:

(i) and (ii) N.A.

### D. Soil type and Soil analysis:

(i) Sandy loam, 61 cm. to 79 cm. depth, dark brown in colour. (ii) Chemical analysis; N.A and (iii) Mechanical analysis: N.A.

### E. No. of Experiments:

- Bhindi—2, Brinjal—1, Tomato—3, Cauliflower—2, Beans—1, Chillies—1; Total=12

#### 4. Seed Multiplication Farm, Bhanote

### A. General Information:

(i) In Chamba taluka of Chamba district, 10 km from Pathankot Rly. Stn. at alt. 1067 m. (ii) Terracing cultivation. (ii) Hilly tract. (iii) Established in 1948. (iv) Paddy—Berseem; Green manure—Wheat. (v) N.A.

### B. Normal Rainfall in cm:

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.6</td>
<td>8.8</td>
<td>17.0</td>
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<tr>
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<td>18.2</td>
<td>10.5</td>
<td>20.5</td>
<td>3.4</td>
<td>0.5</td>
<td>4.4</td>
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<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>107.0</td>
</tr>
</tbody>
</table>
(xxxiv)

(Monthly Av. in cm. based on the rainfall data for the period 1956 to 1967.)

C. Irrigation and Drainage Facilities:
   (i) (a) and (b) Available since the start of farm. (ii) Natural drainage due to slanting elevation.

D. Soil type and Soil analysis:
   (i) Broad soil type—Clay and sandy loam; Depth 0.61 to 1.52m; (ii) Chemical analysis: Organic carbon—332 to 456; Potash—100 to 200; Phosphorus—Low; pH—6 to 7. (iii) Mechanical analysis N.A.

E. No of Experiments:
   Wheat=1; Total=1.

5. Govt. Agriculture Farm, Bhangarota

A. General Information:

B. Normal Rainfall in cm.:

<table>
<thead>
<tr>
<th></th>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.5</td>
<td></td>
<td>21.8</td>
<td>55.8</td>
</tr>
<tr>
<td>26</td>
<td>4</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
<td>107.7</td>
<td></td>
</tr>
</tbody>
</table>

(The period is not available).

C. Irrigation and Drainage Facilities:
   (i) (a) and (b) By tube well and channels. (ii) No drainage exists.

D. Soil type and Soil analysis:
   (i) Broad soil types—Clay to clay loam; depth—1.22m. to 1.52m; (ii) Chemical analysis Nitrogen—Low; Phosphorus—Medium; pH—Normal. (iii) Mechanical analysis N.A.

E. No. of Experiments:
   Paddy=1; Total=1

6. Potato Development and Research Station, Bagpashog

1. General Information:
   (i) In Sirmur district, near Kumarhatti Rly. Stn., situated at 1525m. above m.s.l. (ii) Mid Hill zone tract. (iii) Established in 1953. (iv) Wheat-Maize-Pea/wheat. (v) N.A.

B. Normal Rainfall: —N.A.

   Av. annual rainfall about 130cm to 150cm.

C. Irrigation and Drainage Facilities: N.A.
D. Soil type and Soil analysis:
   (i) Soil type—Clay loam, (ii) and (iii) N.A.

E. No. of Experiments:
   Wheat—3, Potato—10, Total=13

7. Agricultural Research Station, Ambar Farm, Bilaspur.
   A. General Information:
      (i) In Bilaspur district, near Kiratpur Sahib Rly. Stn., at alt. 550m. Terraced Land area. (ii) Sub-Mountaneous tract. (iii) Established in 1961 (iv) and (v) N.A.

B. Normal Rainfall in cm.:
   9.52 cm. (Average) yearly rainfall based on 10 years data i.e. from 1961—62 to 1970-71

C. Irrigation and Drainage Facilities:
   (i) (a) and (b) Available from perennial springs. (ii) There exists a proper drainage system.

D. Soil type and Soil analysis:
   (i) Rocky soil with high lime context. (ii) Chemical and (iii) Mechanical analysis N.A.

E. No. of experiments:
   Wheat—1, Maize—1; Total=2

8. Vegetable Research sub-Station, Boch.
   A. General Information:
      (i) In Solan Tehsil, of Mahasu district, 13 km, away from Solan Rly. Stn. Fields are very small in size with gentle slope. (ii) Mid hill elevation, 100 cm. rainfall. (iii) Established in 1961. (iv) No cropping pattern has been adopted due to very small area. (v) Seed production and multiplication work.

B. Normal Rainfall:
   Information: N.A.

C. Irrigation and Drainage Facilities: N.A.

D. Soil type and Soil analysis:
   N.A.

E. No. of Experiments:
   Sugarbeet—1; Total=1.

9. Agricultural Research Station, Dhula Kuan
   A. General Information:
      (i) In Panota taluk of Sirmoor district, 80 km, away from Barora Rly. Stn, with alt. 555 m.
      The general topography of the experimental area is almost flat flanked by forest (ever green) on one side and a seasonal rivulet and farms on the others. (ii) It represents submountain and
valley area (iii) Established in 1931 (iv) Various kinds and varieties of sub tropical fruits and plan varieties of peaches. And other crops (v) To introduce varieties of fruits for low hills and valley, assessment of manurial and fertilizer requirements for the crops of the tract.

B. Normal Rainfall in cm.:

7.5 cm. (Av. yearly rainfall is based on the data for the period 1961–72).

C. Irrigation and Drainage Facilities:

(i) (a) and (b) Pumping sets and tube well (ii) Drainage exists.

D. Soil type and Soil analysis:

(i) Sandy loam (ii) pH 6.5; low to medium in K₂O and medium in N and P₂O₅

E. No. of Experiments:

Paddy—11; Wheat—7; Barley—1; Maize—8; Gram—1; Pea—1; Cauliflower—3; Carrot—1; Sugarbeet—2; Sugarcane—2; Sarson—2; Linseed—1; Chillies—1; Malta—5; Sweet orange—4; Orange—3; Total=53.

10. Crop Research Sub-Station, Gopalpur

A. to D. Information N.A.

E. No. of Experiments:

Wheat—5; Total=5.

11. Crop Research Station/Agricultural Farm, Haripura

A. to D. Information N.A.

E. No. of Experiments:

Paddy—1; Maize—2; Groundnut—1; Sesamum—1; Total=5.

12. Potato Development Station, Jhatingri

A. to D. Information N.A.

E. No. of Experiments:

Potato—3; Total=3.

13. Rice Research Station, Joginder Nagar

A. General Information:

(i) In Mandi district, near Joginder Nagar Rly. Station at alt. 1200m a.s.l. The topography of the area is small terracial fields (ii) Established in 1965-66 (iv) Double cropping (v) To evolve yielding varieties of short duration of both coarse and fine rice.

B. Normal Rainfall in cm.:

26.8cm. in July.

C. Irrigation and Drainage Facilities:

(i) Kute (ii) Drainage exists
D. Soil type and Soil analysis:

(i) Clay 30cms. deep brownish (ii) Chemical analysis and (iii) Mechanical analysis N.A.

E. No. of experiments:

Paddy—2, Wheat—1; Total=3.


A. General Information:

(i) In Kheradhar of Sirmus district, near Solan Rly. Sta., at alt. 7000' m.s.l.
General topography is slopy mountaneous terrain (ii) Mountainous tract (iii) Established in 1956 (iv) N.A. (v) Cultural and manurial trials and performs.

B. Normal Rainfall; N.A.

C. Irrigation and Drainage Facilities:

(i) N.A. (ii) Making open drains

D. Soil type and Soil analysis:

(i) Clay loam to sandy loam brownish colour
(ii) and (iii) N.A.

Wheat—2, Potato—5; Total=7

15. Vegetable Research Station, Kalpa

A. General Information:

(i) In Kalpa taluka of Kimaur district at 240km. from Simla Rly. Sta. situated at 9500m a.s.l. (ii) It represents dry zone (iii) Established in 1961 (iv) One crop in a year (v) Research on vegetable seed production.

B. Normal Rainfall: N.A.

C. Irrigation and Drainage Facilities: N.A.

D. Soil type and Soil analysis: N.A.

E. No. of Experiments.

Radish—1, Cabbage—7, Turnip—4, Carrot—6; Total=18.

16. Soil Reclamation Farm, Kamma

A. to D. Information N.A.

E. No. of Experiments:

Paddy—6; Wheat—2; Barley—5; Total=13
17.  Zira and Saffron Research Station, Kambo (Sangla)

A. General Information:
   (i) In Sangla Taluka of Kinnaur District, 14km. from NH 22 Karchham at alt 8500m.
   (ii) Semidry-zone (iii) Established in 1961  (iv) Zira and Saffron (v) To standardise the agronomic practices for successful cultivation of Kala Zira and Saffron plants.

B. Normal Rainfall:
   N.A.

C. Irrigation and Drainage Facilities:
   (i) Natural Kaha (ii) No drainage facility exists.

D. Soil type and Soil analysis:
   (i) Sandy 90cms deep, sand colour and sandy structures  (ii) Chemical and Mechanical analysis N.A.

E. No. of Experiments:
   Zira—2; Total=2

18. Potato Development Station Kamrah

A. General Information:
   (i) In Kamrah taluk of Mandi district, near Ropur Rly. Stn., at alt. 8000-8500m, above m.s.l. Its topography is slopy.  (ii) It represents Hilly tract. (iii) Established in 1954 (iv) Fallow-Potato-Fallow (v) Multiplication of nuclear seed Potatoes.

B. Average rainfall: N.A.

C. Irrigation and drainage facilities (i) and (ii) No

D. Soil type and Soil analysis:
   (i) Black alluvial soil depth 23cm., black colour  (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments:
   Potato—1 ; Total=1

19. Regional Fruit Research Sub-Station, Kandoghat

A. to D. Information N.A.

E. No. of Experiments:
   Apricot—2; Plum—2; Total=4

20. Oil Seeds Research Station, Kangra

A. General Information:
   (i) In Kangra taluk of Kangra district, near Kangra Rly. Stn., at alt. 700m. above m.s.l. The general topography is medium hills. (ii) N.A. (iii) Established in 1959 (iv) Linseed Soyabean (v) Improvement in Linseed and Soyabean.
B. Normal rainfall: N.A.

C. Irrigation and drainage facilities
   (i) Canal (ii) Drainage exists.

D. Soil type and Soil analysis:
   (i) Clay Loam (ii) Chemical analysis and (iii) Mechanical analysis N.A.

E. No. of Experiments:
   Linseed—6, Total=6.

21. Vegetable Research Station, Katrain
   A. to D. Information N.A.
   E. No. of Experiments:
      Tomato—1; Cabbage—1; Turnip—1; Carrot—1; Vegetable Marrow—1; Chillies—1; Total=6.

22. Kunihar Farm, Kunihar (Dist. Mahasu)
   A. to D. Information N.A.
   E. No. of Experiments:
      Wheat—1; Total=1.

23. Regional Fruit Research Station, Mashobra
   (i) In Mahasu district, near Simla Rly. Stn., with Lat. 31.01° N and Long. 77.1° E. Central topography is undulating. (ii) Mountaneous (iii) 1938 (iv) N.A. (v) Various aspects of temperate fruits.

B. Normal rain fall in cm.:

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<td>16.60</td>
<td>14.06</td>
<td>11.89</td>
<td>2.11</td>
<td>5.38</td>
<td>5.01</td>
<td>119.52</td>
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C. Irrigation and Drainage Facilities:
   (i) No (ii) Natural drainage exists

D. Soil type and Soil analysis:
   (i) Clay loam to clay fairly deep with clay sub soils, slightly acidic. (ii) N—295kg/ha, P2O5—134kg/ha; K2O—38kg/ha.

E. No. of Experiments:
   Apple—1, Total=1

24. Rice Breeding Sub-Station, Nagrota-Bagwan
   A. to D. Information N.A.
   E. No. of Experiments:
      Paddy—27; Wheat—1, Total=28
25. **Govt. Tea Farm, Palampur.**

A. to D. Information N.A.

E. No. of Experiments:

Tea—18; Total=18

26. **Potato Development Station, Phula-Dhar.**

A. to D. Information N.A.

E. No. of Experiments:

Wheat—4; Potato—2; Total=6.

27. **Potato Development Station, Shilaroo.**

A. **General Information**

(i) In Mahasu district, near Simla Rly. Stn., with alt. 2450 m. above m.s.l., having general topography as slopy.

(ii) N.A.

(iii) Established in 1949.

(iv) Potato—Green Manure—Potato, Potato—Barley—Peas.

(v) Manurial, varietal and other experiments on Potato.

B. **Normal Rainfall in cms:** 250 cms. (yearly)

C. **Irrigation and Drainage Facilities:**

(i) Nil

(ii) Yes but in bench terraced field there is lack of proper drainage.

D. **Soil type and Soil analysis:**

(i) Clay

(ii) and (iii) N.A.

E. **No. of Experiments:**

Wheat—1, Potato—6; Total=7.

28. **Crop Research Station, Solan.**

A. to D. Information N.A.

E. **No. of Experiments:**

Maize—1; Pea—2; Tomato—2; Sugarbeet—2; Total=7.

29. **Crop Research Sub-Station, Sundernagar**

A. **General Information:**

(i) In Mandi district, 88km. away from Jogindernagar Rly. Stn. at alt. 900m. above s.l. Field is divided into slopes and small terraces along the contours.

(ii) Mid Hills

(iii) In 1960

(iv) Maize, Wheat, Barley oilseed, pulses and others green manuring

(v) Varietal and fertilizer trials on different crops, multi-plication of nucleus seeds.

B. **Normal Rainfall in cm:**

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<td>50.0</td>
<td>68.4</td>
<td>104.4</td>
<td>36.6</td>
<td>37.1</td>
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<tr>
<td>376.9</td>
<td>284.2</td>
<td>255.9</td>
<td>39.0</td>
<td>47.4</td>
<td>45.7</td>
<td>1590.50</td>
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</tbody>
</table>
C. Irrigation and Drainage Facilities:
   (i) No.  (ii) Yes.

D. Soil type and Soil analysis:
   (i) Clay loam  (ii) pH 6.5 to 7.0, N=Low, P=High, K=Low—High.  (iii) Nil.

E. No. of Experiments:
   Wheat—1, Maize—1; Linseed—1; Total=3.

JAMMU & KASHMIR

1. Potato Res. Station, Gulmarg

A. General Information:
   (i) In Gulmarg, Baramulla district, near Jammu Rly. Stn., with alt 3000m. (ii) It
   represents Forest tract. (iii) Established in 1957-58. (iv) Potato—Potato, (v) Experiments
   for seed multiplication and produces virus free Potato seed.

B. Normal Rainfall: N.A.

C. Irrigation and Drainage Facilities:
   (i) Rainfed (ii) Ordinary

D. Soil type and Soil analysis:
   (i) N.A.  (ii) Chemical analysis, P₂O₅—4.9 to 25.3 kg/ha and K₂O—13.2 to 69.7 kg/ha
   (iii) Sandy loam.

E. No. of Experiments:
   Potato—15, Total=15.

2. Seed Multiplication Farm, Chegal (Hadarward)

A to D Information N.A.

E. No. of Experiments:
   Paddy—1, Maize—2, Total=3


A. General Information:
   (i) In Jalal Tilico of Jammu district, Northern Railway out agenc at Jammu; Lat.
   32.75° N; Long. 74.3° E and alt. 291m. (ii) It represents plain tract of Jammu (iii) Establi-
   shed about sixty years back (iv) Maize—Wheat now under M.A.E. scheme from Rabi 1968-69
   (v) N.A.

B. Normal Rainfall: N.A.

C. Irrigation and Drainage Facilities:
   (i) (a) & (b) Canal (ii) Drainage exists.
D. Soil type and Soil analysis:


E. No. of Experiments:

Paddy—1; Potato—2; Total=3

4. Rice Research Station, Khudwani (Anantnag, Kashmir)

A. General Information:

(i) In Khudwani, of Anantnag district near Pathankot Rly. Stn. and with lat. 33°—N/Long. 75.0—E/alt. 1335 m. (ii) It represents plain tract. (iii) Established in 1954 (iv) Rice-oil seed-Rice (v) Rice Research.

B. Normal Rainfall:

Av. 86 cm. yearly.

C. Irrigation and Drainage Facilities:

(i) Canal (ii) No

D. Soil type and Soil analysis:

(i) Silty loam depth 30.42 cm. (ii) Chemical analysis and (iii) Mechanical analysis-N.A.

E. No. of Experiments:

Paddy—2; Total=2

5. Seed Multiplication Farm, Padgampura.

A. General Information:


B. Normal Rainfall in cm.:

7.45 cm. (Av. Annual rainfall)

C. Irrigation and Drainage Facilities:

(i) (a) & (b) Light irrigation (ii) No

D. Soil type and Soil analysis:

(i) Clay light brown, slightly clay loam (ii) Av. Nitrogen falls in medium range, P<sub>2</sub>O<sub>5</sub> falls in moderate medium range and Potash falls in low range (iii) N.A.

E. No. of Experiments:

Paddy—1, Total=1.

6. Seed Multiplication Farm, Pombay (Kalgaon)

A. to D. Information : N.A.
E. No. of Experiments:

Paddy—2, Total=2.

7. Regional Paddy Research Station, Poonchak, (Jammu).

A. General Information:

(i) In Ponichak, of Jammu district, near Pathankot Rly. Stn., with Lat. 32° 75', Long. 74.55' Alt. 290.6 meters. (ii) It represents Plain-tract (iii) Established in 1963 (iv) Paddy—Wheat (v) Evaluation of H.Y.V. of rice with resistance to pest and diseases. To introduce and acclimatise high yielding paddy varieties and to test the best cultural and management practices in the improved strains for making sound recommendations to the farmers. Testing Centre for ACRIP.

B. Normal Rainfall: N.A.

C. Irrigation and Drainage Facilities:

(i) (a) and (b) Canal (ii) Surface drainage (natural)

D. Soil type and Soil analysis:

(i) Loamy, Deep soil, Grey in colour (ii) Chemical analysis Carbon 0—43, P₂O₅ (available)—13kg/ha K₂O (available) 100 kg/ha. pH. 7—8 conductivity (1 : 2)—0.41. (iii) Sand 66.07, silt—18.4% and clay—15.67.

E. No. of Experiments:

Paddy—7; Total=7


A. General Information:

(i) In Shalimar Srinagar, District near Jammu Rly. Stn., at Lat. 34° N Long. 74°E, Alt. 5009m. (ii) It represents clay loam tract (iii) Established in 1890 (iv) One to two crops taken in case of food crops and two to three crops taken in case of vegetables per year (v) To evolve and to select improved varieties of locally important vegetable crops. Cultural and to standardise control measures against insect pests and diseases of commercially important vegetable crops. Raising of genetically pure seed stocks of the improved varieties of different vegetable crops.

B. Normal Rainfall in cm.:

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<th>Jan.</th>
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<tr>
<td>15.3</td>
<td>49.6</td>
<td>4.4</td>
<td>106.3</td>
<td>17.6</td>
<td>82.8</td>
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<td>18.9</td>
<td>30.7</td>
<td>8.0</td>
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<tr>
<td>Total</td>
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<td>261.3</td>
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(monthly rainfall for the year 1972 as supplied by Srinagar observatory).

C. Irrigation and Drainage Facilities:

(i) (a) and (b) Natural perennial stream (ii) Yes. Drainage exists.

D. Soil type and Soil analysis:

(i) Clay loam, depth 22—30 cm. (ii) Carbon 1.45%, P₂O₅—70kg/ha, K—700kg/ha p.H. 6.9 to 7.5 (iii) N.A.
B. Normal Rainfall in cm:

Paddy—13; Wheat—4; Maize—2; Peas—4; Potato—5; Raddish—1; Tomato—2; Cauliflower—6; Turnip—2; Khol-Knol—4; Onion—9; Apple—1; Saffron—7; Total—62.

9. Damodar Kawa Farm, Srinagar

A. General Information: N.A.

B. No. of Experiments:

Maize—12; Total=12

PUNJAB

1. Cotton Research Station, Abohar.

A. General Information:

(i) In Abohar of Ferozepur district, 3.2 kms. from Abohar Rly. Stn. with Lat.—30.2° N, Long—74.2° E. (ii) It represents Plain. (iii) Established in 1949. (iv) N.A. (v) Breeding, Agronomy etc.

B. Normal Rainfall: N.A.

C. Irrigation and Drainage Facilities:

(i) (a) & (b) Irrigation by Canal. (ii) Yes, proper drainage system exists.

D. Soil type and Soil analysis:

(i) Broad soil types—sandy loam to loam. (ii) N.A.

E. No. of Experiments:

Wheat—2; Cotton—31; Total=33

2. Uppal Farm, Amritsar.

(A) to (D) Information N.A.

E. No of Experiments:

Paddy—1; Total=1.

3. Fruit Research Station, Attari.

A. General Information:

(i) In Amrisar Taluka of Amritsar District; 3.2 Kms. from Attari Rly. Stn., with Lat.—31.6°N; Long. 74.6°E. (ii) Plain tract. (iii) N.A. (iv) Nil (v) Breeding work is mainly done.

B. Normal Rainfall in cm:

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<th>Jan.</th>
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<td>5</td>
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Total 76

(Av. based on the rainfall data for the period 1960—62.)
C. Irrigation and Drainage Facilities:

(i) (a) & (b) Irrigation by Canal and Tube well. (ii) Yes, proper drainage system exists.

D. Soil type and Soil analysis:

(i) Soil type—Clay loam. (ii) & (iii) : N.A.

E. No. of Experiments:

Sweet Lime—3; Grape Fruit—2; Sweet Orange—3; Total=8.

4. Fruit Research Station, Bahadurgarh.

A. General Information:

(i) In Patiala taluka of Patiala district, 5 kms, from Patiala Rly. Stn. (Opposite Punjabi University) with Lat.—31.4°N/Long—76.3°E. The general topography is the Plain Area. (ii) Central Punjab tract. (iii) Established in 1960. (iv) Nil. (v) On Citrus, Ber, Pea, Peung peas, Breeding, Agronomical experiments and extension work.

B. Normal Rainfall : N.A.

C. Irrigation and Drainage Facilities:

(i) (a) & (b) Irrigation facilities are available. (ii) Yes, proper drainage system exists,

D. Soil type and Soil analysis:

(i) Broad soil types—Clay loam. (ii) & (iii) : N.A.

E. No. of Experiments:

Sweet Orange—2; Total=2.

5. Soil Conservation & Training Centre, Chandigarh.

A. General Information:

(i) In Chandigarh taluka of Chandigarh district with Lat.—30.7°N and Long—76.3°E. (ii) Sub-mountain tract. (iii) Established in 1956. (iv) Wheat—Maize. (v) Agronomic Breeding and water requirement experiments.

B. Normal Rainfall in cm.:

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<td>July</td>
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<td>22</td>
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(Average rainfall is based on the data for the period 1960-62).

C. Irrigation and Drainage Facilities:

(i) (a) & (b) Tube-well irrigation. (ii) Yes, proper drainage system exists.

D. Soil type and Soil analysis:

(i) Broad soil types—Sandy loam. (ii) & (iii) : N.A.
E. No. of Experiments:

Grass—21, Total=21.

6. Oil Seed Research Station, Farid Kot,

A. General Information:

(i) In Farid Kot taluka of Bhatinda district, 1.6 km. from Farid Kot Rly. Stn, with Lat.—30.7°N, Long—74.8°E. (ii) Plain tract. (iii) Established in 1910. (iv) N.A. (v) Breeding and Agronomic experiments on Oilseeds.

B. Normal Rainfall: N.A.

C. Irrigation and Drainage Facilities:

(i) (a) & (b) Tube-well and canal irrigation. (ii) Yes, proper drainage system exists.

D. Soil type and Soil analysis:

(i) Broad soil type—Sandy loam. (ii) & (iii) N.A.

E. No. of Experiments:

Castor—2, Toria—1, Total=3.

7. Agricultural Research Station (Millet Sub. Stn.) Ferozpur.

A. General Information:

(i) In Ferozpur taluka of Ferozpur district, 5.6 Kms. from Ferozpur Cantt. Rly. Stn. with Lat.—30.8°N, Long.—74.6°E, Alt. 198 m. above m.s.l. (ii) It represents, Central Zone of the state. (iii) Established in 1927. (iv) Gram—Fellow—Gram Baraai, Bajra—Wheat—Fellow; Bajra—Tobacco—Fodder. Evolution of varieties of Gram and Bajra for irrigated torani area of Punjab.

B. Normal Rainfall in cm.:

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(Average rainfall is based on the data for the period 1951—1962).

C. Irrigation and Drainage Facilities:

(i) (a) & (b) Irrigation by Pertain wheel, Tube-well and Canal since inception. (ii)Yes, proper drainage system exists.

D. Soil type and Soil analysis:

(i) Soil types—Varies from clay loam to sandy loam; Depth—61 cm. deep; Colour—light brown. (ii) & (iii) N.A.
E. No. of Experiments:

Bajra—23, Gram—21, Tobacco—33, Mixed—9, Total—86.

8. Agriculture Research Station, Gurdaspur.

A. General Information:

(i) In Gurdaspur taluka of Gurdaspur district, about 400 Meters from Gurdaspur Rly. Stn. with Lat.—32.0°N, Long.—75.9°E, Alt.—400 m. Fairly level land, well drained. (ii) Submountain, Cool humid during winter and hot humid during summer. (iii) Established in 1941. (iv) N.A. (v) Breeding work on various crop plants on comprehensive scale viz. Wheat, Paddy, Sugarcane and on a minor scale viz. Maize, Fodder crops etc.

B. Normal Rainfall in cm.:

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<td>4.2</td>
<td>5.0</td>
<td>7.4</td>
<td>2.4</td>
<td>4.1</td>
<td>9.4</td>
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<tr>
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</table>

(Average rainfall is based on the data for the period 1964—68).

C. Irrigation and Drainage Facilities:

(i) (a) & (b) : Yes, by tube wells since 1941. No. of tube wells increased in 1965.
(ii) Except some fields, remaining area, due to its topography, is well drained.

D. Soil type and Soil analysis:

(i) Soil types—Single grain sub angular blocky soil; 91 cms. deep; Colour—Brown; Structure—Sandy to clay loam. (ii) Chemical analysis : Conductivity—0.1 to 0.2; organic matter—0.2 to 0.8 and pH—7.0 to 7.6 (iii) Mechanical analysis : N.A.

E. No. of Experiments:

Paddy—9; Wheat—52; Maize—12; Mash—1; Masoor—2; Pea—1; Sugarcane—17; Cotton—21, Sesamum—3; Mixed crops—1, Total—115

9. Sugarcane Research Station, Jullundur

(i) In Jullundur district near Jullundur Rly. Stn., with Lat.—31°40' N, Long.—75. E, Alt.—238m, above m.s.l. The general topography of the experimental area is flat.
(ii) Alluvial belt (Doab). (iii) Established in 1934. (iv) Sugarcane, Wheat, Maize, Senji, Cotton and Berseem. (v) (a) Research on evolution and selection of Sugarcane varieties. Cultural and manurial aspects of cane culture as well as control measures of Sugarcane pests and diseases. (b) Varietal, cultural and manurial aspects of sugarcane.
B. Normal Rainfall in cm.: 

<table>
<thead>
<tr>
<th></th>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
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<tbody>
<tr>
<td>0.2</td>
<td>1</td>
<td>2</td>
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<td>2</td>
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1  2  1  2  1  2  1  2  1  2  1  2  Total
9.6 9.5 13.9 9.8 5.6 0.6 0.5 0.5 0.9 0.0 0.6 1.2 68.9

(The average of rainfall, is based on the data for the period 1967—71).

C. Irrigation and Drainage Facilities: 

(i) (a) & (b): Yes; since 1933 by Tube well. (ii) Yes, proper drainage system exists.

D. Soil type and Soil analysis: 

(i) Alluvial soil, sandy loam texture, depth beyond 180cm., yellowish grey to brownish grey, single grain to crumb structure with iron mottling. (ii) Chemical analysis: \( N = 0.08\%; \) \( K_2O\% \) Carbon-0.5\%, \( CaCO_3 -0.2\% \). (iii) Mechanical analysis: —Clay—5.8\%, Sand—75.9\%.

E. No. of Experiments:

Sugarcane—20, Total=20

10. Agricultural Res. Station, Jullundur

A. General Information:

(i) In Jullundur Taluka of Jullundur district, 8 Kms, from Jullundur Rly. Stn., with Lat. 31.3° N, Long 75.6° E (ii) Plain trail (iii) N.A. (iv) Fallow—Green Manure, Potato, Wheat—(green manure) (v) Breeding, Agronomy, seed multiplication etc.

B. Normal Rainfall in cm.: N.A.

C. Irrigation and Drainage Facilities:

(i) Yes by Tube well (ii) Yes, drainage exists.

D. Soil type and Soil analysis:

(i) Sandy loam to clay loam (ii) and (iii) N.A.

E. No. of Experiments:

Wheat—16, Maize—10, Potato—2, Cotton—15, Total=43.

11. Reg. Research Station, Kapurthala

A. General Information:

(i) In Kapurthala taluka of Kapurthala district, 1.5km. from Kapurthala Rly. Stn., with Lat. −31.4° N, Long. −75.4° E, Alt. −239 above m.s.l. The general topography of the experimental area is Flat topography. (ii) It represents—Sub-tropical tract. (iii) Established in 1962. (iv) Paddy—Wheat, (v) Agronomical, Pathological, Entomotogical and Breeding on Rice crop.
B. Normal Rainfall in cm. : Not Available.

C. Irrigation and Drainage Facilities:

(i) (a) & (b) Irrigation facilities were made available since 1962 by Tube well.
(ii) Yes, proper drainage system exists.

D. Soil type and Soil analysis:

(i) Soil types, Depth, Colour, Structure N.A.
(iii) Mechanical analysis: N.A.

E. No. of Experiments:

Paddy—16, Groundnut—1, Toria—2, Citrus—2, Total=21

12. Sugarcane Sub-Station, Kheri

A. General Information:

(i) In Kheri taluka of Sangroor district, about 7kms. from Sangroor Rly. Stn., (ii) It represents :—Plain tract. (iii) N.A. (iv) Fallow—Sugarcane. (v) Breeding, Agronomy etc.

B. to D. Information N.A.

E. No. of Experiments:

Sugarcane—24, Total=24

13. Punjab Agricultural University, Ludhiana

A. General Information:

(i) In Ludhiana Taluka of Ludhiana district, at 5 Kms. from the Ludhiana Rly. Stn. with Latitude 30.9° N. Longitude 75.9°E, and alt. 247m. (ii) Plain Tract (iii) 1962 (iv) According to crops (v) Breeding, Agronomy and Pathological expts. on different crops.

B. Normal Rainfall : N.A.

C. Irrigation and Drainage Facilities:

(i) Tube well and Canal irrigation (ii) Yes, drainage system exists.

D. Soil Type and Soil analysis:

(i) Sand to loamy sand, Raddish grey, loose single grain (ii) O.C, 0.2 to 0.3% available P—5 to 15%, available K—150 to 200. (iii) Clay 5.0% 7.0%, silt 10% to 12% and 80% to 85%.

E. No. of Experiments:

Paddy—3, Wheat—25, Barley—4, Bajra—1, Gram—2, Mash—2, Peas—1, Cotton—24, Groundnut—17, Mixed crops—2, Total=81.

14. M.A.E. Centre, Nasirpur

A. to D. Information N.A.

E. No. of Experiments:

Cotton—4, Total=4
EXPERIMENTAL DATA
Crop: Paddy (Kharij).

Site: Govt. Agri. Stn., Hansi.

Ref.: Hr. 61(151).

Type: 'M'.

Object: To study the effect of G.M. and levels of N on the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) G.M. crops as per treatments. (c) N.A. (d) Sandy loam. (iii) 5.8.61. (iv) (a) 4 to 5 ploughings. (b) Transplanting. (c) - (d) and (e) N.A. (v) and (vi) N.A. (vi) Irrigated. (vii) 2 weedings. (ix) N.A. (x) 3rd week of Oct., 61.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 4 G.M. treatments with P.O. as Super : G0=No G.M., G1=Jantar, G2=G1 + Super applied to G1, and G3=G1+34 Kg/ha. of P.O. applied to Paddy only.

(2) 3 levels of N applied to paddy crop : N0=0, N1=23 and N2=45 Kg/ha.

In treatment G2 level of P.O.=N.A.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) and (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/244.6 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 2478 Kg/ha. (ii) 511.2 Kg/ha. (iii) None of the effects is significant. (iv) App. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>G0</th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>Mean</th>
</tr>
</thead>
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<tr>
<td>N0</td>
<td>2525</td>
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<td>2522</td>
<td>2455</td>
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<td>N1</td>
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<td>2566</td>
<td>2494</td>
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<td>N2</td>
<td>2396</td>
<td>2659</td>
<td>2659</td>
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<tr>
<td>Mean</td>
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<td>2582</td>
<td>2347</td>
<td>2478</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharij).

Site: Govt. Recl. Farm, Nilokheri.

Ref.: Hr. 60(106), 61(156).

Type: 'M'.

Object: To study the effect of leaching on the yield of Paddy.

1. BASAL CONDITIONS:

(i) N.A (ii) N.A.; highly saline soil. (iii) 14.7.60; 27.7.61. (iv) (a) 4 to 5 ploughings. (b) N.A.; transplanted. (c) to (e) N.A. (v) 28 Kg/ha. of K2O; N.A. (vi) N.A. (vi) Irrigated. (vii) N.A.; 2 weeding. (ix) N.A. (x) 17.10.60; 16.10.61.

2. TREATMENTS:

Main-plot treatments:

All combinations of (1) and (2)

(1) 2 levels of gypsum : G0=0 and G1=10.6 Q/ha.

(2) 3 levels of leaching : L0=0, L1=1 and L2=3 leachings.

Sub-plot treatments:

2 levels of manure: M0=Control and M1=56 Kg/ha. of N as C/A/N+28 Kg/ha. of P.O. as Super.
3. DESIGN:
(i) Split-plot. (ii) (a) 6 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/800 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960–61. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Main-plot error variances are heterogeneous and main-plot Treatments × Years interaction is absent. Hence individual years results are presented under 5. Results.

5. RESULTS:
60(106)
(i) 1612 Kg/ha. (ii) (a) 456.0 Kg/ha. (b) 392.0 Kg/ha. (iii) Main effect of L alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>L0</th>
<th>L1</th>
<th>L2</th>
<th>M0</th>
<th>M1</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>G0</td>
<td>1068 1666 1633</td>
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<tr>
<td>G1</td>
<td>1321 2372 1915</td>
<td>1680 1859</td>
<td>1769</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1194 1859 1774</td>
<td>1483 1742</td>
<td>1612</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for L marginal means = 414.8 Kg/ha.

61(156)
(i) 3593 Kg/ha. (ii) (a) 1114.3 Kg/ha. (b) 605.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>L0</th>
<th>L1</th>
<th>L2</th>
<th>M0</th>
<th>M1</th>
<th>Mean</th>
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<tbody>
<tr>
<td>G0</td>
<td>3308 4274 3518</td>
<td>3719 3681</td>
<td>3700</td>
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<td>G1</td>
<td>392 3546 3518</td>
<td>329 3681</td>
<td>3485</td>
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<td>3320 3910 3518</td>
<td>3504 3681</td>
<td>3593</td>
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Crop :- Paddy (Kharif).
Ref :- Hr. 60(152), 61(148).
Site :- Govt. Recl. Farm, Nilokheri.
Type :- 'M'.
Object :- To study the effect of high doses of N on the yield of Paddy.

1. BASAL CONDITIONS:
(ii) (b) N.A.; Dhaincha-Paddy—Barley or Wheat. (b) N.A.; Dhaincha. (c) N.A. (ii) High saline soil. (iii) 4.8.60; 18.7.61. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (a) 24.10.60; 20.10.61.

2. TREATMENTS:
Main-plot treatments:
5 manuriul treatments: T0 = Control, T1 = 224 Kg/ha. of N as A/C+224 Kg/ha. of P2O5 as Super, T2 = 224 Kg/ha. of N as A/S+224 Kg/ha. of P2O5 as Super, T3 = 152.4 Q/ha. of Gypsum and T4 = T3+152.4 Q/ha. of press-mud.
Sub-plot treatments:
2 levels of fertilizers: $F_0=0$ and $F_1=56$ Kg/ha. of N+28 Kg/ha. of $P_2O_5$.

3. DESIGN:
(i) Split-plot. (ii) 5 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/4305 6 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960 -61. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) Kama. (vi) Nil. (vii) Both the main-plot and sub-plot error variances are homogeneous and main-plot Treatments x Years and sub-plot Treatments x Years interactions are present.

5. RESULTS:
Pooled results
(i) 2965 Kg/ha. (ii) (a) 555.6 Kg/ha. (based on 4 d.f. made up of Treatments x Years interaction). (b) 406.3 Kg/ha. (based on 5 d.f. made up of Treatments x Years interaction). (iii) Main effect of $F$ alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$T_0$</th>
<th>$T_1$</th>
<th>$T_2$</th>
<th>$T_3$</th>
<th>$T_4$</th>
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<td>1661</td>
<td>1906</td>
<td>1585</td>
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<td>2613</td>
<td>2402</td>
<td>2629</td>
<td>3150</td>
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<td>Mean</td>
<td>1510</td>
<td>2111</td>
<td>2030</td>
<td>2145</td>
<td>2528</td>
<td>2065</td>
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</table>

C.D. for $F$ marginal means=269.9 Kg/ha.

Individual results

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<tr>
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<th>$T_0$</th>
<th>$T_1$</th>
<th>$T_2$</th>
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<th>$F_0$</th>
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<td></td>
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Crop :- Paddy (*Kharif*).

Ref : Hr. 60(154), 61(155).

Site :- Govt. Recl. Farm, Nilokheri.

Type :- ‘M’.

Object :- To study the effect of different soil amendments on the yield of Paddy.

1. BASAL CONDITIONS:
(i) N.A. (ii) Highly saline soil. (iii) 16.8.60; 13.7.61. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) 2 weedicings; 2 to 3 hoeings. (ix) N.A. (x) 17.10.60; 11.10.61.
2. TREATMENTS:

11 manural treatments: T₀ = Control, T₁ = Gypsum at 101.6 Q/ha., T₂ = Sulphur at 900 Kg/ha., T₃ = H₂SO₄ at 3153 litres/ha., T₄ = HNO₃ at 969 Kg/ha., T₅ = HCl at 3585 litres/ha., T₆ = A/S at 6160 Kg/ha., T₇ = F.Y.M. at 3759 Q/ha., T₈ = T₇ + Press-mud at 101.6 Q/ha., T₉ = T₇ + Mollases at 101.6 Q/ha., T₁₀ = T₇ + Press-mud at 101.6 Q/ha., T₁₁ = Mollases at 101.6 Q/ha., + Press-mud at 101.6 Q/ha.

3. DESIGN:


4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-61. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) No. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:

Pooled results

(i) 1074 Kg/ha. (ii) 757.9 Kg/ha. (based on 50 d.f. made up of pooled error and Treatments x Years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Q/ha.

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<th>Treatment</th>
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<th>T₂</th>
<th>T₃</th>
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Individual results

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<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
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</tr>
<tr>
<td>N.S.</td>
<td>1048</td>
<td>801.8</td>
</tr>
<tr>
<td>N.S.</td>
<td>1074</td>
<td>757.9</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).
Ref :- Hr. 60(165), 61(154).
Site :- Govt. Recl. Farm, Nilokheri.
Type :- 'M'.
Object :- To study the effect of Gypsum requirement of Paddy with different combination of N, P and K on highly saline soil.

1. BASAL CONDITIONS:

(i) N.A. (ii) Highly saline alkaline soil. (iii) 22.7.60; 15.7.61. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) N.A.; 56 Kg/ha. of N as C/A(N applied on 8.8.61 and 5.9.61 and 28 Kg/ha. of each of P and K on 15.7.61. (vi) N.A. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) 24.10.60; 18.10.61.

2. TREATMENTS:

Main-plot treatments:

4 doses of Gypsum : C₁ = 33 %, C₄ = 50 %, C₅ = 75 % and C₈ = 10 % of requirement.
Sub-plot treatments:

5 levels of manures: \( M_0 = 0, M_1 = 56 \text{ Kg/ha} \). of N, \( M_2 - M_1 + 28 \text{ Kg/ha} \). of \( P_2O_5 \), \( M_4 = M_1 + 28 \text{ Kg/ha. of K}_2O \) and \( M_4 = M_1 + \text{micronutrients (Mn+Zn)} \).

Doses of Mn and Zn are N.A.

3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/replication; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/700/8/ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—51. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and main-plot Treatments X Years and Sub-plot Treatments X Years interaction are absent.

5. RESULTS:

Pooled results

(i) 138 Kg/ha. (ii) (a) 254'1 Kg/ha. (based on 21 d.f. made up of pooled error and Treatments X Years interaction). (b) 137'6 Kg/ha. (based on 121 d.f. made up of pooled error and Treatments X Years interaction). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( M_0 )</th>
<th>( M_1 )</th>
<th>( M_2 )</th>
<th>( M_3 )</th>
<th>( M_4 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( C_1 )</td>
<td>58</td>
<td>82</td>
<td>50</td>
<td>174</td>
<td>88</td>
<td>90</td>
</tr>
<tr>
<td>( C_4 )</td>
<td>76</td>
<td>105</td>
<td>146</td>
<td>117</td>
<td>210</td>
<td>131</td>
</tr>
<tr>
<td>( C_2 )</td>
<td>71</td>
<td>130</td>
<td>147</td>
<td>204</td>
<td>60</td>
<td>122</td>
</tr>
<tr>
<td>( C_4 )</td>
<td>134</td>
<td>200</td>
<td>330</td>
<td>216</td>
<td>169</td>
<td>210</td>
</tr>
<tr>
<td>Mean</td>
<td>85</td>
<td>129</td>
<td>168</td>
<td>178</td>
<td>132</td>
<td>138</td>
</tr>
</tbody>
</table>

Individual results

<table>
<thead>
<tr>
<th>Treatments</th>
<th>( C_1 )</th>
<th>( C_2 )</th>
<th>( C_3 )</th>
<th>( C_4 )</th>
<th>Sig.</th>
<th>( M_0 )</th>
<th>( M_1 )</th>
<th>( M_2 )</th>
<th>( M_3 )</th>
<th>( M_4 )</th>
<th>Sig.</th>
</tr>
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<tr>
<td>Years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>1960</td>
<td>75</td>
<td>175</td>
<td>141</td>
<td>156</td>
<td>N.S.</td>
<td>56</td>
<td>116</td>
<td>175</td>
<td>198</td>
<td>140</td>
<td>N.S.</td>
</tr>
<tr>
<td>1961</td>
<td>105</td>
<td>84</td>
<td>104</td>
<td>264</td>
<td>N.S.</td>
<td>111</td>
<td>143</td>
<td>161</td>
<td>158</td>
<td>174</td>
<td>N.S.</td>
</tr>
<tr>
<td>Pooled</td>
<td>90</td>
<td>131</td>
<td>122</td>
<td>210</td>
<td>N.S.</td>
<td>85</td>
<td>129</td>
<td>168</td>
<td>178</td>
<td>132</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

G.M. | S.E./plot
Main | Sub |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>137</td>
<td>182.2</td>
</tr>
<tr>
<td>139</td>
<td>209.1</td>
</tr>
<tr>
<td>138</td>
<td>254.1</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharij).

Site :- Village Kachhwa Karmal.

Object :- To study the effect of different combination of N, P and K on the yield of Paddy.

1. BASAL CONDITIONS:

(i) N.A. (ii) Saline soil. (iii) and (iv) N.A. (v) (a) 4 to 5 ploughings. (b) to (e) N.A. (vi) 14.7.60. (vii) Irrigated. (viii) 2 to 3 weeding. (ix) N.A. (x) 23.10.60.
2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 2 levels of N as C/A/N : N_0 = 0 and N_1 = 22.5 Kg/ha.
(2) 2 levels of P_2O_5 as Super : P_0 = 0 and P_1 = 22.5 Kg/ha.
(3) 2 levels of K_2O as Mur. Pot. : K_0 = 0 and K_1 = 22.5 Kg/ha.

3. DESIGN:
(i) Fact. in R.B.D., 8, 4. (ii) and (iii) N.A. (iv) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 541 Kg/ha. (ii) 126.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P_0</th>
<th>P_1</th>
<th>K_0</th>
<th>K_1</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N_0</td>
<td>517</td>
<td>583</td>
<td>520</td>
<td>580</td>
<td>550</td>
</tr>
<tr>
<td>N_1</td>
<td>569</td>
<td>507</td>
<td>526</td>
<td>550</td>
<td>538</td>
</tr>
<tr>
<td>Mean</td>
<td>543</td>
<td>545</td>
<td>523</td>
<td>565</td>
<td>544</td>
</tr>
</tbody>
</table>

_Crop :- Paddy (Kharif)._  
_Site :- District : Ambala and Karnal._  
_Type :- 'M'.

Object :- Type A : To study the response of Paddy to levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:
8 manurial treatments :  
O=Control (no manure),  
N=22.4 Kg/ha. of N,  
P=22.4 Kg/ha. of P_2O_5,  
K=22.4 Kg/ha. of K_2O,  
NP=22.4 Kg/ha. of N+22.4 Kg/ha. of P_2O_5,  
NK=22.4 Kg/ha. of N+22.4 Kg/ha. of K_2O,  
PK=22.4 Kg/ha. of P_2O_5+22.4 Kg/ha. of K_2O and  
NPK=22.4 Kg/ha. of N+22.4 Kg/ha. of P_2O_5+22.4 Kg/ha. of K_2O.

3. DESIGN:
(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 21 trials in a year, 8 on kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of Type C. Residual effect of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.
4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-61. (b) and (c) N.A. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

60(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>P</td>
</tr>
<tr>
<td>Ambala</td>
<td>2</td>
<td>2100</td>
<td>220</td>
</tr>
<tr>
<td>Karnal</td>
<td>17</td>
<td>2310</td>
<td>420</td>
</tr>
</tbody>
</table>

61(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n1</td>
<td>n2</td>
</tr>
<tr>
<td>Ambala</td>
<td>2</td>
<td>3380</td>
<td>600</td>
</tr>
<tr>
<td>Karnal</td>
<td>14</td>
<td>2310</td>
<td>570</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).
Site: District: Ambala and Karnal.

Ref: Hr. 60(SFT) for Ambala and Karnal and 61(SFT) for Ambala.

Type: 'M'.

Object: Type D: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
(i) N.A. (ii) Alluvial. (iii) to (x) N.A.

2. TREATMENTS:
7 manurial treatments:
O = Control (no manure),
n1 = 22.4 Kg/ha. of N as A/S,
n1' = 44.8 Kg/ha. of N as A/S,
n1'' = 22.4 Kg/ha. of N as Urea,
n2 = 44.8 Kg/ha. of N as C/A/N,
n2' = 22.4 Kg/ha. of N as C/A/N,
n2'' = 44.8 Kg/ha. of N as C/A/N,

3. DESIGN:
Same as in type A conducted on Paddy crop on page No. 6.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) to (vii) N.A.

5. RESULTS:

60(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n1</td>
<td>n2</td>
</tr>
<tr>
<td>Ambala</td>
<td>2</td>
<td>3380</td>
<td>600</td>
</tr>
<tr>
<td>Karnal</td>
<td>14</td>
<td>2310</td>
<td>570</td>
</tr>
</tbody>
</table>

61(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n1</td>
<td>n2</td>
</tr>
<tr>
<td>Ambala</td>
<td>1</td>
<td>2490</td>
<td>570</td>
</tr>
</tbody>
</table>
Crop: Paddy (Kharij).

Site: District: Karnal.

Ref: Hr. 61(SFT).

Type: 'M'.

Object: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:

(i) N.A. (ii) Alluvial. (iii) to (x) N.A.

2. TREATMENTS:

7 manurial treatments:

O=Control (no manure),
\[ n_1 = 22.4 \text{ Kg/ha. of N as A/S}, \]
\[ n_2 = 44.8 \text{ Kg/ha. of N as A/S}, \]
\[ n_4 = 22.4 \text{ Kg/ha. of N as Urea}, \]
\[ n_6 = 44.8 \text{ Kg/ha. of N as Urea}, \]
\[ n_7 = 22.4 \text{ Kg/ha. of N as A/S/N}, \]
\[ n_9 = 44.8 \text{ Kg/ha. of N as A/S/N}, \]

3. DESIGN:

Same as in type A conducted on Paddy crop on page No. 6.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of gaid. (iv) (a) 1961-only. (b) and (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>( n_1 )</th>
<th>( n_2 )</th>
<th>( n_4 )</th>
<th>( n_6 )</th>
<th>( n_7 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karnal</td>
<td>10</td>
<td>2670</td>
<td>410</td>
<td>620</td>
<td>580</td>
<td>730</td>
<td>580</td>
<td>740</td>
</tr>
</tbody>
</table>

---

Crop: Paddy (Kharij).

Site: District: Ambala.

Ref: Hr. 62 to 64(SFT).

Type: 'M'.

Object: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:

(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments:

O=Control (no manure),
\[ N_1 = 35 \text{ Kg/ha. of N}, \]
\[ N_2 = 75 \text{ Kg/ha. of N}, \]
\[ P_2 = 35 \text{ Kg/ha. of } P_2O_5, \]
\[ N_1 P_1 = 35 \text{ Kg/ha. of N+35 Kg/ha. of } P_2O_5, \]
\[ N_2 P_1 = 35 \text{ Kg/ha. of N+35 Kg/ha. of } P_2O_5, \]
\[ N_2 P_2 = 70 \text{ Kg/ha. of N+70 Kg/ha. of } P_2O_5, \]
\[ N_2 P_1 K_1 = 70 \text{ Kg/ha. of N+70 Kg/ha. of } P_2O_5+35 \text{ Kg/ha. of } K_2O, \]

N applied as A/S, P_2O_5 as Super and K_2O as Mur. Pot.
3. DESIGN:

(i) and (ii) A selected district is divided into four agriculturally homogenous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50 - 100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A₁, 11 of type A₂, 11 of type A₃ and 3 are of type C. The eleven experiments under type A₁, A₂ and A₃ are distributed as 3 on a kharif cereal, 3 on a raah cereal, 3 on a cash crop and 2 on oil seed. All the three type—C experiments are conducted on a legume crop. For the purpose of conducting the A₁, A₂ and A₃ experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A₁, A₂ and A₃ are laid out. For conducting the three type—C trials three villages are randomly selected in each block.

(iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—66 (1965 N.A.). (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₄P₁</th>
<th>N₄P₂</th>
<th>N₄P₃K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>548</td>
<td>238</td>
<td>487</td>
<td>271</td>
<td>790</td>
<td>620</td>
<td>927</td>
</tr>
</tbody>
</table>

Control yield = 1903 Kg/ha.; No. of trials = 4

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₄P₁</th>
<th>N₄P₂</th>
<th>N₄P₃K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>810</td>
<td>1329</td>
<td>845</td>
<td>1191</td>
<td>1186</td>
<td>1174</td>
<td>815</td>
</tr>
</tbody>
</table>

Control yield = 1339 Kg/ha.; No. of trials = 2

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₄P₁</th>
<th>N₄P₂</th>
<th>N₄P₃K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>87</td>
<td>328</td>
<td>202</td>
<td>445</td>
<td>544</td>
<td>691</td>
<td>858</td>
</tr>
</tbody>
</table>

Control yield = 2071 Kg/ha.; No. of trials = 7

Crop :— Paddy (Kharif).

Ref. :- Hr. 63, 65(SFT) for Ambala and 62 to 65(SFT) for Karnal.

Site :— District: Ambala and Karnal. Type :- ‘M’.

Object :— Type A₁ : To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:

(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN:

Same as in type A₁ conducted on Paddy crop under unirrigated conditions on page No. 8.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—66 for Ambala (1962 and 64 N.A.) and 62 to 66 for Karnal. (b) and (c) N.A. (v) to (vii) Nil.
## RESULTS:

### Ambala

**63(SFf)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$N_3P_1$</th>
<th>$N_4P_1$</th>
<th>$N_5P_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>836</td>
<td>844</td>
<td>131</td>
<td>1304</td>
<td>1739</td>
<td>1963</td>
<td>1822</td>
<td>385.8</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 2016 Kg/ha.; No. of trials = 3

**65(SFf)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$N_3P_1$</th>
<th>$N_4P_1$</th>
<th>$N_5P_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>225</td>
<td>464</td>
<td>99</td>
<td>421</td>
<td>688</td>
<td>862</td>
<td>1022</td>
<td>55.6</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1021 Kg/ha.; No. of trials = 7

### Karnal

**62(SFf)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$N_3P_1$</th>
<th>$N_4P_1$</th>
<th>$N_5P_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>362</td>
<td>714</td>
<td>298</td>
<td>349</td>
<td>719</td>
<td>708</td>
<td>846</td>
<td>129.5</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1835 Kg/ha.; No. of trials = 10

**63(SFf)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$N_3P_1$</th>
<th>$N_4P_1$</th>
<th>$N_5P_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>512</td>
<td>789</td>
<td>41</td>
<td>659</td>
<td>887</td>
<td>994</td>
<td>1284</td>
<td>234.6</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 2300 Kg/ha.; No. of trials = 13

**64(SFf)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$N_3P_1$</th>
<th>$N_4P_1$</th>
<th>$N_5P_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>771</td>
<td>1028</td>
<td>219</td>
<td>944</td>
<td>1247</td>
<td>1590</td>
<td>1842</td>
<td>123.6</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 2371 Kg/ha.; No. of trials = 12

**65(SFf)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$N_3P_1$</th>
<th>$N_4P_1$</th>
<th>$N_5P_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>841</td>
<td>796</td>
<td>14</td>
<td>596</td>
<td>1096</td>
<td>1233</td>
<td>1477</td>
<td>133.8</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 2603 Kg/ha.; No. of trials = 6

---

### Crop :: **Paddy (Kharif)**

**Ref ::** Hr. 65(SFf) for Ambala and 62 to 65(SFf) for Karnal.

### Site :: **District : Ambala and Karnal**

**Type ::** 'M'.

Object :: —**Type A2 :** To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS :**

   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.
2. TREATMENTS:

8 manurial treatments:

- **O** = Control (no manure),
- N\(_1\) = 35 Kg/ha. of N,
- P\(_1\) = 35 Kg/ha. of P\(_2\)O\(_5\),
- N\(_1\)P\(_1\) = 35 Kg/ha. of N+35 Kg/ha. of P\(_2\)O\(_5\),
- N\(_1\)P\(_2\) = 35 Kg/ha. of N+70 Kg/ha. of P\(_2\)O\(_5\),
- N\(_1\)P\(_2\)K\(_2\) = 70 Kg/ha. of N+70 Kg/ha. of P\(_2\)O\(_5\) and
- N\(_1\)P\(_2\)K\(_2\) = 70 Kg/ha. of N+70 Kg/ha. of P\(_2\)O\(_5\)+70 Kg/ha. of K\(_2\)O.


3. DESIGN:

Same as in type A, conducted under unirrigated conditions on Paddy crop on page No. 8.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962–66 for Ambala (62 to 64 N.A.) and 1962–65 for Karnal. (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

### Ambala

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N(_1)</th>
<th>P(_1)</th>
<th>P(_2)</th>
<th>N(_1)P(_1)</th>
<th>N(_1)P(_2)</th>
<th>N(_1)P(_1)K(_2)</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>56</td>
<td>116</td>
<td>255</td>
<td>489</td>
<td>644</td>
<td>1033</td>
<td>1395</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>47</td>
</tr>
</tbody>
</table>

Control yield = 1080 Kg/ha.; No. of trials = 7

### Karnal

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N(_1)</th>
<th>P(_1)</th>
<th>P(_2)</th>
<th>N(_1)P(_1)</th>
<th>N(_1)P(_2)</th>
<th>N(_1)P(_1)K(_2)</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>456</td>
<td>235</td>
<td>421</td>
<td>540</td>
<td>428</td>
<td>802</td>
<td>925</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>109</td>
</tr>
</tbody>
</table>

Control yield = 1774 Kg/ha.; No. of trials = 11

### 63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N(_1)</th>
<th>P(_1)</th>
<th>P(_2)</th>
<th>N(_1)P(_1)</th>
<th>N(_1)P(_2)</th>
<th>N(_1)P(_1)K(_2)</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>533</td>
<td>156</td>
<td>261</td>
<td>565</td>
<td>598</td>
<td>1006</td>
<td>127</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Control yield = 1904 Kg/ha.; No. of trials = 11

### 64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N(_1)</th>
<th>P(_1)</th>
<th>P(_2)</th>
<th>N(_1)P(_1)</th>
<th>N(_1)P(_2)</th>
<th>N(_1)P(_1)K(_2)</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>668</td>
<td>289</td>
<td>370</td>
<td>938</td>
<td>1144</td>
<td>1655</td>
<td>2009</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>107</td>
</tr>
</tbody>
</table>

Control yield = 2355 Kg/ha.; No. of trials = 12

### 65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N(_1)</th>
<th>P(_1)</th>
<th>P(_2)</th>
<th>N(_1)P(_1)</th>
<th>N(_1)P(_2)</th>
<th>N(_1)P(_1)K(_2)</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>331</td>
<td>21</td>
<td>-31</td>
<td>530</td>
<td>580</td>
<td>920</td>
<td>1184</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>245</td>
</tr>
</tbody>
</table>

Control yield = 2506 Kg/ha.; No. of trials = 7
Crop: Paddy (Kharif).
Site: District: Ambala.
Object: Type A1: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
Some as in type A1 conducted on paddy crop under irrigated conditions on page No. 10.

3. DESIGN:
Same as in type A1 conducted under unirrigated conditions on paddy crop on page No. 8.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-56 for Ambala (1963 and 65 N.A.). (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS:

### Ambala

**62(SFT)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P1</th>
<th>N2P2</th>
<th>N1P1K4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>397</td>
<td>303</td>
<td>60</td>
<td>506</td>
<td>317</td>
<td>559</td>
<td>336</td>
<td>220.6</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=1824 Kg/ha.; No. of trials=3

**64(SFT)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P1</th>
<th>N2P2</th>
<th>N1P1K4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>258</td>
<td>185</td>
<td>265</td>
<td>809</td>
<td>868</td>
<td>1102</td>
<td>1231</td>
<td>172.5</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=2045 Kg/ha.; No. of trials=8

---

### Crop: Paddy (Kharif).

Site: District: Ambala.

Object: Type A2: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
- O=Control (no manure),
- N1=35 Kg/ha. of N,
- K1=35 Kg/ha. of K2O,
- K2=70 Kg/ha. of K2O,
- N1K2=35 Kg/ha. of N+35 Kg/ha. of K2O,
- N1K1=35 Kg/ha. of N+70 Kg/ha. of K2O,
- K2K1=70 Kg/ha. of N+70 Kg/ha. of K2O and
- N1P1K2=35 Kg/ha. of N+35 Kg/ha. of P2O5+35 Kg/ha. of K2O.

N applied as A/S, P2O5 as Super and K2O as Mur. Pot.
3. DESIGN:
Same as in type A, conducted under unirrigated condition on Paddy crop on page No. 8.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1962—66 for Ambala (63 and 65 N.A.); (b) and (c) N.A.
(v) to (vii) Nil.

RESULTS:

62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₂K₂</th>
<th>N₃P₂K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>252</td>
<td>195</td>
<td>73</td>
<td>669</td>
<td>280</td>
<td>876</td>
<td>-2</td>
<td>215.8</td>
</tr>
</tbody>
</table>

Control yield—2056 Kg/ha.; No. of trials=3

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₂K₂</th>
<th>N₃P₂K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>599</td>
<td>428</td>
<td>471</td>
<td>701</td>
<td>625</td>
<td>945</td>
<td>940</td>
<td>60.4</td>
</tr>
</tbody>
</table>

Control yield—1634 Kg/ha.; No. of trials=6

Crop: Paddy (Kharif).
Ref: Hr. 63, 65(SFT) for Ambala and 62 to 65(SFT) for Karnal.

Site: District: Ambala and Karnal. Type: ‘M’.

Object:—Type A₂: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
Same as in type A₂ on paddy crop conducted under irrigated conditions on page No. 12.

3. DESIGN:
Same as in type A₂ conducted under unirrigated conditions on paddy crop on page No. 8.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1962—65 for Ambala (1962 and 65 N.A.) and 1962—65 for Karnal. (b) and (c) N.A.  (v) to (vii) Nil.

5. RESULTS:

Ambala

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₂K₂</th>
<th>N₃P₂K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>148</td>
<td>143</td>
<td>306</td>
<td>869</td>
<td>142</td>
<td>1052</td>
<td>588</td>
<td>268.1</td>
</tr>
</tbody>
</table>

Control yield—1858 Kg/ha.; No. of trials=2

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₂K₂</th>
<th>N₃P₂K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>307</td>
<td>186</td>
<td>320</td>
<td>457</td>
<td>678</td>
<td>922</td>
<td>1005</td>
<td>39.2</td>
</tr>
</tbody>
</table>

Control yield—989 Kg/ha.; No. of trials=8.
Karnal

62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_2$</th>
<th>$N_1K_1$</th>
<th>$N_1K_2$</th>
<th>$N_2K_1$</th>
<th>$N_2K_2$</th>
<th>$N_2P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>304</td>
<td>306</td>
<td>281</td>
<td>355</td>
<td>547</td>
<td>793</td>
<td>573</td>
<td>155.2</td>
<td></td>
</tr>
<tr>
<td>Control yield</td>
<td>2490 Kg/ha.</td>
<td>No. of trials</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_2$</th>
<th>$N_1K_1$</th>
<th>$N_1K_2$</th>
<th>$N_2K_1$</th>
<th>$N_2K_2$</th>
<th>$N_2P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>483</td>
<td>214</td>
<td>357</td>
<td>622</td>
<td>522</td>
<td>956</td>
<td>1140</td>
<td>108.4</td>
<td></td>
</tr>
<tr>
<td>Control yield</td>
<td>2050 Kg/ha.</td>
<td>No. of trials</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_2$</th>
<th>$N_1K_1$</th>
<th>$N_1K_2$</th>
<th>$N_2K_1$</th>
<th>$N_2K_2$</th>
<th>$N_2P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>486</td>
<td>205</td>
<td>310</td>
<td>669</td>
<td>761</td>
<td>1008</td>
<td>1099</td>
<td>89.9</td>
<td></td>
</tr>
<tr>
<td>Control yield</td>
<td>2733 Kg/ha.</td>
<td>No. of trials</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_2$</th>
<th>$N_1K_1$</th>
<th>$N_1K_2$</th>
<th>$N_2K_1$</th>
<th>$N_2K_2$</th>
<th>$N_2P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>817</td>
<td>510</td>
<td>307</td>
<td>630</td>
<td>745</td>
<td>1317</td>
<td>1390</td>
<td>224.7</td>
<td></td>
</tr>
<tr>
<td>Control yield</td>
<td>2477 Kg/ha.</td>
<td>No. of trials</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Crop :** Paddy *(Kharij).*

**Site :** Govt. Recd. Farm, Nilokheri.

**Type :** 'CM'.

**Object :** To study the effect of different depths of ploughings on the yield of Paddy.

1. **BASAL CONDITIONS:**
   (i) N.A.  
   (ii) Highly saline soil.  
   (iii) 3.8.60; 18.7.61.  
   (iv) (a) 4 to 5 ploughings.  
   (b) to (e) N.A.  
   (v) and (vi) N.A.  
   (vii) Irrigated.  
   (viii) 2 weeding.  
   (ix) N.A.  
   (x) 5.11.60; 23.10.61.

2. **TREATMENTS:**
   Male-plot treatments:
   3 depths of ploughings: $P_1 =$Shallow ploughing 10 cm. to 15 cm. depth, $P_2 =$Deep ploughing 23 cm. to 30 cm. depth and $P_3 =$Sub soil ploughing 30 cm. to 46 cm. depth.
   Sub-plot treatments:
   2 levels of fertilizers: $P_0 =$0 and $P_1 =$55 Kg/ha. of N+28 Kg/ha. of P$_2$O$_5$.

3. **DESIGN:**
   (i) Split-plot.  
   (ii) (a) 3 main-plot replication; 2 sub-plots/main-plot.  
   (b) N.A.  
   (iii) 3.  
   (iv) (a) N.A.  
   (b) 1/977 ha.  
   (v) N.A.  
   (vi) Yes.

4. **GENERAL:**
   (i) Normal.  
   (ii) Nil.  
   (iii) Yield of grain.  
   (iv) (a) 1960-61.  
   (b) and (c) No.  
   (v) Kama.  
   (vi) Nil.  
   (vii) As sub-plot error variances are heterogeneous, results of individual years are given under 5. Results.

5. **RESULTS:**
   60(168)
   (i) 131 Kg/ha.  
   (ii) (a) 76 Kg/ha.  
   (b) 94.6 Kg/ha.  
   (iii) None of the effects is significant.  
   (iv) Av. yield of grain in Kg/ha.
Crop : Wheat (Rabi).

Site : Agri. Farm, Ambala.

Object : To study the effect of different soil amendments on structure of the soil and yield of Wheat.

1. BASAL CONDITIONS :
   (i) N.A.  (ii) Clay loam. (iii) 14.11.61. (iv) 4 to 5 ploughings. (b) Keru. (c) to (e) N.A. (v) —. (vi) Local. (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) 25.4.62.

2. TREATMENTS:

3. DESIGN:
   (i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/37·46 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1981—82 (Treatments modified in 62). (b) and (c) No. (v) to (vii) N.A.

5. RESULTS :
   (i) 2796 Kg/ha. (ii) 283·7 Kg/ha. (iii) Treatment differences are significant (iv) Ay. yield of grain in Kg/ha.

\[
\begin{array}{cccc}
\text{Treatment} & T₀ & T₁ & T₂ & T₃ & T₄ & T₅ & T₆ & T₇ \\
\hline
\text{Av. yield} & 2650 & 2468 & 2586 & 2875 & 2921 & 2939 & 2947 & 2978 \\
\end{array}
\]

C.D. = 417·1 Kg/ha.

---

Crop : Wheat (Rabi).

Ref : Hr. 61(111), 62(203).

Site : Agri. Farm, Ambala.

Object : To study the effect of N, P and K with F.Y.M. at different crop s in equal nutrients content basis.
1. BASAL CONDITIONS:

(i) N.A. (ii) Clay loam. (iii) 18.11.61; 25.11.62. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) N.A.; 44·8 Kg/ha. of N+22·4 Kg/ha. of P₂O₅; (vi) C=273. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 24.3.62; 3.5.63.

2. TREATMENTS:

Main-plot treatments:

3 depths of fertilizer applications : D₁=Surface application, D₂=15 cm. depth and D₃=30 cm. depth.

Sub-plot treatments:

2 types of fertilizers : F₁=247 Q/ha. of FYM and F₂=44·8 Kg/ha. of N + 22·4 Kg/ha. of P₂O₅ + 22·4 Kg/ha. of K₂O.

3. DESIGN:

(i) Split-plot. (ii) 3 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/398 ha. ; N.A. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-62. (v) (a) No. (v) N.A. (vi) Nil. (vii) As sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

5. RESULTS:

61(111)

(i) 2519 Kg/ha. (ii) (a) 119·6 Kg/ha. (b) 304·4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>F₁</td>
<td>2397</td>
<td>2512</td>
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<td>2605</td>
</tr>
<tr>
<td>Mean</td>
<td>2543</td>
<td>2578</td>
<td>2581</td>
<td>2519</td>
</tr>
</tbody>
</table>

62(203)

(i) 1689 Kg/ha. (ii) (a) 130·6 Kg/ha. (b) 100·7 Kg/ha. (iii) Main effect of D is significant and that of F is highly significant. (iv) Av. yield of grain is Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>Mean</th>
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<tbody>
<tr>
<td>F₁</td>
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<td>1568</td>
<td>1513</td>
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<tr>
<td>Mean</td>
<td>1456</td>
<td>1641</td>
<td>1729</td>
<td>1609</td>
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</tbody>
</table>

C.D. for D marginal means=159·8 Kg/ha.
C.D. for F marginal means=93·0 Kg/ha.

Ref: Hr. 62(201).
Crop :- Wheat (Rabi).
Site :- Agri. Farm, Ambala.
Object :- To study the comparative effect of different amendments on soil structure and yield of Wheat crop.

1. BASAL CONDITIONS:

(i) N.A. (ii) Clay loam. (iii) 26.11.62. (iv) (a) 4 to 5 ploughings. (v) (a) 44·8 Kg/ha. of N+22·4 Kg/ha. of P₂O₅; (vi) C=273. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 4.5.65.
2. TREATMENTS:
9 manures: T1=Control (no manure), T2=Gypsum, T3=F.Y.M., T4=T1+T2, T5=Press-mud, T6=Sugarcane bagasse, T7=Rice Husk, T8=Saw dust and T9=Sand.

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961–62 (Treatments modified in 62). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 18'1 Kg/ha. (ii) 182'9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
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<tr>
<td>Av. yield</td>
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<td>1929</td>
<td>1927</td>
<td>1895</td>
<td>1913</td>
<td>1687</td>
<td>1937</td>
<td>1769</td>
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Crop: Wheat (Rabi), Site: Govt. Agrt. Stn., Hansi.
Ref: Hr. 60(104), 61(99).
Type: 'M'.

Object: —To study the effect of different sources of N on the yield of Wheat.

1. BASAL CONDITIONS:
(i) (a) Wheat—Maize. (b) Maize. (c) N.A. (ii) Sandy loam. (iii) 21.10.60; 10.11.61. (iv) (a) and (b) N.A. (c) 83 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) C—591. (vii) Irrigated. (viii) and (la) N.A. (x) May 61; 13.4.62.

2. TREATMENTS:
3 sources of 44'8 Kg/ha. of N : S0=Control (no manure), S1=A/S and S2=C/N.

3 DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/24'7 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960–61. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments x Years interaction is present.

5. RESULTS:
Pooled results:
(i) 1471 Kg/ha. (ii) 978'9 Kg/ha. (based on 2 d.f. made up of Treatments x Years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S0</th>
<th>S1</th>
<th>S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
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<td>1744</td>
<td>1576</td>
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Individual results:

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<th>S0</th>
<th>S1</th>
<th>S2</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<td>Year</td>
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<td></td>
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<td></td>
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<tr>
<td>1960</td>
<td>870</td>
<td>2028</td>
<td>2016</td>
<td>N.S.</td>
<td>1638</td>
<td>124'1</td>
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<tr>
<td>1961</td>
<td>1314</td>
<td>1460</td>
<td>1136</td>
<td>N.S.</td>
<td>1304</td>
<td>446'8</td>
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<tr>
<td>Pooled</td>
<td>1092</td>
<td>1744</td>
<td>1576</td>
<td>N.S.</td>
<td>1471</td>
<td>978'9</td>
</tr>
</tbody>
</table>
Crop: Wheat (Rabi).  Ref.: Hr. 60(155).
Site: Govt. Reel. Farm, Nilokheri.  Type: ‘M’.
Object: To study the residual effects of N, P and K in different combinations on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Highly saline sodic soil.  (iii) 7.11.60.  (iv) (a) 4 to 5 ploughings.  (b) Kerr.  (c) to (e) N.A.  (v) N.A.  (vi) C-273.  (vii) Irrigated.  (viii) 2 weedings.  (ix) N.A.  (x) 19.4.61.

2. TREATMENTS:
   Main-plot treatments:
   5 manurial treatments: T0 = Control, T1 = 224 Kg/ha. of N as A/S+224 Kg/ha. of P2O5 as Super, T2 = 224 Kg/ha. of N as A/C+224 Kg/ha. of P2O5 as Super, T3 = 224 Kg/ha. of N as A/C+Gypsum at 152·4 Q/ha. and T4 = 224 Kg/ha. of N as A/C+Press-mud at 152·4 Q/ha.
   (Treatments applied to previous crop).
   Sub-plot treatments:
   2 levels of fertilizers applied to wheat: F0 = 0 and F1 = 56 Kg/ha. of N +28 Kg/ha. of P2O5 +28 Kg/ha. of K2O.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 5 main-plots/replication; 2 sub-plots/main-plot.  (b) N.A.  (iii) 3.  (iv) (a) N.A.  (b) 1/4305·63 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Poor.  (ii) Nil.  (iii) Yield of grain.  (iv) (a) 1960—only.  (b) No.  (c) Nil.  (v) No.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 220 Kg/ha.  (ii) (a) 238·7 Kg/ha.  (b) 184·7 Kg/ha.  (iii) Main effect of F alone is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>Mean</th>
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<tr>
<td>P0</td>
<td>0</td>
<td>172</td>
<td>144</td>
<td>172</td>
<td>129</td>
<td>123</td>
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<tr>
<td>P1</td>
<td>431</td>
<td>172</td>
<td>201</td>
<td>531</td>
<td>244</td>
<td>316</td>
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<tr>
<td>Mean</td>
<td>216</td>
<td>172</td>
<td>172</td>
<td>352</td>
<td>186</td>
<td>220</td>
</tr>
</tbody>
</table>

C.D. for F marginal means=143·7 Kg/ha.
3. DESIGN:
   (i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) and (b) 1/39·5 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1959—60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 2947 Kg/ha. (ii) 362·5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.
   Treatment: T1, T2, T3, T4, T5, T6, T7. C.D.=635·1 Kg/ha.
   Av. yield: 2051 2464 3182 3189 2877 3225 3234 3303

---

Crop: Wheat (Rabi).
Ref: Hr. 60(18), 61(12).
Site: Govt. Agri. Farm, Rohtak.
Type: 'M'.
Object: To study the effect of different sources of N on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 25.10.60—6.12.61. (iv) (a) and (b) N.A. (c) 92 Kg/ha.
   (d) and (c) N.A. (v) Nil. (vi) C—318. (vii) Irrigated. (viii) and (ix) N.A. (x) End of April.

2. TREATMENTS:
   6 sources of 44·8 Kg/ha. of N: S1=Control, S1=C/A/N, S2=A/S, S3=Urea, S4=Ammo. liquor and S5=A/C.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 1/39·5 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959—61 (modified in 60). (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) No. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:
   Pooled results
   (i) 2061 Kg/ha. (ii) 415·8 Kg/ha. (based on 35 d.f. made up of pooled error and Treatments x Years interaction).
   Treatment: S1, S2, S3, S4, S5, S6, S7. C.D.=647·7 Kg/ha.
   Av. yield: 1570 2248 2418 2083 1682 2366

Individual results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
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<tr>
<td>Year</td>
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<td></td>
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<tr>
<td>1960</td>
<td>2326</td>
<td>2812</td>
<td>3046</td>
<td>2846</td>
<td>2458</td>
<td>3028</td>
<td>N.S.</td>
<td>2733</td>
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<tr>
<td>1961</td>
<td>813</td>
<td>1685</td>
<td>1789</td>
<td>1320</td>
<td>907</td>
<td>1705</td>
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<td>1370</td>
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<td>2418</td>
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<td>2061</td>
<td>415·8</td>
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</table>
Crop :- Wheat (Rabi).
Site :- Govt. Agri. Farm, Rohtak.

Ref :- Hr. 60(80), 61(20).
Type :- 'M'.

Object :- To study the effect of different times and methods of application of N on the yield of Wheat.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 27.10.60 ; 7.12.61. (iv) (a) and (b) N.A. (c) 92 Kg/ha. (d) and (e) N.A. (v) Nil. (vi) C—281. (vii) Irrigated. (viii) and (ix) N.A. (x) Mid. of April.

2. TREATMENTS :
   7 methods and times of application of 44.8 Kg/ha. of N as C/A/N : T₀ = Control (no manure), T₁ = Drilled before sowing, T₂ = Mixed with the seed, T₃ = Broadcast before sowing, T₄ = Broadcast with 1st irrigation, T₅ = Drilled at sowing and T₆ = Band placement.

3. DESIGN :
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/51'9 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1959 –61 (modified in 60). (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments x Years interaction is present.

5. RESULTS :
   Pooled results
   (i) 1935 Kg/ha. (ii) 452.6 Kg/ha. (based on 6 d.f. made up of Treatments x Years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

   Treatment  | T₀  | T₁  | T₂  | T₃  | T₄  | T₅  | T₆  | Sig. | G.M. | S.E./plot
---          |-----|-----|-----|-----|-----|-----|-----|-----|-----|--------
Year 1960   | 1604| 2586| 2417| 2370| 2417| 2478| 2327| **  | 2114 | 124.0
           | 1388| 1422| 1434| 1382| 2009| 1444| 1813| N.S. | 1556 | 288.0
Pooled      | 1496| 2004| 1926| 1876| 2213| 1961| 2069| N.S. | 1935 | 452.6

Crop :- Wheat (Rabi).
Site :- Govt. Agri. Sta., Rohtak.

Ref :- Hr. 61(88).
Type :- 'M'.
2. TREATMENTS:

All combinations of (1) and (2) + one control

(1) 2 methods of application of fertilizers: \( M_1 = \text{Broadcasting} \) and \( M_2 = \text{Drilling} \).

(2) 2 levels of fertilizers: \( F_1 = 98.8 \text{ Kg/ha. of N+49.4 Kg/ha. of P}_2\text{O}_5 \) and \( F_2 = 98.8 \text{ Kg/ha. of N+98.8 Kg/ha. of P}_2\text{O}_5 \).

3. DESIGN:

(i) Fact. in R.B D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/20.2 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 1953 Kg/ha. (ii) 198 Kg/ha. (iii) Main effect of M is highly significant and that of F is significant.

\[
\begin{array}{c|c|c|c}
 & M_1 & M_2 & \text{Mean} \\
\hline
F_1 & 1726 & 2298 & 1972 \\
F_2 & 1957 & 2505 & 2251 \\
\hline
\text{Mean} & 1862 & 2361 & 2112 \\
\end{array}
\]

C.D. for M or F marginal means = 215.7 Kg/ha.

C.D. for control vs. others = 771.8 Kg/ha.

Crop :- Wheat (Rabi).

Site :- District : Ambala and Rohtak.

Ref :- Hr. 60 and 61(SFT).

Type :- 'M'.

Object :- Type A: To study the response of Wheat to levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:

(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments:

\( O = \text{Control} \) (no manure),

\( N = 22.4 \text{ Kg/ha. of N} \),

\( P = 22.4 \text{ Kg/ha. of P}_2\text{O}_5 \),

\( K = 22.4 \text{ Kg/ha. of K}_2\text{O} \),

\( NP = 22.4 \text{ Kg/ha. of N+22.4 Kg/ha. of P}_2\text{O}_5 \),

\( NK = 22.4 \text{ Kg/ha. of N+22.4 Kg/ha. of K}_2\text{O} \),

\( PK = 22.4 \text{ Kg/ha. of P}_2\text{O}_5 + 22.4 \text{ Kg/ha. of K}_2\text{O} \) and

\( NPK = 22.4 \text{ Kg/ha. of N+22.4 Kg/ha. of P}_2\text{O}_5 + 22.4 \text{ Kg/ha. of K}_2\text{O} \).

3. DESIGN:

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on Type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1968-8 ha. (b) 1/197-7 ha. (iv) Yes.
4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1950 and 61.  (b) and (c) Nil.  (v) Nil.  (vi) and (vii) N.A.

5. RESULTS:

### 60(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha. N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
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<td>1290</td>
<td>180 180 20 71'0 30 70</td>
<td>100</td>
<td>120</td>
<td>61 0</td>
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<tr>
<td>Rohtak</td>
<td>2</td>
<td>1090</td>
<td>550 100 300 326'0 -40 10</td>
<td>-160</td>
<td>180</td>
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<tr>
<td>Hissar</td>
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<td>1870</td>
<td>220 150 50'0 -40 -50</td>
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<td>29 0</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karnal</td>
<td>7</td>
<td>1350</td>
<td>620 360 340 32'0 50</td>
<td>0 140</td>
<td>90 37 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rohtak</td>
<td>10</td>
<td>2030</td>
<td>290 190 100 67'0 -40 -20</td>
<td>-50 110</td>
<td>71 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hissar</td>
<td>15</td>
<td>1520</td>
<td>330 120 80 34'0 -20 -10</td>
<td>-10 10</td>
<td>26 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Crop:** Wheat (Rabi).  **Ref:** Hr. 60 and 61(SFT).  **Site:** District Karnal, Rohtak and Hissar.  **Type:** 'M'.

Object:—Type A; To study the response of Wheat to levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
(i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN:
Same as in type A conducted under unirrigated condition on Wheat crop on page No. 21.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of Wheat.  (iv) (a) 1960 to 61.  (b) and (c) Nil.  (v) Nil.  (vi) and (vii) N.A.

5. RESULTS:

### 60(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha. N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karnal</td>
<td>16</td>
<td>1470</td>
<td>300 220 130 32'0 -20 -10</td>
<td>10 60</td>
<td>23 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rohtak</td>
<td>12</td>
<td>1590</td>
<td>470 180 110 60'0 -60 50</td>
<td>60 70</td>
<td>55 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hissar</td>
<td>9</td>
<td>1870</td>
<td>220 150 50'0 -40 -50</td>
<td>40 20</td>
<td>29 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karnal</td>
<td>7</td>
<td>1350</td>
<td>620 360 340 32'0 50</td>
<td>0 140</td>
<td>90 37 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rohtak</td>
<td>10</td>
<td>2030</td>
<td>290 190 100 67'0 -40 -20</td>
<td>-50 110</td>
<td>71 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hissar</td>
<td>15</td>
<td>1520</td>
<td>330 120 80 34'0 -20 -10</td>
<td>-10 10</td>
<td>26 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Crop:** Wheat (Rabi).  **Ref:** Hr. 60(SFT).  **Site:** Ambala and Rohtak.  **Type:** 'M'.

Object:—Type B; To investigate the relative efficiency of different N fertilizers at different doses.
1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
7 manurial treatments:
Control — No manure,
\( n_1 = 22.4 \text{ Kg/ha. of N as A/S,} \)
\( n_2 = 44.8 \text{ Kg/ha. of N as A/S,} \)
\( n_1' = 22.4 \text{ Kg/ha. of N as urea,} \)
\( n_2' = 44.8 \text{ Kg/ha. of N as urea,} \)
\( n_1'' = 22.4 \text{ Kg/ha. of N as C/A/N,} \)
\( n_2'' = 44.8 \text{ Kg/ha. of N as C/A/N,} \)

3. DESIGN:
Same as in type A conducted under unirrigated condition on Wheat crop on page No. 21.

4. GENERAL:
(i) and (iii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) and (c) Nil. (v) Nil. (vi) and (vii) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>( n_1 )</th>
<th>( n_2 )</th>
<th>( n_1' )</th>
<th>( n_2' )</th>
<th>( n_1'' )</th>
<th>( n_2'' )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambala</td>
<td>10</td>
<td>1360</td>
<td>240</td>
<td>530</td>
<td>390</td>
<td>440</td>
<td>420</td>
<td>550</td>
<td>95</td>
</tr>
<tr>
<td>Rohtak</td>
<td>2</td>
<td>650</td>
<td>120</td>
<td>270</td>
<td>140</td>
<td>250</td>
<td>130</td>
<td>210</td>
<td>75</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).
Site: District: Ambala

Ref.: Hr. 61(SFT).
Type: 'M'.

Object: — Type B: To investigate the relative efficiency of different N fertilizers at different doses.
4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) and (c) No. (v) No. (vi) and (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$n_1$</td>
<td>$n_2$</td>
</tr>
<tr>
<td>Ambala</td>
<td>7</td>
<td>910</td>
<td>360</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).
Site: District: Hisar and Rohtak.
Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.

6. BASEAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

7. TREATMENTS:
7 manurial treatments:
- $O=$Control (no manure),
- $n_1=22.4$ Kg/ha. of N as A/S,
- $n_2=44.8$ Kg/ha. of N as A/S,
- $n_1'=22.4$ Kg/ha. of N as Urea,
- $n_2'=44.8$ Kg/ha. of N as Urea,
- $n_1''=22.4$ Kg/ha. of N as A/S/N,
- $n_2''=44.8$ Kg/ha. of N as A/S/N.

3. DESIGN:
Same as in type A conducted under unirrigated condition on Wheat crop on page No. 21.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 and 61. (b) and (c) N.A. (v) No. (vi) and (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$n_1$</td>
<td>$n_2$</td>
</tr>
<tr>
<td>Hisar</td>
<td>10</td>
<td>1690</td>
<td>330</td>
</tr>
<tr>
<td>Rohtak</td>
<td>10</td>
<td>2090</td>
<td>50</td>
</tr>
</tbody>
</table>

60(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$n_1$</td>
<td>$n_2$</td>
</tr>
<tr>
<td>Hisar</td>
<td>19</td>
<td>1250</td>
<td>280</td>
</tr>
<tr>
<td>Rohtak</td>
<td>13</td>
<td>2230</td>
<td>330</td>
</tr>
</tbody>
</table>

Ref.: Hr. 60 and 61 (SFT).
Crop: Wheat (Rabi).

Ref: Hr. 62 to 65(SFT) for Hissar and Rohtak, 62, 63(SFT) for Ambala and 64(SFT) for Karnal.

Site: District: Hissar, Rohtak, Ambala and Karnal.

Object: - Type A, 1: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O=Control (no manure),
   N1=35 Kg/ha. of N,
   N2=70 Kg/ha. of N,
   P1=35 Kg/ha. of P2O5,
   N1P1=35 Kg/ha. of N + 35 Kg/ha. of P2O5,
   N2P1=70 Kg/ha. of N + 35 Kg/ha. of P2O5,
   N2P2K1=70 Kg/ha. of N+70 Kg/ha. of P2O5 and
   N2P4K1=70 Kg/ha. of N+70 Kg/ha. of P2O5+35 Kg/ha. of K2O.

3. DESIGN:
   (i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50—100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A, 11 of type A, and 3 are of type C. The eleven experiments under type A, A, and A are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A, A and A experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A, A and A are laid out. For conducting the three villages are randomly selected in each block.
   (iii) (a) 1/100 ha. (b) 1/20 ha., (iv) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962–66 for Hissar and Rohtak, 1962–66 for Ambala (64, 65 N.A.) and 1962–66 for Karnal (65 N.A.). (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

Hissar

62(SFT):
Treatment | N1 | N2 | P1 | N1P1 | N2P1 | N1P2 | N2P2K1 | S.E. |
---|---|---|---|---|---|---|---|---|
Av. response of grain in Kg/ha. | 492 | 678 | 237 | 517 | 843 | 1027 | 1117 | 701 |

Control yield=1606 Kg/ha.; No. of trials=13

63(SFT):
Treatment | N1 | N2 | P1 | N1P1 | N2P1 | N1P2 | N2P2K1 | S.E. |
---|---|---|---|---|---|---|---|---|
Av. response of grain in Kg/ha. | 368 | 642 | 94 | 540 | 770 | 850 | 831 | 602 |

Control yield=1417 Kg/ha.; N of trials=12

64(SFT):
Treatment | N1 | N2 | P1 | N1P1 | N2P1 | N1P2 | N2P2K1 | S.E. |
---|---|---|---|---|---|---|---|---|
Av. response of grain in Kg/ha. | 689 | 1192 | 153 | 826 | 1214 | 1594 | 1187 | 830 |

Control yield=1230 Kg/ha.; No. of trials=14
65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P2</th>
<th>N3P3</th>
<th>N4P4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>313</td>
<td>579</td>
<td>70</td>
<td>93</td>
<td>802</td>
<td>1295</td>
<td>1161</td>
<td>1860</td>
</tr>
<tr>
<td>Control yield = 1443 Kg/ha.; No. of trials = 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Robtak

62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P2</th>
<th>N3P3</th>
<th>N4P4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>381</td>
<td>303</td>
<td>124</td>
<td>405</td>
<td>513</td>
<td>637</td>
<td>653</td>
<td>60 0</td>
</tr>
<tr>
<td>Control yield = 1387 Kg/ha.; No. of trials = 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P2</th>
<th>N3P3</th>
<th>N4P4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>729</td>
<td>958</td>
<td>147</td>
<td>820</td>
<td>997</td>
<td>1126</td>
<td>1235</td>
<td>101 3</td>
</tr>
<tr>
<td>Control yield = 1342 Kg/ha.; No. of trials = 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
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</table>

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P2</th>
<th>N3P3</th>
<th>N4P4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>606</td>
<td>836</td>
<td>62</td>
<td>718</td>
<td>861</td>
<td>1192</td>
<td>1237</td>
<td>79 5</td>
</tr>
<tr>
<td>Control yield = 1617 Kg/ha.; No. of trials = 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P2</th>
<th>N3P3</th>
<th>N4P4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>611</td>
<td>924</td>
<td>206</td>
<td>613</td>
<td>1027</td>
<td>1200</td>
<td>1380</td>
<td>104 9</td>
</tr>
<tr>
<td>Control yield = 1579 Kg/ha.; No. of trials = 11</td>
<td></td>
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</tbody>
</table>

Ambala

62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P2</th>
<th>N3P3</th>
<th>N4P4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>586</td>
<td>495</td>
<td>283</td>
<td>696</td>
<td>765</td>
<td>907</td>
<td>940</td>
<td>168 4</td>
</tr>
<tr>
<td>Control yield = 1769 Kg/ha.; No. of trials = 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P2</th>
<th>N3P3</th>
<th>N4P4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>681</td>
<td>459</td>
<td>296</td>
<td>649</td>
<td>687</td>
<td>647</td>
<td>724</td>
<td>159 5</td>
</tr>
<tr>
<td>Control yield = 1131 Kg/ha.; No. of trials = 4</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Karnal

62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P2</th>
<th>N3P3</th>
<th>N4P4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>273</td>
<td>235</td>
<td>141</td>
<td>439</td>
<td>437</td>
<td>398</td>
<td>635</td>
<td>114 3</td>
</tr>
<tr>
<td>Control yield = 1210 Kg/ha.; No. of trials = 14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Object: — Type A1: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vii) N.A. (viii) Unirrigated. (vii) to (x) N.A.

2. TREATMENTS and 3. DESIGN:
   Same as in type A1 conducted on Wheat crop under irrigated condition on page No. 25.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—66 for Ambala and 62 for Karnal. (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

Ambala

62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P1</th>
<th>N3P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>367</td>
<td>527</td>
<td>31</td>
<td>556</td>
<td>705</td>
<td>665</td>
<td>965</td>
<td>180.4</td>
</tr>
</tbody>
</table>

Control yield = 1109 Kg/ha.; No. of trials = 5

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P1</th>
<th>N3P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>154</td>
<td>334</td>
<td>136</td>
<td>563</td>
<td>515</td>
<td>569</td>
<td>793</td>
<td>99.5</td>
</tr>
</tbody>
</table>

Control yield = 1069 Kg/ha.; No. of trials = 12

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P1</th>
<th>N3P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>337</td>
<td>679</td>
<td>324</td>
<td>619</td>
<td>750</td>
<td>929</td>
<td>1154</td>
<td>107.2</td>
</tr>
</tbody>
</table>

Control yield = 1672 Kg/ha.; No. of trials = 16

Ref:— Hr. 62 to 65(SFT) for Ambala and 62(SFT) for Karnal.

Site:— District: Ambala and Karnal. Type:— 'M'.

Crop:— Wheat (Rabi).

Crop conditions:— Type A1: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.
65(SFT)

Treatment | N1 | N2 | P1 | N1P1 | N2P1 | N1P2 | N2P2 | N2P2K1 | S.E.
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Av. response of grain in Kg/ha. | 332 | 494 | 107 | 428 | 783 | 799 | 842 | 80·9

Control yield=1138 Kg/ha.; No. of trials=15

Karnal

62(SFT)

Treatment | N1 | N2 | P1 | N1P1 | N2P1 | N1P2 | N2P2 | N2P2K1 | S.E.
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Av. response of grain in Kg/ha. | 233 | 266 | 19 | 459 | 301 | 583 | 578 | 105·5

Control yield=1472 Kg/ha.; No. of trials=3

Crop :- Wheat (Rabi).

Ref :- Hr. 62 to 64(SFT) for Ambala, 62 to 65(SFT) for Karnal, Hissar and Rohtak and 62(SFT) for Gurgaon.

Site :- District : Ambala, Karnal, Hissar, Rohtak and Gurgaon.

Type :- 'M'.

Object :- Type A 2 : To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manural treatments :
   O=Control (no manure),
   N1=35 Kg/ha. of N,
   P1=35 Kg/ha. of P2O5,
   P2=70 Kg/ha. of P2O5,
   N1P1=35 Kg/ha. of N+35 Kg/ha. of P2O5,
   N1P2=35 Kg/ha. of N+70 Kg/ha. of P2O5,
   N2P1=70 Kg/ha. of N+70 Kg/ha. of P2O5,
   N2P2K1=70 Kg/ha. of N+70 Kg/ha. of P2O5+70 Kg/ha. of K2O,

3. DESIGN:
   Same as in type A 1 conducted under irrigated conditions on Wheat crop on page No. 25.

4. GENERAL:
   (i) and (iii) N.A. (iii) Yield of grain. (iv) (a) 1962—66 (65 N.A. for Ambala and only 62 is available for Gurgaon). (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:
   Ambala

62(SFT)

Treatment | N1 | P1 | P2 | N1P1 | N1P2 | N2P2 | N2P2K1 | S.E.
--- | --- | --- | --- | --- | --- | --- | --- | ---
Av. response of grain in Kg/ha. | 125 | 92 | 207 | 253 | 596 | 304 | 606 | 190·8

Control yield=1482 Kg/ha.; No. of trials=4
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₂</th>
<th>N₄P₂</th>
<th>N₅P₃K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>190</td>
<td>27</td>
<td>-121</td>
<td>397</td>
<td>281</td>
<td>701</td>
<td>639</td>
<td>2129</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 2174 Kg/ha.; No. of trials = 3

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₂</th>
<th>N₄P₂</th>
<th>N₅P₃K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>386</td>
<td>257</td>
<td>283</td>
<td>672</td>
<td>734</td>
<td>939</td>
<td>968</td>
<td>68 4</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1411 Kg/ha.; No. of trials = 16

Karnal

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₂</th>
<th>N₄P₂</th>
<th>N₅P₃K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>113</td>
<td>79</td>
<td>141</td>
<td>276</td>
<td>239</td>
<td>246</td>
<td>608</td>
<td>118 6</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1537 Kg/ha.; No. of trials = 13

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₂</th>
<th>N₄P₂</th>
<th>N₅P₃K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>404</td>
<td>-70</td>
<td>286</td>
<td>480</td>
<td>653</td>
<td>988</td>
<td>1051</td>
<td>155 2</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 2120 Kg/ha.; No. of trials = 11

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₂</th>
<th>N₄P₂</th>
<th>N₅P₃K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>348</td>
<td>240</td>
<td>423</td>
<td>609</td>
<td>662</td>
<td>1183</td>
<td>1292</td>
<td>84 8</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1391 Kg/ha.; No. of trials = 8

Hissar

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₂</th>
<th>N₄P₂</th>
<th>N₅P₃K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>524</td>
<td>487</td>
<td>261</td>
<td>883</td>
<td>705</td>
<td>1350</td>
<td>1448</td>
<td>171 4</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1760 Kg/ha.; No. of trials = 12

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₂</th>
<th>N₄P₂</th>
<th>N₅P₃K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>779</td>
<td>712</td>
<td>401</td>
<td>669</td>
<td>1061</td>
<td>1303</td>
<td>1474</td>
<td>138 8</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1255 Kg/ha.; No. of trials = 13

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₂</th>
<th>N₄P₂</th>
<th>N₅P₃K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>473</td>
<td>4 12</td>
<td>171</td>
<td>590</td>
<td>830</td>
<td>844</td>
<td>902</td>
<td>70 2</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1066 Kg/ha.; No. of trials = 12
Crop: Wheat (Rabi).  
Ref: Hr. 62(SFT) for Karnal and 62, 63, 65(SFT) for Ambala.

Site: District: Karnal and Ambala.  
Type: 'M'.

Object: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

<table>
<thead>
<tr>
<th>Site</th>
<th>Treatment</th>
<th>N_1</th>
<th>P_1</th>
<th>P_2</th>
<th>N_1P_1</th>
<th>N_1P_2</th>
<th>N_2P_1</th>
<th>N_2P_2</th>
<th>N_4P_1K_2</th>
<th>S.E.</th>
<th>Av. response of grain in Kg/ha.</th>
<th>Control yield (Kg/ha)</th>
<th>No. of trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karnal</td>
<td>Treatment</td>
<td>N_1</td>
<td>P_1</td>
<td>P_2</td>
<td>N_1P_1</td>
<td>N_1P_2</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_4P_1K_2</td>
<td>S.E.</td>
<td>803 104 272 1013 1050 1450 1550 104 4</td>
<td>1510 Kg/ha.</td>
<td>15</td>
</tr>
<tr>
<td>Karnal</td>
<td>Treatment</td>
<td>N_1</td>
<td>P_1</td>
<td>P_2</td>
<td>N_1P_1</td>
<td>N_1P_2</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_4P_1K_2</td>
<td>S.E.</td>
<td>468 270 290 574 795 1011 952 148 0</td>
<td>1516 Kg/ha.</td>
<td>9</td>
</tr>
<tr>
<td>Karnal</td>
<td>Treatment</td>
<td>N_1</td>
<td>P_1</td>
<td>P_2</td>
<td>N_1P_1</td>
<td>N_1P_2</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_4P_1K_2</td>
<td>S.E.</td>
<td>332 143 231 434 435 644 714 51 0</td>
<td>1984 Kg/ha.</td>
<td>15</td>
</tr>
<tr>
<td>Karnal</td>
<td>Treatment</td>
<td>N_1</td>
<td>P_1</td>
<td>P_2</td>
<td>N_1P_1</td>
<td>N_1P_2</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_4P_1K_2</td>
<td>S.E.</td>
<td>705 228 293 731 934 1131 1366 106 5</td>
<td>1349 Kg/ha.</td>
<td>15</td>
</tr>
<tr>
<td>Karnal</td>
<td>Treatment</td>
<td>N_1</td>
<td>P_1</td>
<td>P_2</td>
<td>N_1P_1</td>
<td>N_1P_2</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_4P_1K_2</td>
<td>S.E.</td>
<td>248 98 228 505 584 980 1124 75 7</td>
<td>1940 Kg/ha.</td>
<td>10</td>
</tr>
<tr>
<td>Karnal</td>
<td>Treatment</td>
<td>N_1</td>
<td>P_1</td>
<td>P_2</td>
<td>N_1P_1</td>
<td>N_1P_2</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_4P_1K_2</td>
<td>S.E.</td>
<td>683 354 550 649 628 1168 1330 103 9</td>
<td>1888 Kg/ha.</td>
<td>13</td>
</tr>
<tr>
<td>Karnal</td>
<td>Treatment</td>
<td>N_1</td>
<td>P_1</td>
<td>P_2</td>
<td>N_1P_1</td>
<td>N_1P_2</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_4P_1K_2</td>
<td>S.E.</td>
<td>340 240 385 540 546 891 899 121 8</td>
<td>1031 Kg/ha.</td>
<td>7</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).  
Ref: Hr. 62(SFT) for Karnal and 62, 63, 65(SFT) for Ambala.

Site: District: Karnal and Ambala.  
Type: 'M'.

Object: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.
1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
   Same as in type A2 conducted under irrigated condition on Wheat crop on page No. 28.

3. DESIGN:
   Same as in type A1 conducted under irrigated condition on Wheat crop on page No. 25.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 for Karnal and 1962-66 for Ambala (64 N.A.). (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   Karnal
   62(SFT)
   Treatment
   N1  P1  P2  N1P1  N1P2  N1P3  N1P4  N1P5K1  S.E.
   Av. response of grain in Kg/ha.
   65  72  16  191  200  336  494  44.5
   Control yield=1452 Kg/ha.; No. of trials=4

   Ambala
   61(SFT)
   Treatment
   N1  P1  P2  N1P1  N1P2  N1P3  N1P4  N1P5K1  S.E.
   Av. response of grain in Kg/ha.
   365 -17  44  254  137  510  477  135.9
   Control yield=941 Kg/ha.; No. of trials=7

   63(SFT)
   Treatment
   N1  P1  P2  N1P1  N1P2  N1P3  N1P4  N1P5K1  S.E.
   Av. response of grain in Kg/ha.
   287  219  313  389  675  593  814  109.3
   Control yield=975 Kg/ha.; No. of trials=13

   65(SFT)
   Treatment
   N1  P1  P2  N1P1  N1P2  N1P3  N1P4  N1P5K1  S.E.
   Av. response of grain in Kg/ha.
   355 101 186 495 535 732 767 99.1
   Control yield=984 Kg/ha.; No. of trials=14

---

Crop :- Wheat (Kas). Ref :- Hr. 62 to 65 (SFT) for Hissar, Rohtak and Karnal, 62(SFT) for Gurgaon and 62, 63(SFT) for Ambala.

Site :- District : Hissar, Rohtak, Karnal, Gurgaon and Ambala.

Type :- 'M'.

Object :- Type A3 : To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.
1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O = Control (no manure),
N = 35 Kg/ha. of N,
K = 35 Kg/ha. of K_2O,
K_s = 70 Kg/ha. of K_2O,
N_1K = 35 Kg/ha. of N + 35 Kg/ha. of K_2O,
N_1K_2 = 35 Kg/ha. of N + 70 Kg/ha. of K_2O,
N_2K_2 = 70 Kg/ha. of N + 70 Kg/ha. of K_2O and
N_1P_1K_1 = 35 Kg/ha. of P_2O_5 + 35 Kg/ha. of K_2O.

3. DESIGN:
Same as in Type A, conducted under irrigated condition on Wheat crop on page No. 25.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962–66 for Hissar, Rohtak and Karnal, 1962 only for Gurgaon and 62 to 63 for Ambala. (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:
Hissar
62(SF1')
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_2</th>
<th>N_2K_2</th>
<th>N_1P_1K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>566</td>
<td>102</td>
<td>285</td>
<td>510</td>
<td>541</td>
<td>709</td>
<td>652</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>119.2</td>
</tr>
</tbody>
</table>

Control yield = 1471 Kg/ha.; No. of trials = 11

63(SF1')
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_2</th>
<th>N_2K_2</th>
<th>N_1P_1K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>439</td>
<td>44</td>
<td>185</td>
<td>521</td>
<td>508</td>
<td>609</td>
<td>636</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>77.0</td>
</tr>
</tbody>
</table>

Control yield = 1261 Kg/ha.; No. of trials = 10

64(SF1')
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_2</th>
<th>N_2K_2</th>
<th>N_1P_1K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>723</td>
<td>4</td>
<td>107</td>
<td>663</td>
<td>827</td>
<td>1154</td>
<td>841</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>90.2</td>
</tr>
</tbody>
</table>

Control yield = 1284 Kg/ha.; No. of trials = 12

65(SF1')
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_2</th>
<th>N_2K_2</th>
<th>N_1P_1K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>703</td>
<td>299</td>
<td>206</td>
<td>489</td>
<td>673</td>
<td>864</td>
<td>922</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>134.6</td>
</tr>
</tbody>
</table>

Control yield = 1249 Kg/ha.; No. of trials = 9

Rohtak
62(SF1')
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_2</th>
<th>N_2K_2</th>
<th>N_1P_1K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>270</td>
<td>79</td>
<td>130</td>
<td>311</td>
<td>352</td>
<td>449</td>
<td>452</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>32.4</td>
</tr>
</tbody>
</table>

Control yield = 1749 Kg/ha.; No. of trials = 14
### Rohtak

#### 62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>589</td>
<td>119</td>
<td>189</td>
<td>617</td>
<td>743</td>
<td>1094</td>
<td>1205</td>
<td>90.0</td>
</tr>
</tbody>
</table>

Control yield: 1301 Kg/ha.; No. of trials: 13

#### 63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>429</td>
<td>107</td>
<td>240</td>
<td>596</td>
<td>597</td>
<td>965</td>
<td>952</td>
<td>64.5</td>
</tr>
</tbody>
</table>

Control yield: 1561 Kg/ha.; No. of trials: 9

#### 64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>576</td>
<td>153</td>
<td>255</td>
<td>786</td>
<td>645</td>
<td>930</td>
<td>823</td>
<td>101.2</td>
</tr>
</tbody>
</table>

Control yield: 1532 Kg/ha.; No. of trials: 12

### Karnal

#### 62(SFT)

<table>
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<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>214</td>
<td>91</td>
<td>113</td>
<td>250</td>
<td>498</td>
<td>500</td>
<td>460</td>
<td>131.1</td>
</tr>
</tbody>
</table>

Control yield: 1523 Kg/ha.; No. of trials: 11

#### 63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>499</td>
<td>136</td>
<td>348</td>
<td>444</td>
<td>576</td>
<td>769</td>
<td>1034</td>
<td>111.7</td>
</tr>
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</table>

Control yield: 1275 Kg/ha.; No. of trials: 11

#### 64(SFT)

<table>
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<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>543</td>
<td>194</td>
<td>248</td>
<td>520</td>
<td>465</td>
<td>943</td>
<td>895</td>
<td>107.0</td>
</tr>
</tbody>
</table>

Control yield: 1401 Kg/ha.; No. of trials: 8

#### 65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>538</td>
<td>-16</td>
<td>76</td>
<td>420</td>
<td>508</td>
<td>924</td>
<td>971</td>
<td>123.3</td>
</tr>
</tbody>
</table>

Control yield: 1839 Kg/ha.; No. of trials: 11

### Gurgaon

#### 62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>226</td>
<td>200</td>
<td>25</td>
<td>317</td>
<td>572</td>
<td>711</td>
<td>910</td>
<td>103.6</td>
</tr>
</tbody>
</table>

Control yield: 961 Kg/ha.; No. of trials: 6
Ambala

62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_1</th>
<th>N_2K_2</th>
<th>N_3K_4</th>
<th>N_1P_1K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>486</td>
<td>-153</td>
<td>164</td>
<td>65</td>
<td>236</td>
<td>463</td>
<td>538</td>
<td>153.3</td>
</tr>
</tbody>
</table>

Control yield = 1411 Kg/ha.; No. of trials = 5

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_1</th>
<th>N_2K_2</th>
<th>N_3K_4</th>
<th>N_1P_1K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>300</td>
<td>18</td>
<td>374</td>
<td>375</td>
<td>577</td>
<td>343</td>
<td>560</td>
<td>200.1</td>
</tr>
</tbody>
</table>

Control yield = 1750 Kg/ha.; No. of trials = 4


Crop: Wheat (Rabi).
Site: District: Ambala.

Object: Type A: To study the response curves of important cereal, cash and oilseed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
   Same as in type A conducted under irrigated condition on Wheat crop on page No. 32.

3. DESIGN:
   Same as in type A conducted under irrigated condition on Wheat crop on page No. 25.

4. GENERAL:
   (i) to (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-66. (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_1</th>
<th>N_2K_2</th>
<th>N_3K_4</th>
<th>N_1P_1K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>354</td>
<td>-100</td>
<td>9</td>
<td>358</td>
<td>239</td>
<td>314</td>
<td>554</td>
<td>190.8</td>
</tr>
</tbody>
</table>

Control yield = 1127 Kg/ha.; No. of trials = 7

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_1</th>
<th>N_2K_2</th>
<th>N_3K_4</th>
<th>N_1P_1K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>281</td>
<td>96</td>
<td>143</td>
<td>314</td>
<td>525</td>
<td>708</td>
<td>810</td>
<td>87.9</td>
</tr>
</tbody>
</table>

Control yield = 909 Kg/ha.; No. of trials = 12

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_1</th>
<th>N_2K_2</th>
<th>N_3K_4</th>
<th>N_1P_1K_1</th>
<th>S.E.</th>
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</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>458</td>
<td>85</td>
<td>206</td>
<td>524</td>
<td>554</td>
<td>702</td>
<td>845</td>
<td>93.5</td>
</tr>
</tbody>
</table>

Control yield = 1388 Kg/ha.; No. of trials = 14

Ref: SS 62 to 65(SFT) for Ambala.
Crop: Wheat (Rabi).  
Site: Agri. Farm, Ambala.

Object: To study the effect of deep cultivation on the yield of Wheat.

1. Basal Conditions:
   (i) N.A.  (ii) Clay loam; Sandy loam.  
   (iii) 18.11.61; 25.11.62.  
   (iv) (a) As per treatments.  
   (b) to (e) N.A.  (vi) 44·8 Kglha. of N + 22·4 Kglha. of P₂O₅ as Super.  
   (vii) Irrigated.  
   (viii) 2 to 3 weedings.  

2. Treatments:
   3 depths of ploughings: D₁ = Shallow ploughing 10 cm. to 15 cm. deep, D₂ = Deep ploughing 20 cm. to 25 cm. depth and D₃ = Deep ploughing (Ripping up to 46 cm. deep).

3. Design:
   (i) R.B.D.  
   (ii) (a) 3. (b) N.A.  (iii) 4; 8. (iv) (a) N.A.  (b) 1/448 ha.; N.A.  (v) N.A.  (vi) Yes.

4. General:
   (i) Normal.  
   (ii) Nil.  
   (iii) Yield of grain.  
   (iv) (a) 1961-62.  (b) No.  
   (c) Results of combined analysis are presented under 5. Results.  

5. Results:
   Pooled results (i) 2260 Kglha. (ii) 442·6 Kglha. (based on 2 d.f. made up of Treatments × Years interaction).  
   (iii) Treatment differences are not significant.  
   (iv) Av. yield of grain in Kglha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<tbody>
<tr>
<td>Year 1961</td>
<td>2674</td>
<td>2693</td>
<td>2687</td>
<td>N.S.</td>
<td>2685</td>
<td>167·1</td>
</tr>
<tr>
<td>Year 1962</td>
<td>1780</td>
<td>2028</td>
<td>2333</td>
<td>**</td>
<td>2047</td>
<td>135·2</td>
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<tr>
<td>Pooled</td>
<td>2078</td>
<td>2250</td>
<td>2451</td>
<td>N.S.</td>
<td>2260</td>
<td>192·5</td>
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</tbody>
</table>

Crop: Wheat (Rabi).  
Site: Agri. Farm, Ambala.

Object: To study the residual effect of different crop rotations on the yield of Wheat.
1. BASAL CONDITIONS:
(i) N.A. (ii) Clay loam. (iii) 27.11.62. (iv) (a) 5 ploughings. (b) to (e) N.A. (v) 44·8 Kg/ha. of N+22·4 Kg/ha. of P, of (vi) N.A. (vii) Irrigated. (viii) 2 weedings and hoeings. (ix) N.A. (x) 3·5·63.

2. TREATMENTS:
5 crop rotations: T₁=Guara (G.M.)—Wheat, T₂=Guara (fodder)—Wheat, T₃=Chari Moth (fodder)—Wheat, T₄=Chari fodder—Wheat and T₅=Maize (Grain)—Wheat.

3. DESIGN:
(i) R.B.D. (ii) 5. (b) N.A. (iii) 6. (iv) and (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) and (vi) N.A. (vi) Yield for treatment T₅ is not available.

RESULTS:
(i) 1974 Kg/ha. (ii) 196·0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1946</td>
<td>1901</td>
<td>1975</td>
<td>2074</td>
<td></td>
</tr>
</tbody>
</table>

Crop:- Wheat (Rabi).
Object:- To study the effect of different seed rates on the different varieties of Wheat.

1. BASAL CONDITIONS:
(i) to (iii) N.A. (iv) (a) 6 to 8 ploughings. (b) Behind the plough. (c) As per treatments. (d) and (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS:
Main-plot treatments:
3 varieties: V₁=C-281, V₂=C-273 and V₃=C-286.
Sub-plot treatments:
4 seed rates: S₁=49·4, S₂=86·5, S₃=123·6 and S₄=148·3 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/block and 4 sub-plots/main-plot. (iii) 6. (iv) (a) N.A. (b) 1/395 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 3188 Kg/ha. (ii) (a) 1640·5 Kg/ha. (b) 457·8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
<th>Mean</th>
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<tbody>
<tr>
<td>V₁</td>
<td>2876</td>
<td>3311</td>
<td>3558</td>
<td>3321</td>
<td>3267</td>
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<tr>
<td>V₂</td>
<td>2896</td>
<td>3025</td>
<td>2965</td>
<td>3232</td>
<td>3029</td>
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<td>V₃</td>
<td>3153</td>
<td>3341</td>
<td>3262</td>
<td>3311</td>
<td>3267</td>
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<tr>
<td>Mean</td>
<td>2975</td>
<td>3226</td>
<td>3262</td>
<td>3388</td>
<td>3188</td>
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Ref:- Hr. 62(84).
Type:- 'CV'.

Object:- To study the effect of different seed rates on the different varieties of Wheat.
Crop: Wheat (Rabi).
Site: Govt. Recl. Farm, Nilokheri.

Ref: Hr. 60(150).
Type: 'CM'.

Object: To study the residual effect of different depths of ploughing.

1. BASAL CONDITIONS:
   (i) N.A. (ii) Highly saline sodic soil. (iii) 23.11.60. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 19.4.61.

2. TREATMENTS:
   Main-plot treatments:
   3 depths of ploughing: P₁ = Deep ploughing up to 23 cm., P₂ = Shallow ploughing up to 10 cm. and P₃ = Sub soil ploughing up to 45 cm.
   Sub-plot treatments:
   2 levels of manures: F₀ = No manure and F₁ = 56 Kg/ha. of N + 28 Kg/ha. of P₂O₅ as Super.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/197 69 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Fair. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 55 Kg/ha. (ii) (a) 118·2 Kg/ha. (b) 49·1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>F₀</td>
<td>72</td>
<td>94</td>
<td>64</td>
<td>77</td>
</tr>
<tr>
<td>F₁</td>
<td>70</td>
<td>186</td>
<td>84</td>
<td>113</td>
</tr>
<tr>
<td>Mean</td>
<td>71</td>
<td>140</td>
<td>74</td>
<td>95</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).
Site: Govt. Recl. Farm, Nilokheri.

Ref: Hr. 60(166).
Type: 'CM'.

Object: To study the residual effect of different crop rotations on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) (a) As per treatments. (b) and (c) N.A. (ii) Highly saline sodic soil. (iii) 15,11.60. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) 45 Kg/ha. of N as O/A/N + 22·5 Kg/ha. of P₂O₅ as Super + 22·5 Kg/ha. of K₂O as Pot. Sul. (vi) N.A. (vii) Irrigated. (viii) 2 to 3 hoeings. (ix) N.A. (x) 19.4.61.

2. TREATMENTS:
   Main-plot treatments:
   Sub-plot treatments:
   2 levels of manures: F₀ = 0 (no manure) and F₁ = 56 Kg/ha. of N + 28 Kg/ha. of P₂O₅ + 28 Kg/ha. of K₂O.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>P₂</td>
<td>P₃</td>
</tr>
<tr>
<td>F₀</td>
<td>72</td>
<td>94</td>
</tr>
<tr>
<td>F₁</td>
<td>70</td>
<td>186</td>
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<tr>
<td>Mean</td>
<td>71</td>
<td>140</td>
</tr>
</tbody>
</table>
3. DESIGN:
(i) Split-plot. (ii) (a) 6 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/790.75 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 225 Kg/ha. (ii) (a) 212.5 Kg/ha. (b) 117.0 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>Mean</th>
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<tbody>
<tr>
<td>W0</td>
<td>121</td>
<td>162</td>
<td>221</td>
<td>300</td>
<td>65</td>
<td>156</td>
</tr>
<tr>
<td>W1</td>
<td>305</td>
<td>212</td>
<td>340</td>
<td>380</td>
<td>281</td>
<td>162</td>
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<td>Mean</td>
<td>213</td>
<td>187</td>
<td>280</td>
<td>340</td>
<td>173</td>
<td>159</td>
</tr>
</tbody>
</table>

C.D. for F marginal means=70.9 Kg/ha.

Crop: Wheat (Rabi).

Object: To study the effect of different intervals and depths of irrigation.

1. BASAL CONDITIONS:
(i) N.A. (ii) Sandy loam. (iii) Nov., 63. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) C=281. (vi) Irrigated. (vii) 2 weedings. (ix) N.A. (x) April, 64.

2. TREATMENTS:
Main-plot treatments:
3 intervals of irrigation: W1=2, W2=3 and W3=4 weeks.

Sub-plot treatments:
3 depths of irrigation: D0=0, D1=3.7 and D2=7.5 cm.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/432.44 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 2425 Kg/ha. (ii) (a) 276.0 Kg/ha. (b) 327.0 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
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<td>W0</td>
<td>1995</td>
<td>2356</td>
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<td>W2</td>
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<tr>
<td>Mean</td>
<td>2097</td>
<td>2443</td>
<td>2736</td>
<td>2425</td>
</tr>
</tbody>
</table>

C.D. for D marginal means=222.6 Kg/ha.
Crop: Wheat (Rabi).
Site: Punjab Agri. University, (Hissar campus), Hissar. Ref: Hr. 65(38).

Object: To determine the irrigation requirement and its interaction with manures for Wheat crop.

1. BASAL CONDITIONS:
(i) (a) Cotton—Wheat. (b) Cotton. (c) N.A. (ii) Loam. (iii) Nov., 65. (iv) (a) 4 ploughings. (b) to (e) N.A. (v) 40 Kg/ha. of P2O5+40 Kg/ha. of K2O. (vi) H-14. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) April, 66.

2. TREATMENTS:
All combinations of (1) and (2)

(1) 8 irrigational treatments: T1=AI1+B11, T2=AI2+B12, T3=AI3+B13, T4=AI4+B14, T5=AI5+B15, T6=AI6+B16, T7=AI7+B17 and T8=Local practices of irrigation.

Where I1=Irrigation at 25% of available soil moisture, I2—Irrigation at 50% available soil moisture, I3—Irrigation at 75% of available soil moisture and A—Irrigation at preflowering stage, B—Irrigation at post flowering stage.

(2) 2 levels of N: N1=60 and N2=120 Kg/ha.

3. DESIGN:
(i) Factorial R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/370 ha. (v) —. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) 3 times Endrin spray. (iii) Yield of grain. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 1690 Kg/ha. (ii) 355 Kg/ha. (iii) Main effects of T and interaction T\times N are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
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<td>N1</td>
<td>1498</td>
<td>1598</td>
<td>1480</td>
<td>1950</td>
<td>1647</td>
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<td>N2</td>
<td>1598</td>
<td>1838</td>
<td>1695</td>
<td>1110</td>
<td>1610</td>
<td>1661</td>
<td>1961</td>
<td>2035</td>
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<tr>
<td>Mean</td>
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<td>1728</td>
<td>1588</td>
<td>1330</td>
<td>1628</td>
<td>1648</td>
<td>2133</td>
<td>1730</td>
</tr>
</tbody>
</table>

C.D. for T marginal means=356.9 Kg/ha.
C.D. for the body of T\times N table=504.7 Kg/ha.

Crop: Barley (Rabi).

Object: To study the effects of N and P2O5 on the yield of Barley.

1. BASAL CONDITIONS:
(i) N.A. (ii) Sandy loam. (iii) 25.11.64. (iv) (a)4 to 5 ploughings. (b) N.A. (c) 77 Kg/ha. (d) 22 cm. row to row. (e) N.A. (v) N.A. (vi) C—164. (vii) Irrigated. (viii) 1 hoeing. (ix) N.A. (x) May, 65.

2. TREATMENTS:
Main-plot treatments:
3 levels of N: N0=0, N1=33.6 and N2=67.2 Kg/ha.

Sub-plot treatments:
3 levels of P2O5: P0=0, P1=28 and P2=56 Kg/ha.

(Time and kind is N.A.)
3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/988.44 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 3719 Kg/ha. (ii) (a) 676.0 Kg/ha. (b) 345.5 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>P₁</th>
<th>P₉</th>
<th>Mean</th>
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<tr>
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<tr>
<td>N₂</td>
<td>5078</td>
<td>4868</td>
<td>5392</td>
<td>5113</td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 502.0 Kg/ha.

CROP: Barley (Rabi).
Site: Govt. Recl. Farm, Nilokheri.

Ref: Hr. 60(155).
Type: 'M'.

Object: To study the residual effect of different soil amendments on the yield of Barley.

1. BASAL CONDITIONS:
(i) N.A. (ii) Highly saline sodic soil. (iii) 15.11.60. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (f) and (vi) N.A. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 5.4.61.

2. TREATMENTS:
11 manurial treatments: T₀=Control, T₁=Gypsum 101.6 Q/ha., T₂=Sulphur 900 Kg/ha., T₃=H₂SO₄ 3153 litre/ha., T₄=HNO₃ 5219 litre/ha., T₅=Hcl 3865 litre/ha., T₆=Al sulphate 6160 Kg/ha., T₇=F.Y.M. 375.9 Q/ha., T₈=F.Y.M. 375.9 Q/ha.+Press-mud 101.6 Q/ha., T₉=F.Y.M. 375.9 Q/ha.+Mollazes 101.6 Q/ha, and T₁₀=Press-mud 101.6 Q/ha.+Mollazes 101.6 Q/ha.

All applied in 1958—59.

3. DESIGN:
(i) R.B.D. (ii) (a) 11. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/747.5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 114.5 Kg/ha. (ii) 156.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
<th>T₈</th>
<th>T₉</th>
<th>T₁₀</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>48.8</td>
<td>162.0</td>
<td>119.6</td>
<td>49.8</td>
<td>87.2</td>
<td>17.4</td>
<td>107.1</td>
<td>25.0</td>
<td>75.0</td>
<td>416.1</td>
<td>150.0</td>
</tr>
</tbody>
</table>
Crop: Barley (Rabi). Ref: Hr. 60(138).
Site: Agri. Farm, Ambala. Type: "C".

Object:—To study the effect of different depths of ploughing on the yield of Barley.

1. BASAL CONDITIONS:
(i) N.A. (ii) Clay loam. (iii) 24.12.50. (iv) (a) 3 ploughings. (b) Kera method. (c) to (6) N.A. (v) Nil. (vi) Local. (vii) Irrigated. (viii) 2 hoeings and 2 weedicings. (ix) N.A. (x) 2.5.61.

2. TREATMENTS:
3 cultivation practices: P1=Shallow ploughing (3 to 10 cm. deep), P2=Deep ploughing (10 to 25 cm. deep) and P3=Ripping (25 to 45 cm. deep).

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/448'58 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv)(a) 1960—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1201 Kg/ha. (ii) 370.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1155</td>
<td>1287</td>
<td>1162</td>
</tr>
</tbody>
</table>

Crop: Barley (Rabi). Ref: Hr. 62(93).
Site: Agri. Res. Sta., Gurgaon. Type 'C'.

Object:—To study the effect of topping on the yield of Barley.

1. BASAL CONDITIONS:
(i) N.A. (ii) Sandy loam. (iii) 15.11.62. (iv) N.A. (v) N.A. (vi) C—138. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
2 topping treatments: T1=Topping on 20.1.63 and T2=No topping.

3. DESIGN:
(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/1482'87 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv)(a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 3037 Kg/ha. (ii) 121.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3165</td>
<td>2009</td>
</tr>
</tbody>
</table>
Crop : Barley (Rabi).


Object : To study the effect of different seed rates and spacings on the yield of Barley crop.

1. BASAL CONDITIONS :
   (i) N.A. (ii) Sandy loam. (iii) 5.11.64. (iv) (a) 3 ploughings. (b) Para method. (c) As per treatments.
   (d) and (e) N.A. (vi) C -164. (vii) Irrigated. (viii) 2 hoeings and 2 weedings. (ix) N.A. (x) May, 65.

2. TREATMENTS :
   Main-plot treatments :
   3 spacings : S1=15, S2=22 and S3=30 cm.
   Sub-plot treatments :
   3 seed rates : R1=62, R2=87 and R3=112 Kg/ha.

3. DESIGN :
   (i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A.
   (b) 1/984/44 ha. (v) N.A. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :
   (i) 3011 Kg/ha. (ii) (a) 3419.2 Kg/ha. (b) 536.4 Kg/ha. (iii) None of the effects is significant. (iv) Av.
   yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
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<td>2990</td>
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<td>2994</td>
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<tr>
<td>R2</td>
<td>3076</td>
<td>2743</td>
<td>3034</td>
<td>2953</td>
</tr>
<tr>
<td>R3</td>
<td>2891</td>
<td>3002</td>
<td>3361</td>
<td>3085</td>
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<tr>
<td>Mean</td>
<td>2936</td>
<td>2912</td>
<td>3184</td>
<td>3111</td>
</tr>
</tbody>
</table>

Crop : Barley (Rabi).

Site : Govt. Recl. Farm, Nillokheri.

Objective : To study the effect of different levels of leaching on the yield of Barley.

1. BASAL CONDITIONS :
   (i) N.A. (ii) Highly saline sodic soil. (iii) 9.11.60. (iv) (a) 4-5 ploughings. (b) to (e) N.A. (v) 45 Kg/ha.
   of N +22.5 Kg/ha. of P2O5. (vi) N.A. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) 5.4.61.

2. TREATMENTS :
   Main-plot treatments :
   All combinations of (1) and (2)
   (1) 2 levels of Gypsum : G0—No gypsum and G1—Gypsum at 101.6 Kg/ha.
   (2) 3 levels of leaching : T1—No leaching, T2=30 cm. leaching and T3=91 cm. leaching.

   Sub-plot treatments :
   2 levels of fertilizer : F0—No fertilizer and F1=45 Kg/ha. of N+32.5 Kg/ha. of P2O5.
3. DESIGN:
(i) Split-plot. (ii) 6 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/190-66 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 420 Kg/ha. (ii) (a) 196-4 Kg/ha. (b) 221-4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>F1</th>
<th>F2</th>
<th>Mean</th>
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<tbody>
<tr>
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<td>470</td>
<td>348</td>
<td>337</td>
<td>389</td>
<td>380</td>
<td>385</td>
</tr>
<tr>
<td>G1</td>
<td>346</td>
<td>388</td>
<td>429</td>
<td>553</td>
<td>356</td>
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<tr>
<td>Mean</td>
<td>408</td>
<td>468</td>
<td>383</td>
<td>471</td>
<td>368</td>
<td>420</td>
</tr>
<tr>
<td>F1</td>
<td>423</td>
<td>350</td>
<td>331</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>F2</td>
<td>393</td>
<td>566</td>
<td>433</td>
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</table>

Crop: --- Barley (Rabi).

Site: --- Govt. Recl. Farm, Nilokheri.

Object: --- To study the effect of different depths of ploughing on the yield of Barley.

1. BASAL CONDITIONS:
(i) N.A. (ii) Highly saline sodic soil. (iii) 26.11.60. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) 2 to 5 weedings. (ix) N.A. (x) 0.5.61.

2. TREATMENTS:
Main-plot treatments:
3 depths of ploughing: P1 = 15 to 23 cm., P2 = 23 to 30 cm. and P3 = 30 to 46 cm.

Sub-plot treatments:
2 levels of N as C/A/N: N0 = 0 and N1 = 45 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 2 sub-plots/main-plot. (iii) 3. (iv) (a) N.A. (b) 1/190-66 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 638 Kg/ha. (ii) (a) 178.4 Kg/ha. (b) 85.3 Kg/ha. (iii) Main effect of P is significant and that of N is highly significant. Interaction P×N is significant. (iv) Av. yield of grain in Kg/ha.
Crop: Barley (Rabi).


Object: To study the effects of different levels of fertilizers and spacings on varieties of Barley.

1. BASAL CONDITIONS:
   (i) N.A. (ii) Sandy loam. (iii) 26.11.64. (iv) (a) 3 ploughings. (b) Pora. (c) N.A. (d) As per treatments. (e) Nil. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 hoelings. (ix) N.A. (x) May, 65.

2. TREATMENTS:
   Main-Plot treatments:
   2 varieties: V₁ = C-164 and V₂ = BJ-32.
   Sub-plot treatments:
   2 levels of N: N₀ = 0 and N₁ = 56 Kgf/ha.
   Sub-sub-plot treatments:
   2 spacings: S₁ = 15 and S₂ = 22 cm. between rows.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/replication; 2 sub-plots/main-plot; 2 sub-sub-plots/sub-plot. (b) N.A. (iii) 6. (iv) (a) 1/988·44 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964-only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 2520 Kg/ha. (ii) (a) 850·0 Kg/ha. (b) 550·6 Kg/ha. (c) 380·1 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
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<th>S₁</th>
<th>S₂</th>
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<td>2957</td>
<td>2561</td>
<td>2759</td>
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<td>2619</td>
<td>2413</td>
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<td>Mean</td>
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<td>2899</td>
<td>2085</td>
<td>2335</td>
<td>2520</td>
</tr>
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</table>

C.D. for N marginal means=354·1 Kg/ha.

C.D. for P marginal means=327·8 Kg/ha.

C.D. for N means at the same level of P=170·4 Kg/ha.

C.D. for P means at the same level of N=310·1 Kg/ha.
Crop :- Barley (Rabi).
Site :- Agri. Res. Sta., Gurgaon.
Refer :- Hr. 62(94).
Type :- 'I'.

Object :- To study the effect of different irrigations on the yield of Barley.

1. BASAL CONDITIONS:
(i) N.A. (ii) Sandy loam. (iii) 15.11.62. (iv) and (v) N.A. (vi) C—138. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
2 irrigational treatments : T₁—Liberal irrigation at one week's interval and T₂—Normal irrigation at one week's interval.

3. DESIGN:
(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/247-1 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 580 Kg/ha. (ii) 24.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>593</td>
<td>568</td>
</tr>
</tbody>
</table>

Crop :- Oats (Fodder) (Rabi).
Site :- Fodder Res. Sta., Sirsa.
Refer :- Hr. 62(77).
Type :- 'CV'.

Object :- To study the effect of dates of sowing on the yield of Oats.

1. BASAL CONDITIONS:
(i) N.A. (ii) Loam. (iii) As per treatments. (iv) (a) and (b) N.A. (c) 63 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 5 varieties : V₁= Fulgham 109, V₂= CI-94988, V₃= Marotax Bond, V₄= 37/14 and V₅= Weston 11.
(2) 3 dates of sowing : D₁= 10.10.62, D₂= 25.10.62 and D₃= 10.11.62.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 15. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/209-8 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 440 Q/ha. (ii) 60-6 Q/ha. (iii) Main effect of D is highly significant and interaction VxD is significant. (iv) Av. yield of fodder in Q/ha.

<table>
<thead>
<tr>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
<th>V₅</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>D₁</td>
<td>315</td>
<td>480</td>
<td>507</td>
<td>436</td>
<td>471</td>
</tr>
<tr>
<td>D₂</td>
<td>434</td>
<td>424</td>
<td>375</td>
<td>532</td>
<td>512</td>
</tr>
<tr>
<td>D₃</td>
<td>387</td>
<td>325</td>
<td>417</td>
<td>404</td>
<td>414</td>
</tr>
<tr>
<td>Mean</td>
<td>445</td>
<td>410</td>
<td>433</td>
<td>447</td>
<td>466</td>
</tr>
</tbody>
</table>

C.D. for D marginal means—38-6 Q/ha.
C.D. for the body of the VxD table—86-4 Q/ha.
**Crop:** Bajra (Kharif).  
**Ref:** Hr. 60(15).  
**Type:** 'M'.

**Object:** To study the effect of different doses of fertilizers on the yield of Bajra.

1. **BASAL CONDITIONS:**
   
   (i) N.A.  
   (ii) Sandy loam.  
   (iii) 29.7.60.  
   (iv) (a) and (b) N.A.  
   (c) 3'8 Kg/ha.  
   (d) and (e) N.A.  
   (f) T - 55.  
   (v) Irrigated.  
   (vi) T - 55.  
   (vii) N.A.  
   (x) 15.10.60.

2. **TREATMENTS:**

   4 manurial treatments:
   
   M<sub>0</sub> = Control (no manure),  
   M<sub>1</sub> = 44.8 Kg/ha. of N as C/A/N,  
   M<sub>2</sub> = M<sub>1</sub> + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and  
   M<sub>3</sub> = M<sub>2</sub> + 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.

3. **DESIGN:**

   (i) Randomized Block Design.  
   (ii) 4 treatments.  
   (iii) N.A.  
   (iv) N.A.  
   (v) 1/42 ha.  
   (vi) N.A.  
   (vii) N.A.  
   (ix) N.A.

4. **GENERAL:**

   (i) Normal.  
   (ii) N.A.  
   (iii) Yield of grain.  
   (iv) 1960 only.  
   (v) N.A.

5. **RESULTS:**

   (i) 292 Kg/ha.  
   (ii) 850 Kg/ha.  
   (iii) Treatment differences are not significant.  
   (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M&lt;sub&gt;0&lt;/sub&gt;</th>
<th>M&lt;sub&gt;1&lt;/sub&gt;</th>
<th>M&lt;sub&gt;2&lt;/sub&gt;</th>
<th>M&lt;sub&gt;3&lt;/sub&gt;</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2803</td>
<td>3418</td>
<td>3222</td>
<td>2526</td>
<td></td>
</tr>
</tbody>
</table>

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**Crop:** Bajra (Kharif).  
**Ref:** Hr. 62, 63(SFT) for Hissar and 62(SFT) for Rohtak.  
**Type:** 'M'.

**Object:** Type A<sub>1</sub>: To study the response curves to important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS:**

   (i) to (vi) N.A.  
   (vii) Irrigated.  
   (viii) to (x) N.A.

2. **TREATMENTS:**

   8 manurial treatments:
   
   O = Control (no manure),  
   N<sub>1</sub> = 35 Kg/ha. of N<sub>2</sub>,  
   N<sub>2</sub> = 70 Kg/ha. of N<sub>2</sub>,  
   P<sub>1</sub> = 35 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,  
   N<sub>1</sub>P<sub>1</sub> = 35 Kg/ha. of N<sub>2</sub>P<sub>1</sub>,  
   N<sub>2</sub>P<sub>1</sub> = 70 Kg/ha. of N<sub>2</sub>P<sub>1</sub>,  
   N<sub>1</sub>P<sub>2</sub> = 70 Kg/ha. of N<sub>2</sub>P<sub>2</sub>,  
   N<sub>2</sub>P<sub>1</sub>K<sub>1</sub> = 70 Kg/ha. of N<sub>2</sub>P<sub>1</sub>K<sub>1</sub>,  
   N<sub>2</sub>P<sub>2</sub>K<sub>1</sub> = 70 Kg/ha. of N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>,  
   N<sub>2</sub>P<sub>2</sub>K<sub>2</sub> = 35 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and  
   K<sub>2</sub>O.

3. **DESIGN:**

   (i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50 - 100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A<sub>1</sub>, 11 of type A<sub>2</sub>, 11 of type A<sub>3</sub> and 3 are of type C. The eleven experiments under type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A<sub>1</sub>, A<sub>2</sub>
and A₄ experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A₁, A₂ and A₄ are laid out. For conducting the three type—C trials three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/500 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—66 for Hissar (64 and 65 N.A.) and 1962 only for Rohtak. (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

Hissar
61(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₁P₃</th>
<th>N₁P₄</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>467</td>
<td>706</td>
<td>297</td>
<td>386</td>
<td>550</td>
<td>439</td>
<td>613</td>
<td>318</td>
</tr>
</tbody>
</table>

Control yield=404 Kg/ha.; No. of trials=6

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₁P₃</th>
<th>N₁P₄</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>121</td>
<td>233</td>
<td>26</td>
<td>151</td>
<td>209</td>
<td>332</td>
<td>324</td>
<td>230</td>
</tr>
</tbody>
</table>

Control yield=349 Kg/ha.; No. of trials=4

Rohtak
62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₁P₃</th>
<th>N₁P₄</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>99</td>
<td>139</td>
<td>51</td>
<td>145</td>
<td>156</td>
<td>214</td>
<td>254</td>
<td>268</td>
</tr>
</tbody>
</table>

Control yield=1398 Kg/ha.; No. of trials=7

Crop :- Bajra (Kharif).

Site :- District : Hissar and Rohtak.

Ref :- Hr. 60 and 61(SFT).

Type :- 'M'.

Object :- Type A: To study the response of Bajra to levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:

8 manurial treatments :

O=Control (no manure),
N=22.4 Kg/ha. of N,
P=22.4 Kg/ha. of P₂O₅,
K=22.4 Kg/ha. of K₂O,
NP=22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅,
NK=22.4 Kg/ha. of N+22.4 Kg/ha. of K₂O,
PK=22.4 Kg/ha. of P₂O₅+22.4 Kg/ha. of K₂O and
NPK=22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅+22.4 Kg/ha. of K₂O.
3. DESIGN:

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trails in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 11 trials in a year, 8 on Kharif cereal, 8 on a rabi cereal, 8 on a cash crop, 4 on an oilseed crop and 3 on a legume crop. Half the number of trials conducted are of type-A and other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied in type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-61. (b) and (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

| District | No. of trials | Control yield in Kg/ha. | N | P | K | S.E. | NP | NK | PK | NPK | S.E. |
|----------|---------------|-------------------------|---|---|---|-------|---|---|----|-----|-----|-----|
| Hissar   | 7             | 510                     | 130| 60| 20| 11.0  | -10| -10| 30 | 20  |     |     |
| Rohtak   | 7             | 700                     | 170| 100| 50| 13.0  | 20 | 10 | 20 | -30 | 17.0 |     |
| 61(SFT)  |               |                         |    |    |    |        |    |    |    |     |      |     |
| Hissar   | 12            | 440                     | 170| 70 | 10| 20.0  | 0  | 10 | -50| 0   | 18.0 |     |
| Rohtak   | 7             | 700                     | 150| 70 | 50| 22.0  | 10 | 10 | 20 | -20 | 18.0 |     |

**Crop**: Bajra (*Kharif*).

**Site**: District : Rohtak and Hissar.

**Object**: Type B : To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:

(i) to (x) N.A.

2. TREATMENTS:

7 manurial treatments:

- O = Control (no manure),
- \( n_1 = 22.4 \text{ Kg/ha. of N as } \text{A/S} \),
- \( n_2 = 44.8 \text{ Kg/ha. of N as } \text{A/S} \),
- \( n_1' = 22.4 \text{ Kg/ha. of N as } \text{Urea} \),
- \( n_2' = 44.8 \text{ Kg/ha. of N as } \text{Urea} \),
- \( n_1'' = 22.4 \text{ Kg/ha. of N as } \text{C/A/N} \),
- \( n_2'' = 44.8 \text{ Kg/ha. of N as } \text{C/A/N} \).

3. DESIGN:

Same as in type A conducted on Bajra crop on page No. 47.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) and (c) Nil. (v) Nil. (vi) and (vii) N.A.
5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha</th>
<th>Av. response in Kg/ha</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rohtak</td>
<td>5</td>
<td>840</td>
<td>240</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>370</td>
<td>170</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>350</td>
<td>130</td>
</tr>
</tbody>
</table>

Crop : Bajra (Kharif).
Ref : Hr. 64(SFT).

Site : District : Hissar and Rohtak.
Type : ‘MP’.

Object : Type B : To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS :
   (i) to (x) N.A.

2. TREATMENTS :
   7 manurial treatments :
   - O = Control (no manure),
   - \( n_1 = 22.4 \text{ Kg/ha. of N as A/S}, \)
   - \( n_2 = 44.8 \text{ Kg/ha. of N as A/S}, \)
   - \( n_1' = 22.4 \text{ Kg/ha. of N as urea}, \)
   - \( n_2' = 44.8 \text{ Kg/ha. of N as urea}, \)
   - \( n_1'' = 22.4 \text{ Kg/ha. of N as A/S/N and} \)
   - \( n_2'' = 44.8 \text{ Kg/ha. of N as A/S/N}. \)

3. DESIGN :
   Same as in type A conducted on Bajra crop on page No. 4k.

4. GENERAL :
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-only. (b) and (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS :

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha</th>
<th>Av. response in Kg/ha</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hissar</td>
<td>11</td>
<td>450</td>
<td>160</td>
<td>390</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>340</td>
<td>440</td>
</tr>
<tr>
<td>Rohtak</td>
<td>7</td>
<td>740</td>
<td>100</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>390</td>
<td>390</td>
</tr>
</tbody>
</table>

Crop : Bajra (Kharif).
Ref : Hr. 63, 64(SFT) for Hissar and 62(SFT) for Rohtak.

Site : District : Hissar and Rohtak.
Type : ‘M’.

Object :—Type A2 : To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :
   (i) to (vii) N.A. (viii) Irrigated. (ix) to (x) N.A.
2. TREATMENTS:
8 manurial treatments:
- Control (no manure),
- \( \text{N}_1=35 \text{ Kgf/ha. of } \text{N} \)
- \( \text{P}_1=35 \text{ Kgf/ha. of } \text{P}_2 \text{O}_5 \)
- \( \text{P}_2=70 \text{ Kgf/ha. of } \text{P}_2 \text{O}_5 \)
- \( \text{N}_1\text{P}_1=35 \text{ Kgf/ha. of } \text{N}+35 \text{ Kgf/ha. of } \text{P}_2 \text{O}_5 \)
- \( \text{N}_1\text{P}_2=35 \text{ Kgf/ha. of } \text{N}+70 \text{ Kgf/ha. of } \text{P}_2 \text{O}_5 \)
- \( \text{N}_2\text{P}_1=70 \text{ Kgf/ha. of } \text{N}+70 \text{ Kgf/ha. of } \text{P}_2 \text{O}_5 \)
- \( \text{N}_2\text{P}_2=70 \text{ Kgf/ha. of } \text{N}+70 \text{ Kgf/ha. of } \text{P}_2 \text{O}_5 \)

3. DESIGN:
Same as in type A1 conducted under irrigated condition on Bajra crop on page No. 46.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—66 for Hissar (64, 65 N.A.) and 1962—66 for Rohtak (63, 64, 65 N.A.). (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
Hissar
62(SFT)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P3</th>
<th>N1P3</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>269</td>
<td>122</td>
<td>207</td>
<td>310</td>
<td>307</td>
<td>481</td>
<td>367</td>
<td>29</td>
</tr>
<tr>
<td>Control yield=482 Kg/ha. ; No. of trials=5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

63(SFT)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P3</th>
<th>N2P3</th>
<th>N1P3</th>
<th>N1P1</th>
<th>N2P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>148</td>
<td>29</td>
<td>88</td>
<td>192</td>
<td>230</td>
<td>349</td>
<td>364</td>
<td>30</td>
</tr>
<tr>
<td>Control yield=425 Kg/ha. ; No. of trials=4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rohtak
62(SFT)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P3</th>
<th>N1P3</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>150</td>
<td>113</td>
<td>172</td>
<td>49</td>
<td>84</td>
<td>248</td>
<td>270</td>
<td>66</td>
</tr>
<tr>
<td>Control yield=1517 Kg/ha. ; No. of trials=5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Bajra (Kharif). Ref :- 64(SFT) for Hissar, 62 to 65(SFT) for Rohtak and 62(SFT) for Gurgaon.

Site - District : Hissar, Rohtak and Gurgaon.

Type 1- ‘M’.

Object :- Type A1: To study the response curves of important cereal, cash and oil seed crops to \( N \) applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS and J. DESIGN:
Same as in type A1 conducted under irrigated condition on Bajra crop on page No. 46.
4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain, (iv) (a) 1964 for Hissar, 62 to 66 for Rohtak and 1962 for Gurgaon.
(b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

Hissar
64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>247</td>
<td>464</td>
<td>32</td>
<td>315</td>
<td>382</td>
<td>472</td>
<td>479</td>
<td>63.9</td>
</tr>
</tbody>
</table>

Control yield = 764 Kg/ha.; No. of trials = 5

Rohtak
62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>160</td>
<td>216</td>
<td>76</td>
<td>167</td>
<td>209</td>
<td>238</td>
<td>321</td>
<td>40.0</td>
</tr>
</tbody>
</table>

Control yield = 561 Kg/ha.; No. of trials = 8

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>143</td>
<td>255</td>
<td>44</td>
<td>181</td>
<td>327</td>
<td>312</td>
<td>499</td>
<td>600.0</td>
</tr>
</tbody>
</table>

Control yield = 947 Kg/ha.; No. of trials = 4

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>79</td>
<td>113</td>
<td>4</td>
<td>128</td>
<td>153</td>
<td>187</td>
<td>182</td>
<td>26.6</td>
</tr>
</tbody>
</table>

Control yield = 541 Kg/ha.; No. of trials = 4

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>146</td>
<td>208</td>
<td>72</td>
<td>176</td>
<td>250</td>
<td>305</td>
<td>329</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Control yield = 792 Kg/ha.; No. of trials = 16

Gurgaon
62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>-16</td>
<td>227</td>
<td>-100</td>
<td>153</td>
<td>222</td>
<td>286</td>
<td>583</td>
<td>246.6</td>
</tr>
</tbody>
</table>

Control yield = 1037 Kg/ha.; No. of trials = 3

Crop : Bajra ('Kharif').
Ref :- Hr. 62 to 65(SFT) for Rohtak and 64(SFT) for Hissar.

Site :- District : Rohtak and Hissar. Type : 'M'.

Object :- Type A2 : To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.
1. **BASAL CONDITIONS:**
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. **TREATMENTS:**
Same as in type A₂ conducted under irrigated condition on Bajra crop on page No. 50.

3. **DESIGN:**
Same as in type A₂ conducted under irrigated condition on Bajra crop on page No. 46.

4. **GENERAL:**
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-66 for Rohtak and 1964 for Hissar. (b) and (c) Nil. (v) to (vii) Nil.

5. **RESULTS:**

**Robtak**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. response of grain in Kg/ha.</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₂</td>
<td>96</td>
<td>46</td>
</tr>
<tr>
<td>Control yield=662 Kg/ha.; No. of trials=9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. response of grain in Kg/ha.</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₂</td>
<td>60</td>
<td>22</td>
</tr>
<tr>
<td>Control yield=1000 Kg/ha.; No. of trials=3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. response of grain in Kg/ha.</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₂</td>
<td>74</td>
<td>19</td>
</tr>
<tr>
<td>Control yield=597 Kg/ha.; No. of trials=4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. response of grain in Kg/ha.</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₂</td>
<td>242</td>
<td>61</td>
</tr>
<tr>
<td>Control yield=702 Kg/ha.; No. of trials=16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hissar**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. response of grain in Kg/ha.</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₂</td>
<td>24</td>
<td>91</td>
</tr>
<tr>
<td>Control yield=730 Kg/ha.; No. of trials=5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Crop:** Bajra *(Kharif)*. **Ref:** Hr. 62 to 64(SFT) for Hissar and 64(SFT) for Rohtak.

**Site:** District: Hissar and Rohtak. **Type:** 'M'.

**Object:** Type A₂: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.
1. BASAL CONDITIONS:
(i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
- O = Control (no manure),
- \( N_1 = 35 \) Kg/ha. of \( N \),
- \( K_1 = 35 \) Kg/ha. of \( K_2O \),
- \( K_2 = 70 \) Kg/ha. of \( K_2O \),
- \( N_1K_1 = 35 \) Kg/ha. of \( N \) + \( 35 \) Kg/ha. of \( K_1O \),
- \( N_1K_2 = 35 \) Kg/ha. of \( N \) + \( 70 \) Kg/ha. of \( K_1O \),
- \( N_2K_2 = 70 \) Kg/ha. of \( N \) + \( 70 \) Kg/ha. of \( K_2O \) and
- \( N_1P_1K_1 = 35 \) Kg/ha. of \( N \) + \( 35 \) Kg/ha. of \( P_1O \) + 35 Kg/ha. of \( K_1O \).

3. DESIGN:
Same as in type A1 conducted under irrigated condition on bajra crop on page No. 46.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1962-64 for Hissar and 62 only for Rohtak,  (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1K_1 )</th>
<th>( N_1K_2 )</th>
<th>( N_1P_1K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>250</td>
<td>119</td>
<td>161</td>
<td>347</td>
<td>314</td>
<td>333</td>
<td>366</td>
</tr>
<tr>
<td>S.E.</td>
<td>99·5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 389 Kg/ha.; No. of trials = 4

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1K_1 )</th>
<th>( N_1K_2 )</th>
<th>( N_1P_1K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>163</td>
<td>29</td>
<td>60</td>
<td>148</td>
<td>202</td>
<td>306</td>
<td>202</td>
</tr>
<tr>
<td>S.E.</td>
<td>18·0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 390 Kg/ha.; No. of trials = 3

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1K_1 )</th>
<th>( N_1K_2 )</th>
<th>( N_1P_1K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>228</td>
<td>23</td>
<td>52</td>
<td>256</td>
<td>373</td>
<td>472</td>
<td>327</td>
</tr>
<tr>
<td>S.E.</td>
<td>89·4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 617 Kg/ha.; No. of trials = 5

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1K_1 )</th>
<th>( N_1K_2 )</th>
<th>( N_1P_1K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>117</td>
<td>40</td>
<td>85</td>
<td>154</td>
<td>146</td>
<td>274</td>
<td>274</td>
</tr>
<tr>
<td>S.E.</td>
<td>68·4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1246 Kg/ha.; No. of trials = 7

Crop: Bajra (Kharif).
Site: District: Rohtak.
Type: "M".

Object: Type A1: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.
1. BASAL CONDITIONS:
   (i) to (vi) N.A.  (vii) Unirrugged.  (viii) to (x) N.A.

2. TREATMENTS:
   Same as in type A conducted under irrigated condition on Bajra crop on page No. 53.

3. DESIGN:
   Same as in type A conducted under irrigated condition on Bajra crop on page No. 46.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1962—66.  (b) and (c) N.A.  (v) to (vii) Nil.

5. RESULTS:

62 (SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K2</th>
<th>N1P1K1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>91</td>
<td>67</td>
<td>345</td>
<td>136</td>
<td>164</td>
<td>215</td>
<td>248</td>
</tr>
</tbody>
</table>

Control yield—577 Kg/ha.; No. of trials—8

63 (SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K2</th>
<th>N1P1K1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>77</td>
<td>15</td>
<td>35</td>
<td>74</td>
<td>119</td>
<td>232</td>
<td>264</td>
</tr>
</tbody>
</table>

Control yield—936 Kg/ha.; No. of trials—3

64 (SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K2</th>
<th>N1P1K1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>47</td>
<td>23</td>
<td>27</td>
<td>79</td>
<td>86</td>
<td>173</td>
<td>201</td>
</tr>
</tbody>
</table>

Control yield—557 Kg/ha.; No. of trials—5

65 (SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K2</th>
<th>N1P1K1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>198</td>
<td>23</td>
<td>81</td>
<td>115</td>
<td>204</td>
<td>296</td>
<td>284</td>
</tr>
</tbody>
</table>

Control yield—785 Kg/ha.; No. of trials—12

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**Crop:** Bajra (Kharif).

**Ref.** Hr. 64(207).

**Site:** Punjab Agri. University (Hissar Campus), Hissar. Type — 'P'.

**Object:** To study the effect of different times of irrigation.

1. BASAL CONDITIONS:
   (i) (ii) to (c) N.A.  (ii) Sandy loam.  (iii) 4.8.64.  (iv) (a) N.A.  (b) Line sowing behind the plough.
   (c) 3 Kg/ha.  (d) 30 cm. apart.  (e) 1 seed/hole.  (v) N.A.  (vi) T—53.  (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   4 times of irrigation: I1—No irrigation, I2—One irrigation at full flowering stage, I3—One irrigation at peak flowering stage and I4—Two irrigations at pre and peak flowering stage.
**Object:** To see the effect of different times of weed removal on the yield of Bajra.

1. **BASAL CONDITIONS:**
   - (i) (a) to (c) N.A.
   - (ii) Sandy loam.
   - (iii) 15.7.65.
   - (iv) (a) 2 ploughings.
   - (b) Pora.
   - (c) 22.4 Kg/ha. of C/A/N.
   - (d) 30 cm. row to row.
   - (e) N.A.
   - (f) 427 Kg/ha. of C/A/N.
   - (g) T-55.
   - (h) Irrigated.
   - (i) As per treatments.
   - (j) N.A.
   - (k) Mid-Oct., 65.

2. **TREATMENTS:**
   - 7 times of weed removal: W_0 = Through out the season weeds are not allowed to grow, W_1 = Full weed removal 3 weeks after sowing, W_2 = Full weed removal 5 weeks after sowing, W_3 = Full weed removal 7 weeks after sowing, W_4 = Full weed removal 9 weeks after sowing, W_5 = Full weed removal 11 weeks after sowing and W_6 = Weeds not removed, allowed to grow.

3. **DESIGN:**
   - (i) R.B.D. (ii) 7. (b) N.A.
   - (iii) 4. (iv) and (v) N.A.

4. **GENERAL:**
   - (i) Normal.
   - (ii) Nil.
   - (iii) Yield of grain.
   - (iv) (a) 1965—contd.
   - (b) No.
   - (c) Nil.
   - (v) to (vii) N.A.

**RESULTS:**
- (i) 825.9 Kg/ha.
- (ii) Treatment differences are highly significant.
- (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W_0</th>
<th>W_1</th>
<th>W_2</th>
<th>W_3</th>
<th>W_4</th>
<th>W_5</th>
<th>W_6</th>
<th>C.D.-127 Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3102</td>
<td>2988</td>
<td>2555</td>
<td>1778</td>
<td>1416</td>
<td>1338</td>
<td>1329</td>
<td></td>
</tr>
</tbody>
</table>

---

**Crop:** Bajra (Kharij).  
**Site:** Punjab Agr. University (Hissar Campus), Hissar.  
**Type:** 'D'.

**Ref.:** Hr. 65(101).

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**Crop:** Bajra (Kharij).  
**Site:** Punjab Agr. University (Hissar Campus), Hissar.  
**Type:** 'D'.

**Ref.:** Hr. 65(104).

Object: To study the effect of weed control methods on Bajra.

1. **BASAL CONDITIONS:**
   - (i) (a) to (c) N.A.
   - (ii) Sandy loam.
   - (iii) 15.7.65.
   - (iv) (a) 2 ploughings.
   - (b) Pora.
   - (c) 5 Kg/ha.
   - (d) 30 cm. row to row.
   - (e) N.A.
   - (f) 45 Kg/ha. of C/A/N.
   - (g) T-55.
   - (h) Irrigated.
   - (i) As per treatments.
   - (j) N.A.
   - (k) Mid-Oct., 65.
2. TREATMENTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Description</th>
<th>Av. yield (Kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₀</td>
<td>Control (no manure)</td>
<td>683</td>
</tr>
<tr>
<td>T₁</td>
<td>N=22.4 Kg/ha, P=22.4 Kg/ha, K=22.4 Kg/ha</td>
<td>888</td>
</tr>
<tr>
<td>T₂</td>
<td>N=22.4 Kg/ha, P=22.4 Kg/ha, K=22.4 Kg/ha</td>
<td>854</td>
</tr>
<tr>
<td>T₃</td>
<td>N=22.4 Kg/ha, P=22.4 Kg/ha, K=22.4 Kg/ha</td>
<td>1522</td>
</tr>
<tr>
<td>T₄</td>
<td>N=22.4 Kg/ha, P=22.4 Kg/ha, K=22.4 Kg/ha</td>
<td>919</td>
</tr>
<tr>
<td>T₅</td>
<td>N=22.4 Kg/ha, P=22.4 Kg/ha, K=22.4 Kg/ha</td>
<td>719</td>
</tr>
<tr>
<td>T₆</td>
<td>N=22.4 Kg/ha, P=22.4 Kg/ha, K=22.4 Kg/ha</td>
<td>752</td>
</tr>
<tr>
<td>T₇</td>
<td>N=22.4 Kg/ha, P=22.4 Kg/ha, K=22.4 Kg/ha</td>
<td>829</td>
</tr>
<tr>
<td>T₈</td>
<td>N=22.4 Kg/ha, P=22.4 Kg/ha, K=22.4 Kg/ha</td>
<td>700</td>
</tr>
<tr>
<td>T₉</td>
<td>N=22.4 Kg/ha, P=22.4 Kg/ha, K=22.4 Kg/ha</td>
<td>1965</td>
</tr>
</tbody>
</table>

Crop: Maize (Kharif).
Site: District: Ambala.
Ref: Hr. 60 and 61(SFT).
Type: M.

Object: - Type A: To study the response of Maize to levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
(i) Control (no manure).
(ii) Alluvial.

2. TREATMENTS:
8 manural treatments:
O=Control (no manure),
N=22.4 Kg/ha, P=22.4 Kg/ha, K=22.4 Kg/ha.
NP=22.4 Kg/ha, of N+22.4 Kg/ha, of P₂O₅.
NK=22.4 Kg/ha, of N+22.4 Kg/ha, of K₂O.
FK=22.4 Kg/ha, of P₂O₅+22.4 Kg/ha, of K₂O and
NPK=22.4 Kg/ha, of N+22.4 Kg/ha, of P₂O₅+22.4 Kg/ha, of K₂O.

3. DESIGN:
(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, g on a Rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village.
(iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-61. (b) and (c) N.A. (v) to (vii) Nil.
CROP: Maize (Kharif).

Site: District: Karnal.

Object: Type A1: To study the response curves of important cereal, cash and oilseed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manorial treatments:
- O = Control (no manure),
- \( N_1 = 60 \text{ Kg/ha. of N} \),
- \( N_2 = 120 \text{ Kg/ha. of N} \),
- \( P_1 = 35 \text{ Kg/ha. of P}_2O_5 \),
- \( N_2 P_1 = 60 \text{ Kg/ha. of N+35 Kg/ha. of P}_2O_5 \),
- \( N_2 P_2 = 120 \text{ Kg/ha. of N+70 Kg/ha. of P}_2O_5 \),
- \( N_2 P_2 K_1 = 120 \text{ Kg/ha. of N+70 Kg/ha. of P}_2O_5 + 35 \text{ Kg/ha. of K}_2O \).

3. DESIGN:
(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block, 36 experiments are conducted in a year of which 11 are of type A1, 11 of type A2, 3 are of type A3 and 3 are of type C. The eleven experiments under type A1, A2 and A3 are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a cash crop and 3 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A1, A2 and A3 experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A1, A2 and A3 are laid out. For conducting the three villages are randomly selected in each block.
(iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-66. (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:
63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( P_1 )</th>
<th>( N_2 P_1 )</th>
<th>( N_2 P_2 )</th>
<th>( N_2 P_2 K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>456</td>
<td>540</td>
<td>162</td>
<td>714</td>
<td>589</td>
<td>1005</td>
<td>1227</td>
</tr>
</tbody>
</table>

Control yield = 1245 Kg/ha. ; No. of trials=6
Crop : Maize (Kharif).

Site : District : Ambala.

Object : Type A1 : To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Un-irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN:
   Same as in type A1 conducted under irrigated condition on Maize crop on page No. 57.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962–66. (b) and (c) N.A. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P1</th>
<th>N4P1</th>
<th>N2P3K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>543</td>
<td>642</td>
<td>170</td>
<td>336</td>
<td>332</td>
<td>799</td>
<td>913</td>
<td>1069</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 2037 Kg/ha.; no. of trials = 5

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P1</th>
<th>N4P1</th>
<th>N2P3K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>415</td>
<td>523</td>
<td>270</td>
<td>508</td>
<td>623</td>
<td>738</td>
<td>808</td>
<td>66.0</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1886 Kg/ha.; No. of trials = 7

Ref : Hr. 62 to 65(SFT).

Type : ‘M’.

Object : Type A1 ; To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Un-irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN:
   Same as in type A1 conducted under irrigated condition on Maize crop on page No. 57.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962–66. (b) and (c) N.A. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

66(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P1</th>
<th>N4P1</th>
<th>N2P3K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>511</td>
<td>799</td>
<td>238</td>
<td>926</td>
<td>989</td>
<td>1128</td>
<td>1415</td>
<td>303 1</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 820 Kg/ha.; No. of trials = 4

67(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P1</th>
<th>N4P1</th>
<th>N2P3K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>449</td>
<td>742</td>
<td>95</td>
<td>664</td>
<td>879</td>
<td>1122</td>
<td>1108</td>
<td>159 0</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1232 Kg/ha.; No. of trials = 7

68(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P1</th>
<th>N4P1</th>
<th>N2P3K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>477</td>
<td>756</td>
<td>182</td>
<td>664</td>
<td>872</td>
<td>950</td>
<td>1114</td>
<td>185 1</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1125 Kg/ha.; No of trials = 10

69(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P1</th>
<th>N4P1</th>
<th>N2P3K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>390</td>
<td>644</td>
<td>150</td>
<td>336</td>
<td>846</td>
<td>900</td>
<td>919</td>
<td>173 1</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1142 Kg/ha.; No. of trials = 10
Crop: Maize (Kharif).
Site: District: Karnal.

Object: Type A: To study the response curves of important cereal, cash, and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manured treatments:
- O=Control (no manure),
- \( N_1 = 60 \text{ Kg/ha. of } N \),
- \( P_1 = 35 \text{ Kg/ha. of } P_2O_5 \),
- \( P_2 = 70 \text{ Kg/ha. of } P_2O_5 \),
- \( N_1 P_1 = 60 \text{ Kg/ha. of } N + 35 \text{ Kg/ha. of } P_2O_5 \),
- \( N_1 P_2 = 60 \text{ Kg/ha. of } N + 70 \text{ Kg/ha. of } P_2O_5 \),
- \( N_2 P_2 = 120 \text{ Kg/ha. of } N + 70 \text{ Kg/ha. of } P_2O_5 \), and
- \( N_2 P_2 K_2 = 120 \text{ Kg/ha. of } N + 70 \text{ Kg/ha. of } P_2O_5 + 70 \text{ Kg/ha. of } K_2O \).

3. DESIGN:
Same as in type A1 conducted under irrigated condition on Maize crop on page No. 57.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield or grain. (iv) (a) 1963-66. (b) and (c) N.A. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( P_1 )</th>
<th>( P_2 )</th>
<th>( N_1 P_1 )</th>
<th>( N_1 P_2 )</th>
<th>( N_1 P_2 K_2 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>63(SFT)</td>
<td>Treatment</td>
<td>448</td>
<td>263</td>
<td>425</td>
<td>527</td>
<td>551</td>
<td>876</td>
<td>1105</td>
</tr>
<tr>
<td>Control yield</td>
<td>1057 Kg/ha.; No. of trials=6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64(SFT)</td>
<td>Treatment</td>
<td>552</td>
<td>139</td>
<td>265</td>
<td>767</td>
<td>713</td>
<td>946</td>
<td>1439</td>
</tr>
<tr>
<td>Control yield</td>
<td>1724 Kg/ha.; No. of trials=5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65(SFT)</td>
<td>Treatment</td>
<td>418</td>
<td>406</td>
<td>128</td>
<td>375</td>
<td>491</td>
<td>726</td>
<td>1008</td>
</tr>
<tr>
<td>Control yield</td>
<td>2216 Kg/ha.; No. of trials=6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Maize (Kharif).
Site: District: Ambala.

Object: Type A: To study the response curves of important cereal, cash, and oil seed crops to P applied singly and in combination with other nutrients.
1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   Same as in type A conducted under irrigated condition on Maize crop on page No. 39.

3. DESIGN:
   Same as in type A conducted under irrigated condition on Maize crop on page No. 57.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—66. (b) and (c) N.A. (v) to (vii) Nil

5. RESULTS:

   62(SFT)
   Treatment  | N\_1 | P\_1 | P\_2 | N\_1 P\_1 | N\_1 P\_2 | N\_1 P\_3 | N\_1 P\_4 | N\_1 P\_5 | N\_1 P\_6 | S.E.
   Av. response of grain in Kg/ha.
   Control yield = 1255 Kg/ha.; No. of trials = 5

   63(SFT)
   Treatment  | N\_1 | P\_1 | P\_2 | N\_1 P\_1 | N\_1 P\_2 | N\_1 P\_3 | N\_1 P\_4 | N\_1 P\_5 | N\_1 P\_6 | S.E.
   Av. response of grain in Kg/ha.
   Control yield = 1140 Kg/ha.; No. of trials = 7

   64(SFT)
   Treatment  | N\_1 | P\_1 | P\_2 | N\_1 P\_1 | N\_1 P\_2 | N\_1 P\_3 | N\_1 P\_4 | N\_1 P\_5 | N\_1 P\_6 | S.E.
   Av. response of grain in Kg/ha.
   Control yield = 1288 Kg/ha.; No. of trials = 9

   65(SFT)
   Treatment  | N\_1 | P\_1 | P\_2 | N\_1 P\_1 | N\_1 P\_2 | N\_1 P\_3 | N\_1 P\_4 | N\_1 P\_5 | N\_1 P\_6 | S.E.
   Av. response of grain in Kg/ha.
   Control yield = 1299 Kg/ha.; No. of trials = 9

Crop: Maize (Kharif).
Site: District: Karnal.
Object: Type A: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O = Control (no manure),
   N\_1 = 60 Kg/ha. of N,
   K\_1 = 35 Kg/ha. of K\_2 O,
   N\_1 K\_1 = 60 Kg/ha. of N + 35 Kg/ha. of K\_2 O,
   N\_1 K\_2 = 60 Kg/ha. of N + 70 Kg/ha. of K\_2 O,
   N\_1 K\_3 = 120 Kg/ha. of N + 70 Kg/ha. of K\_2 O and
   N\_1 P\_1 K\_1 = 60 Kg/ha. of N + 35 Kg/ha. of P\_2 O\_5 + 35 Kg/ha. of K\_2 O,
3. DESIGN:
Same as in type A₂ conducted under irrigated condition on Maize crop on page No. 57.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—66 (64 N. A.). (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

| Crop : Maize (Kh vegetarian) | Ref : Hr. 62 to 65(SFT) for Ambala and 66(SFT) for Karnal. |
| Site : District : Ambala and Karnal. |
| Type : 'M'. |

Object: — Type A₂: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (a) N.A.

2. TREATMENTS:
Same as in type A₂ conducted under irrigated condition on Maize crop on page No. 60.

3. DESIGN:
Same as in type A₂ conducted under irrigated condition on Maize crop on page No. 57.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—66 for Ambala and 64 for Karnal only. (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

| Ambala 62(SFT) |
| Control yield=1585 Kg/ha.; No. of trials=5 |

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄K₄</th>
<th>N₅P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>139</td>
<td>—228</td>
<td>—21</td>
<td>—170</td>
<td>400</td>
<td>233</td>
<td>472</td>
<td>—</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Ambala 63(SFT) |
| Control yield=1144 Kg/ha.; No. of trials=7 |

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄K₄</th>
<th>N₅P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>491</td>
<td>45</td>
<td>53</td>
<td>565</td>
<td>760</td>
<td>1060</td>
<td>806</td>
<td>2070</td>
</tr>
<tr>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Maize (Kharif).  
Site: Punjab Agri. University (Hissar Campus), Hissar.  
Type: ‘ICM’.  

Object: To study the effect of nitrogen, irrigation and plant density on the yield of Maize.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 30.6 and 1.7.65.  (iv) (a) 2 ploughings.  (b) By hand dibbling.  
(c) 16 to 18 Kg/ha.  (d) 90 cm. x 60 cm.  (e) N.A.  (vi) Ganga-10.1.  (vii) Irrigated.  (viii) 3 hoeings.  (ix) 311 em.  
(x) 15.10.65.

2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) Three types of irrigation: 1 =2 irrigations (20 cm. water), 1 =3 irrigation (25 cm. water) and 1 =5 irrigations (40 cm. water).

(2) 3 levels of N: 0, 80 and 160 Kg/ha.

(3) 3 plant density: D1=72500 plants/ha. (60 cm. x 22.5 cm. spacing), D2=54500 plants/ha. (60 cm. x 30 cm.) and D3=43500 plants/ha. (60 cm. x 37.5 cm).

3. DESIGN:

(i) 3*confounded.  (ii) (a) 9 plots/block; 3 blocks/replication.  (b) N.A.  (ii) 2.  (iv) (a) N.A.  (b) 6 00 m.  
(x) 7.00 m.  (v) N.A.  (vi) Yes.

4. GENERAL:

(i) Normal.  (ii) Stem borer, Endrine 20 cc at 0.1% in 3 sprays.  (iii) Yield of grain.  (iv) (a) 0:5—only.
(b) and (c) No.  (vi) Only following results are supplied by research station.

5. RESULTS:

(i) 2615 Kg/ha.  (ii) 484.6 Kg/ha.  (iii) Main effect of N is highly significant and that of N is significant.  
(iv) Av. yield of grain in Kg/ha.

Treatment:  

| Treatment | N1 | K1 | K2 | N1K1 | N2K1 | N2K2 | N1P1K1 | S.E.  
|-----------|----|----|----|------|------|------|--------|------  
| Av. yield | 2405 | 2592 | 2848 | 2172 | 2719 | 2954 | 2574 | 2735 | 2340 |

C.D. for 1 or N marginal means=335 Kg/ha.
Crop: Jowar (Kharif).

Site: District: Gurgaon.

Object: Type A1: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vii) N.A. (viii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:

- O-Control (no manure),
- \( N_1 = 35 \text{ Kg/ha. of } N \),
- \( N_2 = 70 \text{ Kg/ha. of } N \),
- \( P_1 = 35 \text{ Kg/ha. of } P_2O_5 \),
- \( N_1 P_1 = 35 \text{ Kg/ha. of } N \text{ + } 35 \text{ Kg/ha. of } P_2O_5 \),
- \( N_2 P_1 = 70 \text{ Kg/ha. of } N \text{ + } 70 \text{ Kg/ha. of } P_2O_5 \),
- \( N_1 P_2 K_1 = 70 \text{ Kg/ha. of } N \text{ + } 70 \text{ Kg/ha. of } P_2O_5 \text{ + } 35 \text{ Kg/ha. of } K_2O \).

3. DESIGN:
(iii) and (iv) A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 30 experiments are conducted in a year of which 11 are of type A1, 11 of type A2, 11 of type A3 and 3 are of type C. The eleven experiments under type A1, A2 and A3 are distributed as 3 on a kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A4, A5 and A6 experiments 11 villages are randomly selected in each block and in each village 3 experiments are laid out. For conducting the three villages are randomly selected in each block.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-only, (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

Gurgaon

Treatment | \( N_1 \) | \( N_2 \) | \( P_1 \) | \( N_1 P_1 \) | \( N_2 P_1 \) | \( N_1 P_2 K_1 \) | S.E.
--- | --- | --- | --- | --- | --- | --- | ---
Av. response of grain in Kg/ha. | 88 | 237 | 14 | 266 | 336 | 454 | 711 | 57.6

Control yield = 247 Kg/ha.; No. of trials = 2
5. RESULTS:

52(SFT)

**Gurgaon**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>281</td>
<td>448</td>
<td>46</td>
<td>511</td>
<td>597</td>
<td>743</td>
<td>878</td>
<td>70.6</td>
</tr>
</tbody>
</table>

Control yield=696 Kg/ha.; No. of trials=3

---

**Crop:** Jowar *(Kharif)*  
**Site:** District: Gurgaon  
**Ref:** Hr. 62(SFT).  
**Type:** ‘M’.

Object:—Type A<sub>4</sub>: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS**:  
   (i) to (vii) N.A.  
   (viii) to (x) N.A.

2. **TREATMENTS**:  
   8 manurial treatments:
   
   - O=Control (no manure),
   - N<sub>1</sub>=35 Kg/ha. of N<sub>2</sub>,
   - P<sub>1</sub>=35 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
   - P<sub>2</sub>=70 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
   - N<sub>1</sub>P<sub>1</sub>=35 Kg/ha. of N<sub>1</sub> + 35 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
   - N<sub>2</sub>P<sub>2</sub>=35 Kg/ha. of N<sub>2</sub> + 70 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
   - N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=70 Kg/ha. of N<sub>2</sub> + 70 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 70 Kg/ha. of K<sub>2</sub>O.

3. **DESIGN**:  
   Same as in type A<sub>4</sub> conducted under irrigated condition on Jowar crop on page No. 63.

4. **GENERAL**:  
   (i) and (ii) N.A.  
   (iii) Yield of grain.  
   (iv) (a) 19%—only.  
   (b) and (c) N.A.  
   (v) to (vii) N.A.

5. **RESULTS**:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>187</td>
<td>19</td>
<td>34</td>
<td>286</td>
<td>301</td>
<td>484</td>
<td>612</td>
<td>45.8</td>
</tr>
</tbody>
</table>

---

**Crop:** Jowar *(Kharif)*  
**Site:** District: Gurgaon  
**Ref:** Hr. 62(SFT).  
**Type:** ‘M’.

Object:—Type A<sub>4</sub>: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS**:  
   (i) to (vi) N.A.  
   (vii) Unirrigated.  
   (viii) to (x) N.A.

2. **TREATMENTS**:  
   Same as in type A<sub>4</sub> conducted under irrigated condition on Jowar crop above.
3. DESIGN:
Same as in type A1 conducted under irrigated condition on Jowar crop on page No. 63.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of Jowar. (iv) (a) 1962—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

62(SFT)

Gurgon

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>K1</th>
<th>N1P1</th>
<th>N1K1</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>345</td>
<td>69</td>
<td>172</td>
<td>623</td>
<td>647</td>
<td>854</td>
<td>948</td>
</tr>
</tbody>
</table>

Control yield—148 Kg/ha. ; No. of trials—2

Crop :- Jowar (Kharif).
Site :- District : Gurgon.
Object :- Type A1: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (a) N.A.

2. TREATMENTS:
8 manurial treatments:
O—Control (no manure),
N1—35 Kg/ha. of N,
K1—35 Kg/ha. of K4O,
N1K1—70 Kg/ha. of K4O,
N1P1K1—35 Kg/ha. of N+35 Kg/ha. of K4O,
N1K2—35 Kg/ha. of N+70 Kg/ha. of K4O,
N1P2K1—70 Kg/ha. of N+70 Kg/ha. of K4O and
N1P2K2—35 Kg/ha. of N+35 Kg/ha. of P2O5+35 Kg/ha. of K4O.

N applied as A/S, P2O5 as Super and K4O as Mur. Pot.

3. DESIGN:
Same as in type A1 conducted under irrigated condition on Jowar crop on page No. 63.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>314</td>
<td>21</td>
<td>145</td>
<td>303</td>
<td>405</td>
<td>501</td>
<td>733</td>
<td>80-4</td>
</tr>
</tbody>
</table>

Control yield—200 Kg/ha. ; No. of trials—2
Crop : Gram (Rahi).

Site : Govt. Agri. Farm, Rohtak.

Object :- To study the effect of N, P and K on the yield of Gram.

1. BASAL CONDITIONS:
(i) to (c) N.A. (ii) Sandy loam. (iii) 14.10.60 ; 15.10.63. (iv) 2 ploughings. (b) Line sowing kera (c) 45-50 Kg/ha. (d) 22 cm. between rows. (e) --. (f) Nil. (vii) Irrigated. (viii) and (ix) N.A. (x) March and April, 61 ; April, 64.

2. TREATMENTS:
5 manurial treatments: M₀ = Control, M₁ = 16.8 Kg/ha. of N as A/S/N, Ma = 33.6 Kg/ha. of P₀₆ as Super, M₄ = (M₁+M₀), M₅ = (M₄+33.6 Kg/ha. of K₂O).

3. DESIGN:
(i) R.B.D. (ii) 5. (b) N.A. (iii) 3 ; 2. (iv) (a) and (b) 1/39.5 ha. ; 1/24.7 ha. (v) No. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of Grain. (iv) 1960-63 (Expts. for 61, 62—N.A.) (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments X Years interaction is absent, hence results of individual years are presented under 5. RESULTS.

5. RESULTS:

60(14)
(i) 322 Kg/ha. (ii) 146.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>257</td>
<td>280</td>
<td>382</td>
<td>402</td>
<td>290</td>
</tr>
</tbody>
</table>

63(80)
(i) 3539 Kg/ha. (ii) 1645.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3163</td>
<td>3163</td>
<td>4646</td>
<td>2496</td>
<td>4226</td>
</tr>
</tbody>
</table>

Crop : Bengal Gram.

Site : District : Hisar, Rohtak and Karnal.

Object :- Type C: To compare the relative responses to alternative sources of Phosphatic fertilizers at each of two levels.

1. BASAL CONDITIONS:
(i) to (c) N.A. (ii) Alluvial. (iii) to (x) N.A.

2. TREATMENTS:
7 manurial treatments:
O = Control (no manure),
P₀ = 33.6 Kg/ha. of P₀₆ as Super,
P₁ = 33.6 Kg/ha. of P₀₆ as mono Ammon. Phos.
P₂ = P₀+7.7 Kg/ha. of N,
P₃ = 67.2 Kg/ha. of P₀₆ as Super,
P₄ = 67.2 Kg/ha. of P₀₆ as mono Ammon. Phos. and
P₅ = P₅+15.4 Kg/ha. of N.
3. DESIGN:
(i) and (ii) The district has been divided into four agricultural homogeneous zones and one field assistant posted in each zone. The field assistant announces the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 11 trials in a year, 8 on Charlat Rabi cereal, 3 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C, residual effects of phosphates application are studied on Type C in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1968.6 ha. (b) 1/197.7 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hisar</td>
<td>14</td>
<td>1050</td>
<td>P₁, P₂, P₃, P₄, S.E.</td>
</tr>
<tr>
<td>Rohtak</td>
<td>9</td>
<td>1340</td>
<td></td>
</tr>
<tr>
<td>Karnal</td>
<td>5</td>
<td>930</td>
<td></td>
</tr>
</tbody>
</table>

Crop: Gram (Rabi), Site: Punjab Agri. University (Hisar Campus), Hisar. Type: C.

Object: To study the effects of different rates of seed sown at different dates with three different spacings.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy soil. (iii) As per treatments. (iv) (a) 2 ploughings. (b) Line sowing kera. (c) and (d) As per treatments. (e) N.A. (v) IRRIGATED. (vi) and (ix) N.A. (a) April 65.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 dates of sowing: D₁=5th Oct., D₂=15th Oct. and D₃=25th Oct., 64
(2) 3 spacings between rows: S₁=22, S₂=30 and S₃=38 cm.
(3) 3 seed rates: R₁=40, R₂=50 and R₃=60 Kg/ha.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/1965 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 2106 Kg/ha. (ii) 348.5 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>1836</td>
<td>1945</td>
<td></td>
</tr>
<tr>
<td>2357</td>
<td>2147</td>
<td>2290</td>
<td></td>
</tr>
<tr>
<td>2214</td>
<td>2039</td>
<td>2148</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2183</td>
<td>2007</td>
<td>2128</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R₁</th>
<th>R₂</th>
<th>R₃</th>
<th>R₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>1862</td>
<td>1907</td>
<td></td>
<td>1920</td>
</tr>
<tr>
<td>2233</td>
<td>2252</td>
<td>2359</td>
<td></td>
<td>2265</td>
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<tr>
<td>2033</td>
<td>2159</td>
<td>2209</td>
<td></td>
<td>2134</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2086</td>
<td>2091</td>
<td>2142</td>
<td></td>
<td>2106</td>
</tr>
</tbody>
</table>

C.D. for D marginal means = 163.8 Kg/ha.
Crop :- Urad (Kharif).

Site :- Punjab Agri. University (Hissar Campus), Hissar.

Type :- 'M'.

Object :- To see the effect of application of different Phosphorus levels to Urad crop.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A.  (ii) Sandy loam. (iii) 4.5.65. (iv) (a) 2 ploughings. (b) By kera. (c) 20 Kg/ha. (d) 30 cm. row to row. (e) Nil. (v) 11 Kg/ha. of N as C/A/N. (vi) March 1-1 (late). (vii) Irrigated. (viii) 2 hoedings. (ix) N.A. (x) Oct. 65.

2. TREATMENTS :
   5 levels of PO₄, P₁ =0, P₂ =17, P₃ =34, P₄ =51 and P₅ =68 Kg/ha.

3. DESIGN :
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) Endrine was sprayed against Jassid attack (92%). (iii) Yield of grain. (iv) (a) 1965—cond. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :
   (i) 659 Kg/ha. (ii) 117.8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of Urad in Kg/ha.

   Treatment | P₀ | P₁ | P₂ | P₃ | P₄ | C.D. = 157.9 Kg/ha.
   Av. yield  | 530| 604| 760| 643| 696|

Crop :- Sugarcane.

Site :- Punjab Agri. University (Hissar Campus), Hissar.

Type 'M'.

Object :- To study the effect of N, P and K levels on cane yield.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Fallow. (c) Nil. (d) Sandy loam. (e) 1st week of April, 65. (f) 4 to 5 ploughings (g) Flat sowing. (h) 75000 two budded sets/ha. (i) N.A. (j) —. (k) N.A. (l) Col: 148. (m) Irrigated. (n) to (x) N.A.

2. TREATMENTS :
   Main-plot treatments :
   4 levels of N : N₀ =0, N₁ =16, N₂ =11 and N₃ =168 Kg/ha.
   Sub-plot treatments :
   All combinations of (1) and (2)
   (1) 2 levels of P₂O₅ : P₀ =0 and P₁ =56 Kg/ha.
   (2) 2 levels of K : K₀ =0 and K₁ =56 Kg/ha.

3. DESIGN :
   (i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 24 x 196 m. (v) N.A. (vi) Yes.

4. GENERAL :
   (i) Good. (ii) N.A. (iii) Yield of cane. (iv) (a) 1965—cond. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :
   (i) 1042.8 Q/ha. (ii) 234.6 Q/ha. (b) 171.6 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.
Crop: Sugarcane.
Site: Sugarcane Res. Sta., Jagadhari.

Object: To study the effect of different levels of N on the yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) lst week of March 60. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) N.A (vi) CoJ-39. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) Mid. of Feb. 61.

2. TREATMENTS:
6 levels of N as C/A/N: N₀=0, N₁=56, N₂=112, N₃=166, N₄=224 and N₅=280 Kg/ha.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/98.8 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1960-only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 909.8 Q/ha. (ii) 583 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av yield</td>
<td>656.4</td>
<td>1026.1</td>
<td>1001.8</td>
<td>844.0</td>
<td>1049.0</td>
<td>871.5</td>
<td></td>
</tr>
<tr>
<td>C.D.</td>
<td>87.8 Q/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication; 4 Sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/74.3 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1960—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 462.2 Q/ha. (ii) (a) 50.6 Q/ha. (b) 41.05 Q/ha. (iii) Main effect of S is highly significant and interaction T×S is significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T_1</td>
<td>404.2</td>
<td>542.5</td>
<td>605.6</td>
<td>428.5</td>
<td>517.7</td>
</tr>
<tr>
<td>T_2</td>
<td>368.3</td>
<td>444.9</td>
<td>433.6</td>
<td>380.2</td>
<td>406.8</td>
</tr>
<tr>
<td>Mean</td>
<td>431.7</td>
<td>493.7</td>
<td>519.6</td>
<td>4043</td>
<td>462.2</td>
</tr>
</tbody>
</table>

C.D. for S means at the same level of T—51.6 Q/ha.
C.D. for S means at the same level of T—73.0 Q/ha.
C.D. for T means at the same level of S—89.8 Q/ha.

Crop: Sugarcane.  Ref: Hr. 60(89), 61(96).  Type: ‘M’.
Site: Govt. Agri. Farm, Rohtak.

Object: To study the effect of B.H.C. and N, P, K on the yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 24.3.50; 23.3.61. (iv) and (v) N.A. (vi) Col-29. (vii) Irrigated. (viii) and (ix) N.A. (x) Month of March.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 levels of B.H.C.: B_1 = 0 and B_2 = 5.6 Kg/ha.
(2) 3 levels of fertilizers: M_4 = 0, M_1 = 112 Kg/ha. of N+P+K Kg/ha. of P_2O_5 and M_4 = 112 Kg/ha. of N=56 Kg/ha. of P_2O_5 and M_4 = 112 Kg/ha. of K_2O.
N, P and K applied by drilling at sowing. B.H.C. applied at the time of sowing at cane setts.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/69.2 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1960—61. (b) No. (c) Results of combined analysis are presented under S. Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments×Years interaction is present.

5. RESULTS:
Pooled results
(i) 486.1 Q/ha. (ii) 264.9 Q/ha. (based on 5 d.f. made up of Treatments×years interaction). (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.
Object:—to study the effect of fertilizers and micronutrients on the yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 23.3.60; 22.3.61. (iv) and (v) N.A. (vi) Col-29. (vii) Irrigated. (viii) and (ix) N.A. (x) Month of March.

2. TREATMENTS:
All combinations of (1) and (2) + a control.
(i) 2 levels of fertilizers: \( F_1 = 112 \) Kg/ha. of N as A/S and \( F_2 = 112 \) Kg/ha. of N as A/S+56 Kg/ha. of \( P_2O_5 \) as Super+56 Kg/ha. of K as Mur. Pot.
(ii) 3 sources of micronutrients: \( S_1 = FeSO_4 \) and \( S_2 = Mn SO_4 \), N, P and K drilled at sowing and micronutrients at 0.5% solution were sprayed in June and July.

3. DESIGN:
(i) R B D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) N.A (b) 1/4 1 ha (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1960–61. (b) and (c) No. (v) N.A. (vi) Nil (vii) Error variances are heterogeneous and Treatments X Years interaction is absent. Hence the results of individual years are presented under 5. Results.

5. RESULTS:
60(91)
(i) 263·8 Q/ha. (ii) 40·6 Q/ha. (iii) Main effect of F and control vs. others are highly significant. (iv) Av. yield of cane in Q/ha.
Crop: Sugarcane.  
Site: Govt. Agri. Farm, Rohtak.
Object: To study the effect of micronutrients with N, P and K on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) Ratooned. (iv) and (v) N.A. (vi) CL-9. (vii) Irrigated. (viii) and (ix) N.A. (x) Jan., 62.

2. TREATMENTS:
   7 manurial treatments: M₄ = Control, M₁ = 112 Kg/ha. of N as Ca(N), M₄ = M₁ + FeSO₄, M₅ = M₁ + Mn SO₄, M₆ = M₁ + 56 Kg/ha. of K₂O + 56 Kg/ha. of P₂O₅, M₇ = M₁ + 56 Kg/ha. of K₂O + 56 Kg/ha. of P₂O₅ + FeSO₄ and M₈ = M₁ + 56 Kg/ha. of P₂O₅ + Mn SO₄.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) and (b) 1/74 1 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) FeSO₄ + MnSO₄ and 2 % were sprayed on 19.6.61 and 20.7.61. (iii) Yield of cane. (iv) (a) 1961—only. (b) No. (c) Nil. (v) Nil. (vi) Nil.

5. RESULTS:
   (i) 458 Q/ha. (ii) 39-30 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₄</th>
<th>M₁</th>
<th>M₅</th>
<th>M₆</th>
<th>M₇</th>
<th>M₈</th>
<th>M₉</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>303.9</td>
<td>456.6</td>
<td>427.7</td>
<td>510.8</td>
<td>518.9</td>
<td>522.6</td>
<td>470.7</td>
</tr>
<tr>
<td>C.D.</td>
<td>88.1 Q/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for F marginal means = 34.8 Q/ha.
C.D. for control vs. others = 46.1 Q/ha.

(i) 453.8 Q/ha. (ii) 60.2 Q/ha. (iii) Control vs. others alone is highly significant. (iv) Av. yield of cane in Q/ha.
Crop :- Sugarcane.

Site :- Govt. Agri. Farm, Rohtak.

Object :- To study the effect of different fertilizers on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) Ratooned. (iv) (a) to (e) N.A. (v) Nil. (vi) CL—9. (vii) Irrigated. (viii) and (ix) N.A. (x) Jan. 62.

2. TREATMENTS:
   Same as in expt. No. 60(89), 61(96) on page No. 70.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 1/74 4 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of cane. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) No.

5. RESULTS:
   (i) 347.3 Q/ha. (ii) 54.7 Q/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S_0</th>
<th>S_1</th>
<th>S_2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>B_0</td>
<td>308.0</td>
<td>400.0</td>
<td>388.0</td>
<td>365.3</td>
</tr>
<tr>
<td>B_1</td>
<td>264.0</td>
<td>376.0</td>
<td>351.0</td>
<td>329.3</td>
</tr>
<tr>
<td>Mean</td>
<td>284.5</td>
<td>388.0</td>
<td>369.5</td>
<td>347.3</td>
</tr>
</tbody>
</table>

C.D. for M marginal means—58.3 Q/ha.

Crop :- Sugarcane.

Site :- Govt. Agri. Sta., Rohtak.

Object :- To study the effect of different sources of N on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 23.3.61. (iv) and (v) N.A. (vi) Col. 29. (vii) Irrigated. (viii) and (ix) N.A. (x) March, 62.

2. TREATMENTS:
   g sources of N at 45 Kg/ha. : S_0 =Control, S_1 =A/S, S_2 =C/S/N, Urea, S_3 =Ammonium liquor, S_4 =Nitro-phosphate, S_5 =A/C and S_6 =N+P+K.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/74 3 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 310'2 Q/ha. (ii) 67'4 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_0</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
<th>S_5</th>
<th>S_6</th>
<th>S_7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>240'3</td>
<td>295'7</td>
<td>430'1</td>
<td>324'5</td>
<td>285'8</td>
<td>277'0</td>
<td>354'3</td>
<td>274'2</td>
</tr>
</tbody>
</table>
Crop: Sugarcane.  
Ref: Hr. 60 and 61(SFT).  
Site: District: Rohtak, Ambala and Karnal.  
Type: ‘M’.

Object: Type A: To study the response of Sugarcane to different levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Alluvial.  (iii) to (n) N.A.

2. TREATMENTS:
   8 manurial treatments:

   O=Control (no manure),
   N=44.8 Kg/ha. of N,
   P=44.8 Kg/ha. of P2O5,
   K=44.8 Kg/ha. of K2O,
   NP=67.2 Kg/ha. of N+44.8 Kg/ha. of P2O5
   NK=67.2 Kg/ha. of N+44.8 Kg/ha. of K2O,
   PK=44.8 Kg/ha. of P2O5+44.8 Kg/ha. of K2O and
   NPK=67.2 Kg/ha. of N+44.8 Kg/ha. of P2O5+44.8 Kg/ha. of K2O.

3. DESIGN:
   (i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 21 trials in a year, 8 on kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of Type C. Residual effect of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village.  (iii) (a) 1/98.8 ha.  (b) 1/197.7 ha.  (iv) Yes.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of cane.  (iv) (a) 1950–61.  (b) and (c) Nil.  (v) Nil.  (vi) and (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
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<td>Rohtak</td>
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<td>71440</td>
<td>9920</td>
<td>5320</td>
<td>4100</td>
<td>20240</td>
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<td>22040</td>
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<tr>
<td>Ambala</td>
<td>16</td>
<td>38960</td>
<td>9610</td>
<td>1560</td>
<td>2710</td>
<td>20380</td>
<td>1270</td>
<td>1790</td>
<td>830</td>
<td>420</td>
<td>12910</td>
</tr>
<tr>
<td>Karnal</td>
<td>13</td>
<td>49010</td>
<td>7890</td>
<td>2940</td>
<td>1680</td>
<td>24660</td>
<td>240</td>
<td>3450</td>
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<td>290</td>
<td>15360</td>
</tr>
<tr>
<td>Ambala</td>
<td>12</td>
<td>30990</td>
<td>7210</td>
<td>1670</td>
<td>4930</td>
<td>49400</td>
<td>690</td>
<td>2390</td>
<td>1190</td>
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<td>4050</td>
</tr>
<tr>
<td>Karnal</td>
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<td>7830</td>
<td>3790</td>
<td>4970</td>
<td>610</td>
<td>6430</td>
<td>1180</td>
<td>11420</td>
</tr>
</tbody>
</table>

Crop: Sugarcane.  
Ref: Hr. 60 and 61(SFT).  
Site: District: Rohtak, Ambala and Karnal.  
Type: ‘M’.

Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) to (n) N.A.
2. TREATMENTS:
7 manurial treatments:
O—Control (no manure),
\( n_1 = 67.2 \text{ Kg/ha. of N as } \text{A/S} \),
\( n_2 = 134.4 \text{ Kg/ha. of N as } \text{A/S} \),
\( n_3 = 67.2 \text{ Kg/ha. of N as Urea} \),
\( n_4 = 134.4 \text{ Kg/ha. of N as Urea} \),
\( n_5 = 67.2 \text{ Kg/ha. of N as } \text{C/A/N} \),
\( n_6 = 134.4 \text{ Kg/ha. of N as } \text{C/A/N} \).

3. DESIGN:
Same as in type A conducted on Sugarcane crop on page No. 74.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of cane. (iv) (a) 1960—61 (b) and (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( n_1 )</td>
<td>( n_2 )</td>
</tr>
<tr>
<td>60(SFT)</td>
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<td>7</td>
<td>61010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>25640</td>
</tr>
<tr>
<td>61(SFT)</td>
<td></td>
<td>7</td>
<td>61100</td>
</tr>
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<td>4</td>
<td>39190</td>
</tr>
<tr>
<td>Karnal</td>
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<td>4</td>
<td>34790</td>
</tr>
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</table>

Crop: Sugarcane. Site: District Ambala Type: 'M'.

Object: To investigate the relative efficiency of different N fertilizers at different doses.
5. RESULTS:

60(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n1</td>
<td>n2</td>
<td>n1'</td>
</tr>
<tr>
<td></td>
<td>n3</td>
<td>n4</td>
<td>n2'</td>
</tr>
<tr>
<td></td>
<td>n5</td>
<td></td>
<td>n4'</td>
</tr>
<tr>
<td></td>
<td>S.E.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambala</td>
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<td>140</td>
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<td></td>
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<td>7260</td>
</tr>
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<td></td>
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<td>10420</td>
</tr>
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<td>58030</td>
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<td>16340.0</td>
</tr>
</tbody>
</table>

61(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n1</td>
<td>n2</td>
<td>n1'</td>
</tr>
<tr>
<td></td>
<td>n3</td>
<td>n4</td>
<td>n2'</td>
</tr>
<tr>
<td></td>
<td>n5</td>
<td>n6</td>
<td>n4'</td>
</tr>
<tr>
<td></td>
<td>S.E.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambala</td>
<td>5</td>
<td>41640</td>
<td>-3200</td>
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<td></td>
<td></td>
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<td>2718.0</td>
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</tbody>
</table>

Crop :- Sugarcane.

Ref :- Hr. 63, 65(SFT) for Hissar, Rohtak and Karnal.

Site :- District : Hissar, Rohtak and Karnal.

Type :- ‘M’.

Object :- Type A1 : To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:

(i) to (vi) N.A.  (vii) Irrigated  (viii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments:

O = Control (no manure),
N1 = 70 Kg/ha. of N,
N2 = 140 Kg/ha. of N,
P1 = 70 Kg/ha. of P2O5,
N1P1 = 70 Kg/ha. of N+70 Kg/ha. of P2O5,
N2P1 = 140 Kg/ha. of N+70 Kg/ha. of P2O5,
N2P2 = 140 Kg/ha. of N+140 Kg/ha. of P2O5 and
N2P4K1 = Kg/ha. of 140 N+140 Kg/ha. of P2O5+7 0Kg/ha. of K2O.

3. DESIGN:

(i) and (ii) A selected district is divided into four agriculturally homogenous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50 - 100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A1, 11 of type A2, 11 of type A3 and 3 are of type C. The eleven experiments under type A1, A2 and A3 are distributed as 3 on a kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A1, A2 and A3 experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A1, A2 and A3 are laid out. For conducting the three type-C trials three villages are randomly selected in each block.

(iii) (a) 1/100 ha.  (b) 1/200 ha.  (iv) Yes.

4. GENERAL:

(i) and (ii) N.A.  (iii) Yield of cane.  (iv) (a) 1962—66 (62 and 64 N.A.)  (b) and (c) N.A.  (v) to (vii) Nil

5. RESULTS:

Hissar

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P4K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>6262</td>
<td>18581</td>
<td>3755</td>
<td>7215</td>
<td>19076</td>
<td>20163</td>
<td>14628</td>
<td>3315.0</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 54359 Kg/ha.; No. of trials = 2
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S.E.</th>
<th>Av. response of cane in Kg/ha.</th>
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</thead>
<tbody>
<tr>
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<td>2833</td>
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<td>16000</td>
<td>30133</td>
<td>36666</td>
<td>28333</td>
<td>42600</td>
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<tr>
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<td>6490</td>
<td>2833</td>
<td>4909</td>
<td>8006</td>
<td>10839</td>
<td>13277</td>
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</tr>
<tr>
<td>Control</td>
<td>8708</td>
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<td>2775</td>
<td>15783</td>
<td>19345</td>
<td>26166</td>
<td>28579</td>
<td>23419</td>
</tr>
<tr>
<td>Control</td>
<td>7264</td>
<td>14002</td>
<td>2553</td>
<td>5436</td>
<td>13228</td>
<td>18977</td>
<td>19998</td>
<td>32670</td>
</tr>
<tr>
<td>Control</td>
<td>11761</td>
<td>20688</td>
<td>10672</td>
<td>10972</td>
<td>24222</td>
<td>25177</td>
<td>26083</td>
<td>32575</td>
</tr>
</tbody>
</table>

**Crop:** Sugarcane *(Annual)*  
**Site:** District: Ambala  
**Ref:** Hr. 63(SFT) for Ambala  
**Type:** 'M'.

Object: Type A<sub>1</sub>: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS**:
   (i) to (vi) N.A.  (vii) Unirrigated.  (viii) to (x) N.A.

2. **TREATMENTS and DESIGN**:
   Same as in Type A<sub>1</sub> conducted under unirrigated condition on Sugarcane crop on page No. 76.

4. **GENERAL**:
   (i) and (ii) N.A.  (iii) Yield of Sugarcane.  (iv) (a) 1962–66 (62 and 64 N.A.)  (b) and (c) N.A.  (v) to (vii) Nil.
5. RESULTS:

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₁P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>7347</td>
<td>8613</td>
<td>6441</td>
<td>14167</td>
<td>19562</td>
<td>19850</td>
<td>9439</td>
</tr>
</tbody>
</table>

Control yield=34313 Kg/ha.; No. of trials=5

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₁P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>11400</td>
<td>11225</td>
<td>5908</td>
<td>14000</td>
<td>20875</td>
<td>31766</td>
<td>36850</td>
</tr>
</tbody>
</table>

Control yield=36349 Kg/ha.; No. of trials=10

---

Crop: Sugarcane (Annual).

Ref: Hr. 63 to 65(SFT) for Rohtak, Karnal, Hisar and 63, 64(SFT) for Ambala.

Site: District: Rohtak, Karnal, Hisar and Ambala.

Object:—Type A₂: To study the response curve of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:

(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments:

O=Control (no manure),
N₁=70 Kg/ha. of N,
P₁=70 Kg/ha. of P₂O₅,
P₂=140 Kg/ha. of P₂O₅,
N₁P₁=70 Kg/ha. of N+70 Kg/ha. of P₂O₅,
N₁P₂=70 Kg/ha. of N+140 Kg/ha. of P₂O₅,
N₁P₂K₁=140 Kg/ha. of N+140 Kg/ha. of P₂O₅ and
N₁P₂K₂=140 Kg/ha. of N+140 Kg/ha. of P₂O₅+140 Kg/ha. of K₂O.

N applied as A/S, P₂O₅ as Super and K₂O as Mur. Pot.

3. DESIGN:

Same as in type A₁ conducted under unirrigated condition on Sugarcane crop on page No. 76.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of cane (iv) (a) 1963—66 for Rohtak, Karnal, Hisar (61 N.A.) and 1963 to 66 for Ambala (65 N.A.) (b) and (c) N.A. (v) to (vii) N.I.

5. RESULTS:

Rohtak

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₁P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>3195</td>
<td>3525</td>
<td>5732</td>
<td>10608</td>
<td>5172</td>
<td>14101</td>
<td>16341</td>
</tr>
</tbody>
</table>

Control yield=54658 Kg/ha.; No. of trials=3
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N$_1$</th>
<th>P$_1$</th>
<th>P$_2$</th>
<th>N$_2$P$_1$</th>
<th>N$_3$P$_2$</th>
<th>N$_4$P$_3$</th>
<th>N$_5$P$_4$K$_4$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>10155</td>
<td>6943</td>
<td>7652</td>
<td>49511</td>
<td>21209</td>
<td>37921</td>
<td>40886</td>
<td>4179-4</td>
</tr>
<tr>
<td>Control yield = 95245 Kg/ha.; No. of trials = 7</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N$_1$</th>
<th>P$_1$</th>
<th>P$_2$</th>
<th>N$_2$P$_1$</th>
<th>N$_3$P$_2$</th>
<th>N$_4$P$_3$</th>
<th>N$_5$P$_4$K$_4$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>response of grain in Kg/ha.</td>
<td>14600</td>
<td>6722</td>
<td>11493</td>
<td>68182</td>
<td>18445</td>
<td>28363</td>
<td>30113</td>
<td>2432-1</td>
</tr>
<tr>
<td>Control yield = 98296 Kg/ha.; No. of trials = 16</td>
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</tbody>
</table>

Kesar

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N$_1$</th>
<th>P$_1$</th>
<th>P$_2$</th>
<th>N$_2$P$_1$</th>
<th>N$_3$P$_2$</th>
<th>N$_4$P$_3$</th>
<th>N$_5$P$_4$K$_4$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>10312</td>
<td>5897</td>
<td>4857</td>
<td>9514</td>
<td>14337</td>
<td>19054</td>
<td>18944</td>
<td>3432-0</td>
</tr>
<tr>
<td>Control yield = 37092 Kg/ha.; No. of trials = 7</td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Treatment</th>
<th>N$_1$</th>
<th>P$_1$</th>
<th>P$_2$</th>
<th>N$_2$P$_1$</th>
<th>N$_3$P$_2$</th>
<th>N$_4$P$_3$</th>
<th>N$_5$P$_4$K$_4$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>9262</td>
<td>5180</td>
<td>8211</td>
<td>9183</td>
<td>13903</td>
<td>18153</td>
<td>21621</td>
<td>2357-4</td>
</tr>
<tr>
<td>Control yield = 49514 Kg/ha.; No. of trials = 12</td>
<td></td>
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<table>
<thead>
<tr>
<th>Treatment</th>
<th>N$_1$</th>
<th>P$_1$</th>
<th>P$_2$</th>
<th>N$_2$P$_1$</th>
<th>N$_3$P$_2$</th>
<th>N$_4$P$_3$</th>
<th>N$_5$P$_4$K$_4$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>22200</td>
<td>11450</td>
<td>11633</td>
<td>17350</td>
<td>17430</td>
<td>23383</td>
<td>27900</td>
<td>4358-8</td>
</tr>
<tr>
<td>Control yield = 55983 Kg/ha.; No. of trials = 8</td>
<td></td>
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</tr>
</tbody>
</table>

Hissar

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N$_1$</th>
<th>P$_1$</th>
<th>P$_2$</th>
<th>N$_2$P$_1$</th>
<th>N$_3$P$_2$</th>
<th>N$_4$P$_3$</th>
<th>N$_5$P$_4$K$_4$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>11566</td>
<td>9389</td>
<td>10872</td>
<td>8895</td>
<td>11860</td>
<td>14430</td>
<td>15814</td>
<td>4053-0</td>
</tr>
<tr>
<td>Control yield = 50408 Kg/ha.; No. of trials = 2</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N$_1$</th>
<th>P$_1$</th>
<th>P$_2$</th>
<th>N$_2$P$_1$</th>
<th>N$_3$P$_2$</th>
<th>N$_4$P$_3$</th>
<th>N$_5$P$_4$K$_4$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>—</td>
<td>12849</td>
<td>7116</td>
<td>23721</td>
<td>18779</td>
<td>31431</td>
<td>33605</td>
<td>1437-92</td>
</tr>
<tr>
<td>Control yield = 52385 Kg/ha.; No. of trials = 2</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N$_1$</th>
<th>P$_1$</th>
<th>P$_2$</th>
<th>N$_2$P$_1$</th>
<th>N$_3$P$_2$</th>
<th>N$_4$P$_3$</th>
<th>N$_5$P$_4$K$_4$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>—</td>
<td>19000</td>
<td>-6000</td>
<td>-7666</td>
<td>12333</td>
<td>17000</td>
<td>29333</td>
<td>30666</td>
</tr>
<tr>
<td>Control yield = 55999 Kg/ha.; No. of trials = 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Ambala

63(SFT)  

treatment  $N_1 P_1 P_2 N_1 P_3 N_4 P_3 N_4 P_4 N_4 P_4 K_4$  S.E.  

Av. response of  grain in Kg/ha.  

Control yield $= 26357$ Kg/ha; No. of trials $= 5$

64(SFT)  

treatment  $N_1 P_1 P_2 N_1 P_3 N_4 P_3 N_4 P_4 N_4 P_4 K_4$  S.E.  

Av. response of  grain in Kg/ha.  

Control yield $= 3127$ Kg/ha; No. of trials $= 6$

Crop : Sugarcane  

Site : District : Ambala.

Ref : Hr. 63 to 65(SFT).  

Type : - M'.

Object : - Type A : To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:  

(i) to (vi) N.A.  (vii) Unirrigated.  (viii) to (x) N.A.

2. TREATMENTS:  

Same as in type A conducted crop under irrigated conditions on Sugarcane on page No. 78.

3. DESIGN:  

Same as in type A conducted under irrigated conditions on Sugarcane crop on page No. 76.

4. GENERAL:  

(i) and (ii) N.A  (iii) Yield of cane.  (iv) (a) 1965-66.  (b) and (c) N.A.  (v) to (vii) Nil.

5. RESULTS:  

65(SFT)  

Treatment  $N_1 P_1 P_2 N_1 P_3 N_4 P_3 N_4 P_4 N_4 P_4 K_4$  S.E.  

Av. response of yield in Kg/ha.  

Control yield $= 36933$ Kg/ha; No. of trials $= 12$

Crop : Sugarcane  

Site : District : Karnal, Rohtak and Ambala.

Ref : Hr. 63 to 65(SFT) for Karnal, 63 to 65(SFT) for Rohtak and 64 to 65(SFT) for Ambala.

Type : - M'.

Object : - Type A : To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:  

(i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.
2. TREATMENTS:

Manurial treatments:
- O = Control (no manure),
- N, = 70 Kg/ha of N,
- K, = 70 Kg/ha of K₂O,
- K, = 140 Kg/ha of K₂O,
- N₁K₁ = 70 Kg/ha of N + 70 Kg/ha of K₂O,
- N₂K₂ = 70 Kg/ha of N + 140 Kg/ha of K₂O,
- N₃K₃ = 140 Kg/ha of N + 140 Kg/ha of K₂O and
- N₄P₁K₁ = 70 Kg/ha of N + 70 Kg/ha of P₂O₅ + 70 Kg/ha of K₂O.

3. DESIGN:

Same as in type A₁ conducted under irrigated condition on Sugarcane on page No. 76.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of cane. (iv) (a) 1963—66 for Karnal and Rohtak and 1964—66 for Ambala (63 N.A.). (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

Karnal

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>15353</td>
<td>8316</td>
<td>13715</td>
<td>16028</td>
<td>12783</td>
<td>23816</td>
<td>18548</td>
<td>3351.0</td>
</tr>
</tbody>
</table>

Control yield = 37559 Kg/ha.; No. of trials = 7.

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>12046</td>
<td>4250</td>
<td>5794</td>
<td>13775</td>
<td>15666</td>
<td>17655</td>
<td>13563</td>
<td>5918</td>
</tr>
</tbody>
</table>

Control yield = 42562 Kg/ha.; No. of trials = 9.

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>7222</td>
<td>1244</td>
<td>1538</td>
<td>11711</td>
<td>12733</td>
<td>17644</td>
<td>19144</td>
<td>15945</td>
</tr>
</tbody>
</table>

Control yield = 48694 Kg/ha.; No. of trials = 10.

Rohtak

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>6358</td>
<td>625</td>
<td>3953</td>
<td>5304</td>
<td>8566</td>
<td>8566</td>
<td>12124</td>
<td>26290</td>
</tr>
</tbody>
</table>

Control yield = 60028 Kg/ha.; No. of trials = 3.

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>9636</td>
<td>2320</td>
<td>6325</td>
<td>1407</td>
<td>31035</td>
<td>26192</td>
<td>31974</td>
<td>41987</td>
</tr>
</tbody>
</table>

Control yield = 54757 Kg/ha.; No. of trials = 4.
Crop :- Sugarcane.  
Site :- District : Ambala.  
Ref :- Hr. 63(SFT).  
Type :- 'M'.

Object :- Type A1 : To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :  
(i) N.A. (ii) Tropical arid brown. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS : 
Same as in type A1 conducted under irrigated condition on Sugarcane crop on page No. 81.

3. DESIGN: 
Same as in type A1 conducted under irrigated condition on Sugarcane crop on page No. 76.

4. GENERAL: 
(i) and (ii) N.A. (iii) Yield of cane. (iv) (a) 1963—only. (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>4546</td>
<td>1960</td>
<td>5271</td>
<td>10180</td>
<td>9340</td>
<td>13162</td>
<td>14282</td>
</tr>
</tbody>
</table>

Control yield=31162 Kg/ha.; No. of trials=5

Crop :- Sugarcane.  
Site :- Sugarcane Sub-Stn., Jagadhari.  
Ref :- Hr. 60(48).  
Type :- 'MV'.

Object :- To study the effect of different levels of N on different varieties of Sugarcane.
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) March, 60. (iv) (a) 4—5 ploughings. (b) to (e) N.A. (v) N.A.
   (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) 12.3.61.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 varieties: \( V_1 = \text{Col-29, } V_2 = \text{Co. J-39} \).
   (2) 7 levels of N as C/A/N: \( N_1 = 0, N_2 = 56, N_3 = 112, N_4 = 178, N_5 = 224, N_6 = 280 \) and \( N_7 = 336 \) Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/98.8 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 841'0 Q/ha. (ii) 60'7 Q/ha. (iii) Main effects of N and V are highly significant. (iv) Av. yield of cane in Q/ha.

\[
\begin{array}{cccccccc}
 N_4 & N_1 & N_4 & N_4 & N_3 & N_6 & N_6 & \text{Mean} \\
 V_1 & 483'9 & 613'7 & 755'1 & 859'5 & 912'2 & 948'0 & 1008'3 & 1000'4 \\
 V_2 & 554'1 & 647'0 & 788'3 & 956'9 & 1035'5 & 1059'2 & 1150'5 & 881'6 \\
 \text{Mean} & 509'0 & 641'4 & 771'7 & 908'2 & 973'9 & 1003'6 & 1079'4 & 841'0 \\
\end{array}
\]

C.D. for V marginal means=32·8 Q/ha.
C.D. for N marginal means=61'4 Q/ha.

---

Crop: Sugarcane.
Site: Sugarcane Sub-Stn., Jagadhari.
Type: 'MV'.

Object: To study the effect of different levels of N on the yield of different varieties of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) G.M. — Sugarcane — G.M. (b) G.M. (c) N.A. (ii) Sandy loam. (iii) 1st week of March (iv) (a) 6 to 8 ploughings. (b) to (e) N.A. (v) 50 C.L./ha. of F.Y.M. (vi) As per treatments. (vii) Irrigated, (viii) 4 to 5 weedings. (ix) N.A. (x) 20.2.61; 1st fortnight of March, 62.

2. TREATMENTS:
   Same as in Expt. No. 60(48) presented above.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 30·48 m. x 3·66 m. for 60; N.A. (b) 27·71 m. x 3·66 m. for 60; 1/98·8 ha. (v) 139 cm. on either side; N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Aratan solution sprayed; N.A. (iii) Yield of cane. (iv) (a) 1960—61. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x Years interaction is present.

5. RESULTS:
   Pooled results
   (i) 612'5 Q/ha. (ii) 188'7 Q/ha. (based on 13 d.f. made up of Treatments x Years interaction). (iii) Main effect of N is highly significant and that of V is significant. (iv) Av. yield of cane in Q/ha.
Crop : Sugarcane.
Site : Sugarcane Sub-Stn., Jagadhari.
Ref : Hr. 64(58).
Type : 'MV'.

Object : To study the effect of different levels of N on different varieties of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) G.M. - Sugarcane - G.M. (b) G.M. (c) N.A. (ii) Sandy loam. (iii) 15.2.64. (iv) (a) 6-8 ploughings. (b) Transplanting. (c) 74000 two budded setts/ha. (d) 60 cm. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) Last week of 65.

2. TREATMENTS:
   Main-plot treatments:
   4 varieties: \( V_1 = Co-1007, V_2 = Co-546, V_3 = Co-1148 \) and \( V_4 = Co-975 \).

   Sub-plot treatments:
   6 levels of N: \( N_0 = 0, N_1 = 112, N_2 = 140, N_3 = 168, N_4 = 196 \) and \( N_5 = 224 \) Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) 4 main-plots/replication and 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/933 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Poor. (ii) N.A. (iii) Yield of cane. (iv) (a) 1964- only. (b) N.A. (c) Nil. (v) N.A. (vi) and (vii) Nil.
5. RESULTS:
(i) 296·1 Q/ha.  (ii) (a) 130·6 Q/ha.  (b) 40·1 Q/ha.  (iii) Interaction N×V is significant.  (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>N5</th>
<th>N6</th>
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</thead>
<tbody>
<tr>
<td>V1</td>
<td>361·0</td>
<td>342·0</td>
<td>380·3</td>
<td>336·3</td>
<td>323·2</td>
<td>334·3</td>
</tr>
<tr>
<td>V2</td>
<td>255·3</td>
<td>234·3</td>
<td>261·4</td>
<td>256·2</td>
<td>257·5</td>
<td>315·3</td>
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<tr>
<td>V3</td>
<td>327·2</td>
<td>283·7</td>
<td>283·7</td>
<td>291·3</td>
<td>300·0</td>
<td>313·1</td>
</tr>
<tr>
<td>V4</td>
<td>245·6</td>
<td>309·9</td>
<td>310·0</td>
<td>254·0</td>
<td>286·9</td>
<td>243·2</td>
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<tr>
<td>Mean</td>
<td>297·3</td>
<td>292·5</td>
<td>308·9</td>
<td>284·5</td>
<td>291·9</td>
<td>301·5</td>
</tr>
</tbody>
</table>

C.D. for V means at the same level of N=99·5 Q/ha.
C.D. for N means at the same level of V=56·8 Q/ha.

Crop :- Sugarcane.
Site :- Sugarcane Sub-Sta., Jagadhari.
Object :- To study the effect of different methods and seed rates on the yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) G.M. (Sannhemp)—Sugarcane—Ratoon—G.M.  (b) G.M.  (c) 67·6 Kg/ha. of P₂O₅.  (ii) Sandy loam.  (iii) 1st week of March, 64.  (iv) (a) 5-6 ploughings.  (b) to (e) N.A.  (v) 49'4 C.L./ha. of F.Y.M.  (vi) CO₁—46.  (vii) Unirrigated.  (viii) 4—5 weedings.  (ix) N.A.  (x) First fortnight of March, 65.

2. TREATMENTS:
All combinations of (1) and (2)
(2) 2 methods of planting: M₁=Flat and M₂=Trench.
(2) 2 seed rates: S₁=49400 two budded sets/ha. and S₂=74100 two budded sets/ha.

3. DESIGN:
(i) Fact. in R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/98·8 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) Fair.  (ii) Nil.  (iii) Yield of cane.  (iv) (a) 1964—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
(i) 583·2 Q/ha.  (ii) 64·0 Q/ha.  (iii) Main effect of M and interaction S×M is significant.  (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M₁</td>
<td>595·3</td>
<td>546·9</td>
<td>571·1</td>
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<tr>
<td>M₂</td>
<td>591·8</td>
<td>599·0</td>
<td>595·4</td>
</tr>
<tr>
<td>Mean</td>
<td>593·5</td>
<td>572·9</td>
<td>583·2</td>
</tr>
</tbody>
</table>

C.D. for M marginal means=72·4 Q/ha.
C.D. for the body of S×M table=102·3 Q/ha.
Crop : Sugarcane.  
Site : Punjab Agri. University (Hissar Campus), Hissar.  
Object:—To study the effect of methods of sowing with seed rate and spacing on Sugarcane crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) End of March, 65.  (iv) (a) 4—5 ploughings.  (b) As per treatments.  (c) 7500 two budded setts/ha.  (d) As per treatments.  (e) Nil.  (f) N.A.  (vi) COL.—46.  (vii) Irrigated.  (viii) 3 hoeings and 3 weedings.  (ix) N.A.  (x) March, 66.

2. TREATMENTS:
   (1) 2 methods of sowing: M1=Flat sowing and M2=Trench sowing.
   (2) 3 spacings: S1=60 cm. in between rows, S2=90 cm. between rows and S3=60 cm. x 60 cm.

3. DESIGNS:
   (i) Fact. in R.B.D.  (ii) (a) 6.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/198 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) 5.7 litre of feldodrio mixed with 1591 litre of water was sprayed/ha.  (iii) Yield of cane.
   (iv) (a) 1965—only.  (b) No.  (c) —.  (v) to (vii) N.A.

5. RESULTS:
   (i) 723.2 Q/ha.  (ii) 86.0 Q/ha.  (iii) Main effect of M and interaction S x M are significant.  (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>702.4</td>
<td>607.9</td>
<td>677.2</td>
<td>662.5</td>
</tr>
<tr>
<td>M2</td>
<td>755.4</td>
<td>886.5</td>
<td>709.8</td>
<td>783.9</td>
</tr>
<tr>
<td>Mean</td>
<td>728.9</td>
<td>747.2</td>
<td>693.5</td>
<td>723.2</td>
</tr>
</tbody>
</table>

C.D. for M marginal means=74.8 Q/ha.
C.D. for the body of S x M table=129.6 Q/ha.

---

Crop : Cotton (Khajr).  
Site : Govt. Agri. Stn., Hansi.  
Object :—To study the effect of different sources of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A.  (b) Fallow.  (c) Nil.  (ii) Sandy loam.  (iii) 29.3 61.  (iv) and (v) N.A.  (vi) H—14.  (vii) Irrigated.  (viii) and(ix) N.A.  (x) 15.10.61 to 25.11.61.

2. TREATMENTS:
   4 sources of 50 Kg/ha. of N : S0=Control, S1=A/S, S2=Ammo. Phos. and S3=F.Y.M.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 2.  (iv) (a) N.A.  (b) 1/16/48 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of kapas.  (iv) (a) 1961—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.
5. RESULTS:

(i) 539·3 Kg/ha. (ii) 60·0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

Treatment  \( S_0 \)  \( S_1 \)  \( S_2 \)  \( S_3 \)  
Av. yield  499·5  530·3  585·6  541·8

Crop: Cotton ('Kharif').
Site: Govt. Agr. Sta., Hansi.

Object: To study the effect of \( N, P \) and \( K \) on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Loam. (iii) May, 63. (iv) to (vi) N.A. (vii) Irrigated. (viii) 3 hoeings. (ix) N.A.

2. TREATMENTS:
All combinations of (1), (2) and (3)

(1) 3 levels of \( N \) as C/A/N: \( N_0 = 0 \), \( N_1 = 60 \) and \( N_1 = 120 \) Kg/ha.
(2) 2 levels of \( P_2 \): \( P_0 = 0 \) and \( P_1 = 60 \) Kg/ha.
(3) 2 levels of \( K_2 \): \( K_0 = 0 \) and \( K_1 = 60 \) Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10·97 m.x7·32 m. (b) 10·21 m.x6·10 m. (v) 38 cm.x61 cm. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1962—only. (b) and (c) N.A. (v) Hissar. (vi) and (vii) Nil.

5. RESULTS:

(i) 411 Kg/ha. (ii) 212·6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>( N_0 )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( K_0 )</th>
<th>( K_1 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( P_0 )</td>
<td>285</td>
<td>403</td>
<td>491</td>
<td>416</td>
<td>370</td>
</tr>
<tr>
<td>( P_1 )</td>
<td>336</td>
<td>452</td>
<td>497</td>
<td>468</td>
<td>388</td>
</tr>
<tr>
<td>Mean</td>
<td>311</td>
<td>427</td>
<td>494</td>
<td>442</td>
<td>379</td>
</tr>
<tr>
<td>( K_0 )</td>
<td>379</td>
<td>464</td>
<td>484</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( K_1 )</td>
<td>243</td>
<td>391</td>
<td>504</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Cotton ('Kharif').
Site: Govt. Res. Sta., Hansi.

Object: To study the effect of soil application of micronutrients on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) 3 ploughings. (b) to (e) N.A. (v) to (vii) N.A.

(viii) 2 hoeings; 3 hoeings. (ix) N.A. (x) Nov./Dec., 63; N.A.
2. TREATMENTS:
7 micronutrient treatments: T_0=Control, T_1=Borax, T_2=MnSO₄, T_3=CuSO₄, T_4=ZnSO₄, T_5=FeSO₄, and T_6=Ammo. Molybdate.

The level and time of application—N.A.

3. DESIGN:
(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/274 2 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1963—64. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) Hissar. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:
Pooled results
(i) 823 Kg/ha. (ii) 131.8 Kg/ha. (based on 66 d.f. made up of pooled error and Treatments x Years interaction). (iii) Treatment differences are not significant. (iv) A v. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_0</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>Avg. yield</th>
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<td>Year 1963</td>
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<td>694</td>
<td>840</td>
<td>771</td>
<td>749</td>
<td>823</td>
<td>749</td>
<td>N.S. 767</td>
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<td></td>
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<td>104.0</td>
</tr>
<tr>
<td>Year 1964</td>
<td>838</td>
<td>872</td>
<td>900</td>
<td>882</td>
<td>914</td>
<td>882</td>
<td>872</td>
<td>N.S. 880</td>
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<td>827</td>
<td>832</td>
<td>853</td>
<td>810</td>
<td>N.S. 823</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>131.8</td>
</tr>
</tbody>
</table>

Crop :- Cotton (Kharif).
Site :- Punjab Agri. University (Hissar Campus), Hissar.
Type :- 'M'.

Object:-To find out the optimum time of application of N on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loamy. (iii) 1st week of May, 62. (iv) (a) 3 ploughings. (b) to (e) N.A. (v) N.A. (vi) H—14. (vii) Irrigated. (viii) and (ix) N.A. (x) Nov., 62.

2. TREATMENTS:
All combinations of (1) and (2) + control (two plots):

(1) 6 times of application: T_1=Full dose at sowing, T_2=Full dose at thinning, T_3=Full dose at flowering, T_4=dose at sowing +d at thinning, T_5=d at sowing +d at flowering and T_6=d at thinning +d at flowering.

(2) 2 levels of N: N_1=56 and N_2=112 Kg/ha.

3. DESIGN:
(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 1/299.9 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of kapar. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) Nil.
5. RESULTS:

(i) 1589 Kg/ha. (ii) 284.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

Control = 1364 Kg/ha.

\[
\begin{array}{cccccc|c}
T_1 & T_2 & T_3 & T_4 & T_5 & T_6 & \text{Mean} \\
N_1 & 1533 & 1804 & 1446 & 1594 & 1603 & 1551 & 1589 \\
N_2 & 1525 & 1410 & 1690 & 1734 & 1385 & 1777 & 1589 \\
\text{Mean} & 1529 & 1612 & 1588 & 1664 & 1494 & 1664 & 1589 \\
\end{array}
\]

Object: To study the effect of N on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Loamy. (iii) 2nd week of May, 62. (iv) (a) 5 ploughings. (b) to (e) N.A. (vi) N.A. (vi) H-14. (vii) Irrigated, (viii) and (ix) Nov./Dec., 62.

2. TREATMENTS:

3 levels of N as C/A/N; N_0=0, N_1=56 and N_2=112 Kg/ha.

3. DESIGN:

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/298.9 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of kapar. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 1458 Kg/ha. (ii) 85.4 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of kapar in Kg/ha.

\[
\begin{array}{ccc}
\text{Treatment} & N_0 & N_1 & N_2 \\
\text{Av. yield} & 1350 & 1486 & 1538 \\
\text{C.D.} = 147.8 \text{ Kg/ha.} \\
\end{array}
\]

Crop: Cotton (Kharif).

Site: Punjab Agri. University (Hissar Campus), Hissar.

Ref: Hr. 64(87), 65(43).

Type: 'M'.

Object: To study the effect of N on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) N.A.; Gram. (c) N.A. (ii) Loamy soil. (iii) 23.5.64; 3rd week of Apr. 65. (iv) (a) 3 ploughings with tractor and one dest Hal. (b) to (e) N.A. (vi) H—14. (vii) Irrigated, (viii) 2 hoeings; 1 thinning. (ix) N.A. (x) 22.10.64 to 13.11.64; 25.10.65 to 3.11.65.

Crop: Cotton (Kharif).

Site: Punjab Agri. University (Hissar Campus), Hissar.

Ref: Hr. 62(79).

Type: 'M'.

Object: To study the effect of N on the yield of Cotton.
2. TREATMENTS:

10 methods of fertilizer placement: 

- **C<sub>0</sub>** = Control, 
- **C<sub>1</sub>** = Fertilizer was applied by plough. 
- **C<sub>2</sub>** = Seed and fertilizer were applied in the same line but from separate bowls, 
- **C<sub>3</sub>** = Both in the same line were applied but fertilizer 4 cm. deeper than seed, 
- **C<sub>4</sub>** = Fertilizer was broadcasted at sowing before last cultivation, 
- **C<sub>5</sub>** = Fertilizer was broadcasted at final thinning, 
- **C<sub>6</sub>** = Fertilizer was broadcasted at flowering stage, 
- **C<sub>7</sub>** = Fertilizer was top dressed along Cotton rows at final thinning and 
- **C<sub>8</sub>** = Fertilizer was top dressed along with Cotton rows at flowering.

3. DESIGN:

- (i) R.B.D. 
- (ii) N.A. 
- (iii) 4.

4. GENERAL:

- (i) Normal; Poor. 
- (ii) N.A.; Nil. 
- (iii) Yield of kapas. 
- (iv) (a) 1964—Contd. 
- (v) Yes.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>C&lt;sub&gt;0&lt;/sub&gt;</td>
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</tr>
<tr>
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<tr>
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<tr>
<td>C&lt;sub&gt;3&lt;/sub&gt;</td>
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<td>1442</td>
</tr>
<tr>
<td>C&lt;sub&gt;6&lt;/sub&gt;</td>
<td>1201</td>
</tr>
<tr>
<td>C&lt;sub&gt;7&lt;/sub&gt;</td>
<td>1321</td>
</tr>
<tr>
<td>C&lt;sub&gt;8&lt;/sub&gt;</td>
<td>1325</td>
</tr>
</tbody>
</table>

Crop: Cotton (Kharif).
Ref.: Hr. 64(89), 65(44).
Site: Punjab Agri. University (Hissar Campus), Hissar.
Type: 'M'.
Object: To determine the effect of soil application of micronutrients on the yield of Cotton.

1. BASAL CONDITIONS:

- (i) (a) N.A. 
- (ii) N.A.; Bajra. 
- (iii) N.A. 
- (iv) (a) to 4 ploughings by disc harrow. 
- (v) N.A.; 
- (vi) N.A.; 
- (vii) Irrigated. 
- (viii) N.A.; 

2. TREATMENTS:

7 micronutrient treatments: 

- **M<sub>0</sub>** = Control, 
- **M<sub>1</sub>** = 0.25 Kg/ha. of Borax, 
- **M<sub>2</sub>** = 1.00 Kg/ha. of manganese sul., 
- **M<sub>3</sub>** = 0.50 Kg/ha. of copper sul., 
- **M<sub>4</sub>** = 1.00 Kg/ha. of Zinc sul., 
- **M<sub>5</sub>** = 2.50 Kg/ha. of Ferrous sul. and 
- **M<sub>6</sub>** = 0.25 Kg/ha. of Ammo. molybdate.

(Micronutrients were applied to soil).

3. DESIGN:

- (i) R.B.D. 
- (ii) 7. 
- (iii) 6. 
- (iv) (a) 9 14 m. x 57 m.; 
- (b) 792 m. x 38.1; 
- (v) Yes.
4. GENERAL:
(i) Normal; Very poor.  (ii) N.A.; Endrin was sprayed against Jassid attack.  (iii) Yield of kapas.
(iv) (a) 1964 – contd.  (b) No.  (c) Nil.  (v) No.  (vi) Nil.  (vii) Since exp. is contd. beyond 65, results of
individual years are presented under 5. Results.

5. RESULTS:
64(89)
(i) 755 Kg/ha.  (ii) 209.0 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of kapas
in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>622</td>
<td>795</td>
<td>872</td>
<td>667</td>
<td>701</td>
<td>726</td>
</tr>
<tr>
<td></td>
<td>905</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65(44)
(i) 389 Kg/ha.  (ii) 223.7 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of kapas
in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M7</th>
<th>M8</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>505</td>
<td>313</td>
<td>289</td>
<td>372</td>
<td>313</td>
</tr>
<tr>
<td></td>
<td>485</td>
<td>441</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Cotton (Kharif).
Site: Punjab Agri. University (Hissar Campus), Hissar.
Object: To determine the effect of foliar spray of micronutrients on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) N.A.  (b) N.A.; Bajra.  (c) N.A.  (ii) Loamy.  (iii) 15.5.64; 22.4.65.  (iv) (a) 3 to 4 ploughings
with harrow.  (b) to (e) N.A.  (v) N.A.  (vi) H—14.  (vii) Irrigated.  (viii) and (ix) N.A.
(x) 20.10.64 to 20.11.64; 14.10.65 to 11.11.65.

2. TREATMENTS:
Same as in exp. no. 64(89), 65(44) and presented on page no. 90.
(Micronutrients applied as foliar spray).

3. DESIGN:
(i) R.B.D.  (ii) 7.  (b) N.A.  (iii) 6.  (iv) (a) 9:14 m. x 4:57 m.; 6:60 m.x 6:90 m.  (b) 7:92 m. x 3:81 m.;
5:40 m. x 6:30 m.  (v) 61 cm. x 38 cm.; 60 cm. x 30 cm.  (vi) Yes.

4. GENERAL:
(i) Normal; Poor.  (ii) Jassid attack, Endrin sprayed.  (iii) Yield of cotton.  (iv) (a) 1964—65.  (b) No.
(c) Nil.  (v) No.  (vi) Nil.  (vii) Error variances are heterogeneous and Treatments x Years interaction is
absent, hence the results of individual years are presented under 5. Results.

5. RESULTS:
64(90)
(i) 1287 Kg/ha.  (ii) 227.1 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of kapas
in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M7</th>
<th>M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1209</td>
<td>1324</td>
<td>1415</td>
<td>1258</td>
<td>1253</td>
</tr>
<tr>
<td></td>
<td>1352</td>
<td>1181</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Object: To work out the critical level of N, P and K at different levels of fertility.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) N.A. (c) N.A. (ii) Loamy. (iii) 17.5.74; 18.4.65. (iv) (a) 3 ploughings with disc harrow. (b) to (e) N.A. (v) N.A. ; Nil. (vi) H-14. (vii) Irrigated. (viii) N.A. ; 3 hoeings and 1 thinning. (ix) N.A. (x) 20.10.64 to 16.11.64; 14.10.65 to 11.11.65.

2. TREATMENTS:
   Same as in expt. no. 63(79) and presented on page no. 87. (Manures were applied at the time of sowing).

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 6'70 m. x 10'97 m.; 4'80 m. x 9'60 m. (b) 5'94 m. x 9'75 m.; 3'60 m. x 9'00 m. (v) 39 cm. x 61 cm.; 60 cm. x 30 cm. (vi) Yes.

4. GENERAL:
   (i) Poor. (ii) 2 spray of Endrio both seasons. (iii) Yield of kapas. (iv) (a) 1964–65. (b) No. (c) Nil. (v) Hansi. (vi) Nil; Drought. (vii) Error variances are heterogeneous and Treatments x Years interaction is absent, hence the results of individual years are presented under 5. Results.

5. RESULTS:

64(92)
   (i) 901 Kg/ha. (ii) 33.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>K0</th>
<th>K1</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N0</td>
<td>768</td>
<td>964</td>
<td>895</td>
<td>837</td>
<td>866</td>
</tr>
<tr>
<td>N1</td>
<td>1042</td>
<td>910</td>
<td>1069</td>
<td>884</td>
<td>976</td>
</tr>
<tr>
<td>N2</td>
<td>907</td>
<td>818</td>
<td>856</td>
<td>868</td>
<td>862</td>
</tr>
<tr>
<td>Mean</td>
<td>906</td>
<td>897</td>
<td>940</td>
<td>863</td>
<td>901</td>
</tr>
</tbody>
</table>

65(92)
   (i) 1081 Kg/ha. (ii) 126.5 Kg/ha. (iii) Main effects of N, P and K are significant. (iv) Av. yield of kapas in Kg/ha.
Crop: Cotton (Kharif).
Site: Govt. Agri. Farm, Rohtak.
Object: To study the effect of different sources of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 20.5.60. (iv) (a) to (e) N.A. (v) Nil. (vi) H-14. (vii) Irrigated. (viii) and (ix) N.A. (x) Sept., 60.

2. TREATMENTS:

3. DESIGN:
   (i) R.B.D. (ii) 8. (b) N.A. (iii) 2. (iv) (a) and (b) 1/39.5 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 622 Kg/ha. (ii) 927 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

   Treatment: S₀ S₁ S₂ S₃ S₄ S₅ S₆ S₇
   Av. yield: 602 758 613 627 699 585 564 527

C.D. for N marginal means = 91.0 Kg/ha.
C.D. for K marginal means = 74.3 Kg/ha.

---

Crop: Cotton (Kharif).
Site: Govt. Agri. Farm, Rohtak.
Object: To study the effect of different sources of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Berseem. (c) N.A. (ii) Sandy loam. (iii) 25.5.60. (iv) and (v) N.A. (vi) H-14. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   4 times and methods of application of N at 67 Kg/ha as C/A/N: T₀ = Full dose at sowing, T₁ = 1/2 dose at thinning + 1/2 dose at pre-flowering, T₂ = 1/2 dose at sowing + 1/2 dose at pre-flowering.
Crop : Cotton (Kharij).
Site : Govt. Agri. Farm, Rohtak.
Ref : Hr. 60(119), 61(89).
Type : 'M'.

Object :—To study the effect of different sources of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Berseem. (c) N.A. (ii) Sandy loam. (iii) 17.5.60 ; 24.5.61. (iv) and (v) N.A. (vi) H—14. (vii) Irrigated. (viii) and (ix) N.A. (x) 15.10.61 to 20.11.60 ; Mid of Oct. to 20.11.61.

2. TREATMENTS:
   8 manures: M0 = Control, M1 = A/C, M2 = C/A/N, M3 = Urea, M4 = Ammon. Liquor, M5 = A/S/N, M6 = K as Mur. Pot. and M7 = 56·0 Kg/ha. of N + 56·0 Kg/ha. of K2O.

3. DESIGN:
   (i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 1/39·5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of Kapas. (iv) (a) 1960—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   Pooled results
   (i) 583 Kg/ha. (ii) 76·0 Kg/ha. (based on 21 d.f. made up of pooled error and Treatments X Years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M0</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>494</td>
<td>548</td>
<td>598</td>
<td>634</td>
<td>386</td>
<td>640</td>
<td>474</td>
<td>686</td>
</tr>
<tr>
<td>C.D. = 17'8 Kg/ha.</td>
<td></td>
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</tbody>
</table>

Individual results

<table>
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<tr>
<th>Year</th>
<th>M0</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M7</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>534</td>
<td>627</td>
<td>567</td>
<td>695</td>
<td>505</td>
<td>652</td>
<td>531</td>
<td>694</td>
<td>N.S.</td>
<td>613</td>
<td>91'0</td>
</tr>
<tr>
<td>1961</td>
<td>454</td>
<td>470</td>
<td>630</td>
<td>612</td>
<td>565</td>
<td>623</td>
<td>416</td>
<td>677</td>
<td>**</td>
<td>556</td>
<td>67'0</td>
</tr>
<tr>
<td>Pooled</td>
<td>494</td>
<td>548</td>
<td>598</td>
<td>654</td>
<td>586</td>
<td>640</td>
<td>474</td>
<td>686</td>
<td>**</td>
<td>585</td>
<td>76'0</td>
</tr>
</tbody>
</table>
Crop: Cotton (Kharif).
Site: Govt. Agri. Stn., Rohtak.

Object: To study the effect of F.Y.M. with different levels of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) to (e) N.A. (b) Sandy loam. (iii) 21.5.61. (iv) and (v) N.A. (vi) H—14. (vii) Irrigated. (viii) and (ix) N.A. (x) 15.10.61 to 18.11.61.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 levels of F.Y.M.: F₀=Without F.Y.M. and F₁=With F.Y.M.
   (2) 4 levels of N as C/A/N: N₀=0, M₁=67, N₂=134 and N₃=202 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 2. (iv) N.A. (b) 1/39·5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1961 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 337 Kg/ha. (ii) 48.0 Kg/ha. (iii) Main effect of F alone is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>F₀</td>
<td>279</td>
<td>310</td>
<td>292</td>
<td>345</td>
<td>306</td>
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<tr>
<td>F₁</td>
<td>368</td>
<td>348</td>
<td>384</td>
<td>371</td>
<td>388</td>
</tr>
<tr>
<td>Mean</td>
<td>324</td>
<td>329</td>
<td>338</td>
<td>338</td>
<td>337</td>
</tr>
</tbody>
</table>

C.D. for F marginal means=55·3 Kg/ha.

Crop: Cotton (Kharif).
Site: Govt. Agri. Farm, Rohtak.

Object: To study the effect of different levels of K on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A. ; Nil. (b) Sugarcane ; N.A. (c) Nil ; N.A. (ii) Sandy loam. (iii) 18.5.61; 15.5.62. (iv) (a) to (e) N.A. (v) Nil. (vi) H—14. (vii) Irrigated. (viii) and (ix) N.A. (x) Sept. and October.

2. TREATMENTS:
   6 manurial treatments: M₀=Control, M₁=67·2 Kg/ha. of N as C/A/N, M₂=M₁+67·2 Kg/ha. of P₂O₅, M₃=M₂+67·2 Kg/ha. of K₂O as Mur. Pot., M₄=M₃+134·4 Kg/ha. of K₂O as Mur. Pot. and M₅=M₄+268·8 Kg/ha. of K₂O as Mur. Pot.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 3. (iv) (a) and (b) 1/46·9 ha.; 1/46·5 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1961—62. (b) No. (c) Results of combined analysis are presented under S. Results. (v) and (vi) No. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.
5. RESULTS:

Pooled results
(i) 599 Kg/ha. (ii) 80'2 Kg/ha. (based on 25 d.f. made up of pooled error and Treatments x Years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

Treatment | $M_0$ | $M_1$ | $M_2$ | $M_3$ | $M_4$ | $M_5$ | Sig. | G.M. | S.E./plot
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Year 1961 | 300 | 394 | 386 | 400 | 405 | 418 | N.S. | 364 | 83'1
1962 | 772 | 822 | 875 | 809 | 833 | 781 | N.S. | 815 | 87'6
Pooled | 536 | 608 | 630 | 604 | 619 | 600 | N.S. | 599 | 80'2

Individual results

Crop : Cotton (Kharif).
Site : Govt. Agri. Farm, Rohtak.
Object : To study the effect of surface and deep application of F.Y.M. with or without N, P and K on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Gram ; N.A. (c) N.A. (ii) Sandy loam. (iii) 6 5.61 ; 10.5.62. (iv) (a) to (e) N.A. (v) Nil. (vi) H--14. (vii) Irrigated. (viii) and (ix) N.A. (x) September and October.

2. TREATMENTS:
5 manurial treatments : $M_1$=Surface application of F.Y.M., $M_2$=Deep application of F.Y.M., $M_3$=$M_1$+N.P.K, $M_4$=Surface application of NPK and $M_5$=Deep application of NPK.
(F.Y.M. application at 125 Q/ha. and NPK : 67'2 Kg/ha. of N+33'6 Kg/ha. of P_2O_5+33'6 Kg/ha. of K_2O.)

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) and (b) N.A. (v) No. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1961-62. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) No. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:

Pooled results
(i) 428 Kg/ha. (ii) 74'8 Kg/ha. (based on 28 d.f. made up of pooled error and Treatments x Years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of kapas in Kg/ha.

Treatment | $M_1$ | $M_2$ | $M_3$ | $M_4$ | $M_5$ | C.D.=76'6 Kg/ha.
--- | --- | --- | --- | --- | --- | ---
Av. yield | 446 | 312 | 484 | 460 | 436 |
Object: To study the effect of different sources of N on the yield of Cotton.

1. BASAL CONDITION:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 10.5.62. (iv) (a) to (c) N.A. (v) Nil. (vi) H—14. (vii) Irrigated. (viii) and (ix) N.A. (x) Oct. and Nov., 62.

2. TREATMENTS:
   1 Control and 3 sources of N at 44.8 Kg/ha.:

   3. DESIGN:
      (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 2. (iv) (a) and (b) 1/19.8 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1962—only. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1269 Kg/ha. (ii) 65.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

   Treatment | S4 | S1 | S2 | S3
   ----------|----|----|----|----
   Av. yield | 1218 | 1246 | 1315 | 1296

Object: To study the effect of different sources of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 10.5.62. (iv) (a) to (c) N.A. (v) Nil. (vi) H—14. (vii) Irrigated. (viii) and (ix) N.A. (x) Oct. and Nov., 62.

2. TREATMENTS:
   1 Control and 3 sources of N at 44.8 Kg/ha.:

   3. DESIGN:
      (i) R.B.D. (ii) (a) 4. (b) N.A. (ii) 2. (iv) (a) 1/19.8 ha. (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1962—only. (b) N.A. (c) Nil. (v) to (vii) Nil.
5. RESULTS:
   (i) 1035 Kg/ha.  (ii) 33'0 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of kapas in Kg/ha.

   Treatment  S_1  S_2  S_3  S_4  
   Av. yield  982  1136  1043  1051

   Crop :- Cotton (Kharij).
   Site :- Govt. Agri. Farm, Rohtak.

   Object :- To study the effect of different levels of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) and (c) N.A.  (ii) Sandy loam.  (iii) 10-5.62.  (iv) (a) to (c) N.A.  (v) Nil.  (vi) H=14, Irrigated.  (vii) and (ix) N.A.  (x) Oct. and Nov., 62.

2. TREATMENTS:
   4 levels of N as C/A/N : N_0=0, N_1=67'2, N_2=134'4 and N_3=201'6 Kg/ha.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 4.  (iv) (a) and (b) 1/39'5 ha.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of kapas (iv) (a) 1962-only.  (b) and (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
   (i) 623 Kg/ha.  (ii) 145'0 Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of kapas in Kg/ha.

   Treatment  N_0  N_1  N_2  N_3  C.D.=233 4 Kg/ha.
   Av. yield  818  875  590  210

   Crop :- Cotton (Kharij).
   Site :- District : Karnal and Hissar.

   Object :- Type A: To study the response of N, P and K applied individually and in combination on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Alluvial.  (iii) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments :
   O=Control (no manure),
   N=44'8 Kg/ha. of N,
   P=22'4 Kg/ha. of P_2O_5,
   K=22'4 Kg/ha. of K_2O,
   NP=44'8 Kg/ha. of N+22'4 Kg/ha. of P_2O_5,
   NK=44'8 Kg/ha. of N+22'4 Kg/ha. of K_2O,
   PK=22'4 Kg/ha. of N+22'4 Kg/ha. of K_2O and
   NPK=44'8 Kg/ha. of N+22'4 Kg/ha. of P_2O_5+22'4 Kg/ha. of K_2O.
3. DESIGN:

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/ thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on Type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of Kap.s. (iv) (a) 1960--61. (b) and (c) N.A. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karnal</td>
<td>9</td>
<td>250</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>110</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
<td>-14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>34.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-20</td>
<td>-20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>28.0</td>
</tr>
<tr>
<td>Hissar</td>
<td>7</td>
<td>690</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>34.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-20</td>
<td>-20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>28.0</td>
</tr>
</tbody>
</table>

Crop : Cotton.  
Site : (District) : Hissar.  
Object : Type B. To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:

(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:

7 manurial treatments:

- O = Control (no manure),
- \( n_1 \rightarrow 28 \) Kg/ha. of N as A/S,
- \( n_2 \rightarrow 56 \) Kg/ha. of N as A/S,
- \( n_3 \rightarrow 28 \) Kg/ha. of N as Urea,
- \( n_4 \rightarrow 56 \) Kg/ha. of N as Urea,
- \( n_5 \rightarrow 28 \) Kg/ha. of N as A/S/N and
- \( n_6 \rightarrow 56 \) Kg/ha. of N as A/S/N.

3. DESIGN:

Same as in type A conducted under irrigated condition on Cotton crop on page No. 98.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of kapas. (iv) (a) 1960--only. (b) and (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rohtak</td>
<td>5</td>
<td>940</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>220</td>
<td>-30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>180</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
<td>340</td>
</tr>
<tr>
<td></td>
<td></td>
<td>500</td>
<td>S.E.</td>
</tr>
</tbody>
</table>
Crop: Cotton (Kharif).

Site: (District): Hissar.

Object:—Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Alluvial. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   7 manural treatments:
   0=Control (no manure),
   \( n_1=44.8 \text{ Kg/ha. of N as A/S} \),
   \( n_2=89.6 \text{ Kg/ha. of N as A/S} \),
   \( n_2'=44.8 \text{ Kg/ha. of N as Urea} \),
   \( n_2'=89.6 \text{ Kg/ha. of N as Urea} \),
   \( n_1'=44.8 \text{ Kg/ha. of N as A/S/N} \),
   \( n_2'=89.6 \text{ Kg/ha. of N as A/S/N} \).

3. DESIGN:
   Same as in type A conducted under irrigated condition on Cotton crop on page No. 98.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of Kapas. (iv) (a) 1961—only. (b) and (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:
   District | No. of Control trials | Control yield in Kg/ha. | Av. response in Kg/ha. | \( n_1 \) | \( n_2 \) | \( n_1' \) | \( n_2' \) | S.E.
   --- | --- | --- | --- | --- | --- | --- | --- | ---
   Hissar | 8 | 420 | 130 | 220 | 110 | 220 | 110 | 270 | 43 | 0

Crop: Cotton (Kharif).

Site: (District): Hissar.

Object:—Type A1: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manural treatments:
   0=Control (no manure),
   \( N_1=60 \text{ Kg/ha. of N} \),
   \( N_2=120 \text{ Kg/ha. of N} \),
   \( P_1=35 \text{ Kg/ha. of } P_2O_5 \),
   \( P_1=60 \text{ Kg/ha. of } P_2O_5 +35 \text{ Kg/ha. of } P_2O_5 \),
   \( N_3P_1=120 \text{ Kg/ha. of } N+35 \text{ Kg/ha. of } P_2O_5 \),
   \( N_3P_1=120 \text{ Kg/ha. of } N+70 \text{ Kg/ha. of } P_2O_5 \) and
   \( N_4P_1=120 \text{ Kg/ha. of } N+70 \text{ Kg/ha. of } P_2O_5 +35 \text{ Kg/ha. of } K_2O \).
3. DESIGN:
(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A1, 11 of type A2, 11 of type A3 and 3 are of type C. The eleven experiments under type A1, A2 and A3 are distributed as 3 on a Kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yet.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of Kamas. (iv) (a) 1962-66 (63 N.A.). (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N2P</th>
<th>N2P2K</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>217</td>
<td>413</td>
<td>136</td>
<td>292</td>
<td>377</td>
<td>511</td>
<td>506</td>
<td>61.1</td>
</tr>
</tbody>
</table>

Control yield=810 Kg/ha.; No. of trials=10

66(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N2P</th>
<th>N2P2K</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>183</td>
<td>347</td>
<td>107</td>
<td>388</td>
<td>475</td>
<td>564</td>
<td>636</td>
<td>97.4</td>
</tr>
</tbody>
</table>

Control yield=732 Kg/ha.; No. of trials=8

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N2P</th>
<th>N2P2K</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>355</td>
<td>503</td>
<td>-17</td>
<td>424</td>
<td>596</td>
<td>676</td>
<td>621</td>
<td>65.9</td>
</tr>
</tbody>
</table>

Control yield=631 Kg/ha.; No. of trials=8.

---

Crop :- Cotton (Kharif).
Site :- (District) : Hissar.
Ref :- Hr. 63, 64, 65(SFT).
Type :- 'M'.

Object :- Type A2: To study the response curves of important cereal, cash and oilseed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :
(b) to (vi) N.A. (vii) Irrigated. (viii) to (a) N.A.

2. TREATMENTS :
8 manural treatments :
O=Control (no manure),
N1=60 Kg/ha. of N,
P1=35 Kg/ha. of P2O5,
P3=70 Kg/ha. of P2O5,
N1P1=60 Kg/ha. of N+35 Kg/ha. of P2O5,
N2P2=60 Kg/ha. of N+70 Kg/ha. of P2O5,
N2P2K 1=120 Kg/ha. of N+70 Kg/ha. of P2O5+70 Kg/ha. of K2O.
3. DESIGN:
Same as in type A₁ conducted under irrigated condition on Cotton crop on page No. 101.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of Kapas. (iv) (a) 1962–66 (63 N.A.) (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
62(SFT)
Treatment | N₁ | P₁ | P₂ | N₁P₁ | N₁P₂ | N₂P₂ | N₂P₂K₂ | S.E.
Av. response of yield in Kg/ha.
--- | --- | --- | --- | --- | --- | --- | --- | ---
Control yield=933 Kg/ha.; No. of trials=8

64(SFT)
Treatment | N₁ | P₁ | P₂ | N₁P₁ | N₁P₂ | N₂P₂ | N₂P₂K₂ | S.E.
Av. response of yield in Kg/ha.
--- | --- | --- | --- | --- | --- | --- | --- | ---
Control yield=606 Kg/ha.; No. of trials=8

65(SFT)
Treatment | N₁ | P₁ | P₂ | N₁P₁ | N₁P₂ | N₂P₂ | N₂P₂K₂ | S.E.
Av. response of yield in Kg/ha.
--- | --- | --- | --- | --- | --- | --- | --- | ---
Control yield=607 Kg/ha.; No. of trials=9

Crop: Cotton (*Kharif*)

Site: (District) Hissar.

Type: ‘M’.

Object: — Type A₁: To study the response curves of important cereal, cash and oilseed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O=Control (no manure),
N₁=60 Kg/ha. of N₁,
K₁=35 Kg/ha. of K₂O,
N₂K₂=70 Kg/ha. of K₂O,
N₂K₂=60 Kg/ha. of N₁+35 Kg/ha. of K₂O,
N₂K₂=60 Kg/ha. of N₂+70 Kg/ha. of K₂O,
N₂K₂=120 Kg/ha. of N₁+70 Kg/ha. of K₂O and
N₂P₁K₁=60 Kg/ha. of N₂+35 Kg/ha. of P₂O₅+35 Kg/ha. of K₂O.

3. DESIGN:
Same as in type A₁ conducted under irrigated condition on Cotton crop page No. 101.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of Kapas. (iv) (a) 1962–66 (62 and 63 N.A.). (b) and (c) N.A. (v) to (vii) N.A.
5. RESULTS:

**64(SFT)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>256</td>
<td>40</td>
<td>28</td>
<td>299</td>
<td>358</td>
<td>616</td>
<td>503</td>
</tr>
</tbody>
</table>

Control yield = 501 Kg/ha.; No. of trials = 7

**65(SFT)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>299</td>
<td>-18</td>
<td>26</td>
<td>358</td>
<td>342</td>
<td>607</td>
<td>350</td>
</tr>
</tbody>
</table>

Control yield = 589 Kg/ha.; No. of trials = 7

**Crop:** Cotton (*Kharif*),

**Ref:** Hr. 64(04), 65(41).

**Site:** Punjab Agri-University (Hissar Campus), Hissar.

**Type:** C.

**Object:** To study the effect of pruning at different stages of crop growth and on the yield of Cotton.

1. **BASAL CONDITIONS:**

   (i) (a) N.A. (b) N.A.; *Bajra*, (c) N.A. (ii) Loam. (iii) May 1964; 21.4.65. (iv) (a) to (d) 4 disc harrow and Ploughings. (b) to (d) N.A. (e) Nil. (f) Nil. (g) Nil. (h) 11–14. (i) Irrigated. (j) 1 thinning and 2 hoeings. (k) N.A. (l) 30.10.64 to 15.12.64; 27.10.65 to 6.12.65.

2. **TREATMENTS:**

   10 dates of pruning: D<sub>0</sub>=Control (no pruning), D<sub>1</sub>=25th July, D<sub>2</sub>=15th August, D<sub>3</sub>=5th Sept., D<sub>4</sub>=D<sub>1</sub>+D<sub>2</sub>, D<sub>5</sub>=D<sub>1</sub>+D<sub>3</sub>, D<sub>6</sub>=D<sub>2</sub>+D<sub>3</sub>, D<sub>7</sub>=D<sub>1</sub>+D<sub>6</sub>, D<sub>8</sub>=5th August and D<sub>9</sub>=25th August.

3. **DESIGN:**

   (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 6.71 m. x 4.57 m.; 3.60 m. x 4.00 m. (v) 61 cm. x 38 cm.; 60 cm. x 30 cm. (vi) Yes.

4. **GENERAL:**

   (i) Normal: Poor. (ii) N.A.; Endrin sprayed on 16.8.65. (iii) Yield of *kapas*. (iv) (a) 1964–65. (b) N.A. (c) Results of combined analysis are presented under 5. Results. (j) Abasar, Ludhiana, Jullundur. (v) Nil. (vi) Error variances are homogenous and Treatments X Years interaction is present.

5. **RESULTS:**

   **Pooled results**

   (i) 818 Kg/ha. (ii) 324.4 Kg/ha. (based on 9 d.f. made up of Treatments X Years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D&lt;sub&gt;0&lt;/sub&gt;</th>
<th>D&lt;sub&gt;1&lt;/sub&gt;</th>
<th>D&lt;sub&gt;2&lt;/sub&gt;</th>
<th>D&lt;sub&gt;3&lt;/sub&gt;</th>
<th>D&lt;sub&gt;4&lt;/sub&gt;</th>
<th>D&lt;sub&gt;5&lt;/sub&gt;</th>
<th>D&lt;sub&gt;6&lt;/sub&gt;</th>
<th>D&lt;sub&gt;7&lt;/sub&gt;</th>
<th>D&lt;sub&gt;8&lt;/sub&gt;</th>
<th>D&lt;sub&gt;9&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>824</td>
<td>846</td>
<td>820</td>
<td>862</td>
<td>787</td>
<td>812</td>
<td>857</td>
<td>944</td>
<td>703</td>
<td>726</td>
</tr>
</tbody>
</table>

**Individual results**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D&lt;sub&gt;0&lt;/sub&gt;</th>
<th>D&lt;sub&gt;1&lt;/sub&gt;</th>
<th>D&lt;sub&gt;2&lt;/sub&gt;</th>
<th>D&lt;sub&gt;3&lt;/sub&gt;</th>
<th>D&lt;sub&gt;4&lt;/sub&gt;</th>
<th>D&lt;sub&gt;5&lt;/sub&gt;</th>
<th>D&lt;sub&gt;6&lt;/sub&gt;</th>
<th>D&lt;sub&gt;7&lt;/sub&gt;</th>
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<th>D&lt;sub&gt;9&lt;/sub&gt;</th>
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<tbody>
<tr>
<td>Year 1964</td>
<td>797</td>
<td>765</td>
<td>765</td>
<td>933</td>
<td>813</td>
<td>997</td>
<td>829</td>
<td>1132</td>
<td>718</td>
<td>710</td>
</tr>
<tr>
<td></td>
<td>N.S.</td>
<td>846</td>
<td>249.2</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1965</td>
<td>850</td>
<td>927</td>
<td>874</td>
<td>791</td>
<td>761</td>
<td>628</td>
<td>885</td>
<td>756</td>
<td>688</td>
<td>743</td>
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<tr>
<td></td>
<td>N.S.</td>
<td>790</td>
<td>193.8</td>
<td></td>
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</tr>
<tr>
<td>Pooled</td>
<td>824</td>
<td>846</td>
<td>820</td>
<td>862</td>
<td>787</td>
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<td>857</td>
<td>944</td>
<td>703</td>
<td>726</td>
</tr>
<tr>
<td></td>
<td>N.S.</td>
<td>818</td>
<td>324.4</td>
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</tr>
</tbody>
</table>
Crop: Cotton (Kharif).

Object: To study the effect of deep ploughings and interculturings.

1. BASAL CONDITIONS:
(i) (a) Wheat—Cotton. (b) Wheat. (c) N.A. (ii) Loamy. (iii) 21.5.65. (iv) (a) 2 ploughings. (b) to (e) N.A. (v) 80 Kg/ha. of N at sowing. (vi) H—14. (vii) Irrigated. (viii) 3 hoeings. (ix) N.A. (x) 3 pickings from 16.10.65 and 6.12.65.

2. TREATMENTS:
Main-plot treatments:
3 levels of ploughing: 
- P1=Normal ploughing,
- P2=22 cm. deep ploughing every year (after wheat and Cotton harvest) and
- P3=22 cm. deep ploughing once in two years after Wheat harvesting.

Sub-plot treatments:
3 levels of interculturing: C1=1, C2=2 and C3=3 interculture.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) Nil. (iii) 4. (iv) (a) 9'60 m. x 4'80 m. (b) 9'00 m. x 3'40 m. (v) 30 cm. x 70 cm. (vi) Yes.

4. GENERAL:
(i) Poor. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 2077 Kg/ha. (ii) (a) 298'2 Kg/ha. (b) 415'4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
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<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
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<td>1934</td>
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<td>Mean</td>
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<td>2080</td>
<td>2036</td>
<td>2077</td>
</tr>
</tbody>
</table>

Crop: Cotton (Kharif).

Object: To find out the best method of fertilizer placement for Cotton.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loamy. (iii) Mid. of May 63. (iv) (a) 4 ploughings. (b) to (e) N.A. (v) 62 Kg/ha. of N+37 Kg/ha. of P2O5. (vi) N.A. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) 24.9/2.11.63.

2. TREATMENTS:
10 cultural treatments: 
- C0=No fertilizer,
- C1=Plough sole method fertilizer one week before sowing,
- C2=Seed and fertilizer in the same line but from separate bowls,
- C3=Both in the same line fertilizer 4 cm deeper than the seed,
- C4=Fertilizer 10 cm. deep but 4 cm away from seed line,
- C5=Fertilizer broadcast at sowing before last cultivation,
- C6=Fertilizer broadcast at final thinning,
- C7=Fertilizer broadcast at flowering,
- C8=Fertilizer top dressed along cotton rows at final thinning and
- C9=Fertilizer top dressed along cotton rows at final flowering.
3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) A. (iv) (a) 9.14 m. x 5.49 m. (b) 8.30 m. x 4.27 m. (v) 38 cm. x 61 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) 1% solution of endrine sprayed. (iii) Yield of kapas. (iv) (a) 1963—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 785 Kg/ha. (ii) 106.2 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>C_1</th>
<th>C_2</th>
<th>C_3</th>
<th>C_4</th>
<th>C_5</th>
<th>C_6</th>
<th>C_7</th>
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<tr>
<td>Av. yield</td>
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<td>772</td>
<td>769</td>
<td>824</td>
<td>814</td>
<td>828</td>
<td>831</td>
<td>870</td>
<td>583</td>
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<tr>
<td>C.D.</td>
<td>154.1 Kg/ha.</td>
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Crop: Cotton (Kharij).
Site: Cotton Sub-Stn., Hansi.
Object: To study the effect of intercropping on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loam. (iii) May, 63. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) 2 hoeings.

2. TREATMENTS:
All combinations of (I) and (2)+2 controls

(I) 8 crop treatments: T_1=Cotton (n) normal spacing 60 cm. x 45 cm., T_2=Cotton (w) wide spacing 90 cm. x 30 cm., T_3=Cotton (w)+Bhindhi one row (for fruit) variety Pb. 13, T_4=Cotton (w)+Bhindhi two rows (for fruit) variety Pb. 13, T_5=Cotton (w)+cowpeas one row (for grain) variety Branco, T_6=Cotton (w) cowpeas two rows (Green manure), Pb. 10, T_7=Cotton (w)+Guara two rows (for fodder) and T_8=Cotton (w)+Guara two rows (G.M.)

(II) 2 levels of N : N_1=60, N_2=120 Kg/ha. of N.

Control: C_0=Cotton (n) without N and C_1=Cotton (w) without N.

3. DESIGN:
(i) Fast. in R. B. D. + two controls. (ii) (a) 18. (b) N.A. (iii) A. (iv) (a) 10'97 m. x 4'57 m. (b) 10'36 m. x 2'74 m. (v) 30 cm. x 91 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1963—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 503 Kg/ha. (ii) 246·2 Kg/ha. (iii) Main effect of T is highly significant and that of N is significant. (iv) Av. yield of kapas in Kg/ha.
Crop: Cotton (Kharif).
Site: Punjab Agri. University, (Hissar Campus), Hissar. Type: 'M'.

Object: To study the effect of different dates of sowing, spacings and levels of N on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loamy. (iii) As per treatments. (iv) (a) 6 to 8 ploughings with deshi plough. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) H-14. (vii) to (x) N.A.

2. TREATMENTS:
Main-plot treatments:
(i) All combinations of (1) and (2)
(1) 4 dates of sowing: D1=7.4.62, D2=28.4.62, D3=17.5.62 and D4=7.6.62.
(2) 3 spacings: S1=61 cm. x 46 cm., S2=61 cm. x 61 cm. and S3=61 cm. x 76 cm.

Sub-plot treatments:
3 levels of N: N0=0, N1=56 and N2=112 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 12 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/299.0 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1493 Kg/ha. (ii) (a) 875 1 Kg/ha. (b) 656 9 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of kapas in kg/ha.

<table>
<thead>
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<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>S1</th>
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<th>S3</th>
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<td>1505</td>
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C0=434 and C1=661 Kg/ha.
C.D. for T marginal means=247.3 Kg/ha.
C.D. for N marginal means=123.6 Kg/ha.

Ref: Hr. 62(68).

C.D. for T marginal means=247.3 Kg/ha.
C.D. for N marginal means=123.6 Kg/ha.
Crop: Cotton (Kharif).
Ref: Hr. 64(86), 65(37).
Site: Punjab Agri. University (Hisar (Compus), Hisar.

Object: To study the effect of mixed cropping along with levels of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Loamy. (iii) 22.5.64; 10.5.65. (iv) (a) 2 to 4 ploughings. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) H—14. (vii) Irrigated. (viii) 5 hoings. (ix) N.A (x) 23.10.64 to 23.12.64; 1.11.65 to 21.11.65.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 8 cultural treatments: T1=Cotton 60 cm. x 46 cm. spacing, T3=Cotton wide 90 cm. x 30 cm. spacing. T4=T1 + one row of Btndi, T5=T1 + two rows of Btndi, T6=T1 + one row of cowpea, T7=T1 + two rows of cowpea (for G.M.), T8=T1 + two rows of Guara (for fodder) and T9=T1 + two rows of Guara (for G.M.)
   (2) 2 levels of N: N1=60 and N2=120 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) 7.32 m. x 6.71 m.; 9.60 m. x 4.80 m. (b) 1/299 ha. 9.0 m. x 3.0 m. (v) N.A.; 30 cm. x 40 cm. (vi) Yes.

4. GENERAL:
   (i) Normal; Poor. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1964—65. (b) and (c) No. (v) Abohar, Jullundur, Ludhiana in Punjab. (vi) Lack of rains for 65. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:
Pooled results
   (i) 874 Kg/ha. (ii) 185.1 Kg/ha, (based on 105 d.f. made up of pooled error and Treatments x Years interaction. (iii) Main effect of T alone is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
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C.D. for T marginal means=129.5 Kg/ha.

Individual results:

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<tr>
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<td>779</td>
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<td>822</td>
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</table>


Object: To study the effect of irrigation requirements with the graded doses of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) May, 63. (iv) (a) to (e) N.A. (v) 120 Kg/ha. of P₂O₅ + 40 Kg/ha. of K₂O + 300 Kg/ha. of F.Y.M. before sowing. (vi) N.A. (vii) As per treatments. (viii) 3 hoings. (ix) N.A. (x) Nov. and Dec., 63.

2. TREATMENTS:
   Main-plot treatments:
   8 levels of irrigation: I₁ = Local practice of Irrigation, I₁ = T₁T₂, I₂ = T₂T₃, I₃ = T₃T₄, I₄ = T₄T₅, I₅ = T₅T₆ and I₆ = T₆T₇.
   Sub-plot treatments:
   3 levels of N: N₀ = 0, N₁ = 60 and N₂ = 120 Kg/ha.
   Where T₁, T₂ and T₃ respectively stand for irrigation when 25 %, 50 % and 75 % of the available soil moisture in the top 30 cm. of the soil was consumed. The first letter of the treatment combination stands for pre-flowering and later for Post-flowering stages.

3. DESIGN:
   (i) Split-plot. (ii) (a) 8 main-plots/repllication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9 : 14 m. × 5 : 49 m. (b) 8 : 23 m. × 4 : 27 m. (v) 46 cm. × 61 cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1963—only. (b) No. (c) Nil. (v) Hissar. (vi) and (vii) Nil.

5. RESULTS:
   (i) 854 Kg/ha. (ii) (a) 146.9 Kg/ha. (b) 158.9 Kg/ha. (iii) Main effect of N alone is highly significant.
   (iv) Av. yield of kapas in Kg/ha.

<table>
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<tr>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>I₁</th>
<th>I₂</th>
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C.D. for N marginal means=299.7 Kg/ha.

Crop :- Cotton (Kharif).
Ref :- Hr., 64(91), 65(64).
Site :- Punjab Agri. University Hissar.
Type :- 'IM'.
2. TREATMENTS:
Same as in ext. no. 63(85) presented on page No. 108.

3. DESIGN:
(i) Split-plot. (ii) (a) 8 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6'70 m. x 5'49 m. ; 4'00 m. x 9'60 m. (b) 5'94 m. x 4'27 m. ; 3'60 m. x 9'00 m. (v) 38 cm. x 61 cm. ; 60 cm. x 30 cm. (vi) Yes.

4. GENERAL:
(i) Poor. (ii) N.A.; Endrin was sprayed. (iii) Yield of kapas. (iv) (a) 1964—contd. (b) No. (c) Nil. (v) Hansi. (vi) Nil; Drought. (vii) Since the ext. is contd. beyond 65, results of individual years are presented under 5 Results.

5. RESULTS:

### 64(91)

(i) 1297 Kg/ha. (ii) (a) 288.6 Kg/ha. (b) 201.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
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<th>I₂</th>
<th>I₃</th>
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### 64(64)

(i) 935 Kg/ha. (ii) (a) 334.3 Kg/ha. (b) 280.2 Kg/ha. (iii) Main effect of I alone is significant. (iv) Av. yield of kapas in Kg/ha.

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</table>

C.D. for I marginal means=283.9 Kg/ha.

---

Crop :- Cotton (Kharif).
Ref :- Hr. 64(208).
Site :- Punjab Agri University (Hissar Campus), Hissar. Type :- 'IMV'.
Object:—To study the effect of irrigations and N on different varieties of Cotton.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A: (ii) Sandy loam. (iii) 15.5.64. (iv) (a) N.A. (b) Dibbling. (c) N.A. (d) 45 cm. x 30 cm. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) 20th Oct. to 28th Dec. 64
2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) 3 times of irrigations when available moisture depth by: I<sub>a</sub>=20 %, I<sub>b</sub>=40 % and I<sub>c</sub>=60 %
(2) 3 doses of N: N<sub>1</sub>=40, N<sub>2</sub>=100 and N<sub>3</sub>=150 Kg/ha.
(3) 2 varieties: V<sub>1</sub>=H-14 and V<sub>2</sub>=F-320.

Dates of irrigation for: I<sub>a</sub>: 15.6.64, 29.6.64, 24.9.64; I<sub>b</sub>: 29.6.65 and I<sub>c</sub>: no. irrigation.

Entire dose of N applied before sowing.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of kapar. (iv) (a) 1964—only. (b) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 1361 Kg/ha. (ii) 270.0 Kg/ha. (iii) Main effect of V is highly significant and that of N is significant,
(iv) Av. yield of kapar in Kg/ha.

<table>
<thead>
<tr>
<th>V&lt;sub&gt;1&lt;/sub&gt;</th>
<th>V&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;0&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>Mean</th>
</tr>
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<tr>
<td>I&lt;sub&gt;a&lt;/sub&gt;</td>
<td>1565</td>
<td>1299</td>
<td>1567</td>
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<td>I&lt;sub&gt;b&lt;/sub&gt;</td>
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<td>1247</td>
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<td>1287</td>
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<tr>
<td>I&lt;sub&gt;c&lt;/sub&gt;</td>
<td>1440</td>
<td>1150</td>
<td>1277</td>
<td>1307</td>
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<td>Mean</td>
<td>1490</td>
<td>1232</td>
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<tr>
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<tr>
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<tr>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>1362</td>
<td>1160</td>
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</tr>
</tbody>
</table>

C.D. for V marginal means=127.9 Kg/ha.
C.D. for N marginal means=156.7 Kg/ha.

Crop: Cotton (Kharif).
Ref: Hr. 63(77), Type: ‘D’. 

Object: To study the effect of beta Naphthoxyacetic acid (NOA) on the yield of Cotton.
4. GENERAL:
(i) Normal. (ii) 1% endrine spray for jassid attack. (iii) Yield of kapas. (iv) (a) 1963—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 698 Kg/ha. (ii) 133.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W_0</th>
<th>W_1</th>
<th>W_2</th>
<th>W_3</th>
<th>W_4</th>
<th>W_5</th>
<th>W_6</th>
<th>W_7</th>
<th>W_8</th>
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<td>700</td>
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<td>749</td>
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<td>665</td>
<td>706</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>C_2</td>
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<td>703</td>
<td>665</td>
<td>744</td>
<td>673</td>
<td>657</td>
<td>691</td>
<td></td>
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</tr>
<tr>
<td>Mean</td>
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<td>702</td>
<td>690</td>
<td>746</td>
<td>688</td>
<td>661</td>
<td>698</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Cotton (Kharif).

ObjecT: To determine suitable method of controlling weeds and its effects on the yield of Cotton.

1. BASAL CONDITIONS:
(i) N.A. (ii) Loam. (iii) Mid. of May 63. (iv) (a) 3 ploughings. (b) to (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) 20.9.62, 7.11.63.

2. TREATMENTS:
10 weedical treatments: W_0=Unweeded, W_1=Local method of weeding, W_2=2 Kg/ha. of Eptam, W_3=4 Kg/ha. of Eptam, W_4=0.5 Kg/ha. of CMU, W_5=1.0 Kg/ha. of CMU, W_6=25 Kg/ha. of PCP, W_7=50 Kg/ha. of PCP, W_8=50 Kg/ha. of Dowpon and W_9=10 Kg/ha. of Dowpon.

3. DESIGN:
(i) R.B.D. (ii) 10. (b) N.A. (iii) 6. (iv) (a) 6-71 m. x 7-62 m. (b) 5.49 m. x 6-71 m. (v) 61 cm. x 46 cm. (vi) Yes.

GENERAL:
(i) Normal. (ii) 1% solution of Endrine sprayed at flowering. (iii) Yield of kapas. (iv) (a) 1963—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 222 Kg/ha. (ii) 60.5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W_0</th>
<th>W_1</th>
<th>W_2</th>
<th>W_3</th>
<th>W_4</th>
<th>W_5</th>
<th>W_6</th>
<th>W_7</th>
<th>W_8</th>
<th>W_9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>248</td>
<td>344</td>
<td>177</td>
<td>178</td>
<td>326</td>
<td>297</td>
<td>206</td>
<td>127</td>
<td>143</td>
<td>107</td>
</tr>
</tbody>
</table>

C.D. for W marginal means—69.9 Kg/ha.
Crop: Cotton (Kharif).
Site: Cotton Res. Stn., Hansei.

Object: To determine the ideal plant population for obtaining high cotton yield under the condition of high fertilization and restricted plant growth.

1. BASAL CONDITIONS:
   (i) N.A.
   (ii) Sandy loam.
   (iii) N.A.
   (iv) (a) 3 to 4 ploughings with country plough. (b) N.A. (c) and (d) As per treatments. (e) N.A. (v) 15 Kg. each of K, S.P. and F.Y.M. (vi) N.A. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) 8.10.63 to 29.11.63.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4):
   (1) 3 spacings: S1 = 60 cm. x 30 cm., S2 = 60 cm. x 45 cm., and S3 = 60 cm. x 60 cm
   (2) 3 plant population per hill: P1 = 1, P2 = 2 and P3 = 3 plants/hill.
   (3) 3 levels of N as Ca(N): N0 = 0, N1 = 125 and N2 = 250 Kg/ha.
   (4) 3 doses of N.A.A.: H0 = 0, H1 = 20 and H2 = 40 p.p.m.

3. DESIGN:
   (i) 3’ confd. (ii) (a) 9 plots/block, 9 blocks/replications. (b) N.A. (iii) 1. (iv) (a) 5.53 m. x 5.18 m (b) 7.62 m. x 3.96 m. (v) 46 cm. x 61 cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A.A. sprayed to check the Jassid. (iii) Yield of kapas. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 1123 Kg/ha. (ii) 317.9 Kg/ha. (iii) Main effects of S and H are significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>H0</th>
<th>H1</th>
<th>H2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>1019</td>
<td>990</td>
<td>1121</td>
<td>937</td>
<td>1008</td>
<td>1235</td>
<td>1176</td>
<td>1019</td>
<td>984</td>
<td>1060</td>
</tr>
<tr>
<td>P2</td>
<td>1176</td>
<td>1121</td>
<td>1082</td>
<td>1027</td>
<td>1165</td>
<td>1187</td>
<td>1404</td>
<td>815</td>
<td>1159</td>
<td>1126</td>
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<tr>
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<td>1109</td>
<td>1256</td>
<td>1249</td>
<td>992</td>
<td>1128</td>
<td>1123</td>
</tr>
</tbody>
</table>

C.D. for S or H marginal means = 183.4 Kg/ha.

Crop: Cotton.
Site: Cotton Res. Stn., Hansei.

Object: To study the effect of soaking Cotton seed in different concentrations of some plant regulators on yield of Cotton.

Ref: Hr. 63(81).
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) May, 63. (iv) (a) 3 ploughings. (b) to (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) 20.9.63 to 2.11.63.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4)+Control
   (1) 3 plant regulations: R1= Naphthalene acetic acid, R2=Indole-3 acetic acid and R3=Indole-3 butyric acid
   (2) 3 concentrations: C1=10, C2=20 and C3=30 p.p.m. in H2O.
   (3) 3 spacings: S1=60 cm.×15 cm., S2=60 cm.×30 cm. and S3=60 cm.×45 cm.
   (4) 3 doses of N: N1=60, N2=120 and N3=180 Kg/ha.
   Each confd. block had an additional control plot. Control plot-water soaked, sown at 60 cm.x45 cm., at 60 Kg/ha. of N.

3. DESIGN:
   (i) 3 confd.+one control. (ii) (a) 10 plots/block, 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9·14 m. x 4·37 m. (b) 8·53 m. x 3·35 m. (v) 30 cm x 61 em. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) 1% solution of Endrine spray at flowering. (iii) Yield of kapas. (iv) (a) 1963—only. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Before sowing the cotton seed was soaked in the hormone soln. of desired concentration for 8 hrs. One Kg of seed was soaked in 3 litres of soln.

5. RESULTS:
   (i) 339 Kg/ha. (ii) 103·7 Kg/ha. (iii) Interaction (S×N) and S×R are significant. (iv) Av. yield of kapas in Kg/ha

<table>
<thead>
<tr>
<th>Control=397</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C1  C2  C3</td>
</tr>
<tr>
<td>R1  777 272 227</td>
</tr>
<tr>
<td>R2  373 336 348</td>
</tr>
<tr>
<td>R3  342 347 365</td>
</tr>
<tr>
<td>Mean 364 318 313</td>
</tr>
<tr>
<td>N1  377 315 320</td>
</tr>
<tr>
<td>N2  349 326 288</td>
</tr>
<tr>
<td>N3  367 294 312</td>
</tr>
<tr>
<td>S1  267 339 389</td>
</tr>
<tr>
<td>S2  348 332 266</td>
</tr>
<tr>
<td>S3  378 284 285</td>
</tr>
</tbody>
</table>

C.D. for (S×N) or (R×S) body of the table=98·4 Kg/ha.

---

Crop ⊄ Cotton (Kharif).

Ref ⊄ Hr. 62(69).

Site ⊄ Punjab Agri. University (Hissar Campus) Hissar. Type ⊄ 'D'.

Object:—To study the effect of (Naphthalene acetic acid) (NAA) application on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy soil. (iii) May, 62. (iv) and (v) N.A. (vi) H—14. (vii) Irrigated. (viii) and (ix) N.A. (x) Oct. to end of Nov., 62.
2. TREATMENTS:

Main-plot treatments:
- All combinations of (1), (2)+control (2 plots)
  - (1) 2 concentrations of NAA: \( C_1 = 10 \) and \( C_2 = 20 \) p.p.m.
  - (2) 2 times of spray: \( T_1 = \text{At 4 to 5 leaf stage} \), \( T_2 = \text{At flowering stage} \), and \( T_3 = \text{as} T_1 + \text{as} T_2 \)

Sub-plot treatments:
- 2 manurial treatments: \( M_1 = 56 \text{ Kg/ha. of N} + 33.6 \text{ Kg/ha. of P}_2\text{O}_5 + 56 \text{ Kg/ha. of K}_2\text{O} \) and \( M_2 = 112 \text{ Kg/ha. of N} + 67.1 \text{ Kg/ha. of P}_2\text{O}_5 + 67.2 \text{ Kg/ha. of K}_2\text{O} \)

3. DESIGN:
- (i) Split-plot. (ii) (a) 8 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/299 ha. (v) N.A. (vi) Yes.

4. GENERAL:
- (i) Good. (ii) N.A. (iii) Yield of kapas. (iv) (a) and (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
- (i) 1366 Kg/ha. (ii) (a) 341.8 Kg/ha. (b) 315.3 Kg/ha.
- (iii) Main effect of M alone is highly significant.
- (iv) Av. yield of kapas in Kg/ha.

Control \( M_1 = 1236 \), Control \( M_4 = 1418 \) Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_4 )</th>
<th>( C_1 )</th>
<th>( C_2 )</th>
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</tr>
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<tbody>
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<td>1284</td>
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<td>( M_2 )</td>
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<td>1292</td>
<td>1694</td>
<td>1490</td>
<td>1458</td>
<td>1474</td>
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<td>1469</td>
<td>1384</td>
<td>1394</td>
<td>1379</td>
</tr>
<tr>
<td>( C_1 )</td>
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<td>1263</td>
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<td></td>
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<td>1300</td>
<td>1318</td>
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</table>

C.D. for M marginal means = 187.9 Kg/ha.

Crop: Cotton. Ref. :- Hr. 64(83).
Site: Punjab Agri. University (Hissar Campus) Hissar. Type:- 'D'.

Object: To study the effect of soaking of seed in different concentrations of plant regulators on growth and yield of Cotton.

1. BASAL CONDITIONS:
- (i) N.A. (ii) Loamy soil. (iii) May, 64. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) As per treatments. (e) N.A. (f) H-14. (g) Irrigated. (h) 1 thinning. (i) N.A. (j) 16.10.64 to 18.11.64.

2. TREATMENTS:
- All combinations of (1), (2), (3) and (4)
  - (1) 3 plant regulators: \( P_1 = \text{NAA} \) (Naphtalene acetic acid), \( P_2 = \text{IAA} \) (Indole -3 acetic acid) and \( P_3 = \text{IBA} \) (Indole -3 butyric acid).
  - (2) 3 concentrations of plant regulators: \( C_1 = 10 \), \( C_2 = 20 \) and \( C_3 = 30 \) p.p.m.
  - (3) 3 spacings: \( S_1 = 60 \text{ cm.} \times 15 \text{ cm.} \), \( S_2 = 60 \text{ cm.} \times 30 \text{ cm.} \) and \( S_3 = 60 \text{ cm.} \times 45 \text{ cm.} \)
  - (4) 3 levels of N: \( N_1 = 0 \), \( N_2 = 120 \) and \( N_4 = 180 \) Kg/ha.

3. DESIGN:
- (i) 3\(^2\) confd. (ii) (a) 9 plots/block, 9 blocks/replication. (b) N.A. (iii) 1. (iv) 9\(^*\) 14 m. \times 5\(^*\) 40 m. (b) 7\(^*\) 92 m. \times 4\(^*\) 88 m. (v) 61 cm. \times 30 cm. (vi) Yes.
4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of kapas. (iv) Only. (v) N.A. (vi) to (vii) Nil.

5. RESULTS:

(i) 522 Kg/ha. (ii) 221.3 Kg/ha. (iii) Main effect of S and interaction P x C are highly significant. Main effect of P is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th></th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
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<td>792</td>
<td>750</td>
<td>691</td>
<td>817</td>
<td>752</td>
<td></td>
</tr>
</tbody>
</table>

C.D. for S or P marginal means=127.8 Kg/ha.
C.D. for the body of P x C table=221.3 Kg/ha.

Crop: Cotton (Kharif).
Site: Punjab Agriculture University (Hissar Campus) Hissar.
Type: 'D'.

Object: To determine the ideal plant population for obtaining high cotton yield under high fertilizer.

1. BASAL CONDITIONS:

(i) N.A. (ii) Loamy soil. (iii) 23/24.4.64. (iv) (a) 3 to 5 ploughings with Disc harrow. (b) and (c) N.A. (d) and (e) As per treatments. (v) 37 Kg/ha. of P₂O₅ + K₂O and 10 C.L. of F.Y.M. (vi) H-14. (vii) Irrigated. (viii) 2 thinnings. (ix) N.A. (x) 7.11.64 to 26.11.64.

2. TREATMENTS:

Same as in Expt. No. 63(83) and presented on page No. 112.

3. DESIGN:

(i) 3' confd. (ii) (a) 9 plots/block; 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) N.A. (b) 1/224 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Attack of Jassid and white fly, 2 sprayings of Endrine. (iii) Yield of kapas. (iv) Only. (v) N.A. (vi) Hissar, Abshar. (b) N.A. (vii) and (vii) N.A.

5. RESULTS:

(i) 985 Kg/ha. (ii) 182.9 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of kapas in Kg/ha.
Crop : Cotton (Kharij).

Site : Punjab Agri. University (Hissar Campus), Hissar.

Object :- To determine the optimum time of spray and concentration of ANAA (alpha naphthalene acetic acid) for Cotton.

1. BASAL CONDITIONS :
(i) N.A. (ii) Loamy soil. (iii) 3rd week of May, 64. (iv) (a) to (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) H—14. (vii) As per treatments. (viii) 2 thinnings. (ix) N.A. (x) 19.10.64 to 10.11.64.

2. TREATMENTS:
All combinations of (1), (2), (3) and (4)
(1) 3 concentrations of NAA : C1 =5, C2 =10 and C3 =20 p.p.m.
(2) 3 times of spray : T1 =15th June, T2 =15th June+30th June and T3 =15th June+30th June+15th July.
(3) 3 times of irrigation : I1 =40, I2 =50 and I3 =60 days after sowing.
(4) 3 spacings : S1 =60 cm x 15 cm., S2 =60 cm x 30 cm. and S3 =60 cm x 45 cm.

3. DESIGN :
(i) 3 confd. (ii) 9 plots/block, 9 blocks/replication. (b) N.A. (iii) 1. (iv) 7-62 m. x 5-49 m. (b) 6-10 m. x 5-49 m. (v) 76 cm. on either side. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of kapa. (iv) (a) 1964—only. (b) No. (c) Nil. (v) and (vi) N.A.
(vii) Results presented under 5. Results, are available only.

5. RESULTS:
(i) 1315 Kg/ha. (ii) 212-1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapa in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
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<td>909</td>
<td>909</td>
<td>739</td>
<td>963</td>
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<tr>
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<td>990</td>
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<td>1008</td>
<td>969</td>
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</table>

C.D. for N marginal means=105.5 Kg/ha.

Other tables are not given.
1. BASAL CONDITIONS:
(i) (a) N.A. (b) N.A.; Gram. (c) N.A. (ii) Loamy. (iii) May, 64; 18.5.65. (iv) (a) 2 to 3 ploughings. (b) to (e) N.A. (v) Nil. 80 Kg/ha. of N. (vi) H—14. (vii) Irrigated. (viii) 1 to 3 hoeings (ix) N.A. (x) 23.10.64 to 22.11.64; 20.10.65 to 10.11.65.

2. TREATMENTS:
10 weedidal treatments: W₁=Unweeded, W₂=Local method of weeding, W₃=2 Kg/ha. of Eptum before sowing, W₄=4 Kg/ha. of Eptum before sowing, W₅=10 Kg/ha. of Chloromethyle Urea pre-emergence, W₆=1 Kg/ha. of Chlororr.ethyle Urea pre-emergence, W₇=25 Kg/ha. of Penta-Chlorophenyle post-emergence, W₈=5 Kg/ha. of Dowpon post-emergence and W₉=10 Kg/ha. of Dowpon post-emergence.

3. DESIGN:
(i) R.B D (ii) (a) 10. (b) N.A. (iii) 6 ; 5. (iv) (a) 6·71 m. x 4.57 m.; 9'00 m. x 4'80 m. (b) 5'49 m. x 3'81 m.; 8'40 m. x 3'60 m. (v) 61 em. x 38 em.; 38 em. x 60 em. (vi) Yes.

4. GENERAL:
(i) Normal; Poor. (ii) Nil. (iii) Yield of kapas (iv) (a) 1964—65. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments X Years interaction is absent, hence the results of individual years are presented under 5. Results.

5. RESULTS:
64(88)
(i) 993 Kg/ha. (ii) 33s 7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.
Treatment W₁ W₂ W₃ W₄ W₅ W₆ W₇ W₈ W₉
Av. yield 957 925 981 1100 989 909 965 1076 1092 933

65(42)
(i) 1791 Kg/ha. (ii) 431'9 Kg/ha. (ii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.
Treatment W₁ W₂ W₃ W₄ W₅ W₆ W₇ W₈ W₉
Av. yield 1825 1375 1834 1766 1791 1721 1616 1652 2063 1811

Crop :- Cotton (Kharif).
Site :- Punjab Agri. University (Hissar Campus), Hissar.
Object :-To study the effect of (Beta naphthoxyacetic acid) BNA spray on growth and yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) N.A.; Bajra (c) N.A. (ii) Loamy. (iii) 25.4.65 (iv) (a) 3 to 4 ploughings with disc harrow. (b) to (e) N.A. (v) 70 kg/ha. of N. (vi) N.A.; H-14. (vii) Irrigated. (viii) 1 thinning ; 1 thinning and 3 hoeings. (ix) N.A. (x) 20.10.64 to 11.12.64; 4.11.65 to 26.11.65.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 4 concentrations: C₀=0, C₁=5, C₂=10 and C₃=15.
(2) 3 times of spray: T₁=one week after flowering, T₂=two weeks after flowering and T₃=three weeks after flowering.

3. DESIGN:
(i) Fact. in R.B D. (ii) (a) 12. (b) N.A. (iii) 4 ; (iv) (a) 5·10 m. x 6·71 m.; 4'80 m. x 9'60 m. (b) 4'88 m. x 5'94 m.; 3'60 m. x 9'03 m. (v) 51 cm. x 33 cm.; 60 cm. x 30 cm. (vi) Yes.

4. GENERAL:
(i) Normal; very poor. (ii) Nil. 2 Endrin sprayings. (iii) Yield of kapas. (iv) (a) 1964—65. (b) No. (c)Nil. (v) No. (vi) N.A.; Drought. (vii) Error variances are homogeneous and Treatments X Years interaction is absent.
5. RESULTS:

Pooled results
(i) 825 kg/ha. (ii) 219.2 kg/ha. (based on 77 d.f. made up of pooled error and Treatments X Years interaction). (iii) None of the efects is significant. (iv) Avg. yield of *kapas* in kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C₁₀</th>
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<tr>
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<td>864</td>
<td>803</td>
<td>838</td>
<td>793</td>
<td>825</td>
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Individual results

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<th>C₁₁</th>
<th>C₁₂</th>
<th>C₁₃</th>
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<td>1964</td>
<td>1124</td>
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<td>1041</td>
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<td>1016</td>
<td>1141</td>
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<td>537</td>
<td>550</td>
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<tr>
<td>Pooled</td>
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<td>803</td>
<td>838</td>
<td>793</td>
<td>N.S.</td>
<td>775</td>
<td>861</td>
<td>838</td>
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</tbody>
</table>

Sig. | O.M. | S.E./plot
-----|------|---------
N.S. | 1090 | 213.9   
N.S. | 559  | 215.0   
N.S. | 825  | 219.2   

---

**Crop:** Tobacco (*Rabi*).
**Site:** Tobacco Res. Sub. Stn., Gurgaon.

Ref.: Hr. 62(32).
Type: "M".

Object: To study the different methods of application and sources of N on the yield of Tobacco.

1. **BASAL CONDITIONS:**
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 23.1.62 (iv) (a) 6 ploughings (b) Transplanting (c) 0.288 Kg/ha.
   (d) 61 cm x 30 cm. (e) N.A. (v) N.A. (vi) C-302 (vii) Irrigated (viii) 2 hoeings and 2 weedicings.
   (ix) 19.3 cm. (x) Mid of June 62.

2. **TREATMENTS:**
   Main-plot treatments:
   3 methods of application of N: M₁ = Band, M₂ = Broad cast and M₃ = Plough Furrow.
   Sub-plot treatments:
   3 sources of 166.8 Kg/ha. of N: S₁ = C/A/N, S₂ = Urea and S₃ = A/S.

3. **DESIGN:**
   (i) Split-plot, (ii) (a) 3 main-plots/replication and 3 sub-plots/main-plot. (b) N.A. (iii) 4, (iv) (a) and (b) 2.4 m x 6.0 m. (v) Nil. (vi) Yes.

4. **GENERAL:**
   (i) Normal. (ii) N.A. (iii) Yield of leaves. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. **RESULTS:**
   (i) 338.7 Q/ha. (ii) (a) 144.5 Q/ha. (b) 41.0 Q/ha. (iii) Main effect of S alone is significant. (iv) Avg. yield of Tobacco in Q/ha.
Crop :- Tobacco (Kharij).
Site :- Tobacco Res. Sub. Stn., Gurgaon.

Ref :- Hr. 62(48).
Type :- 'M'.

Object :- To study the effect of bulky manures and N, P and K on the yield of Tobacco.

1. BASAL CONDITIONS :
(i) (a) to (c) N.A.  (ii) (a) Sandy loam. (b) N.A.  (iii) 21.2.62.  (iv) (a) 6 ploughings. (b) Transplanting (c) 0.286 Kg/ha.  (d) 61 cm x 30 cm. (e) N.A.  (v) As per treatments. (vi) C-302. (vii) Irrigated, (viii) 2 harrowings and 2 weedings. (ix) 19.3 cm. (x) Middle of June.

2. TREATMENTS:
Main-plot treatments :
3 bulky manures:  M=Control (no manure), M1=333.6 Kg/ha. of N as F.Y.M., 1½ months before planting and M2=G M. (Guara).

Sub-plot treatments :
All combinations of (1) and (2)
(1) 3 levels of P2O5 :  P0=0,  P1=55.6 and  P2=111.2 Kg/ha.
(2) 3 levels of K2O :  K0=0,  K1=55.6 and  K2=111.2 Kg/ha.
(Each sub-plot was given 166.8 Kg/ha. of N as A/S)

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replcation, 9 sub-plots/main-plot. (b) N.A.  (iii) 5. (iv) (a) and (b) 3:00 m x 6:00 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A.  (iii) Yield of leaves. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 210.0 Q/ha.  (ii) (a) 50 90 Q/ha.  (b) 30 36 Q/ha.  (iii) Main effect of M alone is significant. (iv) Av. yield of tobacco (green leaves) in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
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<td>211</td>
<td>205</td>
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<td>210</td>
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</table>

C.D. for M marginal means=24.7 Q/ha.
Crop: Tobacco (Rabi).
Ref: Hr. 63(32), 64(20), 65(2)
Site: Tobacco Res. Sta., Gurgaon.
Type: 'M'.

Object: To study the effect of times of application of different sources of N on the yield of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 17.26; 18.26; 9.26. (iv) 3 to 4 ploughings. (b) Transplanting. (c) 0.28 Kg/ha. (d) 61 cm x 30 cm. (e) N.A. (v) Nil. (vi) C—302. (vii) Irrigated. (viii) 3 to 4 hoings. (ix) N.A. (x) Middle of June.

2. TREATMENTS:
   Main-plot treatments:
   3 sources of N at 225 Kg/ha : S1 = C/A/N, S2 = Urea and S3 = A/S.
   Sub-plot treatments:
   4 times of application : T1 = Half applied before planting and half 15 days after planting. T2 = Half applied before planting and half 45 days after planting.

3. DESIGN:
   (i) Split-plot. (ii) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 3.00 m x 5.40 m, (v) N/A. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) N.A.; N.A.; Nil. (iii) Yield of green leaf. (iv) (a) 1963-65. (b) No. (c) Results of combined analysis have been presented under 5-Results. (vi) N/A. (vii) Both the error variances are homogeneous and Treatments x Years. interaction is present in case of main-plot treatments and absent in case of sub-plot treatments.

5. RESULTS:
   Individual results

   Treatment | S1 | S2 | S3 | Sig. | T1 | T2 | T3 | T4 | Mean
   Year 1963
   252.4 372.8 336.9 * 361.5 341.6 306.3 273.5
   1964
   223.4 200.6 223.8 N.S. 229.7 220.7 207.6 205.8
   1965
   334.7 314.0 339.2 N.S. 348.2 330.2 329.6 309.2
   Pooled
   270.0 295.7 299.9 N.S. 313.1 297.4 281.1 262.6

   S.E./plot
   Main Sub
   Sig. G.M. 329.7 329.9 329.5 329.9 329.9
   N.S. 215.9 23.5 23.5 23.5 23.5
   N.S. 329.3 329.5 329.5 329.5 329.5
   N.S.
Crop : Tobacco (Rabi).  
Site :- Tobacco Res. Sta., Gurgaon.  

Object : To study the effect of high doses of N on the different varieties of Tobacco.

1. BASAL CONDITIONS :
(i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 22.12.64.  (iv) (a) to (e) N.A.  (v) Nil.  (vi) As per treatment  
(vii) Irrigated.  (viii) and (ix) N.A.  (x) Mid. of June.

2. TREATMENTS :
Main-plot treatments :
- 6 levels of N: \[ N_1 = 168, N_2 = 224, N_3 = 280, N_4 = 336, N_5 = 392 \text{ and } N_6 = 448 \text{ Kg/ha.} \]

Sub-plot treatments :
- 3 varieties: \( V_A = T-238, V_B = C-302 \text{ and } V_C = T-370. \)

3. DESIGN :
(i) Split-plot.  (ii) (a) 6 main-plots/replication and 3 sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) &  
(b) 1·80 m x 3·60 m.  (v) Nil.  (vi) Yes.

4. GENERAL :
(i) Good.  (ii) N.A.  (iii) Yield of leaves.  (iv) (a) 1964—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
(i) 516 Q/ha.  (ii) (a) 88·1 Q/ha.  (b) 56·8 Q/ha.  (iii) Main effect of V is highly significant and that of  
N is significant.  (iv) Av. yield of tobacco (green leaves) in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( N_3 )</th>
<th>( N_4 )</th>
<th>( N_5 )</th>
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<td>542</td>
<td>490</td>
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<td>405</td>
<td>420</td>
<td>537</td>
<td>503</td>
<td>480</td>
<td>442</td>
<td>465</td>
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<tr>
<td>( V_C )</td>
<td>474</td>
<td>636</td>
<td>619</td>
<td>635</td>
<td>615</td>
<td>565</td>
<td>591</td>
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</table>

| Mean | 433 | 514 | 567 | 561 | 528 | 493 | 516 |

C. D. for N marginal means = 76·6 Q/ha,  
C. D. for V marginal means = 33·3 Q/ha.
4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of tobacco. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 444 Kg/ha. (ii) (a) 113'2 Kg/ha. (b) 102'9 Kg/ha. (iii) Main effects of D and V are highly significant.
(iv) Av. yield of tobacco in Kg/ha.

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<td>Mean</td>
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<td>444</td>
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C. D. for D marginal means=110'3 Kg/ha.
C. D. for V marginal means=65'9 Kg/ha.

Crop: Tobacco (Rabi).
Site: Tobacco Res. Sta., Gurgaon.
Object: To study the effect of piercing on the suppression of suckers of different varieties of Tobacco Crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 12.1.62. (iv) (a) 6 ploughings. (b) Transplanting. (c) 0.288 Kg/ha. (d) 30 cm x 30 cm. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 3 to 4 hoeings. (ix) N.A. (x) Middle of June.

2. TREATMENTS:
Main-plot treatments:
2 levels of Piercings: P_0 = No piercing and P_1 = Piercing.
Sub-plot treatments:
4 varieties: V_1 = C—302 x 192, V_2 = S—131 x 192, V_3 = C—302 and V_4 = T—238

3. DESIGN:
(i) split-plot. (ii) (a) 2 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) and (b) 0.60 m x 3.00 m. (v) N.I. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil (iii) Yield of suckers. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 3101 Kg/ha. (ii) (a) 1224.4 Kg/ha. (b) 1508.4 Kg/ha. (iii) Main effect of P alone is highly significant.
(iv) Av. yield of Tobacco (suckers) in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<td>3666</td>
<td>2256</td>
<td>3027</td>
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C. D. for P marginal means=1074.8 Kg/ha.
Crop :- Tobacco (Rabi).

Site :- Tobacco Res. Sta., Gurguon.

Object :- To study the effect of topping on the yield of different varieties of Tobacco.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) Nil. (iii) 17.2.63. (iv) (a) 6 ploughings. (b) Transplanting. (c) 0.288 Kg/ha. (d) 30 cm x 30 cm. (e) N.A. (f) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 4 hoeings. (ix) N.A. (x) Mid. of June 63.

2. TREATMENTS :
   All combinations of (1) and (2),
   (1) 2 toppings : T0=No topping and T1=topping.
   (2) 7 varieties: V1=T-238, V2=C-302, V3=T-370, V4=C-390, V5=C-435, V6=131 x 192
   T1=302 x 192.

3. DESIGN :
   (i) Fact. in R. B. D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) and (b) 0.3 m x 5.4 m. (v) Nil. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) Nil. (iii) Yield of tobacco. (iv) (a) 1963—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :
   (i) 406.8 Q/ha. (ii) 77.04 Q/ha. (iii) Main effect of V is significant. Main effect of T and interaction V x T are highly significant. (iv) Av. yield of Tobacco in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
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<tr>
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<td>424.4</td>
<td>267.0</td>
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<td>Mean</td>
<td>389.4</td>
<td>431.9</td>
<td>397.4</td>
<td>413.2</td>
<td>372.5</td>
<td>446.0</td>
<td>346.5</td>
</tr>
</tbody>
</table>

C. D. for V marginal means =77.8 Q/ha.
C. D. for T marginal means =41.6 Q/ha.
C. D. for the body of V x T table=110.0 Q/ha.

---

Crop :- Tobacco (Rabi).

Site :- Tobacco Res. Sta., Gurguon.

Object :- To find out the effect of piercings and topping on the yield of different varieties of Tobacco.

1. BASAL CONDITIONS :
   (i) (a) to (c). (ii) Sandy loam. (iii) 17.2.63; 19.2.64. (iv) (a) to 6 ploughings; N.A. (b) Transplanting on ridges. (c) 0.14 Kg/ha. in nursery. (d) 61 cm x 30 cm. (e) N.A. (f) 37 C.L./ha. of F. Y. M.; Nil. (g) As per treatments. (h) Irrigated. (i) 3 to 4 hoeings; N.A. (lx) N.A. (x) 2nd week of June.

2. TREATMENTS :
   Main-plot treatments :
   4 varieties: V1=Hybrid 302 x 192, V2=Hybrid 131 x 192, V3=T-238, and V4=C- 302.

Sub-plot treatments :
   2 piercings : P0=No piercing and P1=Piercing.

Sub-sub-plot treatments :
   3 toppings stages : T1=10 leaves, T2=12 leaves and T3=Topping at flowering stage. Piercing done after topping.
3. DESIGN:
(i) Split-Split-plot. (ii) (a) 4 main-plots/replication ; 2 sub-plots/main-plot and 3 sub-sub-plot/sub-plot. (b) N.A. (iii) 5 ; 6. (iv) (a) and (b) 0·30 m × 5·40 m ; 0·60 m × 5·40 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of leaves. (iv) (a) 19/3—64. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As error variances are heterogeneous, the results of individual years are presented under 5. Results.

5. RESULTS:

(i) 361·6 Q/ha. (ii) (a) 50·62 Q/ha. (b) 50·47 Q/ha. (c) 43·28 Q/ha. (iii) Main effects of V and T are significant. (iv) Av. yield of green leaves in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
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<td>338·1</td>
<td>364·4</td>
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(i) 229·3 Q/ha. (ii) (a) 70·80 Q/ha. (b) 68·21 Q/ha. (c) 51·54 Q/ha. (iii) Main effects of V and T are highly significant while interaction T×V is significant. (iv) Av. yield of leaves in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
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C D. for V marginal means =35·56 Q/ha. C. D. for T marginal means =20·97 Q/ha. C. D. for T means at the same level of V =41·93 Q/ha. C. D. for V means at the same level of T =49·34 Q/ha.

Crop:- Tobacco (Rabi)
Site:- Tobacco Res. Stn., Gurgaon.
Object:- To study the effect of topping on the yield of different varieties of Tobacco crop.

1 BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 18.2.64. (iv) (a) 6 ploughings. (b) Transplanting.
125

(c) 0.288 Kg./ha. in nursery. (d) 30 cm x 30 cm. (e) N.A. (f) N.A. (v) As per treatments. (vi) Irrigated. (vii) 4 harrowings. (ix) 16.4 cm. (x) 15.6.64.

2. TREATMENTS:

Main-plot treatments:
7 varieties: \( V_1 = T-238, V_2 = C-302, V_3 = C-390, V_4 = C-194, V_5 = T-370, V_6 = 131 \times 192 \) and \( V_7 = 302 \times 192 \).

Sub-plot treatments:
3 toppings: - \( T_0 = \) No topping. \( T_1 \) = Topping and \( T_2 \) = Topping at 12 leaves stage.

3. DESIGN:

(i) Split-plot. (ii) (a) 7 main-plots/replication; 3 sub-plots/main-plot. (b) N. A. (iii) 4. (iv) (a) and (b) 0.60 m x 5.40 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of leaves. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 365.9 Q/ha. (ii) (a) 46.76 Q/ha. (b) 40.37 Q/ha. (iii) Main effects of V and T are highly significant. (iv) Average yield of Tobacco in (Green leaves) Q/ha.

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<tr>
<th></th>
<th>( V_1 )</th>
<th>( V_2 )</th>
<th>( V_3 )</th>
<th>( V_4 )</th>
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<tr>
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<td>( T_2 )</td>
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<tr>
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<td>282.7</td>
<td>262.3</td>
<td>250.8</td>
<td>253.9</td>
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</table>


Crop: Tobacco (Rabi).
Site: Tobacco Res. Sta., Gurgaon.
Ref: Hr. 6S(5).
Type: 'CV'.

Object: To study the effects of Topping and no Topping on the yield of different varieties of Tobacco.

1. BASAL CONDITIONS:

(i) (a) to (c) N. A. (ii) (a) Sandy loam. (b) Nil. (iii) 5.265. (iv) (a) to (e) N. A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N. A. (x) Mid. of June, 65.

2. TREATMENTS:

Main-plot treatments:
8 varieties: \( V_1 = T-238, V_2 = C-302, V_3 = C-390, V_4 = C-194, V_5 = T-370, V_6 = 131 \times 192, V_7 = 302 \times 192 \) and \( V_8 = 435 \).

Sub-plot treatments:
3 Toppings: \( T_0 = \) No topping. \( T_1 \) = Topping and \( T_2 \) = Topping at 12 leaves stage and \( T_3 \) = Topping at flowering.

3. DESIGN:

(i) Split-plot. (ii) (a) 8 main-plots/replication; 3 sub-plots/main-plot. (b) N. A. (iii) 4. (iv) (a) and (b) 0.60 m x 5.40 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of green plants. (iv) (a) 1965—only. (b) No. (c) Nil. (v) to (vii) Nil.
5. RESULTS:

(i) 356.1 Q/ha. (ii) (a) 50.31 Q/ha. (b) 26.85 Q/ha. (iii) Main effect of T alone is highly significant.
(iv) Av. yield of Tobacco (green plants) in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
<th>V7</th>
<th>V8</th>
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<tr>
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<td>370.4</td>
<td>312.5</td>
<td>362.7</td>
<td>347.7</td>
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<tr>
<td>T3</td>
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<td>354.9</td>
<td>405.1</td>
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<td>333.1</td>
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<td>338.2</td>
<td>374.2</td>
<td>356.1</td>
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C. D. for T marginal means=13.7 Q/ha.

---

Crop :- Tobacco (Rabi).
Site :- Tobacco Res. Stn., Gurgaon.
Object :- To study the effect of N and spacings on the yield of Tobacco crop.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 17.2.63 (iv) (a) to (e) N.A. (v) Nil. (vi) C—302—(ear y).
(vii) Irrigated. (viii) N.A. (ix) N.A. (x) Mid. of June, 63.

2. TREATMENTS:

Main-plot treatments:
3 doses of N as C/A/N: N1=100, N2=200 and N3=300 kg/ha.

Sub-plot treatments:
4 spacings: S1=30 cm x 30 cm, S2=60 cm x 22.5 cm, S3=60 cm x 30 cm and S4=60 cm x 45 cm.

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/block; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 2 x 40 m x 5 x 40 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good growth. (ii) N.A. (iii) Yield of leaves. (iv) (a) 1963—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 521 Q/ha. (ii) (a) 102.5 Q/ha. (b) 45.2 Q/ha. (iii) Main effects of N and S are highly significant. (iv) Av. yield of Tobacco (green leaves) in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
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<td>593</td>
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<td>569</td>
<td>420</td>
<td>521</td>
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</tbody>
</table>

C. D. for N marginal means= 88.7 Q/ha.
C. D. for S marginal means =37.9 Q/ha.
Crop: Tobacco (Rabi)
Site: Tobacco Res. Sta., Gurgaon,
Ref: Hr. 63(27), 65(7)

Object: To study the effect of different doses of N and spacings on the yield of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 21.12.63; 3.1.65. (iv) (a) to (e) N.A. (v) Nil; N.A. (vi) C—302. (vii) Irrigated. (viii) and (ix) N.A. . (x) Mid. of June.

TREATMENTS:
   Same as in exp. no. 63(35) presented on page no. 126.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 2 40m x 5 40 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of green leaves. (iv) (a) 1963—65 (1964 N.A.) (b) No. (c) Nil. (v) and (vi) Nil. (vii) As sub-plot error variances are heterogeneous, hence results of individual years are given below.

5. RESULTS:

63(27)
   (i) 233 Q/ha. (ii) (a) 85·8 Q/ha. (b) 16·5 Q/ha. (iii) Main effect of S and interaction SxN are highly significant. (iv) Av. yield of green leaves in Q/ha.

<table>
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<td>193</td>
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</table>

C. D. for S marginal means = 14 Q/ha.
C. D. for S means at the same level of N = 24 Q/ha.

65(7)
   (i) 309 Q/ha. (ii) (a) 65·8 Q/ha. (b) 42·9 Q/ha. (iii) Main effect of S is highly significant and that of N is significant. (iv) Av. yield of green leaves in Q/ha.

<table>
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<th>V3</th>
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<td>334</td>
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C. D. for N marginal means = 37 Q/ha.
C. D. for S marginal means = 35 Q/ha.
Crop: Tobacco (Rabi).
Site: Tobacco Res. Stn., Gurgaon.

Object: To study the effect of different dates of sowing in combination with the doses of "K" on the yield of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) to (c) N.A. (d) As per treatments.

2. TREATMENTS:
   Main-plot treatments:
   6 dates of sowing: D1=12th Nov., 64, D2=3rd Dec., 64, D3=24th Dec., 64, D4=14th Jan., 65, D5=4th Feb., 65 and D6=25th Feb., 65.

   Sub-plot treatments:
   4 doses of N as C/A/N: N1=125, N2=175, N3=225 and N4=275 Kg/ha.

   Sub-sub-plot treatments:
   3 spacings: S1=60 cm x 30 cm, S2=45 cm x 30 cm, and S3=30 cm x 30 cm.

3 DESIGN:
   (i) Split-Split-plot. (ii) 6 main-plots/replication; 4 sub-plots/main-plot and 3 sub-sub plots/sub-plot. (iii) 4, (iv) (a) and (b) 0.60 m x 5.40 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of green leaves. (iv) (a) 1965—only. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 496 Q/ha. (ii) (a) 140.1 Q/ha. (b) 76.2 Q/ha. (c) 61.1 Q/ha. (iii) Main effects of D, N, S and interaction D x S are highly significant. (iv) Av. yield of Tobacco in Q/ha.

<table>
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<td>584</td>
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C. D. for D marginal means = 61.0 Q/ha.
C. D. for N marginal means = 25.5 Q/ha.
C. D. for S marginal means = 19.5 Q/ha.
2. TREATMENTS:

Main-plot treatments:
4 dates of sowing: \( D_1 = 16.10 \), \( D_2 = 11.11 \), \( D_3 = 11.12 \), and \( D_4 = 11.14 \).

Sub-plot treatments:
3 levels of \( P_2O_5 \) as super; \( P_2 = \) Control (no \( P_2O_5 \)), \( P_2 = 112 \) and \( P_2 = 224 \) Kg/ha.

Sub-sub-plot treatments:
2 varieties: \( V_1 = C-302 \) and \( V_2 = T-238 \).

3. DESIGN:

(i) Split-split-plot. (ii) (a) 4-main-plots/replication ; 3 sub-plots/main-plot and 3 sub-sub-plots/sub-plot.
(b) N.A. (iii) 3. (iv) (a) and (b) 120 m \( \times \) 5-40 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of leaves; Yield of seed. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 1093 Kg/ha. (ii) (a) 435-2 Kg/ha. (b) 372-1 Kg/ha. (c) 170-5 Kg/ha. (iii) Main effect of \( D \) is significant and that of \( V \) is highly significant. (iv) Av. yield of tobacco (seed) in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( D_1 )</th>
<th>( D_2 )</th>
<th>( D_3 )</th>
<th>( D_4 )</th>
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C. D. for \( D \) marginal means = 355-0 Kg/ha.
C. D. for \( V \) marginal means = 82-9 Kg/ha.

Crop : Tobacco (Rah).
Site : Tobacco Res. Stn., Gurgaon.
Object : To study the effect of different doses of N and spacings on different varieties of Tobacco Crop.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 10.3-64 ; 9.2-65. (iv) (a) 4 to 5 ploughings. (b) Transplanting. (c) (—) (d) As per treatments. (e) N.A. (v) Nil ; N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 hoeings: N.A. (ix) 30-8 cm; N.A. (x) 16.9-64; Mid of June.

2. TREATMENTS:

Main-plot treatments:
3 levels of \( N \) as \( C/A/N : N_1 = 112, N_4 = 168 \) and \( N_6 = 224 \) Kg/ha.

Sub-plot treatments:
4 varieties: \( V_1 = 131 \times 92, V_2 = 302 \times 192, V_3 = C-302 \) and \( V_4 = T-238 \).
Sub-sub-plot treatments:
4 spacings: $S_1 = 30 \text{ cm} \times 15 \text{ cm}$, $S_2 = 30 \text{ cm} \times 23 \text{ cm}$, $S_3 = 30 \text{ cm} \times 30 \text{ cm}$ and $S_4 = 30 \text{ cm} \times 46 \text{ cm}$.

3. DESIGN:
(i) Split-split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot; 4 sub-sub-plots/sub-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 0.60 m $\times$ 5.40 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Good. (ii) N.A. (iii) Yield of green leaves. (iv) (a) 1964 – 65. (b) No. (c) Nil. (v) and. (vi) Nil. (vii) Because sub-sub plot error variances are heterogeneous, therefore results of individual years are given below.

5. RESULTS:
6(21)
(i) 253 Q/ha. (ii) (a) 74.4 Q/ha. (b) 85.8 Q/ha. (c) 46.5 Q/ha. (iii) Main effect of $V$ and $S$ are highly significant. (iv) Av. yield of green leaves in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>$V_1$</th>
<th>$V_2$</th>
<th>$V_3$</th>
<th>$V_4$</th>
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<th>$S_3$</th>
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</tbody>
</table>

C.D. for $V$ marginal means = 35.9 Q/ha.
C.D. for $S$ marginal means = 18.8 Q/ha.

$6(23)$
(i) 272 Q/ha. (ii) (a) 91.0 Q/ha. (b) 10.7 Q/ha. (c) 3.8 Q/ha. (iii) Main effects of $N$ and $S$ are highly significant and that of $V$ is significant. (iv) Av. yield of tobacco (green leaves) in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>$V_1$</th>
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<th>$V_4$</th>
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</tbody>
</table>

C.D. for $N$ marginal means = 39 Q/ha.
C.D. for $V$ marginal means = 45 Q/ha.
C.D. for $S$ marginal means = 25 Q/ha.
Crop: Tobacco (Rabli).
Site: Tobacco Res. Sta., Gurgaon.

Object: To study the effect of different chemical oils on the suppression of suckers and on the yield of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (iii) Sandy loam.
   (ii) 17.2.63; 19.2.64; 5.2.65.
   (iv) (a) to (e) N.A. (v) Nil. (vi) C—302.
   (vii) Irrigated. (viii) and (ix) N.A. (x) Middle of June.

2. TREATMENTS:
   8 chemical treatments: C—Control, C1—Mustard oil, C2—Coconut oil, C3—Coconut oil 1:1 emulsion, C4—Coconut oil 1:5 emulsion, C5—Maleic Hydrazide 1% in water as spray, C6—Maleic Hydrazide 2% in water spray and C7—Napthalene acetic and 2% in triethylenamine.

3. DESIGN:
   (i) R.B.D. (ii) 1963, 64, 65.
   (iv) (a) 0.30 m × 3.00 m for 63; 0.60 m × 5.40 m for others.
   (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of suckers and green leaves. (iv) (a) 1963 to 65. (b) No. (c) The results of the combined analysis are presented under S-Results. (v) and (vi) Nil. (vii) (i) Error variances are heterogeneous and Treatments × years interaction is present for suckers. (ii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS:

Suckers

Pooled results:
(i) 4415 Kg/ha. (ii) 2550 Kg/ha. (based on 14 d.f. made up of Treatments x years interaction.) (iii) Treatment differences are not significant. (iv) Av. yield of suckers in Kg/ha.

<table>
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<tr>
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<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
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S.E./plot

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<td>7253</td>
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</table>

Green leaves

Pooled results:
(i) 331 Q/ha. (ii) 42.2 Q/ha. (based on 119 d.f. made up of pooled error and Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of green leaves in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C0</th>
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<th>C3</th>
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### Individual results

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</table>

### Crop: Groundnut (Kharif)

**Site:** (District) : Ambala.

Type A: To study the response of Groundnut on different levels of N, P, and K applied individually and in combination.

#### 1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Alluvial. (iii) to (x) N.A.

#### 2. TREATMENTS:

8 manurial treatments:

- **O** = Control (no manure)
- **N** = 22.4 kg/ha. of N
- **P** = 33.6 kg/ha. of P_2O_5
- **K** = 33.6 kg/ha. of K_2O
- **NP** = 22.4 kg/ha. of N + 33.6 kg/ha. of P_2O_5
- **NK** = 22.4 kg/ha. of N + 33.6 kg/ha. of K_2O
- **PK** = 33.6 kg/ha. of P + 33.6 kg/ha. of K_2O and
- **NPK** = 22.4 kg/ha. of N + 33.6 kg/ha. of P_2O_5 + 33.6 kg/ha. of K_2O

#### 3. DESIGN:

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and circle/ thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on Type C trial in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

#### 4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—61. (b) and (c) Nil. (v) Nil. (vi) and (vii) N.A. Av. response in Kg/ha.

#### 5. RESULTS:

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<th>District</th>
<th>No of trials</th>
<th>Control yield in Kharif</th>
<th>N</th>
<th>P</th>
<th>K</th>
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<th>NP</th>
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</table>
Crop: Greengram (Kharif)
Site: (District) Ambala

Object: Type A1: To study the response curves of important cereal, cash and oilseed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O = Control (no manure),
   N1 = 15 Kg/ha. of N,
   N2 = 30 Kg/ha. of N,
   P1 = 20 Kg/ha. of P2O5,
   N1P1 = 15 Kg/ha. of N + 20 Kg/ha. of P2O5,
   N2P1 = 30 Kg/ha. of N + 20 Kg/ha. of P2O5,
   N2P2 = 30 Kg/ha. of N + 40 Kg/ha. of P2O5 and
   N2P2K1 = 30 Kg/ha. of N + 40 Kg/ha. of P2O5 + 20 Kg/ha. of K2O.

3. DESIGN:
   (i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A1, 11 of type A2 and 3 are of type C. The eleven experiments under type A1, A2 and A4 are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A1, A2 and A4 experiments 11 villages are randomly selected in each block and in each village 3 experiments out of each of type A1, A2 and A4 are laid out. For conducting the experiments three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of Kernel. (iv) (a) 1964—only. (b) and (c) N.A. (v) to (vii) N.I.

5. RESULTS:
   Treatment
   N1 N2 P1 N1P1 N2P1 N2P2 N2P2K1 S.B.
   Av. response of yield in Kg/ha.
   770 349 698 942 777 1026 1228 495 9

Control yield = 1627 Kg/ha. No. of trials = 3.
3. DESIGN:
Same as in type A 1 conducted under unirrigated conditions on groundnut crop on page No. 133.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of Kernel. (iv) (a) 1965 only. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:
Treatment N, N 1 P, N 1 P 1 N 1 P 1 K 1 S.B. Av. response of yield in Kg/ha.

Control yield = 490 Kg/ha. No. of trials = 2.

Crop :- Groundnut (Kharif). Site :- (District) Hissar and Ambala.

Object :- Type A 2 : To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:

O = Control (no manure),
N 1 = 15 Kg/ha. of N,
P 1 = 20 Kg/ha. of P 2 O 5 ,
N 1 P 1 = 15 Kg/ha. of N + 30 Kg/ha. of P 2 O 5 ,
N 1 P 1 = 30 Kg/ha. of N + 60 Kg/ha. of P 2 O 5 ,
N 1 P 1 K 1 = 30 Kg/ha. of N + 60 Kg/ha. of P 2 O 5 + 30 Kg/ha. of K 2 O.

3. DESIGN:
Same as in type A 1 conducted under unirrigated conditions on groundnut crop on page No. 133.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of Pods. (iv) (a) 1965 for Hissar and 64 for Ambala. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
Hissar 64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N 1</th>
<th>P 1</th>
<th>P 2</th>
<th>N 1 P 1</th>
<th>N 1 P 1</th>
<th>N 1 P 1</th>
<th>N 1 P 1 K 1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>560</td>
<td>20</td>
<td>60</td>
<td>850</td>
<td>860</td>
<td>920</td>
<td>930</td>
<td>1008</td>
</tr>
</tbody>
</table>

Control yield = 800 Kg/ha. ; No. of trials = 2.
Ambala
64(S.P.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₂P₁</th>
<th>N₂P₂</th>
<th>N₃P₂K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>227</td>
<td>467</td>
<td>609</td>
<td>625</td>
<td>408</td>
<td>612</td>
<td>876</td>
</tr>
</tbody>
</table>

Control yield = 1107 Kg/ha.; No. of trials = 3.

**Crop**: Groundnut (*Kharif*).  
**Site**: Punjab Agri. University (Hissar Campus), Hissar.  
**Type**: 'IM'.

Object: To study the minimum water and fertilizer requirements of Groundnut.

1. **BASAL CONDITIONS**:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) to (v) N.A.  (vi) C—501.  (vii) As per treatment.  (viii) to (x) N.A.

2. **TREATMENTS**:
   All combinations of (1) and (2).
   (1) 3 levels of irrigation:
   Ĩ₁=No irrigation, Ĩ₂=One irrigation at flowering and Ĩ₃=One irrigation at flowering and one at fruiting.
   (2) 3 levels of fertilizers:
   F₀=No fertilizer, F₁=15 Kg/ha. of P₂O₅+10 Kg/ha. of N and F₂=20 Kg/ha. of P₂O₅+20 Kg/ha. of N.

The fertilizer were applied just before sowing by ptea.

3. **DESIGN**:
   (i) Fact. in R.B.D.  (ii) (a) 9.  (b) N.A.  (iii) 4. (iv) (a) N.A.  (b) 1/269 39 ha.  (v) N.A.  (vi) Yes

4. **GENERAL**:
   (i) and (ii) N.A.  (iii) Yield of pods.  (iv) (a) 1965—only.  (b) No.  (c) Nil.  (v) No.  (vi) Nil.  (vii) Only the following results are supplied by research station.

5. **RESULTS**:
   (i) 2036 Kg/ha.  (ii) 1044.8 Kg/ha.  (iii) Main effect of I alone is highly significant.  (iv) Av. yield of pods in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I₀</th>
<th>I₁</th>
<th>I₂</th>
<th>F₀</th>
<th>F₁</th>
<th>F₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1597</td>
<td>1372</td>
<td>2830</td>
<td>1872</td>
<td>2047</td>
<td>2511</td>
</tr>
</tbody>
</table>

(C.D. for 1 marginal means = 873.6 Kg/ha.)

**Crop**: Castor (*Kharif*).  
**Site**: Agri. Res. Stu., Gurgaon.  
**Type**: 'M'.

Object: To study the effects of different times of application on different levels of N.

1. **BASAL CONDITIONS**:
   (i) (a) to (c) N.A.  (ii) (a) Sandy loam.  (b) N.A.  (iii) 22.7.65.  (iv) (a) to 5 ploughings.  (b) to (a) N.A.  (v) N.A.  (vi) P₁.  (vii) Irrigated.  (viii) 3rd week of Nov., 65.
2. TREATMENTS:
All combinations of (1) and (2) + One control (N0)
(1) 4 levels of N:
N1 = 22.4, N2 = 33.6, N3 = 44.8, and N4 = 56 Kg/ha.
(2) Two times of application of N:
T1 = Full dose at sowing and T2 = 1/2 dose at sowing + 1/2 after 2 months.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 9, (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/271.82 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of Castor. (iv) (a) 1965-contrd. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1976 Kg/ha. (ii) 416.5 Kg/ha. (iii) Main effect of 'N' alone is significant. (iv) Av. yield of Castor in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>1665</td>
<td>1914</td>
<td>1936</td>
<td>2081</td>
<td>1899</td>
</tr>
<tr>
<td>T2</td>
<td>1545</td>
<td>1934</td>
<td>2400</td>
<td>2329</td>
<td>2052</td>
</tr>
<tr>
<td>Mean</td>
<td>1605</td>
<td>1924</td>
<td>2168</td>
<td>2205</td>
<td>1976</td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 429.8 Kg/ha.

Crop :- Castor (Kharif).
Site :- Agri. Res. Stn., Gurgaon.

Object :-To study the effect of dates of sowing-cum-spacing on the yield of castor.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) to (c) N.A. (d) As per treatments. (v) N.A. (vi) FC No. 1. (vii) Irrigated. (viii) to (a) N.A.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1) and (2)
(1) 3 dates of sowing:-D1 = 15th June, D2 = 5th July and D3 = 25th July,
(2) 3 row to row spacings:-R1 = 35, R2 = 60 and R3 = 75 cm.

Sub-plot treatments:
3 plant to plant spacings: R1 = 45, R2 = 60 and R3 = 75 cm.

3. DESIGN:
(i) Split-plot design. (ii) (a) 9 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/370.72 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of seed. (iv) (a) 1965-contrd. (b) and (c) Nil. (v) and (vi) N.A. (vii) Only the following results are supplied by research station.

5. RESULTS:
(i) 1419 Kg/ha. (ii) (a) 213.0 Kg/ha. (b) N.A. (iii) Main effect of D alone is significant. (iv) Av. yield of castor in Kg/ha.

Crop :- Castor (Kharif).
Site :- Agri. Res. Stn., Gurgaon.

Ref :- Hr. 65(156).
Type :- 'C'.

Object :-To study the effect of dates of sowing-cum-spacing on the yield of castor.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) to (c) N.A. (d) As per treatments. (v) N.A. (vi) FC No. 1. (vii) Irrigated. (viii) to (a) N.A.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1) and (2)
(1) 3 dates of sowing:-D1 = 15th June, D2 = 5th July and D3 = 25th July,
(2) 3 row to row spacings:-R1 = 35, R2 = 60 and R3 = 75 cm.

Sub-plot treatments:
3 plant to plant spacings: R1 = 45, R2 = 60 and R3 = 75 cm.

3. DESIGN:
(i) Split-plot design. (ii) (a) 9 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/370.72 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of seed. (iv) (a) 1965-contrd. (b) and (c) Nil. (v) and (vi) N.A. (vii) Only the following results are supplied by research station.

5. RESULTS:
(i) 1419 Kg/ha. (ii) (a) 213.0 Kg/ha. (b) N.A. (iii) Main effect of D alone is significant. (iv) Av. yield of castor in Kg/ha.
Crop: Sarson (Rabi).

Site: Oil Seed Sub-Station, Jagadhari.

Object: To study the effect of different levels of N on the yield and quality of Sarson.

1. BASAL CONDITIONS:
   (i) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) October. (iv) (a) to (e) N.A. (v) N.A. (vi) B.S.G. (improved). (vii) Irrigated. (viii) N.A.; 2 weedings. (ix) N.A. (x) Last week of March.

2. TREATMENTS:
   6 levels of N as C/A/N: N₁=0, N₂=22.4, N₃=44.8, N₄=67.2, N₅=89.6 and N₆=112.0 Kg/ha.

3. DESIGN:
   (i) R.B.D. (ii) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 1/197.6 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A.; Spraying of Bosodine in January. (iii) Yield of sarson. (iv) (a) 1963 to 64. (b) No. (c) Results of combined analysis are presented under 5-Results. (v) and (vi) Nil. (vii) Error variances are homogeneous, and 'Treatments X years' interaction is present.

5. RESULTS:

   Pooled results:
   (i) 515 Kg/ha. (ii) 711.2 Kg/ha. (based on 5 d.f. made up of Treatments X years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of sarson in Kg/ha.

Treatment | N₁ | N₂ | N₃ | N₄ | N₅ | N₆
---|---|---|---|---|---|---
Av. yield | 183 | 340 | 528 | 692 | 756 | 776

Individual results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
<th>N₆</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>1963</td>
<td>162</td>
<td>202</td>
<td>263</td>
<td>314</td>
<td>219</td>
<td>188</td>
<td>N.S.</td>
<td>225</td>
</tr>
<tr>
<td>1964</td>
<td>204</td>
<td>478</td>
<td>794</td>
<td>1071</td>
<td>1292</td>
<td>13/5</td>
<td>**</td>
<td>867</td>
<td>130.5</td>
</tr>
<tr>
<td>Pooled</td>
<td>183</td>
<td>340</td>
<td>528</td>
<td>692</td>
<td>756</td>
<td>776</td>
<td>N.S.</td>
<td>546</td>
<td>771.2</td>
</tr>
</tbody>
</table>

Crop: Mustard (Rabi).

Site: District: Hissar.

Object: To study the response of Mustard to different levels of N, P and K applied individually and in combination.
1. **BASAL CONDITIONS**:
   (i) (a) to (c) N.A. (iii) to (x) N.A.

2. **TREATMENTS**:
   8 manurial treatments:
   
   O = Control (no manure),
   
   N = 22.4 Kg/ha. of N,
   
   P = 22.4 Kg/ha. of P₂O₅,
   
   K = 22.4 Kg/ha. of K₂O,
   
   NP = 22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅,
   
   NK = 22.4 Kg/ha. of N+22.4 Kg/ha. of K₂O,
   
   PK = 22.4 Kg/ha. of P₂O₅+22.4 Kg/ha. of K₂O,
   
   NPK = 22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅+22.4 Kg/ha. of K₂O.

3. **DESIGN**:
   (i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on cash crop, 4 on oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on Type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

4. **GENERAL**:
   (i) and (ii) N.A. (iii) Yield of mustard. (iv) (a) 1960-61. (b) and (c) Nil (v) Nil (vi) and (vii) N.A.

5. **RESULTS**:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hissar</td>
<td>6</td>
<td>910</td>
<td>70</td>
<td>60</td>
<td>40</td>
<td>270</td>
<td>-10</td>
<td>-70</td>
<td>70</td>
<td>60</td>
<td>21.0</td>
</tr>
<tr>
<td>Hissar</td>
<td>6</td>
<td>1130</td>
<td>250</td>
<td>100</td>
<td>20</td>
<td>430</td>
<td>-60</td>
<td>-30</td>
<td>-10</td>
<td>40</td>
<td>45.0</td>
</tr>
</tbody>
</table>

**Crop**: Mustard (Rabi).

**Site 1**: District: Hissar.

Object: — Type B: To investigate the relative efficiency of different fertilizers of N at different doses.

1. **BASAL CONDITIONS**:
   (i) to (x) N.A.

2. **TREATMENTS**:
   7 manurial treatments:
   
   O = Control (no manure),
   
   Nₐ = 22.4 Kg/ha. of N as A/S,
   
   Nₐ = 44.8 Kg/ha. of N as A/S,
   
   Nₐ₁ = 22.4 Kg/ha. of N as urea,
   
   Nₐ₂ = 44.8 Kg/ha. of N as urea,
   
   Nₐ₃ = 22.4 Kg/ha. of N as C/A/N,
   
   Nₐ₄ = 44.8 Kg/ha. of N as C/A/N,
3. DESIGN:
same as in type A Conducted on mustard crop on page No. 137.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of mustard. (iv) (a) 1963—only. (b) and (c) Nil (v) Nil (vi) and (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;'</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;'</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hissar</td>
<td>5</td>
<td>780</td>
<td>30</td>
<td>140</td>
<td>-10</td>
<td>120</td>
<td>60</td>
<td>980</td>
<td>780</td>
</tr>
</tbody>
</table>

Crop :- Mustard (Rekhi).
Site :- District : Hissar.
Ref :- Hr. 61(SFT).
Type :- 'M'.

Object:-Type B: To investigate the relative efficiency of different fertilizers of N at different doses.

1. BASAL CONDITIONS:
(i) to (a) N.A.

2. TREATMENTS:
7 manural treatments:
O=Control (no manure)
N<sub>1</sub>=22.4 Kg/ha. of N as A/S,
N<sub>2</sub>=44.8 Kg/ha. of N as A/S,
N<sub>1</sub>'=22.4 Kg/ha. of N as urea,
N<sub>2</sub>'=44.8 Kg/ha. of N as urea,
N<sub>3</sub>'=22.4 Kg/ha. of N as A/S/N,
N<sub>4</sub>'=44.8 Kg/ha. of N as A/S/N,

3. DESIGN:
same as in type A Conducted on mustard crop on page No. 137.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of mustard. (iv) (a) 1963—only. (b) and (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;'</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;'</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hissar</td>
<td>4</td>
<td>1340</td>
<td>300</td>
<td>560</td>
<td>200</td>
<td>480</td>
<td>280</td>
<td>500</td>
<td>610</td>
</tr>
</tbody>
</table>
Crop: Mustard (Kharif).

Ref: Hr. 62, 64(SFT) for Hisar and 63(SFT) for Gurgaon and 65(SFT) for Ambala.

Site: District: Hisar, Ambala, and Gurgaon.

Type: 'M'.

Object:—Type A1: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:

(i) to (vi) N.A. (vii) Irrigated and (viii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments i

O = Control (no manure)
N1=55 Kg/ha. of N,
N2=70 Kg/ha. of N,
P1=25 Kg/ha. of P2O5,
N1P1=35 Kg/ha. of N+25 Kg/ha. of P2O5,
N2P1=70 Kg/ha. of N+25 Kg/ha. of P2O5,
N1P2=70 Kg/ha. of N+50 Kg/ha. of P2O5,
N2P2K1=70 Kg/ha. of N+50 Kg/ha. of Nd P2O5+25 Kg/ha. of K2O.

3. DESIGN:

(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate soil, cropping pattern etc. Each zone one block is selected at random. A block normally consists of a group of 50—100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A1, 11 of type A2 and 3 of type C. The eleven experiments under type A, A2, A3 are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type—C experiments are conducted on a legume crop. For the purpose of conducting the A1, A2, A3 experiments, 11 villages are randomly selected in each block and in each village 3 experiments one each of type A1, A2, A3 are laid out. For conducting the three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of mustard. (iv) (a) 1965 for Ambala, 1962 and 64 for Hisar (65 N.A.) and 1962 for Gurgaon. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

Ambala

65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>100</td>
<td>50</td>
<td>-166</td>
<td>153</td>
<td>538</td>
<td>650</td>
<td>650</td>
<td>454.6</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=1633 Kg/ha.; No of trials=3

Hisar

62 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>388</td>
<td>595</td>
<td>268</td>
<td>316</td>
<td>516</td>
<td>602</td>
<td>654</td>
<td>99.1</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=883 Kg/ha.; No. of trials=7

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>220</td>
<td>446</td>
<td>92</td>
<td>280</td>
<td>535</td>
<td>479</td>
<td>505</td>
<td>91.1</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=848 Kg/ha.; No. of trials=5
Object: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
   8 manural treatments:
   O = Control (no manure),
   \( N_1 = 35 \text{ Kg/ha. of } N \)
   \( P_1 = 25 \text{ Kg/ha. of } P_2O_5 \)
   \( P_2 = 50 \text{ Kg/ha. of } P_2O_5 \)
   \( N_1 P_1 = 35 \text{ Kg/ha. of } N+25 \text{ Kg/ha. of } P_2O_5 \)
   \( N_1 P_2 = 35 \text{ Kg/ha. of } N+50 \text{ Kg/ha. of } P_2O_5 \)
   \( N_2 P_2 = 70 \text{ Kg/ha. of } N+50 \text{ Kg/ha. of } P_2O_5 \) and
   \( N_2 P_2 K_2 = 70 \text{ Kg/ha. of } N+50 \text{ Kg/ha. of } P_2O_5+50 \text{ Kg/ha. of } K_2O \).

3. DESIGN:
   Same as in type A1 conducted under irrigated conditions on Mustard (crop on page No. 140).

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of mustard.  (iv) (a) 1962—66 for Gurgaon (63, 64, 65 N.A.), 1962—66 for Hisar (63, 65 N.A.) and 1965 for Ambala.  (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:

Gurgaon
62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( P_1 )</th>
<th>( P_3 )</th>
<th>( N_1 P_1 )</th>
<th>( N_1 P_2 )</th>
<th>( N_2 P_2 K_2 )</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>301</td>
<td>29</td>
<td>108</td>
<td>261</td>
<td>370</td>
<td>261</td>
<td>583</td>
</tr>
</tbody>
</table>

Control yield = 306 Kg/ha.; No. of trials = 2

Hissar
62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( P_1 )</th>
<th>( P_3 )</th>
<th>( N_1 P_1 )</th>
<th>( N_1 P_2 )</th>
<th>( N_2 P_2 K_2 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>196</td>
<td>253</td>
<td>124</td>
<td>204</td>
<td>295</td>
<td>553</td>
<td>639</td>
</tr>
</tbody>
</table>

Control yield = 927 Kg/ha.; No. of trials = 5
Crop: Mustard (Rah).
Ref: Hr. 62(SFT) for Gurgaon and 62, 64(SFT) for Hissar.

Site: District Gurgaon and Hissar. Type: 'M'.

Object: Type A4: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS
   8 manurial treatments:
   O-Control (no manure),
   N1=35 Kg/ha. of N,
   K1=25 Kg/ha. of K2O,
   K2=50 Kg/ha. of K2O,
   N1K1=35 Kg/ha. of N+25 Kg/ha. of K2O,
   N2K1=55 Kg/ha. of N+50 Kg/ha. of K2O,
   N1P1K1=70 Kg/ha. of N+50 Kg/ha. of K2O and
   N1P1K2= 75 Kg/ha. of N+75 Kg/ha. of P2O5+25 Kg/ha. of K2O.

3. DESIGN:
   Same as in type A4 conducted under irrigated conditions on mustard crop on page No. 140.

4. GENERAL:
   (i) and (ii) N.A., (iii) Yield of mustard. (iv)(a) 1962 to 66 for Gurgaon (63 to 65 N A.) and 1962 to 66 for Hissar (63 and 65 N A.). (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

Gurgaon
62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K3</th>
<th>N1P1K3</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>118</td>
<td>24</td>
<td>91</td>
<td>163</td>
<td>133</td>
<td>276</td>
<td>355</td>
<td>19.2</td>
</tr>
</tbody>
</table>

Control yield=395 Kg/ha.; No. of trials=2

Hissar
62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K3</th>
<th>N1P1K3</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>313</td>
<td>-24</td>
<td>191</td>
<td>443</td>
<td>263</td>
<td>53.1</td>
<td>371</td>
<td>85.4</td>
</tr>
</tbody>
</table>

Control yield=944 Kg/ha.; No. of trials=7
Crop: Sarson (Rabi).

Site: Oil seed sub-Strn., Gurgaon.

Object: To study the effect of different dates of sowing and spacings on the yield of Sarson.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) N.A., 6 Ploughings. (b) N.A., Hand drill. (c) N.A., 12 Kg/ha. (d) As per treatments. (e) N.A. (v) N.A.; 50 Kg/ha. of N. (vi) BSH-I (vii) Irrigated. (viii) N.A.; 1 hoeing. (ix) N.A. (x) March, 65; 1st week of February, 66.

2. TREATMENTS:
Main-Plot treatments:
Sub-Plot treatments:
6 spacings: S1 = 30 cm x 5 cm, S2 = 30 cm x 10 cm, S3 = 30 cm x 15 cm, S4 = 38 cm x 5 cm, S5 = 38 cm x 10 cm and S6 = 38 cm x 15 cm.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 1/235.6 ha.; 1/468.6 ha. (v) Nil. (vi) Yes.

4 GENERAL:
(i) Normal. (ii) N.A.; SAFOS. pray. (iii) Yielc of sarson. (iv) (a) 1964-65. (b) No. (c) Results of combined analysis are presented under 5—Results. (v) and (vi) Nil. (vii) Main-plot and sub-plot error variances are homogeneous and main-plot treatments x years and sub-plot treatments x years interactions are absent.

5. RESULTS:
Pooled results:
(i) 2719 Kg/ha. (ii) (a) 5573 Kg/ha. (based on 21 d.f. made up of pooled error and Treatments x years interaction). (b) 5102 Kg/ha (based on 138 d.f. made up of pooled error and Treatments x years interaction). (iii) None of the effects is significant. (iv) Av. yield of sarson in Kg/ha.

<table>
<thead>
<tr>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>Mean</th>
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<tbody>
<tr>
<td>D1</td>
<td>3378</td>
<td>3126</td>
<td>3256</td>
<td>2994</td>
<td>2772</td>
<td>2893</td>
</tr>
<tr>
<td>D2</td>
<td>2784</td>
<td>3248</td>
<td>2897</td>
<td>2962</td>
<td>3094</td>
<td>2828</td>
</tr>
<tr>
<td>D3</td>
<td>3200</td>
<td>3332</td>
<td>3221</td>
<td>3106</td>
<td>3233</td>
<td>2941</td>
</tr>
<tr>
<td>D4</td>
<td>1687</td>
<td>1743</td>
<td>2019</td>
<td>1753</td>
<td>1846</td>
<td>1320</td>
</tr>
</tbody>
</table>

Mean |
2737 | 2862 | 2848 | 2705 | 2637 | 2496 | 2719

Individual results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1964</td>
<td>695</td>
<td>4828</td>
<td>4857</td>
<td>4618</td>
<td>4409</td>
<td>4239</td>
<td>N.S.</td>
</tr>
<tr>
<td>1965</td>
<td>840</td>
<td>898</td>
<td>840</td>
<td>790</td>
<td>865</td>
<td>752</td>
<td>N.S.</td>
</tr>
<tr>
<td>Pooled</td>
<td>2767</td>
<td>2862</td>
<td>2848</td>
<td>2705</td>
<td>2637</td>
<td>2496</td>
<td>N.S.</td>
</tr>
</tbody>
</table>
Crop :- Sarson (Rabi).

Site :- Agri. Res. Stn., Gurgaon.

Object : To study the effect of different dates of sowing and spacings on the yield of Sarson.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 3 Ploughings. (b) N.A. (c) 12 Kg/ha. (d) As per treatments. (e)-(v) and (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :
   Main-Plot treatments:

   Sub-Plot treatments :
   6 spacings : - S1 - 30 cm x 5 cm, S2 - 30 cm x 10 cm, S3 - 30 cm x 15 cm, S4 - 45 cm x 5 cm, S5 - 45 cm x 10 cm and S6 - 45 cm x 15 cm.

3. DESIGN :
   (i) Split-plot design. (ii) (a) 4 main-plots/replieation and 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL :
   (i) and (ii) N.A. (iii) Yield of seeds. (iv) (a) 1965—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :
   (i) 229 Kg/ha. (ii) 337·2 Kg/ha. (iii) N.A. (iv) Main effect of D alone is significant. (v) Av. yield of Sarson in Kg/ha.

   Treatment | D1 | D2 | D3 | D4 | S1 | S2 | S3 | S4 | S5 | S6 |
   Av. yield  | 828 | 1036 | 773 | 681 | 776 | 829 | 776 | 848 | 935 | 811 |

   (Cell means of two-way table are not available)
   C.D. for D marginal means -220.2 Kg/ha.

Crop :- Sarson (Rabi).

Site :- Agri. Res. Stn., Gurgaon.

Object : To study the effect of spacings, seed rates and fertilizers on Sarson crop.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 21.10.66. (iv) (a) 3 Ploughings. (b) By hand drill. (c) and (d) As per treatments. (e) Nil (v) Nil (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.
2. TREATMENTS:
All Combinations of (1), (2) and (3)
(1) 3 spacings: \( S_1 = 30 \), \( S_2 = 45 \) and \( S_3 = 60 \) cm.
(2) 3 seed rates: \( R_1 = 3.7 \), \( R_2 = 4.9 \) and \( R_3 = 6.2 \) Kg/ha.
(3) 3 levels of fertilizers: \( F_0 = 0 \), \( F_1 = 34 \) Kg/ha. of \( N + 17 \) Kg/ha. of \( K_2O \) and \( F_2 = 68 \) Kg/ha. of \( N + 34 \) Kg/ha. of \( K_2O \).

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 2. (iv) (a) 4.57 m x 6.10 m (b) 3.96 m x 5.40 m. (v) 30.5 cm x 30.5 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of seed. (iv) (a) 1965 - contd. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 765 Kg/ha. (ii) 135.8 Kg/ha. (iii) Main effect of F and interaction \( S \times R \) are significant. Interaction \( R \times F \) is highly significant. (iv) Av. yield of seed in Kg/ha.

<table>
<thead>
<tr>
<th>( S_i )</th>
<th>( R_1 )</th>
<th>( R_2 )</th>
<th>( R_3 )</th>
<th>( F_0 )</th>
<th>( F_1 )</th>
<th>( F_2 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S_1</td>
<td>778</td>
<td>759</td>
<td>893</td>
<td>533</td>
<td>866</td>
<td>1031</td>
<td>810</td>
</tr>
<tr>
<td>S_2</td>
<td>632</td>
<td>820</td>
<td>847</td>
<td>636</td>
<td>797</td>
<td>866</td>
<td>766</td>
</tr>
<tr>
<td>S_3</td>
<td>824</td>
<td>655</td>
<td>675</td>
<td>571</td>
<td>816</td>
<td>767</td>
<td>718</td>
</tr>
<tr>
<td>Mean</td>
<td>745</td>
<td>745</td>
<td>805</td>
<td>580</td>
<td>826</td>
<td>888</td>
<td>765</td>
</tr>
</tbody>
</table>

C.D. for F Marginal means - 19.4 Kg/ha.
C.D. for the body of \( R \times F \) or \( S \times R \) table - 217.6 Kg/ha.

Crop: Sarson (Rabi).
Object: To study the effect of different seed rates, spacings and fertilizers on the yield.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) 2 Ploughings. (b) By hand drill. (c) and (i) As per treatments. (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) to (a) N.A.

2. TREATMENTS:
All Combinations of (1), (2) & (3)
(1) 3 Spacings: \( S_1 = 30 \), \( S_2 = 45 \) and \( S_3 = 61 \) cm.
(2) 3 Seeds rates: \( R_1 = 1 \), \( R_2 = 5 \) and \( R_3 = 6.2 \) Kg/ha.
(3) 3 Fertilizers: \( F_0 = 0 \), \( F_1 = 34 \) Kg/ha. of \( N + 17 \) Kg/ha. of \( K_2O \) and \( F_2 = 68 \) Kg/ha. of \( N + 34 \) Kg/ha. of \( K_2O \).

3. DESIGN:
(i) 3rd Confounding. (ii) (a) 9 plots / block and 3 blocks/replication. (b) N.A. (iii) 2 (iv) (a) and (b) 1/38-294 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(v) and (a) N.A. (iii) Yield of seed. (iv) (a) 1965 - only. (b) No (c) Nil. (v) and (vi) N.A. (vii) Only following results are supplied by research station.
5. RESULTS:

(i) 754 Kg/ha. (ii) 257·6 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. Yield of seed in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>R₁</th>
<th>R₂</th>
<th>R₃</th>
<th>F₀</th>
<th>F₁</th>
<th>F₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>745</td>
<td>718</td>
<td>778</td>
<td>748</td>
<td>718</td>
<td>795</td>
<td>553</td>
<td>828</td>
<td>880</td>
</tr>
</tbody>
</table>

(Cell means of the two-way tables are not available).

C.D. for F marginal means=178·1 Kg/ha.

Crop : Raya (Rabi).

Site : Oil seed sub Sta., Gurgaon.

Ref : Hr. 63(21), 64(10).

Type : 'M'.

Object : To study the effect of different levels of N on the yield of Raya crop.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) Last week of October. (iv) (a) to (e) N.A. (v) Nil (vi) RL-18. (vii) Irrigated. (viii) N.A.; 2 hoeings and 2 weedings. (ix) N.A. (x) Middle of March.

2. TREATMENTS:

6 Levels of N as C/A/N : No-0, N₁-22·4, N₂-44·8, N₃-67·2, N₄-89·7 and N₅-112·1 Kg/ha.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 1/197·7 ha. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of Raya. (iv) (a) 1963-64. (b) No (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil (vii) Error Variances are heterogeneous and Treatments x years interaction is present:

5. RESULTS

Pooled results:

(i) 737 Kg/ha. (ii) 737·1 Kg/ha. based (on 5 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of raya in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>322</td>
<td>548</td>
<td>690</td>
<td>862</td>
<td>972</td>
</tr>
</tbody>
</table>

Individual results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
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<tbody>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td>359</td>
<td>432</td>
<td>465</td>
<td>521</td>
<td>501</td>
<td>511</td>
<td>101</td>
<td>511</td>
</tr>
<tr>
<td>1964</td>
<td>283</td>
<td>644</td>
<td>915</td>
<td>1203</td>
<td>1443</td>
<td>1545</td>
<td>1203</td>
<td>1545</td>
</tr>
<tr>
<td>Pool.</td>
<td>322</td>
<td>548</td>
<td>690</td>
<td>862</td>
<td>972</td>
<td>1028</td>
<td>737</td>
<td>737·1</td>
</tr>
</tbody>
</table>
Crop:.- Raya (Rabi).
Site:.- Oil seed sub-Stn, Gurgaon.

Object: To study the effect of different levels of N on different varieties of Raya crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy Loam. (iii) N.A.; 3-11-65. (iv) (a) N.A.; 4-5 Ploughings. (b) N.A.; Hand drill. (c) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) unirrigated; Irrigated. (viii) N.A.; hoeing.
(ii) N.A. (a) N.A.; 29.3.66.

2. TREATMENTS:
All combinations of (1) and (2).
(2) 3 Levels of N: N₁=0, N₂=16'8 and N₃=33.6 Kg/ha.

3. DESIGN:
(i) Fact. in R.B.D. (ii) 12 (b) N.A. (iii) 4. (iv) (a) 1/247 ha.; N.A. (b) 1/247 ha.; 1/448-5 ha.
(v) Nil; N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of raya. (iv) (a) 1964—65. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error Variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:
Pooled results:
(i) 998 Kg/ha. (ii) 436.2 Kg/ha. (based on 11 d.f. made up of Treatments x years interaction). (iii) Main effect of N alone is highly significant. (iv) Av. yield of raya in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>543</td>
<td>453</td>
<td>567</td>
<td>587</td>
<td>537</td>
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<tr>
<td>N₁</td>
<td>916</td>
<td>1006</td>
<td>680</td>
<td>1134</td>
<td>1009</td>
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<tr>
<td>N₂</td>
<td>1498</td>
<td>1393</td>
<td>1468</td>
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<tr>
<td>Mean</td>
<td>986</td>
<td>951</td>
<td>1005</td>
<td>1052</td>
<td>998</td>
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C.D. for N marginal means=240.02 Kg/ha.

Individual results:

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<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>Sig.</th>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
<th>Sig.</th>
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<td>Year</td>
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<td>1180</td>
<td>1256</td>
<td>N.S.</td>
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<td>1964</td>
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<td>1137</td>
<td>#19</td>
<td>**</td>
<td>1164</td>
<td>1124</td>
<td>1180</td>
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<td>1181</td>
<td>189.5</td>
</tr>
<tr>
<td>1965</td>
<td>488</td>
<td>880</td>
<td>1079</td>
<td>**</td>
<td>807</td>
<td>777</td>
<td>830</td>
<td>848</td>
<td>N.S.</td>
<td>816</td>
<td>196.1</td>
</tr>
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</table>

Pooled  537 1009 1449 ** 986 951 1005 1052 N.S. 998 436.2

Crop:.- Raya (Rabi).
Site:.- Agri. Res. Stn., Gurgaon.

Object: To study the effect of different dates of sowing and spacings on the yield of Raya Crop.

Ref: Hr. 65(16), 65(127).
Type: - MV.

Ref: Hr. 65(122).
Type: - 'C'.
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy Loam. (iii) As per treatments. (iv) (a) 4 to 5 Ploughings.
   (b) Hand drill. (c) N.A. (d) As per treatments. (e) N.A. (v) 75 Kg/ha. of N. (vi) RL-16. (vii) Irrigated. (viii) 2 weedings. (x) N.A. (x) 24.3.66.

2. TREATMENTS:
   Main-Plot treatments:
   3 dates of sowing: \(D_1=20.10.65\), \(D_2=27.10.65\) and \(D_3=3.11.65\).
   Sub-Plot treatments:
   4 Spacings: \(S_1=30\) cm \(\times\) 9 cm, \(S_2=30\) cm \(\times\) 15 cm, \(S_3=45\) cm \(\times\) 9 cm and \(S_4=45\) \(\times\) 15 cm.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 Main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/637 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of raya. (iv) (a) 1965—Contd. (b) No (c) Nil. (v) (a) and (b) Nil, (vi) and (vii) Nil.

5. RESULTS
   (i) 1015 Kg/ha. (ii) (a) 220.7 Kg/ha. (b) 227.7 Kg/ha. (iii) Main effect of D alone is highly significant.
   (iv) Av. yield of raya in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>(S_1)</th>
<th>(S_2)</th>
<th>(S_3)</th>
<th>(S_4)</th>
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<tr>
<td>(D_1)</td>
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<td>1529</td>
<td>571</td>
<td>1147</td>
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<td>587</td>
<td>1163</td>
<td>812</td>
<td>1011</td>
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<td>(D_3)</td>
<td>796</td>
<td>1003</td>
<td>73</td>
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<tr>
<td>Mean</td>
<td>1062</td>
<td>1173</td>
<td>956</td>
<td>871</td>
<td>1015</td>
</tr>
</tbody>
</table>

C.D. for D marginal means=190.9 Kg/ha.

**Crop:** Raya (Rabi).  
**Site:** Punjab Agr. University (Hissar Campus), Hissar.  
**Object:** To locate the optimum levels of spacing, seed-rate and fertilizer for Raya crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy Loam. (iii) N.A. (iv) (a) and (b) N.A. (c) and (d) As per treatments. (e) Nil. (v) to (x) N.A.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) Spacings: \(S_1=30\) cm, \(S_2=45\) cm and \(S_3=60\) cm.
   (2) seed-rates: \(R_1=3.70\), \(R_2=4.94\) and \(R_3=6.17\) Kg/ha.
   (3) 3 Levels of fertilizers: \(F_1=\) Control, \(F_2=33.6\) Kg/ha. of NP + 16.8 Kg/ha. of P and \(F_3=2\) F.

3. DESIGN:
   (i) 3 Confounding. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) and (v) N.A. (vi) Yes.
4. GENERAL:
(i) and (ii) N.A. (iii) Yield of seed. (iv) (a) 1963—Only. (b) No (c) Nil. (v) and (vi) N.A. (vii) Only the following results are supplied by Res. stn.

5. RESULTS:
(i) 2787 Kg/ha. (ii) 184.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Raya in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>R1</th>
<th>R2</th>
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<th>F0</th>
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<td>Av. yield</td>
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<td>2629</td>
<td>2745</td>
<td>2937</td>
<td>2744</td>
<td>2680</td>
<td>2832</td>
<td>2699</td>
<td>2839</td>
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</table>

(Cell means of the two-way tables are not available).

Crop : Raya (Rabi).
Site : Oil seed sub-Stn., Gurgaon.
Ref. : Hr. 64(15).
Type : M.

Object : To study the effect of different dates of sowing and levels of N on the different Varieties of Raya.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy Loam. (iii) As per treatments. (iv) (a) to (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) Middle of March.

2. TREATMENTS:
Main-plot treatments:
4 dates of sowing: \( D_1 = 10\text{th Oct.} \), \( D_2 = 25\text{th Oct.} \), \( D_3 = 21\text{st Nov.} \) and \( D_4 = 25\text{th Nov.}, '64. \)

Sub-plot treatments:
4 Varieties: \( V_1 = \text{RG-1} \), \( V_2 = \text{RG-2} \), \( V_3 = \text{RL-9} \), and \( V_4 = \text{RL-18} \).

Sub-Sub-plot treatments:
3 Levels of N as C/A/N: \( N_1 = 0 \), \( N_2 = 74\text{.1} \) and \( N_3 = 111.1 \) Kg/ha.

3. DESIGN:
(i) Split-split-plot. (ii) (a) 4 Main-plots/replcation, 4 sub-plots/main-plot and 3 sub-sub-plots/sub-plot (b) N.A. (iii) 3. (iv) (a) and (b) 1/741 ha. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of Raya. (iv) (a) 1964—Only. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 2012 Kg/ha. (ii) (a) 805.8 Kg/ha. (b) 354.9 Kg/ha. (c) 296.8 Kg/ha. (iii) Main Effects of D and N are highly significant and interaction D \( \times \) V is significant. (iv) Av. yield of Raya in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
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<th>D4</th>
<th>Mean</th>
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<td>1754</td>
<td>1365</td>
<td>859</td>
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<td>( N_2 )</td>
<td>2761</td>
<td>2428</td>
<td>1958</td>
<td>1464</td>
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<td>2174</td>
<td>1600</td>
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<tr>
<td>Mean</td>
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<td>2319</td>
<td>1833</td>
<td>1308</td>
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</tr>
<tr>
<td>( V_1 )</td>
<td>1538</td>
<td>1550</td>
<td>1452</td>
<td>1384</td>
<td>1481</td>
</tr>
<tr>
<td>( V_2 )</td>
<td>2100</td>
<td>2218</td>
<td>2162</td>
<td>2131</td>
<td>2153</td>
</tr>
<tr>
<td>( V_3 )</td>
<td>2261</td>
<td>2483</td>
<td>2434</td>
<td>2434</td>
<td>2403</td>
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<tr>
<td>Mean</td>
<td>1965</td>
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<td>2016</td>
<td>1983</td>
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<th></th>
<th>( V_1 )</th>
<th>( V_2 )</th>
<th>( V_3 )</th>
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<tr>
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<td>2153</td>
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<td>( V_3 )</td>
<td>2261</td>
<td>2483</td>
<td>2434</td>
<td>2434</td>
<td>2403</td>
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<tr>
<td>Mean</td>
<td>1965</td>
<td>2084</td>
<td>2016</td>
<td>1983</td>
<td>2012</td>
</tr>
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</table>
Crop :- Raya (Rabi)  
Site :- Agri. Res. Stn., Gurgaon.

Object : To study the effect of different levels of N along with different dates of sowing on different Varieties of Raya.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy Loam.  (iii) As per treatments.  (iv) (a) to (e) N.A.  (v) Nil.  (vi) As per treatments.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) Mid of March, 66.

2. TREATMENTS:
   Main-plot treatments:

   Sub-Plot treatments:
   3 Levels of N: N₀=0, N₁=75 and N₂=112.5 Kg/ha.

   Sub-Sub-Plot treatments:
   4 dates of sowing: D₁=15.10.65, D₂=30.10.65, D₃=15.11.65 and D₄=30.11.65.

3. DESIGN:
   (i) Split-split-plot.  (ii) (a) 4 Main-plots/replication, 3 sub-plots/main-plot, 4 sub-sub-plots/sub-plot.  (b) N.A.  (iii) 3.  (iv) (a) N.A.  (b) 1/741.3 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) N.A.  (ii) Nil.  (iii) Yield of grains.  (iv) (a) 1965-Only.  (b) No  (v) to (vii) Nil.

5. RESULTS:
   (i) 1347 Kg/ha.  (ii) (a) 239.2 Kg/ha.  (b) 228.7 Kg/ha.  (c) 361.7 Kg/ha.  (iii) Main effects of V, N and D are highly significant.  (iv) Av. Yield of Raya in Kg/ha.

<table>
<thead>
<tr>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>D₄</th>
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<td>2224</td>
<td>984</td>
<td>817</td>
<td>778</td>
<td>778</td>
<td>11510</td>
</tr>
</tbody>
</table>

   | Mean| 1114| 1399| 1528| 1523| 1027| 839 | 839 | 1347 |

   C.D. for V marginal means=1380 Kg/ha.
   C.D. for N marginal means=990 Kg/ha.
   C.D. for D marginal means=170.5 Kg/ha.
Crop: Napier Grass.

Object: To study the effect of different spacings on the yield of Fodder crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Loam. (iii) 17.3.64. (iv) (a) to (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) Napier Hybrid. (vii) Irrigated. (viii) and (ix) N.A. (a) 1st Cutting on 30.6.64 to 7.7.64 and II nd Cutting on 26.10.64 to 13.11.64.

2. TREATMENTS:
   3 spacings: $S_1=61 \text{ cm} \times 45 \text{ cm}$, $S_2=61 \text{ cm} \times 61 \text{ cm}$ and $S_3=91 \text{ cm} \times 61 \text{ cm}$.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/54.4 ha. (v) N.A (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of fodder. (iv) (a) 1964—Only. (b) No (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 534 Q/ha. (ii) 97.5 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of fodder is Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>$S_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. Yield</td>
<td>551</td>
<td>565</td>
<td>512</td>
</tr>
</tbody>
</table>

Crop: Napier Grass.
Site: Punjab Agri. University (Hissar Campus), Hissar.

Object: To study the effect of different spacings on the yield of Napier grass.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil. (ii) Loam. (iii) 22.2.65. (iv) (a) 4 Ploughings. (b) Transplanting. (c) 2700 roots slips/ha. (d) As per treatments. (e) Nil. (f) 101-6 Q/ha. (g) Pusa giant. (h) Irrigated. (i) 1 hoeing after each cutting. (ii) N.A. (iii) 6.10.65.

2. TREATMENTS:
   4 spacings: $S_1=60 \text{ cm} \times 45 \text{ cm}$, $S_2=60 \text{ cm} \times 60 \text{ cm}$, $S_3=60 \text{ cm} \times 75 \text{ cm}$ and $S_4=60 \text{ cm} \times 90 \text{ cm}$.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/57.2 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Endrine spray against jassid attack. (iii) Yield of green fodder. (iv) (a) 1965—Contd. (b) No. (c) Nil. (d) N.A. (vi) and (vii) Nil.

5. RESULTS:
   Results of two cutting.
   (i) 503 Q/ha. (ii) 68.6 Q/ha. (iii) The treatment differences are not significant. (iv) Av. yield of fodder in Q/ha.
Crop: Berseem (Rabi).
Object: To study the effect of N and P on the yield of Berseem.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Loam. (iii) 15.10.60. (iv) to (vi) N.A. (vii) Irrigated. (viii) to (ix) N.A.

2. TREATMENTS:
   All combinations of (1) and (2) + 4 extra treatments,
   (1) 4 Levels of N as C/A/N: N₀ = 0, N₁ = 49'4, N₂ = 74'1 Kgl/ha.
   (2) 2 Levels of P₂O₅ as Super: P₀ = 0 and P₁ = 49'4 Kgl/ha.
   Extra treatments are E₁ = 24'7 and E₂ = 74'1 Kgl/ha. of P₂O₅ and Super.

3. DESIGN:
   (i) R.B.D. (ii) (a) to (f) N.A. (iii) 6. (iv) (a) N.A. (b) 1/197.7 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of fodder. (iv) (a) 1960—Only. (b) No. (c) Nil. (d) to (vii) N.A.

5. RESULTS:
   (i) 386'2 Q/ha. (ii) 95'1 Q/ha. (iii) None of the effect is significant. (iv) Av. yield of fodder in Q/ha.

   E₁ = 401'5 and E₂ = 337'0 Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
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<td>359'7</td>
<td>380'3</td>
<td>358'2</td>
<td>345'3</td>
<td>360'9</td>
</tr>
<tr>
<td>P₁</td>
<td>429'2</td>
<td>433'5</td>
<td>417'3</td>
<td>400'0</td>
<td>320'0</td>
</tr>
<tr>
<td>Mean</td>
<td>394'4</td>
<td>406'9</td>
<td>387'8</td>
<td>372'6</td>
<td>390'4</td>
</tr>
</tbody>
</table>

Crop: Berseem (Rabi).
Object: To study the effect of N and P on the yield of Berseem.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Loam. (iii) 22.10.60. (iv) (a) to (c) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) to (ix) N.A. (x) 4.1 to 28.3.61.

2. TREATMENTS:
   8 manurial treatments: M₀ = Control, M₁ = 43 Kgl/ha. of P₂O₅ as super, M₂ = M₁ + 23 Kgl/ha. of N as C/A/N, M₃ = M₂ + 49 Kgl/ha. of N as C/A/N, M₄ = M₃ + 23 Kgl/ha. of N as A/S, M₅ = M₁ + 49 Kgl/ha. of N as A/S, M₆ = M₅ + 23 Kgl/ha. of N as Urea, and M₇ = 49 Kgl/ha. of N as Urea.
3. DESIGN:
(i) R.B.D.  (ii) a) 8.  (b) N.A.  (iii) 6.  (iv) (a) N.A.  (b) 1/173 Q/ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) Good.  (ii) N.A.  (iii) Yield of fodder.  (iv) (a) 1960—Only.  (b) No.  (c) Nil.  (v) to (vii) N.A.

5. RESULTS:
(i) 683 Q/ha.  (ii) 38.7 Q/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of fodder in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
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<td>652</td>
<td>675</td>
<td>682</td>
<td>693</td>
<td>690</td>
<td>692</td>
</tr>
</tbody>
</table>

Crop : Berseem (Kab).  Site : Govt. Res. Sta., Sirsa.  Type : 'M'.

Object : To study the effect of N and P applied alone and in combination on the yield of Berseem.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  (ii) Loam.  (iii) 28.9.63; 28.9.64.  (iv) (a) to (b) N.A.  (c) 27 Kg/ha.  (d) and (e) N.A.
(v) N.A.  (vi) Magavi; N.A.  (vii) to (ix) N.A.  (x) 28.11.63 to 7.12.63; 2.1.64 to 4.1.64; 7.12.64, 14.12.64
12 to 6.1.65 and 24.2.65 to 4.3.65.

2. TREATMENTS:
All combinations of (1) and (3).
(1) 2 Levels of N as C/A/N: N₀=0 and N₁=22·4 Kg/ha.
(2) 4 Levels of P₂₀ as super: P₀=0, P₁=22·4, P₂=44·8 and P₃=67·2 Kg/ha.

3. DESIGN:
(i) Fact. in R.B.D.  (ii) a) 8.  (b) N.A.  (iii) 6.  (iv) (a) N.A.  (b) 20·12 m x 3·66 m.  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) Normal.  (ii) N.A.  (iii) Yield of fodder.  (iv) (a) 1963—64.  (b) No.  (c) Nil.  (v) N.A.  (vi) Nil.
(vii) Error Variances are heterogeneous and Treatments X years interaction is absent, therefore individual years results are presented under Results.

5. RESULTS:
63(118)
(i) 435 Q/ha.  (ii) 30·5 Q/ha.  (iii) Main effect of P alone is highly significant.  (iv) Av. yield of green fodder in Q/ha.

<table>
<thead>
<tr>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>386</td>
<td>428</td>
<td>452</td>
<td>469</td>
</tr>
<tr>
<td>N₀</td>
<td>374</td>
<td>450</td>
<td>451</td>
<td>494</td>
</tr>
<tr>
<td>Mean</td>
<td>380</td>
<td>439</td>
<td>452</td>
<td>481</td>
</tr>
</tbody>
</table>

C.D. for P marginal means = 25·3 Q/ha.
Crop: Lucerne (Rabi).

Object: To study the effect of \( P_2O_5 \) and Boron on the yield of Lucerne.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Loam. (iii) 17.1 : 1.64. (iv) (a) and (b) N.A. (c) 12 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) No. 9. (vii) Irrigated. (viii) and (ix) N.A. (x) 16.6.65.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 levels of Boron: \( B_0 = 0 \), and \( B_1 = \) Boron (dose N.A.)
   (2) 3 levels of \( P_2O_5 \) as Super: \( P_0 = 0 \), \( P_1 = 84 \) and \( P_2 = 112 \) Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/229 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of fodder. (iv) (a) 1964—Only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 46 Q/ha. (ii) 10-6 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of fodder in Q/ha.

<table>
<thead>
<tr>
<th>( P_0 )</th>
<th>( P_1 )</th>
<th>( P_2 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( B_0 )</td>
<td>43</td>
<td>47</td>
<td>35</td>
</tr>
<tr>
<td>( B_1 )</td>
<td>52</td>
<td>45</td>
<td>54</td>
</tr>
<tr>
<td>Mean</td>
<td>47</td>
<td>46</td>
<td>44</td>
</tr>
</tbody>
</table>

C.D. for P marginal means—37° Q/ha.
C.D. for the body of \( N \times P \) table—32-4 Q/ha.

Crop: Lucerne (Rabi).

Object: To study the effect of \( N, P \) and \( K \) on the yield of Lucerne crop.

Ref: Hr. 64(110). Type: 'M'.
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Loam. (iii) 26.12.64. (iv) (a) and (b) N.A. (c) 12 Kg/ha. (d) and (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) 23.6.65.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 Levels of N : N₁ = 0, N₂ = 22.4, N₃ = 44.8 Kg/ha.
   (2) 5 Levels of P₂O₅ : P₁ = 0, P₂ = 28, P₃ = 56, P₄ = 84, P₅ = 112 Kg/ha.
   (3) 2 Levels of K₂O : K₁ = 0 and K₂ = 56 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 30. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/445 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of green fodder. (iv) (a) 1963–64. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 76 Q/ha. (ii) 25.35 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of green fodder in Q/ha.

<table>
<thead>
<tr>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>P₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>73</td>
<td>76</td>
<td>73</td>
<td>66</td>
<td>83</td>
<td>75</td>
<td>67</td>
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<td>75</td>
<td>51</td>
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<td>77</td>
<td>80</td>
<td>82</td>
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<tr>
<td>Mean</td>
<td>70</td>
<td>78</td>
<td>73</td>
<td>72</td>
<td>82</td>
<td>78</td>
<td>71</td>
</tr>
</tbody>
</table>

Crop : Lucerne (Radī).

Object : To study the effect of different spacings on the yield of Lucerne crop.
4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of fodder. (iv) (a) 1964—Only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 55 Q/ha. (ii) 18.9 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of Lucerne in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>45</td>
<td>73</td>
<td>70</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>61</td>
</tr>
<tr>
<td>S₂</td>
<td>48</td>
<td>46</td>
<td>50</td>
<td>40</td>
<td>50</td>
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<td>49</td>
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<tr>
<td>Mean</td>
<td>46</td>
<td>60</td>
<td>60</td>
<td>55</td>
<td>50</td>
<td>60</td>
<td>55</td>
</tr>
</tbody>
</table>

Crop > Sweet Sudan (Rabi).
Object: To study the effect of different doses of N on the yield of Fodder crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (i) Loam. (ii) 6.5.64. (iv) (a) and (b) N.A. (c) 25 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) (5-3) grass. (vii) Irrigated. (viii) and (ix) N.A. (x) 17.7.61 to 29.7.64.

2. TREATMENTS:
4 doses of N as C/A/N: N₁ = 62, N₂ = 124, N₃ = 185 and N₄ = 247 Kg/ha.

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 1/98.6 ha. (b) 1/113.7 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of Fodder. (iv) (a) 1964—Only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 238 Q/ha. (ii) 34.8 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of fodder in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>230</td>
<td>233</td>
<td>227</td>
<td>262</td>
</tr>
</tbody>
</table>

Crop > Sweet Sudan (Summer).
Object: To study the effect of different dates of sowing on the yield of fodder.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loam. (iii) As per treatments. (iv) (a) and (b) N.A. (c) 35 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) (5-3). (vii) Irrigated. (viii) and (ix) N.A. (x) 10.5.63, 22.5.63, 18.5.63 and 7.7.63 to 31.8.63.

2. TREATMENTS:
3 dates of sowing: D₁ = 2.3.63, D₂ = 17.3.63, D₃ = 1.4.63 (Resown on 18.4.63).
3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/34.5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of fodder. (iv) (a) 1983—Only. (b) Nil. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 123 Q/ha. (ii) 18° 8 Q/ha. (iii) Treatment differences are significant. (iv) Av. yield of fodder in Q/ha.
   Treatment       D₁  D₂  D₃  D₄
   Av. yield        108 103 113 118
   C.D. for marginal means=32.5 Q/ha.

---

Crop: Teasinte (Summer).
Site: Fodder F.e.s. Stn., Sirsa.
Object: To study the effect of different dates of sowing on the yield of Teasinte crop.

BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loam. (iii) As per treatments. (iv) (a) and (b) N.A. (c) 49 Kg/ha. (d) and (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) 20.7.63 to 23.8.63.

TREATMENTS:
4 dates of sowing: D₁=13.3.63, D₂=20.3.63, D₃=27.3.63 and D₄=34.3.63.

DESIGN:
(i) R.B.D. (ii) (a) N.A. (iii) 4. (iv) (a) N.A. (b) 1/34.5 ha. (v) N.A. (vi) Yes.

GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of fodder. (iv) (a) 1963—Only. (b) No. (c) Nil. (v) to (vii) N.A.

RESULTS:
(i) 277 Q/ha. (ii) 124° 3 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of fodder in Q/ha.
   Treatment       D₁  D₂  D₃  D₄
   Av. yield        236 253 291 328

---

Crop: Wheat and Raya (Rabi).
Site: Oil Seed Sub-Stn., Gurgaon.
Object: To study the effect of mixed cropping of wheat and Raya under irrigated conditions.

BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 1.11.63; October, 64. (iv) (a) to (e) N.A. (v) Nil; N.A. (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) During the month of March.

TREATMENTS:
6 Mixed cropping treatments: C₁=Wheat pure, C₂=Raya pure, C₃=Wheat and Raya lines at 122 cm, C₄=Wheat and Raya lines at 244 cm, C₅=Wheat and Raya lines at 366 cm, and C₆=Wheat and Raya lines at 488 cm.
3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 1/247 ha. (v) Nl. (vi) Yes.

4. GENERAL:
(i) Fair; Satisfactory. (ii) Nil; N.A. (iii) Yield of grain and monetary return. (iv) (a) 1963-64. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) Nil. (vi) Severe cold affected Raya crop in 63. (vii) Error variances are heterogeneous and Treatment x years interaction is present.

5. RESULTS:

Pooled results
(i) 1551 Rs/ha. (ii) 666.6 Rs/ha. (based on 5 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. money value in Rs/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1963</td>
<td>1055</td>
<td>1035</td>
<td>1051</td>
<td>1127</td>
<td>1135</td>
<td>424</td>
<td>971</td>
<td>153.2</td>
</tr>
<tr>
<td>1964</td>
<td>1904</td>
<td>2456</td>
<td>2034</td>
<td>2032</td>
<td>2091</td>
<td>2253</td>
<td>2132</td>
<td>269.3</td>
</tr>
<tr>
<td>Pooled</td>
<td>1480</td>
<td>1746</td>
<td>1542</td>
<td>1590</td>
<td>1613</td>
<td>1338</td>
<td>N.S.</td>
<td>1551</td>
</tr>
</tbody>
</table>

Crop > Wheat and Raya (Rabi).
Ref :- Hr. 65(11).
Site :- Agri. Res. Farm, Gurgaon.
Type :- X'.

Object : To study the economy of mixed cropping of Raya and wheat.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy Loam. (iii) 10.11.65. (iv) (a) 4 to 5 ploughings. (b) Hand drill. (c) N.A. (d) As per treatments. (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) Last week of March, 66.

2. TREATMENTS:
4 mixed cropping treatments: T1= Pure wheat, 22 cm row to row. T2=Pure Raya, 30 cm row to row. T3=6 rows of wheat+1 row of Raya. T4=9 rows of wheat+1 row of Raya.

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/218.3 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain and monetary return. (iv) (a) 1965-67. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1284 Rs/ha. (ii) 152.7 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. income in Rs/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. income</td>
<td>1396</td>
<td>950</td>
<td>1382</td>
<td>1409</td>
</tr>
</tbody>
</table>

C.D. =187.9 Rs/ha.
Crop: Mixed fodder crops (Summer).

Object: To study the effect of mixed fodder cropping for getting maximum fodder yield.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Loam. (iii) 4.4.62; 14 to 16.3.63. (iv) (a) and (b) N.A. (c) Jowar at 27 kg/ha., Maize at 6 Kg/ha., Sweet Sudan at 3 Kg/ha., Bajra at 3 Kg/ha., Cowpea at 2 Kg/ha. (d) and (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) May and June.

2. TREATMENTS:
   4 mixed croppings: T1=Maize+Cowpea, T2=Bajra+Cowpea, T3=Jowar+Cowpea and T4=Sweet Sudan+Cowpea.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 19.66 m x 5.18 m. ; N.A. (b) 19.51 m x 4.38 m. ; 1/24 7 ha. (v) 8 cm x 15 cm. ; N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of fodder. (iv) (a) 1962-63. (b) No. (c) Results of combined analysis are presented under 5. results. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x years interaction is present.

5. RESULTS:
   (i) 293 Q/ha. (ii) 169.4 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of fodder in Q/ha.

   Treatment: T1 T2 T3 T4
   Av. yield: 238 106 224 316

   Individual results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1962</td>
<td>475</td>
<td>439</td>
<td>261</td>
<td>427</td>
<td>**</td>
<td>401</td>
<td>64.1</td>
</tr>
<tr>
<td>19.53</td>
<td>181</td>
<td>172</td>
<td>186</td>
<td>205</td>
<td>N.S.</td>
<td>186</td>
<td>29.8</td>
</tr>
<tr>
<td>Pool:5</td>
<td>328</td>
<td>306</td>
<td>224</td>
<td>316</td>
<td>N.S.</td>
<td>293</td>
<td>169.4</td>
</tr>
</tbody>
</table>

Crop: Gram and Raya (Rabi).
Site: Oil seed sub Stn., Gurgaon.

Object: To study the effect of mixed cropping on the yield of Gram and Raya.

1. BASAL CONDITIONS:
   (i) (a) to (e) N.A. (ii) Sandy loam. (iii) October, 63; October, 64. (iv) (a) to (e) N.A. (v) Nil; N.A. (vi) N.A. (vii) Unirrigated. (viii) N.A. (ix) N.A. (x) March, 64; March, 65.

2. TREATMENTS:
   6 mixed cropping treatments: C1=Gram pure, C2=Raya pure, C3=Gram and Raya lines at 122 cm, C4=Gram and Raya lines 244 cm, C5=Gram and Raya lines at 366 cm and C6=Gram and Raya lines at 488 cm.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 1/247 ha. (v) Nil. (vi) Yes.
4. GENERAL:

(i) Fair; Satisfactory. (ii) Nil; N.A. (iii) Yield of grain and monetary return. (iv) (a) 1963 to 65 (1965 N.A). (b) No. (c) Results of combined analysis are presented under 5 results. (v) Nil. (vi) Severe cold destroyed affected the yield of crops in 63. (vii) Error variances are hetregenous and Treatments x years interaction is present.

5. RESULTS:

Pooled results

(i) 336 Rs/ha. (ii) 363.2 Rs/ha. (based on 5 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. value of produce in Rs/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
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</thead>
<tbody>
<tr>
<td>Av. value</td>
<td>231</td>
<td>318</td>
<td>492</td>
<td>336</td>
<td>330</td>
<td>307</td>
</tr>
</tbody>
</table>

Individual results

<table>
<thead>
<tr>
<th>Year</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./pl at</th>
</tr>
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<tbody>
<tr>
<td>1963</td>
<td>144</td>
<td>168</td>
<td>111</td>
<td>217</td>
<td>169</td>
<td>154</td>
<td>N.S.</td>
<td>161</td>
<td>71.7</td>
</tr>
<tr>
<td>1964</td>
<td>317</td>
<td>468</td>
<td>874</td>
<td>454</td>
<td>491</td>
<td>460</td>
<td>*</td>
<td>511</td>
<td>242.2</td>
</tr>
<tr>
<td>Pooled</td>
<td>231</td>
<td>318</td>
<td>492</td>
<td>336</td>
<td>330</td>
<td>307</td>
<td>N.S.</td>
<td>336</td>
<td>363.2</td>
</tr>
</tbody>
</table>
HIMACHAL PRADESH
Crop: Paddy (Kharif).


Type: 'M'.

Object: To study the effect of different times of application of N on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Berseem. (c) N.A. (ii) Clayey loam. (iii) 22.7.63. (iv) (a) 5 to 7 ploughings. (b) N.A. (c) 33.6 Kg/ha. (d) and (e) N.A. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 22.4 Kg/ha. of K<sub>2</sub>O. (vi) China 4. (Late). (vii) Irrigated. (viii) 3. Weeding. (ix) 185 cm. (x) 11.11.63.

2. TREATMENTS:
   5 times of application of 33.6 Kg/ha. of N as C/N:
   \( T_1 = \frac{2}{3} \text{rd at puddling and \( \frac{1}{3} \text{rd 15 days before flowering,} \}
   T_3 = \frac{1}{3} \text{rd at paddling and \( \frac{1}{3} \text{rd one month after paddling and} \}
   T_5 = \frac{1}{3} \text{rd at paddling and \( \frac{1}{3} \text{rd 15 days before heading,} \}
   T_7 = \frac{1}{3} \text{rd at puddling and \( \frac{1}{3} \text{rd 15 days before heading and} \}
   T_9 = \frac{1}{3} \text{rd at one month after paddling.} \)

3. DESIGN:
   (i) R.B.D. (ii) 5. (b) N.A. (iii) 4. (iv) (a) 3.20 m x 11.89 m. (b) 2.29 m x 10.06 m. (v) 46 cm x 91 cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—Only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 3693 Kg/ha. (ii) 3929 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
   Treatment | \( T_1 \) | \( T_3 \) | \( T_5 \) | \( T_7 \) | \( T_9 \)
--- | --- | --- | --- | --- | ---
Av. yield | 3506 | 3375 | 3547 | 3915 | 3741
Crop: Paddy (Kharif)

Object: To study the effect of different Sources of N on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Berseem. (c) N.A. (ii) Clayey Loam. (iii) 4.8.63. (iv) (a) 5 ploughings. (b) N.A. (c) 19.8 Kg/ha. (d) and (e) N.A. (v) Nil. (vi) China—4. (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) 12.11.63.

2. TREATMENTS:
   4 Sources of N at 44.8 Kg/ha.: S₀=Control (No. N), S₁=C/A/N, S₂=A/S and S₃=Urea.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 4.57m x 11.89m. (b) 3.66 m x 10.06 m. (v) 45 cm x 91 cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—Only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 2723 Kg/ha. (ii) 268.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

   Treatment
<table>
<thead>
<tr>
<th>S₀</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
</tr>
</thead>
</table>
   Av. yield | 2062 | 2737 | 3159 | 2934 |
   C.D. =453.5 Kg/ha.

Crop: Paddy (Kharif)

Object: To study the effect of N, P and K applied individually and in combination on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Berseem. (c) N.A. (ii) Sandy Loam. (iii) 26.7.63. (iv) (a) 4 to 5 ploughings. (b) Transplanting. (c) 20 Kg/ha. (d) and (e) N.A. (v) Nil. (vi) China—4. (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) 26.10.63.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 Levels of N as C/A/N: N₀=0, N₁=44.8 and N₂=67.3 Kg/ha.
   (2) 3 Levels of P₂O₅ as Super: P₀=0, P₁=16.8 and P₂=22.4 Kg/ha.
   (3) 3 Levels of K₂O as Mur. Pot: K₀=0, K₁=22.4 and K₂=44.8 Kg/ha.

3. DESIGN:
   (i) 3³ Partially Confld. (N/P/K and NPK³ are confld.) (ii) (a) 3 blocks/replication and 9 plots/block. (b) N.A. (iii) 2. (iv) 2.29 m x 10.36 m. (b) 1.83 m x 9.14 m. (v) 23 cm x 61 cm. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—Only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 2582 Kg/ha. (ii) 517.9 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Kharif).


Object: To study the effect of micronutrients on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) to (c) N.A. (ii) Loam. (iii) N.A. (iv) (a) to (e) N.A. (v) to (e) N.A. (vi) China—988 (improved). (vii) Irrigated (viii) to (x) N.A.

2. TREATMENTS:
   8 Micronutrients treatments: M₀=Control, M₁=Cu. Sul at 5·6 Kg/ha, M₂=Cu. Sul at 11·2 Kg/ha, M₃=Zn. Sul at 5·6 Kg/ha, M₄=Zn. Sul at 11·2 Kg/ha, M₅=Fe chelate at 5·6 Kg/ha, M₆=Mg. Sul at 5·6 Kg/ha, M₇=(M₁+M₄+M₆+M₇).

3. DESIGN:
   (i) R.B.D. (ii) 8. (b) N.A. (iii) 4. (iv) (a) to (e) N.A. (v) 3·6 m x 4·57 m. (vi) N.A. (vii) Yca.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—Only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 524 Kg/ha. (ii) 232-4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

   Treatment: M₄, M₁, M₃, M₅, M₆, M₇
   Av. yield: 595, 740, 471, 531, 416, 590, 426, 426

C.D. for N marginal means = 351·0 Kg/ha.
3. DESIGN:
(i) Plot, in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3'20 m x 1'83 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 Only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 646 Kg/ha. (ii) 101'2 Kg/ha. (iii) Main effect of N alone is highly significant
(iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>K0</th>
<th>K1</th>
<th>Mean</th>
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<tr>
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<td>725</td>
<td>720</td>
<td>760</td>
<td>685</td>
<td>723</td>
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<td>N1</td>
<td>507</td>
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<tr>
<td>Mean</td>
<td>616</td>
<td>675</td>
<td>652</td>
<td>639</td>
<td>640</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=.74'0 Kg/ha.

Crop : Paddy (Kharif)

Site : Rice Res. Sta., Jogindernagar.

Ref : H.P. 65(174).

Type : 'M'.

Object : — To study the effect of N, P and K on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—Berseem—Paddy. (b) Berseem. (c) N.A. (d) N.A. (ii) 21.7.65. (iv) (a) 3 ploughings with furrows. (b) S. (c) 20 to 30 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) Japanica SMG—1 (Local)
(vii) Irrigated. (viii) 4 hand weedicings. (ix) N.A. (x) 14.10.65.

2. TREATMENTS:
All combinations (1), (2) and (3)
(l) 3 levels of N : N0 =0, N1 =25'5, N2 =45 and N4 =67'5 Kg/ha.
(2) 3 levels of P : P0 =0, P1 =36 and P2 =72 Kg/ha.
(3) 3 levels of K0 : K0 =0, K1 =45 and K2 =90 Kg/ha.

3. DESIGN:
(i) 3 Conf. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 3'4 m x 2'29 m. (b) 2'74 m x 1'83 m. (v) 15 cm x 23 cm. (vi) Yes.

4. GENERAL:
(i) Medium; no lodging. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—Only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 3756 Kg/ha. (ii) 505'4 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>K0</th>
<th>K1</th>
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<td>3588</td>
<td>4056</td>
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<td>3754</td>
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<td>3771</td>
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<tr>
<td>N2</td>
<td>4119</td>
<td>4252</td>
<td>4036</td>
<td>402</td>
<td>4036</td>
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<td>3555</td>
<td>3788</td>
<td>3925</td>
<td>3693</td>
<td>3833</td>
<td>3743</td>
</tr>
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</table>

C.D. for N marginal means=.347'6 Kg/ha.
Crop: Paddy (Kharij).

Site: Govt. Reclamation Farm, Kamma.

Object: To study the calcium requirements for the better yield of Paddy in Saline Alkaline soil.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Saline Alkaline soil. (iii) July 60. (iv) (a) 4 to 5 ploughings. (b) to (c) N.A. (v) N.I. (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) Oct. 60.

2. TREATMENTS:
   Main-plot treatments:
   5 calcium requirements: $T_0 =$Control, (no calcium), $T_1 = 50\%$, $T_2 = 75\%$, $T_3 = 85\%$ and $T_4 = 100\%$ calcium requirement.

Sub-plot treatments:
5 levels of fertilizer: $F_1 =$Control, (no fertilizer), $F_2 = 56$ Kg/ha. of $N$, $F_3 = F_2 + 28$ Kg/ha. of $P_0_4$,
   $F_4 = F_3 + 56$ Kg/ha. of $K_2O$, and $F_5 = F_4 +$ Zinc and Magnese

Source of calcium N.A.

3. DESIGN:
   (i) Split-plot. (ii) (a) 5 main-plots/replication, 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/79 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—Only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2561 Kg/ha. (ii) (a) 438 0 Kg/ha. (b) 384 0 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$F_0$</th>
<th>$F_1$</th>
<th>$F_2$</th>
<th>$F_3$</th>
<th>$F_4$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_0$</td>
<td>1963</td>
<td>2728</td>
<td>2866</td>
<td>2692</td>
<td>2948</td>
<td>2673</td>
</tr>
<tr>
<td>$T_1$</td>
<td>1989</td>
<td>2457</td>
<td>2835</td>
<td>2702</td>
<td>2926</td>
<td>2582</td>
</tr>
<tr>
<td>$T_2$</td>
<td>1755</td>
<td>2284</td>
<td>2358</td>
<td>2936</td>
<td>2813</td>
<td>2431</td>
</tr>
<tr>
<td>$T_3$</td>
<td>1878</td>
<td>2386</td>
<td>2511</td>
<td>2920</td>
<td>2835</td>
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<td>$T_4$</td>
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<tr>
<td>Mean</td>
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<td>2499</td>
<td>2594</td>
<td>2830</td>
<td>2952</td>
<td>2561</td>
</tr>
</tbody>
</table>

C.D. for F marginal means = 240·4 Kg/ha.

Crop: Paddy (Kharij).

Site: Govt. Reclamation Farm, Kamma.

Object: To study the effect of dry leaf powder of organic materials on the reclaimation of soil and yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Saline, Alkaline soil. (iii) July, 60. (iv) (a) 4 to 5 ploughings. (b) to (c) N.A. (v) N.I. (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) Oct., 60.

2. TREATMENTS:
   10 organic manurial treatments: $T_0 =$Control (no manure), $T_1 =$Agasson mexicana dry powder at 5 02 Q/ha., $T_2 =$Pobil dry powder at 5 02 Q/ha., $T_3 =$Dry leaves dry powder at 5 02 Q/ha., $T_4 =$Impomma correa dry powder at 5 02 Q/ha., $T_5 =$Rice husk dry powder 5 02 Q/ha., $T_6 =$Saran straw chopped dry powder at 5 02 Q/ha., $T_7 =$Rice chopped dry powder at 5 02 Q/ha., $T_8 =$Dhaincha (green plants) 25 to Q/ha and $T_9 =$Recommended Method.

Treatments were applied Month before transplanting.
3. DESIGN:
(i) R.B.D. (ii) (a) 10 (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/494 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain (iv) (a) 1960 - Only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 1419 Kg/ha. (ii) 328·0 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1037</td>
<td>1321</td>
<td>1538</td>
<td>1257</td>
<td>1446</td>
<td>1300</td>
<td>1218</td>
<td>1354</td>
<td>1835</td>
</tr>
<tr>
<td>C.D.</td>
<td>476·0 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Crop: Paddy (Kharif). Ref: H.P. 60(161).
Site: Govt. Reclamation Farm, Kamama. Type: 'M'.

Object: To study the residual effect of different soil amendments on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy (Kharif) - Paddy (Kharif), (b) Paddy (Kharif). (c) As per treatments. (ii) Sandy loam. (iii) 30.7.60. (iv) (a) 4 to 5 ploughings. (b) To (e) and (v) N.A. (vi) Irrigated. (vii) Nil. (viii) 2 Weedings. (ix) N.A. (x) 27.10.60.

2. TREATMENTS:
11 manorial treatments: T0=Control, T1=Gypsum at 100 Q/ha., T2=Sulphur at 900 Kg/ha., T3=H2SO4 at 3153 Litres/ha., T4=HNO3 at 5219 Litres/ha., T5=HCl at 3865 Litres/ha., T6=Fe M at 370 Q/ha., T7=T0+Press mud at 100 Q/ha., T8=T0+Mollases at 100 Q/ha. and T9=Mollases at 100 Q/ha. Manures applied during 1958 Kharif season.

3. DESIGN:
(i) R.B.D. (ii) (a) 11. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/747·5 ha. (v) N.A. (vi) Yes.

4 DESIGN:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1958-60. (b) Yes. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1987 Kg/ha. (ii) 344·7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1739</td>
<td>2165</td>
<td>1712</td>
<td>1971</td>
<td>.068</td>
<td>1789</td>
<td>17:04</td>
<td>2332</td>
<td>2203</td>
<td>2302</td>
</tr>
<tr>
<td>C.D.</td>
<td>1814</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif). Ref: H.P. 60(87).
Site: Govt. Reclamation Farm, Kamama. Type: 'M'.

Object: To study the residual effect of manures at different levels of leaching on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 19.7.60. (iv) (a) 4 to 5 ploughings. (b) To (e) and (vi) N.A. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 18.10.60.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1) and (2)
(1) 2 levels of Gypsum: G0=Control (no Gypsum) and G1=15·06 Q/ha.
(2) 3 levels of leaching: L0=Control (no leaching), L1=30 cm and L2=61 cm.
Sub-plot treatments:

2 levels of fertilizer:  \( F_0 = \text{Control (No fertilizer)} \) and  \( F_1 = 56 \text{ Kg/ha. of N+28 Kg/ha. of P}_2\text{O}_5 \).

Source of fertilizer is N.A.

3. DESIGN:

(i) split-plot. (ii) (a) 6 main-plots/replication and 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N. (b) 1/897 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 1883 Kg/ha. (ii) (a) 435 Kg/ha. (b) 366 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>L_0</th>
<th>L_1</th>
<th>L_2</th>
<th>G_0</th>
<th>G_1</th>
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<td>1164</td>
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<td>1301</td>
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<td>( G_0 )</td>
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</tr>
<tr>
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<td>2198</td>
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</tr>
</tbody>
</table>

C.D. for F marginal means=265.8 Kg/ha.

---

Crop : Paddy (Kharif).

Site : Govt. Reclamation Farm, Kamma.

Object: To study the effect of high doses of N on the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) Dhanichha—Paddy—Barley—wheat. (b) Dhanichha. (c) N.A. (ii) Saline Sodic soil. (iii) 19.7.61. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) 1/4.69 ha. (vi) N.A. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) 18.10.60.

2. TREATMENTS:

Each treatment was replicated three times as follows:

Male-plots treatments:

5 fertilisation treatments:  \( T_0 = \text{Control} \),  \( T_1 = 224 \text{ Kg/ha. of N as A/S+224 Kg/ha. of P}_2\text{O}_5 \) as Super.,  \( T_2 = 224 \text{ Kg/ha. of N as A/C+224 Kg/ha. of P}_2\text{O}_5 \) as Super,  \( T_3 = T_1 +152.4 \text{ Q/ha. of Gypsum and } T_4 = T_1 +152.4 \text{ Q/ha. of P} \).

Sub-plot treatments:

2 levels of fertilizer:  \( F_0 = \text{Control} \) and  \( F_1 = 56 \text{ Kg/ha. of N+28 Kg/ha. of P}_2\text{O}_5 \) as Super.

3. DESIGN:

(i) Split-plot. (ii) (a) 5 main-plots/replication and 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/469/5 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.
5. RESULTS:
(i) 2438 Kg/ha.  
(ii) (a) 822.6 Kg/ha.  
(b) 480.8 Kg/ha.  
(iii) Main effect of F alone is highly significant.
(iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T_2</th>
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<th>T_3</th>
<th>T_4</th>
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<td>1878</td>
<td>2191</td>
</tr>
<tr>
<td>F_1</td>
<td>3052</td>
<td>3036</td>
<td>2614</td>
<td>2723</td>
<td>3537</td>
</tr>
<tr>
<td>Mean</td>
<td>2402</td>
<td>2574</td>
<td>2050</td>
<td>2300</td>
<td>2864</td>
</tr>
</tbody>
</table>

C.D. for F marginal means=391.0 Kg/ha.

Crop : Paddy (Kharif).
Ref : H.P. 60 and 61(SFT) for Kangra, 61(SFT) for Chamba.

Site : District : Kangra and Chamba.
Type : 'M'.

Object:—Type A: To study the response of Paddy to different levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  
(ii) Hilly.  
(iii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O=Control (no manure),
N=22.4 Kg/ha. of N,
P=22.4 Kg/ha. of P_2O_5,
K=22.4 Kg/ha. of K_2O,
NP=22.4 Kg/ha. of N+22.4 Kg/ha. of P_2O_5,
NK=22.4 Kg/ha. of N+22.4 Kg/ha. of K_2O,
PK=22.4 Kg/ha. of P_2O_5+22.4 Kg/ha. of K_2O and
NPK=22.4 Kg/ha. of N+22.4 Kg/ha. of P_2O_5+22.4 Kg/ha. of K_2O.

3. DESIGN:
(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/ thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied in type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village.  
(iii) (a) 1/98.8 ha.  
(b) 1/197.7 ha.  
(iv) Yes.

4. GENERAL:
(i) and (ii) N.A.  
(iii) Yield of grain.  
(iv) (a) to (c) N.A.  
(v) to (vii) N.A.

5. RESULTS:
Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trails</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kangra</td>
<td>9</td>
<td>1580</td>
<td>480</td>
<td>390</td>
<td>300</td>
<td>340</td>
<td>20</td>
<td>20</td>
<td>10</td>
<td>330</td>
<td></td>
</tr>
<tr>
<td>Chamba</td>
<td>5</td>
<td>1250</td>
<td>70</td>
<td>150</td>
<td>170</td>
<td>600</td>
<td>100</td>
<td>10</td>
<td>10</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>Kangra</td>
<td>7</td>
<td>2450</td>
<td>760</td>
<td>510</td>
<td>370</td>
<td>390</td>
<td>70</td>
<td>70</td>
<td>80</td>
<td>40</td>
<td>290</td>
</tr>
</tbody>
</table>
Crop :- Paddy (Kharif).

Site :- District : Kangra.

Object :- Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Hilly tract. (iii) to (a) N.A.

2. TREATMENTS:
   7 manurial treatments:
   O=Control (no manure),
   \( N_1=22.4 \text{ Kg/ha. of N as A/S,} \)
   \( N_2=44.8 \text{ Kg/ha. of N as A/S,} \)
   \( N_1'=22.4 \text{ Kg/ha. of N as Urea,} \)
   \( N_2'=44.8 \text{ Kg/ha. of N as Urea,} \)
   \( N_1''=22.4 \text{ Kg/ha. of N as C/A/N,} \)
   \( N_2''=44.8 \text{ Kg/ha. of N as C/A/N,} \)

3. DESIGN:
   Same as in type A conducted on Paddy crop on Page No. 170.

4. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kangra</td>
<td>8</td>
<td>1480</td>
</tr>
<tr>
<td>Kangra</td>
<td>14</td>
<td>1830</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).

Site :- District : Chamba.

Object :- Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Hilly. (iii) to (x) N.A.

2. TREATMENTS:
   7 manurial treatments:
   O=Control (no manure),
   \( N_1=22.4 \text{ Kg/ha. of N as A/S} \)
   \( N_2=44.8 \text{ Kg/ha. of N as A/S} \)
   \( N_1'=22.4 \text{ Kg/ha. of N as A/S/N} \)
   \( N_2'=44.8 \text{ Kg/ha. of N as A/S/N} \)
   \( N_1''=22.4 \text{ Kg/ha. of N as C/A/N} \)
   \( N_2''=44.8 \text{ Kg/ha. of N as C/A/N} \)
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3 DESIGN:
Same as in type A Conducted on Paddy crop on Page No. 169.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) to (vi) N.A.

5. RESULTS:
61(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄'</th>
<th>N₄''</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chamba</td>
<td>6</td>
<td>1150</td>
<td>150</td>
<td>150</td>
<td>170</td>
<td>250</td>
<td>320</td>
<td>370</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).
Site: District: Kangra.
Ref.: H.P. 63 to 65(SFT).
Type: "M".

Object: Type A₁: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O = Control (no manure),
N₁ = 35 Kg/ha. of N,
N₂ = 70 Kg/ha. of N,
P₁ = 35 Kg/ha. of P₂O₅,
N₁P₁ = 35 Kg/ha. of N + 35 Kg/ha. of P₂O₅,
N₂P₁ = 70 Kg/ha. of N + 35 Kg/ha. of P₂O₅,
N₁P₂ = 70 Kg/ha. of N + 70 Kg/ha. of P₂O₅ and
N₁P₁K₁ = 70 Kg/ha. of N + 70 Kg/ha. of P₂O₅ + 35 Kg/ha. of K₂O,
N applied as A/S, P₂O₅ as Super and K₂O as Mur. Pot.

3. DESIGN:
(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50—100 villages. In each block 66 experiments are conducted in a year out of which 11 are of type A₁, 11 of type A₂, 11 of type A₃ and 3 are of type C. The eleven experiments under type A₁, A₂ and A₃ are distributed as 3 on a kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the type A₁, A₂ and A₃ experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A₁, A₂ and A₃ are laid out. For conducting the experiments, three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (v) 1962—66. (b) and (c) N.A. (v) to (vi) N.A.

5. RESULTS:
Kangra
61(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₂</th>
<th>N₁P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>462</td>
<td>746</td>
<td>166</td>
<td>820</td>
<td>1038</td>
<td>1283</td>
<td>1473</td>
</tr>
</tbody>
</table>

Control yield = 2508 Kg/ha.; No. of trials = 10
Crop : Paddy (Kharif)

Site : District : Kangra

Ref : H.P. 62 (SFT)
Type : 'M'.

Object : Type A2 : To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :
   Same as in type A1 conducted on Paddy crop under irrigated conditions as page No. 170.

3. DESIGN
   Same as in type A2 conducted on Paddy crop under unirrigated conditions as page No. 170.

4. GENERAL :
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 to 66 for Kangra (1963 to 65 N.A.) (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS :

   Treatment
   \[ N_1 \quad N_2 \quad P_1 \quad N_1P_1 \quad N_1P_2 \quad N_1P_3 \quad N_1P_2K_1 \quad S.E. \]
   \[ 303 \quad 306 \quad 119 \quad 402 \quad 402 \quad 659 \quad 673 \quad 361 \quad 2 \]
   Control yield = 1845 Kg/ha.; No. of trials = 4
2. TREATMENTS:
8 manurai treatments:
- O - Control (no manure),
- N1=35 Kg/ha. of N,
- N2=70 Kg/ha. of P2O5,
- N1P1 = 35 Kg/ha. of N + 35 Kg/ha. of P2O5,
- N1P2=35 Kg/ha. of N+70 Kg/ha. of P2O5,
- N2P1=70 Kg/ha. of N+70 Kg/ha. of P2O5 and
- N2P1K2 = 70 Kg/ha. of N+70 Kg/ha. of P2O5+70 Kg/ha. of K2O.
N applied as A/S, P as Super and K as Mur. Pot.

3. DESIGN:
Same as in type A1, conducted under unirrigated conditions on Paddy crop on page No. 170.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962–66 (1963 to 65 N.A.) (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P1</th>
<th>N2P2</th>
<th>N1P1K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>408</td>
<td>198</td>
<td>408</td>
<td>672</td>
<td>825</td>
<td>1131</td>
<td>1255</td>
<td>170 2</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1649 Kg/ha.; No of trials = 5

Object: Type A2: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
Same as in type A1, conducted on Paddy crop under irrigated conditions as above.

3. DESIGN:
Same as in type A1, conducted under unirrigated conditions on Paddy crop on page No. 170.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962–66. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P1</th>
<th>N2P2</th>
<th>N1P1K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>21</td>
<td>–78</td>
<td>85</td>
<td>87</td>
<td>121</td>
<td>261</td>
<td>239</td>
<td>1.6</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1063 Kg/ha.; No. of trials = 2

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P1</th>
<th>N2P2</th>
<th>N1P1K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>780</td>
<td>336</td>
<td>428</td>
<td>981</td>
<td>1225</td>
<td>1508</td>
<td>1544</td>
<td>127 2</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 2236 Kg/ha.; No. of trials = 12
Object: Type A: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
   Same as in type A, conducted on Paddy crop under unirrigated conditions on page No. 174.

3. DESIGN:
   Same as in type A, conducted under unirrigated conditions on Paddy crop on page No. 170.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1962 to 66 (1963 and 1965 N.A.)  (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>317</td>
<td>8</td>
<td>94</td>
<td>398</td>
<td>368</td>
<td>581</td>
<td>1106</td>
</tr>
</tbody>
</table>

Control yield = 1574 Kg/ha.; No. of trials = 3

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>595</td>
<td>295</td>
<td>469</td>
<td>728</td>
<td>903</td>
<td>1398</td>
<td>1098</td>
</tr>
</tbody>
</table>

Control yield = 1951 Kg/ha.; No. of trials = 9
Crop :- Paddy (Kharij).
Site :- District : Kangra

Object :- Type A4 : To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A.  (vii) Un-irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O=Control (no manure),
N1=35 Kg/ha. of N,
K1=35 Kg/ha. of K2O,
K2=70 Kg/ha. of K2O,
N2=50 Kg/ha. of N+35 Kg/ha. of K2O,
N1K1=35 Kg/ha. of N+70 Kg/ha. of K2O,
N2K1=70 Kg/ha. of N+70 Kg/ha. of K2O and
N1P1K1=35 Kg/ha. of N+35 Kg/ha. of P2O5+35 Kg/ha. of K2O,
N applied as A/S, P2O5 as Super and K2O as Mur. Pot.

3. DESIGN:
Same as in type A4 conducted under unirrigated conditions on Paddy crop on page No. 172.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1962 to 66 (1964 N.A.)  (b) and (c) N.A.  (v) to (vii) N.A.

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K4</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>30</td>
<td>271</td>
<td>16</td>
<td>89</td>
<td>277</td>
<td>425</td>
<td>166</td>
<td>247.6</td>
</tr>
</tbody>
</table>

Control yield=1086 Kg/ha.; No. of trials=12

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K4</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>688</td>
<td>171</td>
<td>170</td>
<td>815</td>
<td>882</td>
<td>1357</td>
<td>1291</td>
<td>77.7</td>
</tr>
</tbody>
</table>

Control yield=2151 Kg/ha. ; No. trials=12

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K4</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>593</td>
<td>254</td>
<td>454</td>
<td>758</td>
<td>939</td>
<td>1075</td>
<td>1015</td>
<td>90.7</td>
</tr>
</tbody>
</table>

Control yield=1843 Kg/ha.; No. of trials=9

———

Crop :- Paddy (Kharij)
Site :- Crop Res. Sta., Dhaula Kuan.

Object :- To find out the optimum date of transplanting, age of seedlings for different varieties of paddy under low hill conditions:

1. BASAL CONDITIONS:
(i) (a) Paddy Bserem.  (b) Bserem for seed.  (c) 67-2 Kg/ha. of P2O5 as super applied before sowing.
(ii) Sandy loam. (iii) As per treatments. (iv) (a) Improved transplanted cultivation. (b) Transplanting. (c) 29.6 Kg/ha. (d) 23 cm x 15 cm. (e) 2. (f) 27.4 Kg/ha. of N, 35.8 Kg/ha. of P₂O₅ and 22.4 Kg/ha. of K₂O at puddling and 22.4 Kg/ha. of N topdressed one month after transplanting. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings by hand Khurpals and Rotary weeders. (ix) N.A. (x) 5.10.65 to 10.11.65.

2. TREATMENTS:
Main-plot treatments:
3 dates of transplanting : D₁=10th, D₂=20th and D₃=30th July.
Sub-plot treatments:
5 ages of seedlings : A₁=20, A₂=25, A₃=30, A₄=35 and A₅=40 days.
Sub-sub-plot treatments:
2 varieties ; V₁=CH-4& V₂=CH-988.

3. DESIGN:
(i) Split-split-plot. (ii) (a) 3 main-plots/replcation ; 5 sub-plots/main-plot ; 2 sub-sub-plots/sub-plot. (b) N.A. (iii) 4. (iv) (a) 5.49 m x 3.81 m. (b) 4.57 m x 2.74 m. (v) 46 cm x 54 cm. (vi) yes.

4. GENERAL:
(i) Normal. (ii) Blast attack in plots with CH-4. (iii) Yield of grain. (iv) (a) 1964-only. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Dry spell and low temperature during early November and late October affected the CH-4 plants.

5. RESULTS:
(i) 3020 Kg/ha. (ii) (a) 3510 Kg/ha. (b) 3448 Kg/ha. (c) 375.2 Kg/ha.
(iii) Main effects of D, A and A×V interaction are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>A₁</th>
<th>A₂</th>
<th>A₃</th>
<th>A₄</th>
<th>A₅</th>
<th>V₁</th>
<th>V₂</th>
<th>Mean</th>
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</table>

C.D. for D marginal means=301.2 Kg/ha.
C.D. for A marginal means=202.0 Kg/ha.
C.D. for V means at the same level of A=308.8 Kg/ha.
C.D. for A means at the same level of V=297.4 Kg/ha.

Crop :- Paddy (Kharif).
Ref :- HP. 61(42).
Site :- Rice Breeding Sub-Stn, Nagrota-Bagwao.
Type :- 'CV'.

Object :- To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy wheat for C₁ and Paddy-fallow for C₂. (b) Wheat for C₁ and follow for C₂. (c) Nil. (ii) Clay loam. (iii) 9.5:6.10:6.61 for C₁ and 26.6:6.11 for C₂. (iv) (a) 2 Subagas and 3 ploughings for C₁ and 2 ploughings for C₂. (b) Broad casting and transplanting. (c) N.A. (d) 23 cm x 15 cm. (e) 2. (f) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) C₁ on 24.10.61 and C₂ on 27.10.61.
2. TREATMENTS:
All combinations of (1) and (2).
(1) 8 Varieties: \( V_1 = R \times NS - 5 \), \( V_2 = R \times NS - 10 \), \( V_3 = R \times NS - 7 \), \( V_4 = A \times RS - 2 \), \( V_5 = A \times RS - 9 \), \( V_6 = A \times RS - 8 \), \( V_7 = A \times RS - 4 \), and \( V_8 = RJ - 100 \).
(2) 2 cultural practices: \( C_1 = \) Vatter broadcasting and \( C_2 = \) Transplanting.

3. DESIGN:
(i) Fact. in R.B.D.  (ii) (a) 16.  (b) N.A.  (iii) 4.  (iv) (a) and (b) 4.57 m \times 3.66 m for \( C_1 \) and 7.62 m \times 2.29 m for \( C_2 \).  (v) Nil.  (vi) yes.

4. GENERAL:
(i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1961—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
(i) 2435 Kg/ha.  (ii) 40.1 Kg/ha.  (iii) Main effect of \( C \) alone is highly significant.  (iv) Av. yield of grain in Kg/ha.

\[
\begin{array}{cccccccc}
V_1 & V_2 & V_3 & V_4 & V_5 & V_6 & V_7 & V_8 \\
\hline
C_1 & 2230 & 2318 & 2082 & 2144 & 2144 & 1838 & 2492 & 2414 \\
C_2 & 2618 & 2714 & 2656 & 2886 & 2538 & 2564 & 2530 & 2789 \\
\hline
\text{Mean} & 2424 & 2516 & 2362 & 2515 & 2341 & 2201 & 2511 & 2602 \\
\end{array}
\]

C.D. for C marginal means=202"2 Kg/ha.

---

Crop :- Paddy (Kharif).
Site :- Rice Breeding Sub-Stn., Nagrota, Bagwan.
Type :- 'CV'.
Ref :- H.P. 61(45).

Object :- To study the effect of different cultural practices on the yield of different varieties of Paddy.

1. BASAL CONDITIONS:
Same as in expt. No. 61 (42) on page No. 177.

2. TREATMENTS:
All combinations of (1) and (2).
(1) 6 varieties: \( V_1 = P \times NS - 3 \), \( V_2 = A \times PS - 6 \), \( V_3 = A \times NS - 2 \), \( V_4 = A \times PS - 7 \), \( V_5 = N \times PS - 1 \) and \( V_6 = PP - 72 \).
(2) 2 cultural practices: \( C_1 = \) Vatter broadcasting and \( C_2 = \) Transplanting.

3. DESIGN:
(i) Fact. in R.B.D.  (ii) (a) 12.  (b) N.A.  (iii) 4.  (iv) (a) and (b) 4.57 m \times 3.66 m for \( C_1 \) and 7.62 m \times 2.29 m for \( C_2 \).  (v) Nil.  (vi) yes.

4. GENERAL:
(i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1961—only.  (b) No.  (c) Nil.  (v) and (vi) Nil.  (vii) No.

5. RESULTS:
(i) 2333 Kg/ha.  (ii) 3440 Kg/ha.  (iii) Main effect of \( V \) is highly significant, and interaction \( V \times C \) is significant.  (iv) Av. yield of grain in Kg/ha.
Crop :- Paddy (Kharif).

Site :- Rice Breeding Sub-Stat., Nageota, Bagwan.

Ref :- H.P. 61(46).

Type :- ‘CV’.

Object :- To study the effect of different cultural practices on the yield of different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—wheat for C_1 and Paddy—fallow for C_2. (b) Wheat for C_1 and fallow for C_2. (c) Nil. (ii) Clay Loam. (iii) C_1 on 10.6.61 and C_2 on 8.5.61/6.7.61. (iv) (a) 2 Subagas and 2 ploughings for C_1 and 2 ploughings for C_2. (b) Broadcasting and Transplanting. (c) N.A. (d) 23 cm x 15 cm. (e) 2. (f) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (a) C_1 on 23/24.10.61 and C_2 on 20.10.61.

2. TREATMENTS:
   All combinations of (1) and (2).
   (1) 7 varieties : V_1 = CP 99—5—7; V_2 = CP 23—5—6; V_3 = CP 6—7; V_4 = CP 33—3; V_5 = CP 11—5—2 and V_6 = PP—7—2.
   (2) 2 cultural practices : C_1 = Vatter broadcasting. C_2 = Transplanting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) and (b) 4.57 m x 3.66 m for C_1 and 7.62 m x 2.29 m for C_2. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 1303 Kg/ha. (ii) 304.1 Kg/ha. (iii) Main effects of V and C are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>V_1</th>
<th>V_2</th>
<th>V_3</th>
<th>V_4</th>
<th>V_5</th>
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<td>907</td>
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<tr>
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<td>2009</td>
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<tr>
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</table>

C. D. for V marginal means= 310.2 Kg/ha.
C. D. for C marginal means= 178.7 Kg/ha.
Crop: Paddy (Kharif).
Site: Rice Breeding Sub-Station, Nagrota, Bagwan.
Object: To study the effect of different cultural practices on the yield of different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy-wheat for C1 and fallow for C2. (b) Wheat for C1 and fallow for C2. (c) Nil.
(ii) Clay loam. (iii) C1 on 8.5.61/10.6.61 and C2 on 1.7.61. (iv) (a) 2 Subhagas and 2 Ploughings for C1. (b) Broadcasting and Transplanting. (c) N.A. (d) 23 cm x 15 cm. (e) 2. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) C1 on 31.10.61 and C2 on 25.10.61.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 4 Varieties: V1 = Hybrid No. 23; V2 = Hybrid No. 27; V3 = Hybrid No. 51 and V4 = RJ-100.
(2) 2 methods of sowing: C1 = Vatter broadcasting and C2 = Transplanting.

3. DESIGN:
(i) Fact in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 4.57 m x 3.66 m for C1 and 7.62 m x 2.29 m for C2. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1980 Kg/ha. (ii) 402 Kg/ha. (iii) None of the effects is significant. (iv) Avg. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>V2</th>
<th>V3</th>
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<td>1706</td>
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<td>1965</td>
<td>2196</td>
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<td>2006</td>
<td>1838</td>
<td>1838</td>
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Crop: Paddy (Kharif).
Site: Rice Breeding Sub-Station, Nagrota, Bagwan.
Object: To study the effect of different cultural practices on the different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy-wheat for C1 and fallow for C2. (b) Wheat for C1 and fallow for C2. (c) Nil.
(ii) Clay loam. (iii) 8.5.61/10.6.61 for C1 and 22.6.61 for C2. (iv) (a) 3 Subhagas and 2 Ploughings for C1 and 2 Ploughings for C2. (b) Broadcasting for C1 and Transplanting for C2. (c) N.A. (d) 23 cm x 15 cm for C1. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) C1 on 16.10.61 and C2 on 7.10.61.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 4 Varieties: V1 = Hybrid No. 23; V2 = Hybrid No. 27; V3 = Hybrid No. 51 and V4 = RJ-100.
(2) 2 methods of sowing: C1 = Vatter broadcasting and C2 = Transplanting.

3. DESIGN:
(i) Fact in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4.57 m x 3.66 m for C1 and 7.62 m x 2.29 m for C2. (c) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-only. (b) No. (c) Nil. (v) to (vii) Nil.
5. RESULTS:
(i) 1725 Kg/ha.  (ii) 258.9 Kg/ha.  (iii) Main effects of V and C are highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
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<th>V₃</th>
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<td>1560</td>
<td>1868</td>
<td>1502</td>
<td>1970</td>
<td>1725</td>
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</table>

C. D. for V marginal means = 269.4 Kg/ha.
C. D. for C marginal means = 190.4 Kg/ha.

Crop : Paddy (Kharij).
Ref :- H.P. 61(43), 62(55).
Site : Rice Breeding Sub-Stn., Nagrota, Bagwan.  Type :- 'CV'.
Object :- To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy = Wheat for C₁ and Paddy = Fallow for C₂.  (b) Wheat for C₁ and Fallow for C₂.  (c) Nil.  (ii) Clay loam.  (iii) 2nd week of June for C₁ and 3rd week of June for C₂.  (iv) (a) 2 ploughings and 2 subhagas.  (b) As per treatments.  (c) N.A.  (d) 23 cm x 15 cm.  (e) 2.  (v) N.A.  (vi) As per treatments.  (vii) Irrigated.  (viii) 2 to 3 weeding.  (ix) N.A.  (x) Mid of Oct. for C₁ and 7.10.61 and 20.10.62 for C₂

2. TREATMENTS:
All combinations of (1) and (2)
(1) 4 varieties : V₁ = NR 2-12-2, V₂ = NR 4-7, V₃ = NR 5-27-3 and V₄ = RJ-100.
(2) 2 cultural practices : C₁ = Vattar broadcasting and C₂ = Transplanting.

3. DESIGN:
(i) Fact. in R.B.D.  (ii) (a) 8.  (b) N.A.  (iii) 4.  (iv) (a) and (b) 4'57 m x 3'66 m for C₁ and 7'62 m x 2'29 m for C₂.  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1961-62.  (b) No.  (c) Results of combined analysis are presented under 5-Results.  (v) and (vi) Nil.  (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:
Pooled results
(i) 2852 Kg/ha.  (ii) 994.0 Kg/ha. (based on 7 d.f. made up of Treatments x years interaction).  (iii) None of the effects is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
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Individual results

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<td>N.S.</td>
<td>2604</td>
<td>3099</td>
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</tbody>
</table>

Sig. | G.M. | S.E./plot |
---|------|----------|
N.S. | 2618 | 3375 |
**  | 3085 | 3045 |
N.S. | 2852 | 9940 |

Crop: Paddy (Kharif).

Site: Rice Breeding Sub-Station, Nagrota, Bagwan.

Type: 'CV'.

Object: To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) Paddy-Wheat for C1 and Paddy-fallow for C2.
   (ii) Wheat for C1 and fallow for C2.
   (iii) Clay loam.
   (iv) 3 ploughings and 2 Sahagen.
   (v) As per treatments.
   (vi) 3 cm x 15 cm.
   (vii) Irrigated.
   (viii) 2 to 3 weedings.
   (ix) N.A.
   (x) 23 em x 15 em.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 varieties: V1 = Ashi, V2 = Norin-18 and V3 = R-7-100.
   (2) 2 cultural practices: C1 = Vatter broadcasting and C2 = Transplanting.

3. DESIGN:
   (i) Fact. in R.B.D.
   (ii) N.A.
   (iii) 4.
   (iv) 3'66m x 4'57m for C1 and 7'62m x 1'83m for C2.
   (v) Nil.
   (vi) Yes.

4. GENERAL:
   (i) Normal.
   (ii) N.A.
   (iii) Yield of grain.
   (iv) (a) 1961-63.
   (b) No.
   (c) Results of combined analysis are presented under 5 Results.
   (v) and (vi) N.A.
   (vii) Error variances are heterogeneous and Treatments x years interaction is present.

5. RESULTS:
   Pooled results:
   (i) 3235 Kg/ha.
   (ii) 6720 Kg/ha. (based on 10 d.f., made up of Treatments x years interaction).
   (iii) Main effect of C is highly significant and interaction C x V is significant.

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<th>V1</th>
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<td>3209</td>
<td>3321</td>
<td>3235</td>
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</table>

C. D. for C marginal means = 351'9 Kg/ha.

C. D. for the body of C x V table = 611'2 Kg/ha.
Crop :- Paddy (Khari).

Site :- Rice Breeding Sub-stn., Nagrota, Bagwan. Type :- 'CV'.

Object :- To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy-Wheat for C1 and Paddy-fallow for C2, (b) Wheat for C1 and fallow for C2. (c) N.A. (ii) Clay loam. (iii) 9.5.61; 8.5.62; 8.5.63. (iv)(a) 3 ploughings and 2 Sahagas. (b) As per treatments. (c) N.A. (d) 23 cm × 15 cm. (e) 2. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) 27.10.61 21.10.62 and 21.10.63 for C1; 24.10.61, 21.10.62 and 22.10.63 for C2.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 varieties: V1=T-23, V2=T-21 and V3=Local.
   (2) 2 cultural practices: C1=Vatter broadcasting and C2=Transplanting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) 4(a) and 4(b) 4.57 m × 3.66 m for C2 and 7.62 m × 1.83 m for C2. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—63. (b) No. (c) Results of combined analysis are presented under Results. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatments × years interaction is present.

5. RESULTS:
   Pooled results.
   (i) 1946 Kg/ha. (ii) 1504-6 Kg/ha (based on 10 d.f made up of Treatments × years interaction). (iii) Main effect of C alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>V1</th>
<th>V2</th>
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<td>2218</td>
<td>4243</td>
</tr>
<tr>
<td>1962</td>
<td>3011</td>
<td>3120</td>
<td>3237</td>
<td>N.S.</td>
<td>1760</td>
<td>4485</td>
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<tr>
<td>1963</td>
<td>3458</td>
<td>3124</td>
<td>3475</td>
<td>**</td>
<td>1842</td>
<td>4892</td>
</tr>
<tr>
<td>Pooled</td>
<td>3176</td>
<td>3259</td>
<td>3321</td>
<td>N.S.</td>
<td>1940</td>
<td>4530</td>
</tr>
</tbody>
</table>

Sig. | G.M. | S.E./plot |
-----|------|-----------|
**   | 3231 | 470.1     |
**   | 3123 | 539.0     |
**   | 3352 | 89.9      |
**   | 3235 | 672.0     |

C, D. for C marginal means=790.0 Kg/ha.
Individual results

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>Sig.</th>
<th>C1</th>
<th>C2</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<td>2642</td>
<td>1923</td>
<td>**</td>
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<td>1622</td>
<td>1298</td>
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<td>1234</td>
<td>2401</td>
<td>**</td>
<td>1817</td>
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<tr>
<td>1963</td>
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<td>1884</td>
<td>1861</td>
<td>**</td>
<td>926</td>
<td>2751</td>
<td>**</td>
<td>1838</td>
<td>651.1</td>
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<td>Pooled</td>
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<td>1808</td>
<td>1726</td>
<td>*</td>
<td>1534</td>
<td>2358</td>
<td>*</td>
<td>1946</td>
<td>1504.6</td>
</tr>
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</table>

Object: — To study the effect of different cultural practices on the different varieties of Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy—wheat for C1 and paddy—fallow for C2. (b) Wheat for C1 and Fallow for C3. (c) Nil.
(ii) Clay loam.
(iii) C1 on 8.5.62/6.6.62 and C3 on 28.6.62.
(iv) (a) 2 Subhaqas and 3 Ploughings for C1 and 2 Ploughings for C2.
(v) Broadcasting and Transplanting.
(vi) N.A.
(vii) 23 cm × 15 cm.
(viii) 2. (v) N.A.
(ix) As per treatments.
(x) Irrigated.
(xi) 2 to 3 weedings.
(xii) N.A.
(xiii) C1 on 16.10.62 and C2 on 20.10.62

2. TREATMENTS:

All combinations of (1) and (2)

(1) 4 varieties: V1—Hybrid—14; V2—Hybrid—27; V3—NR—2—12—2 and V4—2—27—3.
(2) 2 cultural practices: C1—Vattar broadcasting and C2—Transplanting.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) and (b) 4.57 m × 3.66 m for C1 and 7.62 m × 1.83 m for C2. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) No.

5. RESULTS:

(i) 2786 Kg/ha. (ii) 244.5 Kg/ha. (iii) All effects are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>1821</td>
<td>2500</td>
<td>2395</td>
<td>2588</td>
</tr>
<tr>
<td>C2</td>
<td>2540</td>
<td>3090</td>
<td>3690</td>
<td>3664</td>
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<tr>
<td>Mean</td>
<td>2180</td>
<td>2795</td>
<td>3643</td>
<td>3126</td>
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</table>

C. D. for V marginal means = 254.3 Kg/ha.
C. D. for C marginal means = 179.8 Kg/ha.
C. D. for the body of V × C table = 359.6 Kg/ha.

Crop: Paddy (Kharif).
Site: Rice Breeding Sub-Stn., Nagrota, Bagwan, Hissar.
Ref: H.P. 62 (50).
Type: ‘CV’.
Crop: Paddy (Kharif),

Site: Rice Breeding Sub-Stn., Nagrota, Bagwan.

Type: ‘CV’.

Object: To study the effect of different cultural practices on the yield of different varieties of Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy-wheat for C_1 and Paddy-fallow for C_2.
(b) Wheat for C_1 and fallow for C_2.
(c) Nil. (ii) Clay loam.
(iii) C_1 on 24.5.62/6.6.62 and C_2 on 3.7.62.
(iv) (a) 2 Sukagar and 3 ploughings for C_1 and 2 ploughings for C_2.
(b) As per treatments.
(c) For vattar plots 5 Kg/kanal; For transplanting 14 kg 1/2 Kg/kanal.
(d) 23 cm x 15 cm for C_1. (e) 2 for C_2. (v) N.A. (vi) As per treatments.
(vii) Irrigated. (viii) 2 to 3 weedings.

2. TREATMENTS:

All combinations of (1) and (2).
(1) 6 varieties: V_1=Hybrid-27; V_2=Hybrid-23; V_3=Hybrid-37; V_4=Hybrid-51; V_5=Hybrid-14; and V_6=RJ-100.
(2) 2 cultural practices: C_1=Vatter broadcasting and C_2=Transplanting.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) and (b) 4.57m x 3.66m for C_1 and 7.62m x 1.83m for C_2.
(v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) No.

5. RESULTS:

(i) 2291 Kg/ha. (ii) 3907 Kg/ha. (iii) Main effects of V and C are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V_1</th>
<th>V_2</th>
<th>V_3</th>
<th>V_4</th>
<th>V_5</th>
<th>V_6</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1835</td>
<td>1621</td>
<td>1255</td>
<td>1542</td>
<td>1006</td>
<td>1646</td>
<td>1488</td>
</tr>
<tr>
<td>C_2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3544</td>
<td>3053</td>
<td>2708</td>
<td>2844</td>
<td>2760</td>
<td>3674</td>
<td>3094</td>
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<tr>
<td>Mean</td>
<td>2700</td>
<td>2337</td>
<td>1982</td>
<td>2193</td>
<td>1878</td>
<td>2600</td>
</tr>
</tbody>
</table>

C.D. for V marginal means = 3977 Kg/ha.
C.D. for C marginal means = 2296 Kg/ha.

Crop: Paddy (Kharif),

Site: Rice Breeding Sub-Stn., Nagrota, Bagwan.

Type: ‘CV’.

Object: To study the effect of different cultural practices on the different varieties of Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy-wheat for C_1 and Paddy-fallow for C_2.
(b) Wheat for C_1 and fallow for C_2.
(c) Nil. (ii) Clay loam.
(iii) C_1 on 24.5.62/6.6.62 and C_2 on 27.6.62.
(iv) (a) 2 Sukagar and 3 ploughings for C_1 and 2 ploughings for C_2.
(b) Broadcasting and Transplanting.
(c) N.A. (d) 23 cm x 15 cm.
(e) 2. (v) N.A. (vi) As per treatments.
(vii) Irrigated. (viii) 2 to 3 weedings.

2. TREATMENTS:

All combinations of (1) and (2).
(1) 5 varieties: V_1=R x N-5; V_2=R x N-10; V_3=R x N-4; V_4=R x N-2 and V_6=RJ-100.
(2) 2 cultural practices: C_1=Vatter broadcasting and C_2=Transplanting.
3 DESIGN:
(i) Fact. in R.B.D. (ii) N.A. (iii) 4. (iv) (a) and (b) 4.57m x 3.66m for C₁ and 7.62m x 1.83m for C₂. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) Nil. (c) N.A. (v) and (vi) Nil. (vii) No.

5. RESULTS:
(i) 2570 Kg/ha. (ii) 611.0 Kg/ha. (iii) Main effect of C alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C₁</td>
<td>1969</td>
<td>1847</td>
<td>1830</td>
<td>1928</td>
</tr>
<tr>
<td>C₂</td>
<td>3597</td>
<td>3142</td>
<td>3189</td>
<td>2011</td>
</tr>
<tr>
<td>Mean</td>
<td>2783</td>
<td>2494</td>
<td>2510</td>
<td>2154</td>
</tr>
</tbody>
</table>

C. D. for C marginal means = 396.5 Kg/ha.

Crop :- Paddy (Kharif).
Site :- Rice Breeding Sub-Stn., Nagrota, Bagwan.
Object : To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy-wheat for C₁ and Paddy—fallow for C₂. (b) Wheat for C₁ and fallow for C₂. (c) Nil. (c) Clay loam. (iii) C₄ on 8.6.62/7.6.62 and C₅ on 1.6.62. (iv) (a) 2 Sahagas and 3 ploughings for C₃; 2 ploughings for C₅. (b) Broadcasting and Transplanting. (c) N.A. (d) 23 cm x 15 cm. (e) 2. (f) N.A. (g) As per treatments. (h) Irrigated. (i) 2 to 3 weedings. (j) N.A. (k) C₁ on 17.10.62 and C₂ on 21.10.62.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 4 varieties: V₁=N x R=1-8-5-5; V₂=N x R=1-8-5-2; V₃=N x R=1-8-2-4 and V₄=RJ=100.

(2) 2 cultural practices : C₁=Varsity Broadcasting and C₂=Transplanting.

3. DESIGN:
(i) Fact. in R.B.D. (ii) N.A. (iii) 4. (iv) (a) and (b) 4.57m x 3.66m for C₁ and 7.62m x 1.83m for C₂. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) N.A. (d) and (e) Nil. (f) No.

5. RESULTS:
(i) 2610 Kg/ha. (ii) 300.6 Kg/ha. (iii) All effects are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
<th>Mean</th>
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<td>2431</td>
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<td>C₂</td>
<td>2907</td>
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<td>3011</td>
<td>3848</td>
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<tr>
<td>Mean</td>
<td>2160</td>
<td>2655</td>
<td>2721</td>
<td>2904</td>
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</table>
Crop: Paddy (Kharij).

Site: Rice Breeding Sub-Station, Nagrota, Bagwan.

Ref: H.P. 62(53).

Type: 'CV'.

Object: To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:

   (i) (a) Paddy-wheat for C1 and Paddy-fallow for C2. (b) Wheat for C1 and fallow for C2. (c) Nil.
   (ii) Clay loam. (iii) C1 on 6.6.62 and C2 on 8.5.62. (iv) 2 Sahagas and 3 ploughings for C1 and 2 ploughings for C2. (b) Broadcasting and transplanting. (c) N.A. (d) 23 cm x 15 cm. (e) 2. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) C1 on 13.12.62 and C2 on 24.10.62.

2. TREATMENTS:

   All combinations of (1) and (2)
   (1) 4 varieties: \( V_1 = C \times P \) 23.5.6, \( V_2 = C \times P \) 9-5-7, \( V_3 = C \times P \) 33-3 and \( V_4 = P \times P \) 72.
   (2) 2 cultural practices: C1 = Vatter broadcasting, C2 = Transplanting.

3. DESIGN:

   (i) Factor in R.B.D. (ii) 4. (iii) 8. (b) N.A. (iii) 4. (iv) (a) and (b) 4 m x 3 m for C1 and 6 m x 2.26 m for C2. (v) Nil (vii) Yes.

4. GENERAL:

   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) 1962 only. (b) N.A. (c) N.A. (v) and (vii) Nil.

5. RESULTS:

   (i) 1365 Kq/ha. (ii) 314.8 Kq/ha. (iii) Main effect of V and interaction C x V are highly significant. (iv) Av. yield of grain in Kq/ha.

<table>
<thead>
<tr>
<th></th>
<th>( V_1 )</th>
<th>( V_2 )</th>
<th>( V_3 )</th>
<th>( V_4 )</th>
<th>Mean</th>
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<td>1359</td>
<td>1969</td>
<td>1289</td>
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<tr>
<td>( C_2 )</td>
<td>1536</td>
<td>1472</td>
<td>1238</td>
<td>1497</td>
<td>1441</td>
</tr>
<tr>
<td>Mean</td>
<td>1270</td>
<td>1158</td>
<td>1298</td>
<td>1733</td>
<td>1365</td>
</tr>
</tbody>
</table>

C.D. for V marginal means = 327.4 Kq/ha.
C.D. for the body of V x C table = 463.0 Kq/ha.
2. TREATMENTS:
   All combinations of (I) and (2)
   (I) 7 varieties: $V_1 = C \times B \ 24-11, \ V_2 = C \times B \ 11-7, \ V_3 = C \times B \ 23-2, \ V_4 = C \times B \ 25 \times 3, \ V_5 = C \times B \ 21-2, \ V_6 = C \times B \ 3-10$ and $V_7 = \text{Ban直至 T-23.}$
   (2) 2 cultural practices: $C_1 = \text{Vatter broadcasting}$ and $C_2 = \text{Transplanting.}$

3. DESIGN:
   (i) Fact. in R.B.D.  (ii) (a) 14.  (b) N.A.  (iii) 4.  (iv) (a) and (b) $6 \times 10 \times 2.74 \text{m}$ for $C_1$ and $7 \times 62 \times 1 \text{m}$ for $C_2$.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1963—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
   (i) 2022 Kg/ha.  (ii) 300-3 Kg/ha.  (iii) Main effect of $C$ and interaction $C \times V$ are highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>$V_1$</th>
<th>$V_2$</th>
<th>$V_3$</th>
<th>$V_4$</th>
<th>$V_5$</th>
<th>$V_6$</th>
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</tr>
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<td>2227</td>
<td>2305</td>
</tr>
<tr>
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<td>2047</td>
<td>1872</td>
<td>2022</td>
<td>2307</td>
<td>1989</td>
<td>1958</td>
</tr>
</tbody>
</table>

C.D. for C marginal means $=162.4 \text{ Kg/ha.}$

C.D. for the body of $V \times C$ table $=429.6 \text{ Kg/ha.}$

---

**Crop:** Paddy (Kharif).  
**Site:** Rice Breeding Sub-Stn., Nagrota, Bagwan  
**Type:** ‘CV’.

Object: To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) Paddy—wheat for $C_1$ and Paddy—fallow for $C_2$.  (b) Wheat for $C_1$ and fallow for $C_2$.  (c) Nil.  (ii) Clay loam.  (iii) $C_1$ on 2.6.63 and $C_2$ on 8.5.63/18.6.63.  (iv) (a) 2 Sahogar and 3 ploughings for $C_1$ and 2 ploughings for $C_2$.  (b) Broadcasting and transplanting.  (c) N.A.  (d) 23 cm x 15 cm.  (e) 2.  (v) N.A.  (vi) As per treatments.  (vii) Irrigated.  (viii) 2 to 3 weedings.  (ix) N.A.  (x) $C_1$ on 10.10.63. and $C_2$ on 1.10.63.

2 TREATMENTS:
   All combinations of (1) and (7)
   (I) 7 varieties: $V_1 = \text{NR—1-8-4-2}, \ V_2 = \text{NR—5-27-3}, \ V_3 = \text{NR—2-12-2}, \ V_4 = \text{Hybrid—27}, \ V_5 = \text{NR—5}, \ V_6 = \text{RJ—100}$ and $V_7 = \text{NR—4-14-2-4}.$
   (2) 2 cultural practices: $C_1 = \text{Vatter broadcasting}$ and $C_2 = \text{Transplanting.}$

3. DESIGN:
   (i) Fact. in R.B.D.  (ii) (a) 11.  (b) N.A.  (iii) 4.  (iv) (a) and (b) $6 \times 10 \times 2.74 \text{m}$ for $C_1$ and $7 \times 92 \times 1 \text{m}$ for $C_2$.  (v) Nil.  (vi) Yes.

4 GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1963—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.  (vii) No.

5. RESULTS:
   (i) 2723 Kg/ha.  (ii) 143.5 Kg/ha.  (iii) All the effects are highly significant.  (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Khurif).
Site: Rice Breeding Sub-Stn., Nagrota, Bagwan
Type: 'CV'.

Object: To study the effect of different cultural practices on different varieties of Paddy.

1. Basal Conditions:
   (i) (a) Paddy—wheat for C1 and Paddy—fallow for C2. (b) Wheat for C1 and fallow for C2. (c) Nil. (ii) Clay loam. (iii) 2.6.63 for C1 and 6.63 to 20.6.63 for C2. (iv) (a) 2 Suhagas and 3 ploughings for C1 and 2 ploughings for C2. (b) Broadcasting and transplanting. (c) 4. (d) 23 cm x 15 cm. (e) 2. (f) N.A. (g) As per treatments. (h) Irrigated. (iii) 2 to 3 weedings. (iv) N.A. (v) C1 on 11.10.63 and C2 on 4.10.63.

2. Treatments:
   All combinations of (1) and (2)
   (2) 2 cultural practices: C1—Vatter broadcasting and C2—Transplanting.

3. Design:
   (i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) and (b) 6.10 m x 2.74 m for C1 and 7.62 m x 1.83 m for C2. (v) Nil. (vi) Yes.

4. General:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Nil.

5. Results:
   (i) 1925 Kg/ha. (ii) 538.2 Kg/ha. (iii) Main effect of C alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
<th>V7</th>
<th>Mean</th>
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<tbody>
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<td>C1</td>
<td>1777</td>
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<td>1472</td>
<td>1324</td>
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<td>967</td>
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<tr>
<td>C2</td>
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<td>2310</td>
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<td>2049</td>
<td>2703</td>
<td>2645</td>
<td>2206</td>
<td>2272</td>
</tr>
<tr>
<td>Mean</td>
<td>2038</td>
<td>2079</td>
<td>1583</td>
<td>1686</td>
<td>2502</td>
<td>2006</td>
<td>1586</td>
<td>1925</td>
</tr>
</tbody>
</table>

C.D. for C marginal means = 391.0 Kg/ha.
Crop: Paddy (Kharif).

Site: Rice Breeding Sub-Stn., Nagrota, Bagwan.

Object: To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:

   (i) (a) Paddy—wheat for C1 and Paddy—fallow for C2
   (b) Wheat for C1 and fallow for C2
   (c) Nil
   (ii) Clay loam.
   (iii) 8.5.63 for C1 and 21.6.63 for C2
   (iv) (a) 2 Suhagas and 3 ploughings for C2 and 2 ploughings for C2
   (b) Broadcasting and transplanting.
   (c) Nil
   (d) 23 cm × 15 cm.
   (e) 2
   (f) N.A.
   (v) As per treatments.
   (vi) Irrigated.
   (vii) 2 to 3 weedings.
   (ix) N.A.
   (x) C1 on 9.10.63 and C2 on 7.10.63.

2. TREATMENTS:

   All combinations of (1) and (2)
   (1) 6 varieties:
      \( V_1 = N \times P \times 13 \), \( V_2 = N \times P \times 12 \), \( V_3 = N \times P \times 9 \), \( V_4 = N \times P \times 8 \), \( V_5 = N \times P = 41 \), \( V_6 = Asahi \),
   and \( V_7 = PP72 \).
   (2) 2 cultural practices:
      \( C_1 = \) Vatter broadcasting and \( C_2 = \) Transplanting.

3. DESIGN:

   (i) Fact. in R.B.D.
   (ii) (a) 14, (b) N.A.
   (iii) 4.
   (iv) (a) and (b) 60 m × 2.74 m for C1 and 7.62 m × 1.83 m for C2.
   (v) Nil.
   (vi) Yes.
   (vii) Nil.
   (viii) Nil.
   (ix) Nil.
   (x) Nil.

5. RESULTS:

   (i) 2245 Kg/ha.
   (ii) 518.9 Kg/ha.
   (iii) Main effect of C is highly significant and Interaction VÈC is significant.
   (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( V_1 )</th>
<th>( V_2 )</th>
<th>( V_3 )</th>
<th>( V_4 )</th>
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<td>2505</td>
<td>2120</td>
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C.D. for C marginal means = 280.5 Kg/ha
C.D. for the body of VÈC table = 742.3 Kg/ha.

Crop: Paddy

Site: Rice Breeding Sub-Stn., Nagrota, Bagwan.

Object: To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:

   (i) (a) Paddy—wheat for C1 and Paddy—fallow for C2
   (b) Wheat for C1 and fallow for C2
   (c) Nil
   (ii) Clay loam.
   (iii) 10.6.64 for C1 and 17.5.64/1.7.64 for C2 for water treatments B.C. on 10.6.64.
   (iv) (a) 2 Suhagas and 3 ploughings for C2 and 2 ploughings for C2
   (b) Broadcasting and transplanting.
   (c) Nil
   (d) 23 cm × 15 cm.
   (e) 2
   (f) N.A.
   (v) As per treatments.
   (vi) Irrigated.
   (vii) 2 to 3 weedings.
   (viii) N.A.
   (ix) C1 on 9.10.63 and C2 on 29.10.64.

2. TREATMENTS:

   All combinations of (1) and (2)
   (1) 6 varieties:
      \( V_1 = N \times P \times 3 \), \( V_2 = N \times P \times 13 \), \( V_3 = A \times P \times 41 \), \( V_4 = C \times B \times 5 \), \( V_5 = C \times B \times 23 \times 6 \), and \( V_6 = PP72 \).
   (2) 2 cultural practices:
      \( C_1 = \) Vatter broadcasting and \( C_2 = \) Transplanting.
3. GENERAL:
(i) Fact. in R.B.D. (ii) 12. (b) N.A. (iii) 3. (iv) (a) and (b) 4'57m x 3'66m for C₁ and 7'62m x 1'83m for C₂. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) No.

5. RESULTS:
(i) 1988 Kg/ha. (ii) 444.1 Kg/ha. (iii) Main effects of V and C are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th></th>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
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<td>1640</td>
<td>1686</td>
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C.D. for V marginal means=531.8 Kg/ha.
C.D. for C marginal means=307.0 Kg/ha.

Crop : Paddy (Kharif).
Site : Rice Breeding Sub-Stn., Nagrota, Bagwan.
Ref : H.P. 64(50).
Type := ‘CV’.

Object : To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS :
(i) (a) Paddy—wheat for C₁ and Paddy—fallow for C₂. (b) Wheat for C₁ and fallow for C₂. (c) Nil. (ii) Clay loam. (iii) 10.6.64 for C₁ and 17.5.64/30.6.64 for C₂. (iv) (a) 2 ploughings and 3 ploughings for C₁ and 2 ploughings for C₂. (b) Broadcasting and transplanting. (c) Nil. (d) 23 em x 15 cm. (e) 2. (f) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) C₁ on 29.10.64 and C₂ on 25.10.64.

2. TREATMENTS :
All combinations of (1) and (2)
(2) 2 cultural practices : C₁=Vatter broadcasting and C₂=Transplanting.

3. DESIGN :
(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 3. (iv) (a) and (b) 4'57m x 3'66m for C₁ and 7'62m x 1'83m for C₂. (v) Nil. (vi) Yes.

4. GENERAL :
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) No.

5. RESULTS :
(i) 2366 Kg/ha. (ii) 367.2 Kg/ha. (iii) Main effects of V and C are highly significant. Interaction VxC is significant. (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Kharif).
Site: Rice Breeding Sub-Stn., Nagrota, Bagwan.
Type: 'CV'.

Object: To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—wheat for C1 and Paddy—fallow for C2. (b) Wheat for C1 and fallow for C2.
(ii) Clay loam. (iii) 17.5.64 for C1 and 2.7.64 for C2. (iv) (a) 2 Subahas and 3 ploughings for C1 and 2 ploughings for C2. (b) Broadcasting and transplanting. (c) N.A. (d) 23 cm x 15 cm. (e) 2. (f) N.A.
(vi) As per treatments. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) C2 on 29.10.64 and C1 on 25.10.64.

2. TREATMENTS:
All combinations of (1) and (2)

(1) 9 varieties: V1=AL 1-16-1, V2=AL 1-16-2, V3=AL 3-2-3, V4=AL 3-2-1, V5=AL 32-13-3, V6=China 988, and V7=LN 41.
(2) 2 cultural practices: C1=Vaster broadcasting and C2=Transplanting.

3. DESIGN:
(i) Fact, in R.B.D. (ii) (a) 18. (b) N.A. (iii) 3. (iv) (a) and (b) 4.57m x 3.66m and 7.62m x 1.83m for C2.
(v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) No.

5. RESULTS:
(i) 2156 Kg/ha. (ii) 3734 Kg/ha. (iii) Main effect of C is highly significant and that of V is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
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C.D. for V marginal means—438.6 Kg/ha.
C.D. for C marginal means—206.7 Kg/ha.
Crop: Paddy (Kharif).

Site: Rice Breeding Sub-Stn., Nagrota, Bagwan.

Object: —To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy-wheat for C1 and Paddy-fallow for C2. (b) Wheat for C1 and fallow for C2. (c) Nil. (ii) Clay loam. (iii) 7.66 m x 11.66 m for C1 and 7.66 m x 11.66 m for C2. (iv) 2 Suhagas, 3 ploughings for C1 and 2 ploughings for C2. (v) As per treatments. (vi) Irrigated. (vii) 2 to 3 weedings. (viii) N.A. (ix) C1 on 28.10.64 and C2 on 26.10.64.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 5 Varieties: V1=N×P-3, V2=Nori-B, V3=Hybrid 27, V4=Assai, and V5=RJ-100.
   (2) 2 cultural practices : C1=Vatter broadcasting and C2=Transplanting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv)(a) and (b) 457 m x 3.66 m for C1 and 7.62 m x 4.41 m for C2. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv)(a) 1964 only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 2024 Kg/ha. (ii) 394.3 Kg/ha. (iii) Main effect of C and interaction CxV are highly significant and that of V is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
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<td>2041</td>
<td>2130</td>
<td>1774</td>
<td>2400</td>
<td>2024</td>
</tr>
</tbody>
</table>

   C.D. for V marginal means = 404.6 Kg/ha.
   C.D. for C marginal means = 255.9 Kg/ha.
   C.D. for the body of V x C table = 372.1 Kg/ha.

-------------------------

Crop: Paddy (Kharif).

Site: Rice Breeding Sub-Stn., Nagrota, Bagwan.

Object: —To study the effect of different cultural practices on different varieties of Paddy.

1. BASAL CONDITIONS:
   (a) (i) Paddy-wheat for C1 and Paddy-fallow for C2. (b) Wheat for C1 and fallow for C2. (c) Nil. (ii) Clay loam. (iii) 7.56 m x 11.66 m for C1 and 4.74 m x 11.66 m for C2. (iv) 2 Suhagas, 3 ploughings for C1 and 2 ploughings for C2. (v) Broadcasting and transplanting. (c) N.A. (d) 3.61 m x 15 cm. (e) 2. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) C1 on 27.10.64 and C2 on 26.10.64.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 8 varieties: V1=CxB-11-7, V2=CxB-21-2, V3=CxB-5-10, V4=CxB-24-11, V5=CxB-25-2, V6=CxB-25-1, V7=T-21 and V8=T-23.
   (2) 2 cultural practices : C1=Vatter broadcasting and C2=Transplanting.
3. DESIGN

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) and (b) 4·57m x 3·66m for C₁ and 6·10m x 1·83m for C₂. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) No.

5. RESULTS:

(i) 1922 Kg/ha. (ii) 385·7 Kg/ha. (iii) Main effect of C alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>C₁</th>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
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</tbody>
</table>

Mean 1811 2066 1984 1814 2051 1868 1792 1993 1922

C. D. for C marginal means=227·4 Kg/ha.

Crop: Paddy (Khari.Selection).


Object: To study the effect of spacings, fertilizers and number of plants per hill on the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Berseem. (c) 22·4 Kg/ha of N; N.A.; 67·3 Kg/ha. of P₂O₅. (ii) Sandy loam. (iii) 20·7 62: 15·6 63: 31·7 64. (iv) (a) 4 to 5 ploughings. (b) Transplanting. (c) 20 Kg/ha. (d) and (e) As per treatments. (v) Nil. (vi) China-4. (vii) Irrigated. (viii) 2 weedings. (ix) 86 cm for 64 (175); N.A. for others. (x) 4·11·62; 4·11·63; 28·10·64.

2. TREATMENTS:

Main-plot treatments:

2 levels of fertilizers: F₁=No fertilizer and F₁=44·8 Kg/ha. of N+33·6 Kg/ha. of P₂O₅+11·2 Kg/ha. of K₂O.

Sub-plot treatments:

3 row spacings: R₁=15, R₂=23 and R₃=30 cm.

Sub-sub-plot treatments:

3 plant spacings: S₁=8, S₂=15 and S₃=23 cm.

Sub-sub-sub-plot treatments:

No. of plants per hill: P₁=1, P₂=2 and P₃=3 plants/hill

N as C/A/N, P₂O₅ as Super and K₂O as Mur. Pot.

3. DESIGN:

(i) Split-split-split-Plot. (ii) (a) 2 main-plots/replication; 3 sub-plots/main-plot; 3 sub-sub-plots/sub-plot; and 3 sub-sub-sub-plots/sub-sub-plot. (b) N.A. (iii) 3 for 62 and 4 for others. (iv) (a) 3·66 m x 2·29 m. (b) 2·74 m x 1·83 m. (v) 46 cm x 23 cm. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—64. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As sub-sub-plot error variances are heterogeneous, results of individual years are presented below. R x 3 mean table is N.A. for 64 (175).
5. RESULTS:

(i) 2834 Kg/ha. (ii) (a) 383 Kg/ha. (b) 656 Kg/ha. (c) 437 Kg/ha. (d) 418 Kg/ha. (iii) Main effect of F, R and S are highly significant, while effect of P and interaction R x S and S x P are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
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<th></th>
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<th>P₃</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
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</table>

C.D. for R marginal means=258.6 Kg/ha.
C.D. for P marginal means=291.0 Kg/ha.
C.D. for S marginal means=173.8 Kg/ha.
C.D. for F marginal means=190.5 Kg/ha.
C.D. for S means at the same level of F=300.9 Kg/ha.
C.D. for P means at the same level of S=278.2 Kg/ha.
C.D. for S means at the same level of P=286.0 Kg/ha.
C.D. for R means at the same level of S=380.3 Kg/ha.

(ii) 3342 Kg/ha. (iii) (a) 913 Kg/ha. (b) 940 Kg/ha. (c) 765 Kg/ha. (d) 571 Kg/ha. (iii) Main effects of R, P and interaction S x P are significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<th>P₃</th>
<th>S₁</th>
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</tbody>
</table>

C.D. for R marginal means=361.4 Kg/ha.
C.D. for P marginal means=188.0 Kg/ha.
C.D. for P means at the same level of S=325.2 Kg/ha.
C.D. for S means at the same level of P=370.6 Kg/ha.
Object: To study the effect of fertilizer at different depths of ploughing on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (e) N.A.  (ii) Saline Alkaline soil. (iii) 23.7, 60. (iv) (a) 4 to 5 ploughings (b) to (e) N.A. (v) As per treatments. (vi) N.A. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 21.10.60.

2. TREATMENTS:
   Main-plot treatments:
   - 3 ploughings: P₁=Shallow ploughing (15 cm to 23 cm deep), P₂=Deep ploughing (23 cm to 30 cm deep), P₃=Sub-soil ploughing (30 cm to 46 cm deep).
   Sub-plot treatments:
   - 2 levels of fertilizer: F₀=O and F₁=56 Kg/ha. of N + 28 Kg/ha. of P₂O₅ + 28 Kg/ha. of K₂O.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/207 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—61. (b) No. (c) Nil. (v) Nil. (vi) Nil. (vii) Nil.

5. RESULTS:
   (i) 1805 Kg/ha. (ii) (a) 414.6 Kg/ha. (b) 283.3 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>R₁</th>
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<td>2805</td>
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<tr>
<td>Mean</td>
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<td>2896</td>
<td>3039</td>
<td>2763</td>
<td>2609</td>
<td>2993</td>
<td>2828</td>
<td>2590</td>
<td>2804</td>
</tr>
</tbody>
</table>

C.D. for S marginal means=185.9 Kg/ha.
C. D. for P marginal means=103.4 Kg/ha.

Crop: Paddy (Kharif).
Site: Govt. Reclamation Farm, Kama.
Ref: H.P. 60(163).
Type: 'CM'.

Object: To study the effect of fertilizer at different depths of ploughing on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (e) N.A.  (ii) Saline Alkaline soil. (iii) 23.7, 60. (iv) (a) 4 to 5 ploughings (b) to (e) N.A. (v) As per treatments. (vi) N.A. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 21.10.60.

2. TREATMENTS:
   Main-plot treatments:
   - 3 ploughings: P₁=Shallow ploughing (15 cm to 23 cm deep), P₂=Deep ploughing (23 cm to 30 cm deep), P₃=Sub-soil ploughing (30 cm to 46 cm deep).
   Sub-plot treatments:
   - 2 levels of fertilizer: F₀=O and F₁=56 Kg/ha. of N + 28 Kg/ha. of P₂O₅ + 28 Kg/ha. of K₂O.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/207 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—61. (b) No. (c) Nil. (v) Nil. (vi) Nil. (vii) Nil.

5. RESULTS:
   (i) 1805 Kg/ha. (ii) (a) 414.6 Kg/ha. (b) 283.3 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Khajij).

Site: Crop Res. Sta., Dhaula Kuan.

Object: To find out optimum spacing and levels of N for different varieties of Paddy.

1. BASAL CONDITIONS:

(i) Wheat-Paddy. (ii) Wheat. (c) 44.8 Kg/ha of N as Ca(NO)2 and 22.4 Kg/ha of P2O5 as super. (ii) Lourry 37.7.65. (iv) (a) N.A. (b) Transplanting (Improved). (c) 247 Kg/ha. (d) As per treatments. (e) N.A. (v) 537 Kg/ha. of P2O5+44.8 Kg/ha of K2O. (vi) As per treatments. (vii) Irrigated. (viii) One hand weeding with Khurpl. (ix) and (x) N.A.

2. TREATMENTS:

All combinations of (1), (2) and (3):

(i) 3 varieties: V1=SNG-1, V2=Norum-8 and V3=CH-4.
(ii) 3 spacings: S1=15 cm x 15 cm, S2=23 cm x 15 cm and S3=23 cm x 23 cm.
(iii) 3 levels of N: N1=56, N2=112 and N3=168 Kg/ha.

3. DESIGN:

(i) 3 partially confd. VS\N and VS\N² are confd. (ii) 9 plots/block ; 3 blocks/replication. (b) N.A.

4. GENERAL:

(i) Normal, slight lodging in CH-4 plot with high level of N (ii) Medium blast attack in CH-4 plots.
(iii) Height panicle length and yield of grain. (iv) (a) 1965—only. (b) No. (c) Nil. (v) Sundernagar. (vi) Nil. (vii) Dry spell during September and October affected grain formation in CH-4.

5. RESULTS:

(i) 2998 Kg/ha. (ii) 264.3 Kg/ha. (iii) Main effect of V and interaction V \ X N are highly significant while main effects of S and N are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
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<th>S3</th>
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</table>

C.D. for V or S or N marginal means—132.7 Kg/ha.

C.D. for the body of V \ X N table —316.5 Kg/ha.
Crop: Paddy (Kharij).
Site: Seed Multiplication Farm, Jogindranagar.
Object: To study the response of different levels of N, varieties and plant population on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—wheat—paddy. (b) Wheat. (c) N.A. (d) 3 ploughings with furrow turning. (e) N.A. (f) As per treatments. (g) 337 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 44.8 Kg/ha. of K<sub>2</sub>O. (h) As per treatments. (i) Irrigated. (j) 3 weedings. (k) N.A. (l) 4.11.

2. TREATMENTS:
All combinations (1), (2) and (3)
Same as in exp. No. 63(179) presented on page No. 197.

3. DESIGN:
(i) 3<sup>2</sup> confd. (ii) 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) 2.74m x 1.33 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—only. (b) No. (c) Nil. (v) Dharua kuan. (vi) Nil. (vii) Crop suffered up to 20% due to abnormal weather.

5. RESULTS:
(i) 1/22 Kg/ha. (ii) 407.0 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S&lt;sub&gt;9&lt;/sub&gt;</th>
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<td>904</td>
<td>873</td>
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<td>660</td>
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<td>1198</td>
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<td>962</td>
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<td>1153</td>
<td>873</td>
<td>545</td>
<td>462</td>
<td>660</td>
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C.D. for V marginal means = 280.0 Kg/ha.

Crop: Paddy (Kharij).
Site: Govt. Agri. Farm, Bhangrota.
Object: To study the effect of different fungicides against Paddy blast.

1. BASAL CONDITIONS:
(i) (a) N.A.

2. TREATMENTS:
12 Fungicidal treatments: F<sub>1</sub> = Control, F<sub>2</sub> = Agro-san lime dust, F<sub>3</sub> = Tillex, Tale dust, F<sub>4</sub> = Ceresan Tale dust, F<sub>5</sub> = Shell Copper, F<sub>6</sub> = Kirti copper W x P 50, F<sub>7</sub> = Fytofan, F<sub>8</sub> = Copperan, F<sub>9</sub> = Caprolol, F<sub>10</sub> = Vitigram and F<sub>11</sub> = Biltex.

3. DESIGN:
(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 7.32m x 4.88m. (v) N.A. (vi) Yes.
4. GENERAL:

(i) N.A.  (ii) Blast attack : Control measures as per treatments.  (iii) Neck-rot infection and yield of grain. (iv) (a) 1960—only  (b) No.  (c) Nil.  (v) to (vii) Nil.

3. RESULTS:

4. GENERAL:

(i) 1555 Kg/ha.  (ii) 181-9 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>F₀</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
<th>F₅</th>
<th>F₆</th>
<th>F₇</th>
<th>F₈</th>
<th>F₉</th>
<th>F₁₀</th>
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<td>1723</td>
<td>1704</td>
<td>1774</td>
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<td>1598</td>
<td>1782</td>
<td>1819</td>
<td>1144</td>
<td>1354</td>
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</tbody>
</table>

Neck-rot infection:

(i) 24°02 degrees.  (ii) 5°78 degrees.  (iii) Treatment differences are not significant.  (iv) Neck-rot infection in degrees.

<table>
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<tr>
<th>Treatment</th>
<th>F₀</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
<th>F₅</th>
<th>F₆</th>
<th>F₇</th>
<th>F₈</th>
<th>F₉</th>
<th>F₁₀</th>
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<tr>
<td>Mean angle</td>
<td>20'80</td>
<td>25'94</td>
<td>23'25</td>
<td>16'36</td>
<td>22'33</td>
<td>25'37</td>
<td>21'93</td>
<td>26'97</td>
<td>25'76</td>
<td>22'14</td>
<td>30'78</td>
<td>26'62</td>
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</table>

Crop: Paddy (Kharif).  Ref: H.P. 61(194).


Object: To find out efficacy of different fungicides for the control of blast of Paddy.

1. BASAL CONDITIONS:

(i) to (x) N.A.

2. TREATMENTS:

15 fungicidal treatments: F₀=Control, F₁=Agrosan lime dust, F₂=Agrosan Talac dust, F₃=Ceresan Talax dust, F₄=Tillaex Talac dust, F₅=Agrosan seed dressing, F₆=Ceresan wet seed dressing, F₇=Shell copper, F₈=Kirti copper W x P 50, F₉=Blitox, F₁₀=Fytolan, F₁₁=Coppesan, F₁₂=Caprosal, F₁₃=Blue copper and F₁₄=Flit-406.

3. DESIGN:

(i) R.B.D.  (ii) (a) 15.  (b) N.A.  (iii) 4.  (iv) (a) N.A  (b) 5'94mx4'88m.  (v) N.A.  (vi) Yes.

4. GENERAL:

(i) and (ii) Nil.  (iii) Yield of grain.  (iv) (a) 1961—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:

Yield of grain:

(i) 3602 Kg/ha.  (ii) 273·1 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>F₀</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
<th>F₅</th>
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<th>F₇</th>
<th>F₈</th>
<th>F₉</th>
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<td>3588</td>
<td>3681</td>
<td>3222</td>
<td>3055</td>
<td>3686</td>
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</tbody>
</table>

Neck rot infection:

(i) 10°5 degree.  (ii) 3-65 degree.  (iii) Treatment differences are not significant.  (iv) Neck rot infection in degrees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>F₀</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
<th>F₅</th>
<th>F₆</th>
<th>F₇</th>
<th>F₈</th>
<th>F₉</th>
<th>F₁₀</th>
<th>F₁₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Angle</td>
<td>15'52</td>
<td>6'80</td>
<td>6'95</td>
<td>11'57</td>
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<td>11'13</td>
<td>10'69</td>
<td>11'31</td>
<td>8'76</td>
<td>11'02</td>
<td>11'17</td>
<td>9'60</td>
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</table>
Crop - Wheat (Rabi).
Site :- Potato Develop. Stn., Bhagpashg.
Object : To find out the optimum level of fertilizer and best time of application to get the maximum yield of Wheat.

1. BASAL CONDITIONS:
(i) and (ii) N.A. (iii) Oct., 60; N.A. (iv) (a) 4 ploughings. (b) Kara in furrows. (c) 92 Kg/ha. (d) 23 cm. (a) Nil. (v) 36 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as super. (vi) NP-770. (vii) to (ix) N.A. (a) Juen, 61; Jue, June, 63.

2. TREATMENTS:
All combinations of (1) and (2)+one control
(1) 3 levels of N : N<sub>1</sub>=17, N<sub>2</sub>=34 and N<sub>3</sub>=51 Kg/ha.
(2) 3 times of application : T<sub>1</sub>=full dose at sowing, T<sub>2</sub>=full dose in 1st week of March and T<sub>3</sub>=1/2 at sowing+1/2 at 1st week of March.
N<sub>4</sub>=Control.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3'05 mx2'74 m. (v) N.A.

4. GENERAL:
(i) N.A. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960 to 62 (1961 is N.A.). (b) N.A. (c) Nil. (v) and (vi) No. (vii) Error variances are heterogeneous and Treatments x years interaction is absent. Hence individual year results are presented below.

5. RESULTS:
68(187)
(i) 2068 Kg/ha. (ii) 378.0 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain In Kg/ha.
N<sub>4</sub>=2231 Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T&lt;sub&gt;1&lt;/sub&gt;</th>
<th>T&lt;sub&gt;2&lt;/sub&gt;</th>
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<td></td>
<td></td>
<td>C.D. for N marginal means=311.7 Kg/ha.</td>
</tr>
</tbody>
</table>

68(268)
(i) 2864 Kg/ha. (ii) 732.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain In Kg/ha.
No=2541 Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T&lt;sub&gt;1&lt;/sub&gt;</th>
<th>T&lt;sub&gt;2&lt;/sub&gt;</th>
<th>T&lt;sub&gt;3&lt;/sub&gt;</th>
<th>Mean</th>
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<tr>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>3319</td>
<td>2153</td>
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<tr>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>3199</td>
<td>2810</td>
<td>3169</td>
<td>3060</td>
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<tr>
<td>N&lt;sub&gt;3&lt;/sub&gt;</td>
<td>2960</td>
<td>2781</td>
<td>2663</td>
<td>2800</td>
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<tr>
<td>Mean</td>
<td>3159</td>
<td>2581</td>
<td>2900</td>
<td>2900</td>
</tr>
</tbody>
</table>
Object: To find out a suitable manural absorb for the important variety of Wheat.

1. BASAL CONDITIONS:
(i) to (iii) N.A. (iv) (a) to (c) N.A. (d) 25 cm x 23 cm. (e) N.A. (v) Nil. (vi) NP - 770. (vii) to (ix) N.A. (x) June, 63.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N as A/8: N₀ = 0, N₁ = 22.4 and N₂ = 44.8 Kg/ha.
(2) 3 levels of P₂O₅ as Super: P₀ = 0, P₁ = 16.8 and P₂ = 33.6 Kg/ha.
(3) 3 levels of K₂O as Potash: K₀ = 0, K₁ = 11.2 and K₂ = 22.4 Kg/ha.

3. DESIGN:
(i) 3 x Conf. (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 3. (iv) (a) & (b) 3.05 m x 2.74 m. (v) N/A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N/A.

5. RESULTS:
(i) 2724 Kg/ha. (ii) 977.9 Kg/ha. (iii) None of the effects is significant. (v) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
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<td>N₀</td>
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<td>2392</td>
<td>2530</td>
<td>1953</td>
<td>2791</td>
<td>2113</td>
<td>2299</td>
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<tr>
<td>N₁</td>
<td>1914</td>
<td>3070</td>
<td>2791</td>
<td>2193</td>
<td>2751</td>
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<td>N₂</td>
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<td>1508</td>
<td>3628</td>
<td>3309</td>
<td>3631</td>
<td>3907</td>
<td>3282</td>
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<tr>
<td>Mean</td>
<td>2100</td>
<td>2990</td>
<td>3013</td>
<td>2488</td>
<td>2830</td>
<td>2910</td>
<td>2774</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).
Site: Seed Multiplication Farm, Bhanora, (Dist. Chamba).
Object: To study the effect of different levels of P on the yield of Wheat.

1. BASAL CONDITIONS:
(i) to (iv) N.A. (v) 56 Kg/ha. of N as C/A/N. (vi) to (x) N.A.

2. TREATMENTS:
5 levels of P₂O₅: P₀ = 0, P₁ = 28, P₂ = 56, P₃ = 84 and P₄ = 112 Kg/ha.
Other details are not available.

3. DESIGN:
(i) R.D.D. (ii) (a) 5 (b) N.A. (iii) 4. (iv) (a) 1/247.15 ha. (b) 1/395.37 ha. (v) N.A. (vi) Yes.
4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—only (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 1958 Kg/ha. (ii) 69-9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>P₄</th>
</tr>
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<tr>
<td>Av. yield</td>
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<td>1779</td>
<td>1828</td>
<td>2140</td>
<td>2511</td>
</tr>
<tr>
<td>C.D.</td>
<td>13-5 Kg/ha</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).
Site: Auhar Farm, Bilaspur.
Object: To study the effect of urea spray on the yield of Wheat.

1. BASAL CONDITIONS:
(i) to (v) N.A. (vi) NP—809. (vii) to (x) N.A.

2. TREATMENTS:
4 levels of N as urea applied as foliar spray: N₀=0, N₁=22.4, N₂=33.6 and N₃=44.8 Kg/ha.

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (ii) 6. (iv) (a) N.A. (b) 3.15 m x 10.06 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1950—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 1771 Kg/ha. (ii) 59.2 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
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<td>1625</td>
<td>1833</td>
<td>2003</td>
</tr>
<tr>
<td>C.D.</td>
<td>72-8 Kg/ha</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).
Object: To study the effect of N, P and K applied in combination on the yield of Wheat.

1. BASAL CONDITIONS:
(i) (a) Follow—wheat sunnhemp—wheat. (b) undisturbed (G.M.). (c) N.A. (ii) Sandy loam. (iii) N.A., 15.1.62; 19.11.64. (iv) (a) and (b) N.A. (c) 86 Kg/ha. (d) Rows 2 ft apart. (e) N.A. (f) Nil. (vi) NP—829. (vii) Unirrigated. (vii) 2 weedings. (ix) N.A.; 16 cm; 23 cm. (x) 3rd week of April.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N as CAN: N₁=22.4, N₂=44.8 and N₃=67.2 Kg/ha.
(2) 3 levels of P₂O₅ as Super : P₁=22.4, P₂=44.8 and P₃=67.2 Kg/ha.
(3) 3 levels of K₂O as Muri. Pot: K₁=11.3, K₂=22.4 and K₃=33.6 Kg/ha.

3. DESIGN:
(i) 3' Pct. Partially confd. (ii) (a) 9 plots/block. 3 blocks/replication. (b) N.A. (iii) 4. (v) (a) 2.74 m x 7.31 m for 62 and 63; 6.10 m x 3.20 m for 64. (b) 2.28 m x 6.71 m for 62 and 63; 6.10 m x 2.74 m for 64. (v) 23cm x 90cm for 62 & 63; 23 cm on either side for 64. (vi) Yes.
4. GENERAL:

(i) Normal.  (ii) Nil.  (iii) Yield of grain.  (iv) (a) 1962—64.  (b) No.  (c) Results of combined analysis are presented under 5-Results.  (v) and (vi) Nil.  (vii) Error variates are homogeneous and Treatments x years interactions are present.

5. TREATMENTS:

Pooled results

(i) 1762 Kgs/ha.  (ii) 353·7 Kgs/ha. (based on 36 d.f. made up of Treatments x years interaction)  (iii) None of the effects is significant.  (iv) Av. yield of grain in Kgs/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>K1</th>
<th>K2</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td>1748</td>
<td>1780</td>
<td>1848</td>
<td>1751</td>
<td>1802</td>
<td>1822</td>
<td>1792</td>
<td></td>
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<tr>
<td>1964</td>
<td>1794</td>
<td>1686</td>
<td>1830</td>
<td>1737</td>
<td>1819</td>
<td>1753</td>
<td>1770</td>
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<td>1768</td>
<td>1762</td>
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<table>
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<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>1684</td>
<td>1764</td>
<td>1765</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1963</td>
<td>1760</td>
<td>1772</td>
<td>1808</td>
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<td>1669</td>
<td>1837</td>
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Individual results

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<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>Sig</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
<th>Sig</th>
<th>G.M</th>
<th>S.E./ Plot</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>----------</td>
</tr>
<tr>
<td>1963</td>
<td>1352</td>
<td>1386</td>
<td>1460</td>
<td>**</td>
<td>1399</td>
<td>1446</td>
<td>1403</td>
<td>N.S.</td>
<td>1361</td>
<td>1438</td>
<td>1399</td>
<td>N.S.</td>
<td>1399</td>
<td>177-6</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).


Type: 'M'.

Object: To test the efficiency of different types of P on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil.  (b) Maize.  (c) 112 Kgs/ha. of N + 44·8 Kgs/ha. of P2O5.  (ii) (a) Clayey loam.  (b) N.A.  (iii) 16.11 63.  (iv) 4 ploughings.  (b) N.A.  (c) 85·5 Kgs/ha.  (d) and (e) N.A.  (v) Nil.  (vi) C—286.  (vii) Irrigated.  (viii) 2 weeding.  (ix) 15·4 cm.  (x) 8·6 cm.

2. TREATMENTS:

4 sources of P2O5 at 44·8 Kgs/ha: S0—control (no manure), S1—Super ordinary, S2—Super 2·5% zincated and S3—Super 5·0% zincated.

3. DESIGN:

(i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 6.  (iv) (a) 7·32 m x 2·74 m.  (b) 0·70 m x 2·28 m.  (x) 31 cm x 23 cm.  (vi) 5 rows.

4. GENERAL:

(i) Normal.  (ii) Nil.  (iii) Yield of grain.  (iv) (a) 1963—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.
3. TREATMENTS:

(i) 1675 Kg/ha. (ii) 510.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1625</td>
<td>1805</td>
<td>1544</td>
<td>1729</td>
</tr>
</tbody>
</table>

Crop : Wheat (Redi).

Object: To find the optimum time of application of fertilizers to Wheat crop.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Mixture of Mustard, Maize & Guar for fodder. (c) N.A. (ii) Clayey loam. (iii) 22.11.63. (iv) (a) 5 ploughings. (b) N.A. (c) 8% 5 Kg/ha. (d) Rows 23 cm apart. (e) N.A. (v) Nil. (vi) C-286. (vii) Unirrigated. (viii) 1 weeding. (ix) 154 cm. (x) 30.4.64.

2. TREATMENTS:

6 times and methods of application of fertilizers:

<table>
<thead>
<tr>
<th>Time</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>Whole broadcast before last sowing</td>
</tr>
<tr>
<td>T2</td>
<td>Whole drilled at sowing</td>
</tr>
<tr>
<td>T3</td>
<td>Whole applied by Kera in furrow's</td>
</tr>
<tr>
<td>T4</td>
<td>Whole P, K and half N drilled at sowing</td>
</tr>
<tr>
<td>T5</td>
<td>Whole N top dressed with winter rain</td>
</tr>
<tr>
<td>T6</td>
<td>Whole P, K and half N drilled at sowing</td>
</tr>
</tbody>
</table>

Dose of fertilizers is 44.8 Kg/ha of N+44.8 Kg/ha of P04+22.4 Kg/ha of K2O.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 7-32 m x 2-74 m. (b) 6.70 m x 2.28 m. (v) 31 cm x 23 cm. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 2134 Kg/ha. (ii) 315.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2120</td>
<td>2153</td>
<td>1973</td>
<td>2180</td>
<td>2343</td>
<td>2033</td>
</tr>
</tbody>
</table>

Crop : Wheat (Redi).
Site : Govt. Agril. Res. Sta. (Chemistry Section), Dhaula Kuan.

Object: To study the effect of different combinations of N, P and K on the yield of Wheat crop.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Castor. (c) N.A. (ii) Sandy loam. (iii) 23.11.63. (iv) (a) and (b) N.A. (c) 79 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) C-286. (vii) Irrigated. (viii) N.A. (ix) V.A. (x) 12.4.66.
2. TREATMENTS:
All combinations of (1) and (2) + one control
(1) 2 levels of N: N₁ = 30 and N₂ = 75 Kg/ha.
(2) 2 levels of P₂O₅: P₁ = 50 and P₂ = 75 Kg/ha.
(3) 2 levels of K₂O: K₁ = 50 and K₂ = 75 Kg/ha.
Other details are not available.

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 10m x 3m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) No lodging. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—cond. (b) No (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1273 Kg/ha. (ii) 166.3 Kg/ha. (iii) Control Vs. others is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P₁</th>
<th>P₂</th>
<th>K₁</th>
<th>K₂</th>
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<td>Mean</td>
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<td>1271</td>
<td>1302</td>
<td>1325</td>
<td>1325</td>
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</tr>
</tbody>
</table>

C.D. for control vs. others = 182.0 Kg/ha.

---

Crop :- Wheat (Rabi).
Site :- Agri. Res. Stn., Dhaula Kuan.
Object :- To study the efficiency of N, P and K in different combinations on the yield of Wheat.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Maize. (c) N.A. (d) Sandy loam. (iii) 19.11.65. (iv) (a) and (b) N.A. (c) 70 Kg/ha.
(d) and (e) N.A. (v) C—286. (vi) Irrigated. (vii) and (ix) N.A. (x) 25.4.66.

2. TREATMENTS
6 Manurial treatments: M₀ = Control, M₁ = 60 Kg/ha of N, M₂ = M₁ + 60 Kg/ha. of P₂O₅, M₃ = M₁ + 60 Kg/ha. of K₂O, M₄ = 60 Kg/ha. of P₂O₅ + 60 Kg/ha. of K₂O and M₅ = 60 Kg/ha. of N + 60 Kg/ha. of P₂O₅ + 60 Kg/ha. of K₂O.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1000 m x 300 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) No lodging. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—cond. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1194 Kg/ha. (ii) 50.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
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<td>1208</td>
<td>1158</td>
<td>1219</td>
<td>1125</td>
<td>1289</td>
</tr>
</tbody>
</table>

Ref :- H.P. 65(184).
Type :- 'M'.
Crop: Wheat (Rabi).

Site: Crop Res. Sub-Stn., Gopalpur.

Ref: H.P. 61(203).

Type: 'M'.

Object:—To study the effect of different methods of N and P placement on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) and (ii) N.A. (iii) 23.10.61. (iv) and (v) N.A. (vi) N.P.—770. (vii) to (x) N.A.

2. TREATMENTS:
   7 manural treatments: 
   \[ M_0 = 0, M_1 = 18 \text{ Kg/ha. of } N+17 \text{ Kg/ha. of P}_2O_5 \text{ in rows, } M_2 = 18 \text{ Kg/ha. of } N+17 \text{ Kg/ha. of P}_2O_5 \text{ applied between rows, } M_3 = 36 \text{ Kg/ha. of } N+17 \text{ Kg/ha. of P}_2O_5 \text{ applied in rows, } M_4 = 36 \text{ Kg/ha. of } N+17 \text{ Kg/ha. of P}_2O_5 \text{ broadcasted and } M_5 = 36 \text{ Kg/ha. of } N+17 \text{ Kg/ha. of P}_2O_5 \text{ applied in rows.} \]

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3·35 m x 6·70 m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) No.

5. RESULTS:
   (i) 2768 Kg/ha. (ii) 1128 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M_0</th>
<th>M_1</th>
<th>M_2</th>
<th>M_3</th>
<th>M_4</th>
<th>M_5</th>
<th>M_6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1860</td>
<td>2982</td>
<td>2721</td>
<td>2796</td>
<td>3107</td>
<td>3032</td>
<td>2875</td>
</tr>
<tr>
<td>C.D. = &amp;176 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Crop: Wheat (Rabi).

Site: Crop Res. Sub-Stn., Gopalpur.

Ref: H.P. 61(176).

Type: 'M'.

Object:—To study the effect of mulching on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) and (ii) N.A. (iii) 10.11.61. (iv) to (ix) N.A. (v) 20.6.62.

2. TREATMENTS:
   5 mulching treatments: 
   \[ M_0 = \text{Control, } M_1 = \text{Compost, } M_2 = \text{Raw F.Y.M., } M_3 = \text{Sheep manure and } M_4 = \text{Forest manure.} \]

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 3·05m x 6·70m. (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) No. (viii) As not plot size is N.A., the results have been given in Kg/plot.

5. RESULTS:
   (i) 596 Kg/plot. (ii) 0·49 Kg/plot. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M_0</th>
<th>M_1</th>
<th>M_2</th>
<th>M_3</th>
<th>M_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>6·86</td>
<td>5·84</td>
<td>6·09</td>
<td>5·71</td>
<td>5·30</td>
</tr>
</tbody>
</table>
Crop : Wheat (Rabi).

Ref : H.P. 61(205).

Size : Crop Res. Sub-Stn., Gopalpur.

Type : 'M'.

Object : To study the effect of F.Y. M and compost on Sporny soils and yield of Wheat.

1. BASAL CONDITIONS:
(i) to (ix) N.A. (x) 27.6.62.

2. TREATMENTS:
3 manurial treatments: M<sub>0</sub>=0, M<sub>1</sub>=3038 Q/ha. of F.Y. M and M<sub>2</sub>=3038 Q/ha. of Compost.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) 3-35m x 6-70m. (b) N.A. (v) N.A. (vi) Yes.

4 GENERAL:
(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-only. (b) No. (c) Nil. (v) and (vi) N.A. (vii) As net plot size is N.A., the results have been given in Kg/plot.

5. RESULTS:
(i) 5 56 Kg/plot. (ii) 0·63 Kg/plot. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/plot.

\[
\begin{array}{ccc}
\text{Treatment} & M_0 & M_1 & M_2 \\
\text{Av. yield} & 6.03 & 5.42 & 5.22 \\
\end{array}
\]

Crop := Wheat (Rabi).

Ref := H.P. 62(259), 63(256).

Site := Crop Res. Sub-Stn., Gopalpur.

Type := 'M'.

Object := To find out the suitable dose of P for Wheat crop.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Opla ; N.A. (c) N.A. (ii) Light loam. (iii) and (iv) N.A. (v) 56 Kg/ha of N as C/A/N. (vi) NP-770 (Medium). (vii) Unirrigated ; N.A. (viii) and (ix) N.A. (x) 16.6.63; N.A.

2. TREATMENTS:
3 levels of P<sub>2</sub>O<sub>5</sub> as super : P<sub>0</sub>=0, P<sub>1</sub>=28, P<sub>2</sub>=56, P<sub>3</sub>=84 and P<sub>4</sub>=112 Kg/ha.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 3'66m x 6'71m. (b) 3'20m x 6'25m. (v) 23 cm x 23 cm, (vi) Yes.

4 GENERAL:
(i) Very good ; N.A. (ii) Attack of rust ; N.A. (iii) Yield of grain. (iv) (a) 1962-63. (b) No. (c) Results of combined analysis are presented under 5-Results. (v) No. (vi) N.A. (vii) Error variances are heterogeneous and Treatments x years interaction is present.

5. RESULTS:
Pooled results
(i) 251 Kg/ha. (ii) 735-0 Kg/ha. (based on 4. d.f. made up of Treatments x years interaction.) (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

\[
\begin{array}{cccccc}
\text{Treatment} & P_0 & P_1 & P_2 & P_3 & P_4 \\
\text{Av. yield} & 1053 & 2026 & 2495 & 2369 & 2813 \\
\text{C.D.} & 1020.2 Kg/ha. \\
\end{array}
\]
Individual results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>P₄</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>1438</td>
<td>2766</td>
<td>3407</td>
<td>3235</td>
<td>3892</td>
<td>*</td>
<td>2948</td>
<td>781.6</td>
</tr>
<tr>
<td>1963</td>
<td>668</td>
<td>1285</td>
<td>1583</td>
<td>1503</td>
<td>1735</td>
<td>*</td>
<td>1355</td>
<td>318.8</td>
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<tr>
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<td>1053</td>
<td>2026</td>
<td>2495</td>
<td>2369</td>
<td>2813</td>
<td>*</td>
<td>2151</td>
<td>735.0</td>
</tr>
</tbody>
</table>

Crop :- Wheat (Rabi).  
Site :- Seed Multiplication Farm, Jogindernagar.  
Type :- ‘M’

Object:—To study the effect of different levels of P₂O₅ on the yield of Wheat crop.

4. BASAL CONDITIONS:
   (i) and (ii) N.A. (iii) 18/19.11.62. (iv) (a) to (e) N.A. (v) 56 Kg/ha. of N as C/A/N. (vi) to (a) N.A.

2. TREATMENTS:
   Same as in exp. No. 62 (259), 63 (256) and presented on page no. 207

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4.88m × 3.66m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) Gopalpur, Sunder Nagar, Phuladhar. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1801 Kg/ha. (ii) 914 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

   Treatment  | P₀ | P₁ | P₂ | P₃ | P₄ |
   Av. yield  | 1477 | 1874 | 1542 | 2292 | 1830 |
   C.D. = 140.8 Kg/ha.

Crop :- Wheat (Rabi).  
Site :- Govt. Res. Farm, Kama.  
Type :- ‘M’

Object:—To study the effect of high doses of N on the yield of Wheat.

2. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (iii) Saline Alk. soil. (iv) (a) to (c) N.A. (v) N.A. (vi) C—273. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) May, 61.

2. TREATMENTS:
   Main-plot treatments :  
   5 (basal) manurial treatments :  
   T₀=control, T₁=224 Kg/ha. of N as A/C, T₂=224 Kg/ha. of N as A/S, T₃=224 Kg/ha. of N as A/C+161 Kg/ha. of Press-mud and T₄=214 Kg/ha. of N as A/C+161 Kg/ha. of Gypsum.

   Sub-plot treatments :  
   2 levels of N as top-dressing : N₀=0 and N₁=45 Kg/ha.
3. DESIGN:
   (i) Split-plot. (ii) (a) 5 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) N.A. (b) 1/49/7-07 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-61. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1189 Kg/ha. (ii) (a) 320.6 Kg/ha. (b) 171.5 Kg/ha. (iii) Main effect of N alone is highly significant.
   (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>782</td>
<td></td>
<td>939</td>
<td></td>
<td>845</td>
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<tr>
<td>N₁</td>
<td>1565</td>
<td>1252</td>
<td>1565</td>
<td>1721</td>
<td>1534</td>
</tr>
<tr>
<td>Mean</td>
<td>1174</td>
<td>1017</td>
<td>1252</td>
<td>1174</td>
<td>1330</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=393.6 Kg/ha.

_Crop:_ Wheat (Rabi).
_Site:_ Potato Develop. Stn., Kheradhar.
_Object:_ To study the effect of different levels of N on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) and (ii) N.A. (iii) 3rd week of October, 60. (iv) and (v) N.A. (vi) N.P.-770. (vii) to (ix) N.A. (x) 5th June, 61.

2. TREATMENTS:
   4 levels of N as A/S: N₀=0, N₁=22, N₂=33 and N₃=44 Kg/ha.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3.90 m x 10.06 m (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 732 Kg/ha. (ii) 38.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>709</td>
<td>700</td>
<td>748</td>
<td>770</td>
<td></td>
</tr>
</tbody>
</table>

_Crop:_ Wheat (Rabi).
_Site:_ Potato Res. Stn., Kheradhar.
_Object:_ To find out the best time of application of N fertilizers for Wheat crop.

4. BASAL CONDITIONS:
   (i) to (a) N.A.
2. TREATMENTS:
All combinations of (1) and (2)+ one control
(1) 3 levels of N as A/S: N_1=17, N_2=34 and N_3=51 Kg/ha.
(2) 3 times of application of N: A_1=Full dose at sowing, A_2=1/2 at sowing+1/2 after snow melts and A_3=Full dose after snow melts.

3. DESIGN:
(i) R.B.D. (ii) 10. (b) N.A. (iii) 4. (iv) 30 cm x 11.5 cm. (v) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) 1962—only. (b) N.A. (c) Nil. (v) Phula Dhar. (vi) and (vii) Nil.

5. RESULTS:
(i) 2363 Kg/ha. (ii) 966.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain

<table>
<thead>
<tr>
<th>Treatment</th>
<th>A_1</th>
<th>A_2</th>
<th>A_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N_1</td>
<td>1538</td>
<td>2768</td>
<td>2338</td>
<td>2221</td>
</tr>
<tr>
<td>N_2</td>
<td>2870</td>
<td>2338</td>
<td>2255</td>
<td>2494</td>
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<td>N_3</td>
<td>2768</td>
<td>2460</td>
<td>2153</td>
<td>2460</td>
</tr>
<tr>
<td>Mean</td>
<td>2392</td>
<td>2529</td>
<td>2255</td>
<td>2393</td>
</tr>
</tbody>
</table>

Crop : Wheat (*Rabi*). Site: Kunihar Farm, (District : Mahasu). Object : To study the effect of different levels of N on the yield of Wheat crop.

Ref : H.P. 60(177). Type : 'M'.
Crop : Wheat (Rabi).

Site : Soil Res. Sub-Stn., Nagrot, Sangwan.

Object : To study the effect of different micronutrients on the yield of Wheat.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A. (b) Sandy loam. (iii) 6.12.62. (iv) (a) 5 to 6 ploughings. (b) to (e) N.A. (v) 67.2 Kg/ha. of N+33.6 Kg/ha. of P₂O₅+33.6 Kg/ha. of P₂O₅ applied at sowing. (vi) & (vii) N.A. (viii) 2 weedings. (ix) N.A. (x) 20.4.63.

2. TREATMENTS:
   7 micronutrient treatments: T₀=Control, T₁=Borax at 2.3 Kg/ha. in 454.6 litre of water, T₂=Copper Sul. at 4.6 Kg/ha.+2.3 Kg/ha. of hydrated lime in 454.6 litre of water, T₃=Iron Sul. at 4.6 Kg/ha.+2.3 Kg/ha. of hydrated lime in 454.6 litres of water, T₄=Magnesie Sul. at 6.9 Kg/ha.+4.6 Kg/ha. of hydrated lime in 454.6 litre of water and T₅=Magnesium at 4.6 Kg/ha. 454.6 litre of water as foliar spray.

3. DESIGN:
   (i) R.B.D. (ii)(a) 7. (b) N.A. (iii) 4. (iv)(a) N.A. (b) 1/717 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) As per treatments. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) N.A.

5. RESULTS:
   Grain yield.
   (i) 543 Kg/ha. (ii) 650 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>432</td>
<td>604</td>
<td>531</td>
<td>545</td>
<td>520</td>
<td>551</td>
</tr>
<tr>
<td>C.D.</td>
<td>97.9 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop : Wheat (Rabi).

Ref : H.P. 62(156).

Type : 'M'.

Site : Potato Devlop. Sta., Phuladhar (Jogindernagar).

Object : To find out the optimum time of application of Nitrogenous fertilizers to Wheat crop.

1. BASAL CONDITIONS :
   (i) and (ii) N.A. (iii) 24th oct., 60. (iv) (a) to (c) N.A. (d) 23 cm. (e) N.A. (v) 36 Kg/ha. of P₂O₅ on 18th March, 61. (vi) NP—770. (vii) to (ix) N.A. (x) 30.6 June, 61.

2. TREATMENTS:
   Same as in Expt. No. 62(263) on wheat conducted at Kheradhar and presented on page No. 209.

3. DESIGN:
   (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A.(b) 3.05 m × 2.74 m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) Kheradhar (vi) & (vii) Nil.

5. RESULTS:
   (i) 1206 Kg/ha. (ii) 212.9 Kg/ha. (iii) Control Vs others is highly significant. (i) Av. yield of grain in Kg/ha.
Crop :- Wheat (Rabi).

Site :- Potato Devlep. Stn., Phula Dhar (Jogindernagar). Type :- 'M'.

Object :- To study the effect of N, P, K on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) and (ii) N.A. (iii) 22/23.10.60. (iv) (a) N.A. (b) In furrows. (c) N.A. (d) 23 cm x 15 cm. (e) N.A. (v) to (ix) N.A. (x) 30.6.61.

2. TREATMENTS:
   All combinations of (1), (2) and (3) (1) 3 levels of N as A1S: N1=0, N2=22.5 and N3=45 Kg/ha.
   (2) 3 levels of P2O5 as super: P1=0, P2=18 and P3=36 Kg/ha.
   (3) 3 levels of K2O as Po. sul.: K1=0, K2=11 and K3=21.5 Kg/ha.

3. DESIGN:
   (i) 3rd confd. (ii) 9 plots/block ; 3 blocks/repllication. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 6'10m x 2'74m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-only. (b) No. (c) Nil. (v) to (viii) N.A.

5. RESULTS:
   (i) 806 Kg/ha. (ii) 33.9 Kg/ha. (iii) Main effect of P alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>K0</th>
<th>K1</th>
<th>K2</th>
<th>Mean</th>
</tr>
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<tbody>
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<td>N1</td>
<td>409</td>
<td>788</td>
<td>900</td>
<td>688</td>
<td>816</td>
<td>893</td>
<td>868</td>
</tr>
<tr>
<td>N2</td>
<td>524</td>
<td>919</td>
<td>1240</td>
<td>1004</td>
<td>766</td>
<td>914</td>
<td>894</td>
</tr>
<tr>
<td>N3</td>
<td>389</td>
<td>940</td>
<td>1141</td>
<td>693</td>
<td>819</td>
<td>958</td>
<td>824</td>
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<td>Mean</td>
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<td>1094</td>
<td>795</td>
<td>800</td>
<td>822</td>
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<td>469</td>
<td>808</td>
<td>1109</td>
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</tr>
<tr>
<td>K2</td>
<td>408</td>
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<td>1074</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>446</td>
<td>921</td>
<td>1098</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

C. D. for P marginal means=230.4 Kg/ha.
Crop : Wheat (Babi).
Site : Potato Develop. Sta., Phulda Dhar (Jharaonigri).
Object : To assess the efficacy of soil and spray application of Nitrogenous fertilizers on the yield of Wheat.

1. BASAL CONDITIONS:
(i) (ii) N.A. (iii) 25.10.60. (iv) (a) to (c) N.A. (d) 30 cm. (v) 3.9 Kg/ha. of P_2O_5 and a spraying of 1% Urea in 454.4 litres of water on 15.1.61. (vi) N.P. 770. (vii) to (ix) N.A. (x) 10.6.61.

2. TREATMENTS:
9 Methods of application of Urea : M_0 = Control. M_1 = 22.4 Kg/ha. of N at sowing time soil app., M_2 = 23.4 Kg/ha. of N at sowing + 22.4 Kg/ha. as top dressing, M_3 = 17.4 Kg/ha. of N + 4 sprayings of 1% Urea, M_4 = 12.4 Kg/ha. of N + 4 sprayings of 1% Urea, M_5 = 11.2 Kg/ha. of N + 2 sprayings of 1% Urea, M_6 = 11.4 Kg/ha. of N + 4 sprayings of 1% Urea, M_7= No soil application of N + 4 sprayings of 1% Urea and M_8 = No soil application + 4 sprayings of 1% Urea.

3. DESIGN:
(i) R.B.D. (ii) N.A. (iii) 4. (iv) (a) N.A. (b) 3 x 5 m x 2.74 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 170 Kg/ha. (ii) 112.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M_0</th>
<th>M_1</th>
<th>M_2</th>
<th>M_3</th>
<th>M_4</th>
<th>M_5</th>
<th>M_6</th>
<th>M_7</th>
<th>M_8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1006</td>
<td>1289</td>
<td>1477</td>
<td>1276</td>
<td>1269</td>
<td>1079</td>
<td>1073</td>
<td>960</td>
<td>1103</td>
</tr>
</tbody>
</table>

Crop : Wheat (Babi).
Site : Potato Develop. Sta., Phulda Dhar (Jharaonigri).
Object : To find the suitable dose of P for Wheat crop.

1. BASAL CONDITIONS:
(i) to (iv) N.A. (v) 56 Kg/ha. of N as C/A/N. (vi) to (x) N.A.

2. TREATMENTS:
Some as in expt. no. 62 (259) 63 (256), on wheat-conducted at Gopalpura and presented on page no. 207

3. DESIGN:
(i) R.B.D. (ii) 5. (b) N.A. (iii) 4. (iv) (a) 1/247.10 ha. (b) 1/395.378 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) (a) 1963—only. (b) No. (c) Nil. (v) Gopalpura, Sundernagar.

5. RESULTS:
(i) 491 Kg/ha. (ii) 64.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P_0</th>
<th>P_1</th>
<th>P_2</th>
<th>P_3</th>
<th>P_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>423</td>
<td>407</td>
<td>569</td>
<td>412</td>
<td>642</td>
</tr>
</tbody>
</table>
Crop :- Wheat (Rabi).

Site :- Crop Res. sub-Stn., Sunder Nagar (Mandi).

Object :- To determine the response of phosphate application on Wheat.

Ref :- H.P. 62(272).

Type :- ‘M’.

1. BASAL CONDITIONS:
   (a) Nil. (b) Maize. (c) N.A. (ii) Sandy loam.
   (d) 23 cm between rows. (e) Nil. (v) 83’61 Ql/ha. of F.Y.M.+44’8 Kg/ha. of P,0.+22·4 Kg/ha. of K,0
   and 89’6 to 268’8 Kg/ha. of N (vi) NP--829. (vii) Unirrigated. (viii) I weeding. (ix) Normal. (x) 14.5.63.

2. TREATMENTS:
   Same as in exp. no. 62 (259) 63 (256) conducted at Gopalpur and presented on page no. 207.

3. DESIGN:
   (i) R.B.D. (ii) 5. (b) N.A. (iii) 4. (iv) 5’79m x 2’29m. (b) 5’18m x 1’83m. (v) 30.5 cm x 23 cm.
   (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (e) Nil. (v) Gopalpur, Phula Dhar. (vi) Nil.

5. RESULTS:
   (i) 2760 Kg/ha. (ii) 298‘2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>P5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2604</td>
<td>3224</td>
<td>2712</td>
<td>2691</td>
<td>2570</td>
</tr>
</tbody>
</table>

----------

Crop :- Wheat (Rabi).

Site :- District : Kangra.

Object :- Type A : To study the response of Wheat to levels of N, P and K applied individually and in combination.

Ref :- H.P. 61(SFT).

Type :- ‘M’.

1. BASAL CONDITIONS:
   (i) to (v) N.A. (ii) Hilly tract. (iii) to (vii) N.A. (viii) Irrigated. (ix) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments :
   O=Control (no manure)
   N=22’4 Kg/ha. of N,
   P=22’4 Kg/ha. of P,0.
   K=22’4 Kg/ha. of K,0.
   NP=22’4 Kg/ha. of N+22’4 Kg/ha. of P,0.
   NK=22’4 Kg/ha. of N+22’4 Kg/ha. of K,0.
   PK=22’4 Kg/ha. of P,0+22’4 Kg/ha. of K,0.
   NPK=22’4 Kg/ha. of N+22’4 Kg/ha. of P,0+22’4 Kg/ha. of K,0.

3. DESIGN:
   (i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant
   posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and
   the circle/thana is changed once in two years within the same zone. Each field assistant is required to
   conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on cash crops, 4 on an oilseed crop and
   3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B
   on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphates
   application are studied on Type C trials in two out of the 4 zones in each district every year. The
   experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the
   rate of one experiment per village. (iii) (a) 1/98’8 ha (b) 1/197’7 ha. (iv) Yes.
4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-61. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
Av. response in Kg/ha.

60 (SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kangra</td>
<td>2</td>
<td>1460</td>
<td>530</td>
<td>330</td>
<td>220</td>
<td>42.0</td>
<td>70</td>
<td>20</td>
<td>-20</td>
<td>-20</td>
<td>29.0</td>
</tr>
<tr>
<td>Kangra</td>
<td>5</td>
<td>1950</td>
<td>840</td>
<td>120</td>
<td>40</td>
<td>312.0</td>
<td>-170</td>
<td>-120</td>
<td>-140</td>
<td>370</td>
<td>265.0</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi)
Site: District: Mahasu, Mandi, Chamba and Kangra.

Object: Type A: To study the response of Wheat to levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
Same as in wheat-crop conducted under irrigated condition on page No. 214.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-61. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
Av. response in Kg/ha.

60 (SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahasu</td>
<td>26</td>
<td>1250</td>
<td>250</td>
<td>190</td>
<td>100</td>
<td>22.0</td>
<td>60</td>
<td>-40</td>
<td>60</td>
<td>20</td>
<td>21.0</td>
</tr>
<tr>
<td>Mandi</td>
<td>19</td>
<td>930</td>
<td>180</td>
<td>100</td>
<td>70</td>
<td>74.0</td>
<td>-10</td>
<td>40</td>
<td>30</td>
<td>60</td>
<td>38.0</td>
</tr>
<tr>
<td>Chamba</td>
<td>24</td>
<td>630</td>
<td>160</td>
<td>150</td>
<td>100</td>
<td>12.0</td>
<td>10</td>
<td>0</td>
<td>20</td>
<td>60</td>
<td>13.0</td>
</tr>
<tr>
<td>Kangra</td>
<td>15</td>
<td>1000</td>
<td>410</td>
<td>330</td>
<td>190</td>
<td>32.0</td>
<td>10</td>
<td>-50</td>
<td>-10</td>
<td>40</td>
<td>32.0</td>
</tr>
</tbody>
</table>

61 (SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahasu</td>
<td>26</td>
<td>1450</td>
<td>240</td>
<td>190</td>
<td>150</td>
<td>44.0</td>
<td>20</td>
<td>20</td>
<td>80</td>
<td>100</td>
<td>38.0</td>
</tr>
<tr>
<td>Mandi</td>
<td>22</td>
<td>980</td>
<td>150</td>
<td>110</td>
<td>70</td>
<td>13.0</td>
<td>30</td>
<td>0</td>
<td>40</td>
<td>40</td>
<td>14.0</td>
</tr>
<tr>
<td>Chamba</td>
<td>22</td>
<td>940</td>
<td>170</td>
<td>170</td>
<td>50</td>
<td>22.0</td>
<td>-10</td>
<td>20</td>
<td>20</td>
<td>0</td>
<td>22.0</td>
</tr>
<tr>
<td>Kangra</td>
<td>9</td>
<td>1070</td>
<td>320</td>
<td>150</td>
<td>190</td>
<td>37.0</td>
<td>-80</td>
<td>60</td>
<td>10</td>
<td>-10</td>
<td>28.0</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).
Ref: H.P. 60 and 61 (SFT).
Type: 'M'.

5. RESULTS:
Av. response in Kg/ha.

60(SFT)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahasu</td>
<td>26</td>
<td>1250</td>
<td>250</td>
<td>190</td>
<td>100</td>
<td>22.0</td>
<td>60</td>
<td>-40</td>
<td>60</td>
<td>20</td>
<td>21.0</td>
</tr>
<tr>
<td>Mandi</td>
<td>19</td>
<td>930</td>
<td>180</td>
<td>100</td>
<td>70</td>
<td>74.0</td>
<td>-10</td>
<td>40</td>
<td>30</td>
<td>60</td>
<td>38.0</td>
</tr>
<tr>
<td>Chamba</td>
<td>24</td>
<td>630</td>
<td>160</td>
<td>150</td>
<td>100</td>
<td>12.0</td>
<td>10</td>
<td>0</td>
<td>20</td>
<td>60</td>
<td>13.0</td>
</tr>
<tr>
<td>Kangra</td>
<td>15</td>
<td>1000</td>
<td>410</td>
<td>330</td>
<td>190</td>
<td>32.0</td>
<td>10</td>
<td>-50</td>
<td>-10</td>
<td>40</td>
<td>32.0</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).
Site: District: Mahasu, Mandi and Chamba.

Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.
1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
   7 manurial treatments:
   - \(O=\) Control (no manure),
   - \(N_1=22.4\) Kg/ha. of N as A/S,
   - \(N_2=44.8\) Kg/ha. of N as A/S,
   - \(N_1'=22.4\) Kg/ha. of N as A/S/N,
   - \(N_2'=44.8\) Kg/ha. of N as A/S/N,
   - \(N_1''=22.4\) Kg/ha. of N as C/A/N and
   - \(N_2''=44.8\) Kg/ha. of N as C/A/N.

3. DESIGN:
   Same as in type A conducted under irrigated condition on Wheat-crop on page No. 214.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) and (b) N.A. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   \[\text{Av. response in Kg/ha.}\]

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>(N_1)</th>
<th>(N_1)</th>
<th>(N_1')</th>
<th>(N_1'')</th>
<th>(N_1'')</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahasu</td>
<td>22</td>
<td>1190</td>
<td>420</td>
<td>450</td>
<td>450</td>
<td>510</td>
<td>620</td>
<td>73.0</td>
</tr>
<tr>
<td>Mandi</td>
<td>22</td>
<td>860</td>
<td>170</td>
<td>270</td>
<td>320</td>
<td>280</td>
<td>170</td>
<td>300</td>
</tr>
<tr>
<td>Chamba</td>
<td>22</td>
<td>890</td>
<td>120</td>
<td>200</td>
<td>200</td>
<td>260</td>
<td>110</td>
<td>290</td>
</tr>
</tbody>
</table>

6(SFT)

   | Mahasu        | 8              | 1650                   | 630    | 530    | 680    | 540    | 550    | 1160 | 142.0 |

Crop:- Wheat (Rabi).

Ref:- H.P. 60(SFT) for Kangra and 61(SFT) for Mahasu, Chamba and Kangra.

Site:- District : Mahasu, Mandi, Chamba and Kangra.

Type:- "M".

Objection:- Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
   7 manurial treatments:
   - \(O=\) Control (no manure),
   - \(N_1=22.4\) Kg/ha. of N as A/S,
   - \(N_2=44.8\) Kg/ha. of N as A/S,
   - \(N_1'=22.4\) Kg/ha. of N as A/S/N,
   - \(N_2'=44.8\) Kg/ha. of N as A/S/N,
   - \(N_1''=22.4\) Kg/ha. of N as C/A/N and
   - \(N_2''=44.8\) Kg/ha. of N as C/A/N.

3. DESIGN:
   Same as in type A conducted under irrigated conditions on Wheat-crop on page No. 214.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) and (b) N.A. (c) Nil. (v) to (vii) Nil.
5. RESULTS:

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Object:</strong> Type A; To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.</td>
<td></td>
</tr>
</tbody>
</table>

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 material treatments:
   
   - O = Control (no manure),
   - \( N_1 = 35 \text{ Kg/ha. of N} \),
   - \( N_2 = 70 \text{ Kg/ha. of N} \),
   - \( P_1 = 35 \text{ Kg/ha. of } P_2O_5 \),
   - \( N_1P_1 = 35 \text{ Kg/ha. of } N + 35 \text{ Kg/ha. of } P_2O_5 \),
   - \( N_2P_1 = 70 \text{ Kg/ha. of } N + 35 \text{ Kg/ha. of } P_2O_5 \),
   - \( N_2P_2 = 70 \text{ Kg/ha. of } N + 70 \text{ Kg/ha. of } P_2O_5 \),
   - \( N_2P_2K_1 = 70 \text{ Kg/ha. of } N + 70 \text{ Kg/ha. of } P_2O_5 + 35 \text{ Kg/ha. of } K_2O \).

3. DESIGN:
   (i) and (ii) A selected district is divided into four agriculturally homogenous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50–100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A1, 11 are of type A2, 11 are of type A3 and 3 are of type C. The eleven experiments under type A1, A2 and A3 each are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A1, A2 and A3 experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A1, A2 and A3 are laid out. For conducting the three type-C trials three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962–66 (62–65 N.A.) (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( P_1 )</th>
<th>( N_1P_1 )</th>
<th>( N_2P_1 )</th>
<th>( N_2P_2 )</th>
<th>( N_2P_2K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kangra</td>
<td>651</td>
<td>699</td>
<td>153</td>
<td>892</td>
<td>836</td>
<td>1060</td>
<td>1279</td>
<td>72.5</td>
</tr>
</tbody>
</table>

Control yield = 919 Kg/ha.; No. of trials = 4

Ref.: H.P., 62(SFT). Type: 'M'.
Crop: Wheat (Rabi),

Ref: H.P. 62 to 65 (SFT) for Chamba,
62 to 65 (SFT) for Mahasu, 62 to 65 (SFT) for Mandi and 62 to 65 (SFT) for Kangra.

Site: District: Chamba, Mahasu,
Mandi and Kangra.

Object: — Type A₁: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS
Treatments and design are same as in type A₁ on wheat-crop under irrigated conditions on page No. 217.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-66 for every district. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS

Chamba

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₂P₂K₁</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>134</td>
<td>240</td>
<td>170</td>
<td>259</td>
<td>313</td>
<td>284</td>
<td>368</td>
<td>47-9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 781 Kg/ha.; No. of trials = 19

Mahasu

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₂P₂K₁</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
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<tr>
<td></td>
<td>153</td>
<td>298</td>
<td>179</td>
<td>279</td>
<td>325</td>
<td>436</td>
<td>503</td>
<td>41-9</td>
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<td></td>
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</table>

Control yield = 1109 Kg/ha.; No. of trials = 20

Mandi

<table>
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<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₂P₂</th>
<th>N₁P₁K₁</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
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<td></td>
<td>95</td>
<td>159</td>
<td>88</td>
<td>214</td>
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<td>382</td>
<td>499</td>
<td>30-3</td>
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Control yield = 1144 Kg/ha.; No. of trials = 17

Kangra

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<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₂P₂</th>
<th>N₁P₁K₁</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
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<tbody>
<tr>
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<td>181</td>
<td>321</td>
<td>173</td>
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<td>482</td>
<td>560</td>
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Control yield = 1285 Kg/ha.; No. of trials = 13

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<tr>
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<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₂P₂K₁</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
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<tr>
<td></td>
<td>458</td>
<td>453</td>
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<td>575</td>
<td>643</td>
<td>680</td>
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Control yield = 1079 Kg/ha.; No. of trials = 11

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<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₂P₂K₁</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
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<tr>
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<td>268</td>
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<td>259</td>
<td>459</td>
<td>551</td>
<td>750</td>
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Control yield = 990 Kg/ha.; No. of trials = 18
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<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tr>
<td></td>
<td>270</td>
<td>512</td>
<td>713</td>
<td>397</td>
<td>485</td>
<td>720</td>
<td>857</td>
<td>105.4</td>
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<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>259</td>
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<td>358</td>
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<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>327</td>
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<td>200</td>
<td>300</td>
<td>348</td>
<td>434</td>
<td>55.3</td>
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<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>448</td>
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<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
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<td>492</td>
<td>621</td>
<td>764</td>
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<tr>
<td>Treatment</td>
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<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
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<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>S.E.</td>
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<td>326</td>
<td>115</td>
<td>222</td>
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<td>495</td>
<td>54.0</td>
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<tr>
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<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>289</td>
<td>411</td>
<td>86</td>
<td>359</td>
<td>582</td>
<td>760</td>
<td>758</td>
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<td>=787 Kg/ha;</td>
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<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>S.E.</td>
</tr>
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<td>415</td>
<td>582</td>
<td>267</td>
<td>662</td>
<td>791</td>
<td>903</td>
<td>1023</td>
<td>23.4</td>
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65 (S.F.T.)

Treatment

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<th>N1P1</th>
<th>N2P1</th>
<th>N3P3</th>
<th>N1P1K2</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of yield in Kgha.</td>
<td>107</td>
<td>214</td>
<td>108</td>
<td>329</td>
<td>346</td>
<td>496</td>
<td>580</td>
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</table>

Control yield = 762 Kgha.; No. of trials = 11

Crop: Wheat (Rabi).

Ref = H.P. 62 to 65 (SFT) for Chamba, Mahasu, Mandi and Kangra.

Site = District: Chamba, Mahasu, Mandi and Kangra.

Type = 'M'.

Object:—Type A1: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
Treatments are same as in type A2 conducted under irrigated conditions on Wheat-crop on page No. 222.

3. DESIGN:
Same as in type A3 conducted under irrigated condition on Wheat crop on page No. 217.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—66 for each district. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

Chamba

62 (SFT)

Treatment

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<th>N1</th>
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<th>N1P1</th>
<th>N2P1</th>
<th>N3P3</th>
<th>N1P1K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kgha.</td>
<td>138</td>
<td>171</td>
<td>151</td>
<td>280</td>
<td>186</td>
<td>345</td>
<td>381</td>
</tr>
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Control yield = 856 Kgha.; No. of trials = 14

43 (SFT)

Treatment

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<th>N1P1</th>
<th>N2P1</th>
<th>N3P3</th>
<th>N1P1K2</th>
<th>S.E.</th>
</tr>
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<tbody>
<tr>
<td>Av. response of yield in Kgha.</td>
<td>156</td>
<td>134</td>
<td>246</td>
<td>279</td>
<td>230</td>
<td>368</td>
<td>318</td>
</tr>
</tbody>
</table>

Control yield = 1045 Kgha.; No. of trials = 19

64 (SFT)

Treatment

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<th>P3</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P3</th>
<th>N1P1K2</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of yield in Kgha.</td>
<td>132</td>
<td>57</td>
<td>123</td>
<td>215</td>
<td>261</td>
<td>391</td>
<td>509</td>
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Control yield = 1142 Kgha.; No. of trials = 16

45 (SFT)

Treatment

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<th>N2P1</th>
<th>N3P3</th>
<th>N1P1K2</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of yield in Kgha.</td>
<td>180</td>
<td>123</td>
<td>135</td>
<td>310</td>
<td>362</td>
<td>505</td>
<td>504</td>
</tr>
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</table>

Control yield = 1219 Kgha.; No. of trials = 12
### Mahasu

**62(SFT)**

<table>
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<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
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<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>188</td>
<td>449</td>
<td>350</td>
<td>157</td>
<td>426</td>
<td>594</td>
<td>664</td>
<td>117.6</td>
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Control yield=1112 Kg/ha.; No. of trials=13

**63(SFT)**

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<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>170</td>
<td>250</td>
<td>503</td>
<td>553</td>
<td>570</td>
<td>701</td>
<td>864</td>
<td>74.3</td>
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Control yield=844 Kg/ha.; No. of trials=17

**64(SFT)**

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<tr>
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<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>408</td>
<td>239</td>
<td>374</td>
<td>378</td>
<td>367</td>
<td>748</td>
<td>895</td>
<td>87.0</td>
</tr>
</tbody>
</table>

Control yield=971 Kg/ha.; No. of trials=15

**65(SFT)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>164</td>
<td>92</td>
<td>199</td>
<td>256</td>
<td>335</td>
<td>476</td>
<td>599</td>
<td>41.2</td>
</tr>
</tbody>
</table>

Control yield=683 Kg/ha.; No. of trials=22

### Mandi

**66(SFT)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>164</td>
<td>134</td>
<td>158</td>
<td>201</td>
<td>205</td>
<td>14</td>
<td>307</td>
<td>53.0</td>
</tr>
</tbody>
</table>

Control yield=818 Kg/ha.; No. of trials=17

**67(SFT)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>183</td>
<td>158</td>
<td>247</td>
<td>369</td>
<td>308</td>
<td>455</td>
<td>539</td>
<td>51.5</td>
</tr>
</tbody>
</table>

Control yield=575 Kg/ha.; No. of trials=21

**68(SFT)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>165</td>
<td>99</td>
<td>184</td>
<td>335</td>
<td>450</td>
<td>556</td>
<td>684</td>
<td>34.9</td>
</tr>
</tbody>
</table>

Control yield=822 Kg/ha.; No. of trials=21

**69(SFT)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>53</td>
<td>15</td>
<td>98</td>
<td>240</td>
<td>297</td>
<td>428</td>
<td>533</td>
<td>40.2</td>
</tr>
</tbody>
</table>

Control yield=407 Kg/ha.; No. of trials=21
**Kangra**

62 (SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$N_1P_1$</th>
<th>$N_1P_2$</th>
<th>$N_2P_1$</th>
<th>$N_2P_2$</th>
<th>$N_3P_1K_3$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield to Kgs/ha.</td>
<td>-62</td>
<td>83</td>
<td>170</td>
<td>579</td>
<td>603</td>
<td>804</td>
<td>841</td>
<td>663</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 740 Kgs/ha. ; No. of trials = 17

63 (SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$N_1P_1$</th>
<th>$N_1P_2$</th>
<th>$N_2P_1$</th>
<th>$N_2P_2$</th>
<th>$N_3P_1K_3$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kgs/ha.</td>
<td>372</td>
<td>99</td>
<td>177</td>
<td>502</td>
<td>614</td>
<td>706</td>
<td>860</td>
<td>449</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 711 Kgs/ha. ; No. of trials = 13

64 (SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$N_1P_1$</th>
<th>$N_1P_2$</th>
<th>$N_2P_1$</th>
<th>$N_2P_2$</th>
<th>$N_3P_1K_3$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kgs/ha.</td>
<td>483</td>
<td>198</td>
<td>321</td>
<td>675</td>
<td>776</td>
<td>979</td>
<td>1115</td>
<td>544</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1012 Kgs/ha. ; No. of trials = 17

65 (SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$N_1P_1$</th>
<th>$N_1P_2$</th>
<th>$N_2P_1$</th>
<th>$N_2P_2$</th>
<th>$N_3P_1K_3$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kgs/ha.</td>
<td>214</td>
<td>113</td>
<td>153</td>
<td>270</td>
<td>306</td>
<td>433</td>
<td>573</td>
<td>438</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 1012 Kgs/ha. ; No. of trials = 13

---

**Crop:** Wheat *(Rabi).*

**Site:** Kangra.

**Ref:** H.P. 62 (SFT).

**Object:** To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS:**
   1. (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. **TREATMENTS:**

   8 manure treatments:
   
   $O$ = Control (no manure).
   
   $N_1$ = 35 Kgs/ha. of $N$
   
   $P_1$ = 35 Kgs/ha. of $P_2O_5$
   
   $P_2$ = 70 Kgs/ha. of $P_2O_5$
   
   $N_1P_1$ = 35 Kgs/ha. of $N + 35$ Kgs/ha. of $P_2O_5$
   
   $N_1P_2$ = 70 Kgs/ha. of $N + 70$ Kgs/ha. of $P_2O_5$
   
   $N_2P_1$ = 70 Kgs/ha. of $N + 70$ Kgs/ha. of $P_2O_5$ and
   
   $N_2P_2$ = 70 Kgs/ha. of $N + 70$ Kgs/ha. of $P_2O_5 + 70$ Kgs/ha. of $K_2O$

3. **DESIGN:**

   Same as in Type A; Conducted under irrigated conditions on wheat crop on page No. 217.

4. **GENERAL**

   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) and (c) N.A. (v) to (vii) N.A.
## RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;K&lt;sub&gt;1&lt;/sub&gt;&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>376</td>
<td>-8</td>
<td>190</td>
<td>490</td>
<td>552</td>
<td>719</td>
<td>913</td>
</tr>
<tr>
<td>Control yield=1044 Kg/ha.; No. of trials=3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).  
Site: District: Kangra.  
Ref: H.P. 62(SFT) for Kangra.  
Type: ‘M’.

Object: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS:**
   (i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. **TREATMENTS:**
   8 manurial treatments:
   
   - O=Control (no manures),
   - N<sub>1</sub>=35 Kg/ha. of N,
   - K<sub>1</sub>=35 Kg/ha. of K<sub>2</sub>O,
   - K<sub>2</sub>=70 Kg/ha. of K<sub>2</sub>O,
   - N<sub>1</sub>K<sub>1</sub>=35 Kg/ha. of N+35 Kg/ha. of K<sub>2</sub>O,
   - N<sub>1</sub>K<sub>2</sub>=35 Kg/ha. of N+70 Kg/ha. of K<sub>2</sub>O,
   - N<sub>1</sub>K<sub>3</sub>=70 Kg/ha. of N+70 Kg/ha. of K<sub>2</sub>O and
   - N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>=35 Kg/ha. of N+35 Kg/ha. of P<sub>2</sub>O+35 Kg/ha. of K<sub>2</sub>O.

3. **DESIGN:**
   Same as in type A, conducted under irrigated conditions on wheat crop on page 217.

4. **GENERAL:**
   (i) and (ii) N.A  (iii) Yield of grain.  (iv) (a) 1962—only.  (b) and (c) N.A.  (v) to (vii) N.A.

5. **RESULTS:**

62(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;3&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>449</td>
<td>144</td>
<td>252</td>
<td>549</td>
<td>604</td>
<td>838</td>
<td>788</td>
</tr>
<tr>
<td>Control yield=956 Kg/ha.; No. of trials=4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).  
Site: District: Kangra, Chamba, Mahasu and Mandi.  
Ref: H.P. 62 to 65(SFT) for Kangra, Chamba, Mahasu and Mandi.  
Type: ‘M’.

Object: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS:**
   (i) to (vi) N.A.  (vii) Unirrigated.  (viii) to (x) N.A.
2. **TREATMENTS:**
Treatments are same as in type A₁ on wheat crop conducted under irrigated conditions on page No. 223.

3. **DESIGN:**
Same as in type A₁ conducted under irrigated conditions on wheat crop on page No. 217.

4. **GENERAL:**
(i) and (ii) N.A. (iii) Yield of grain. (iv) 1962—66 for each district. (b) and (c) N.A. (vi) to (vii) N.A.

5. **RESULTS:**

### Kangra

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₄K₄</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>439</td>
<td>89</td>
<td>177</td>
<td>649</td>
<td>592</td>
<td>882</td>
<td>793</td>
<td>62.5</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=697 Kg/ha.; No. of trials=17

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₄K₄</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>556</td>
<td>89</td>
<td>133</td>
<td>649</td>
<td>592</td>
<td>882</td>
<td>793</td>
<td>62.5</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=895 Kg/ha.; No. of trials=15

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₄K₄</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>434</td>
<td>176</td>
<td>303</td>
<td>578</td>
<td>600</td>
<td>732</td>
<td>811</td>
<td>64.1</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=1292 Kg/ha.; No. of trials=14

### Chambr

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₄K₄</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>104</td>
<td>147</td>
<td>231</td>
<td>305</td>
<td>251</td>
<td>382</td>
<td>412</td>
<td>25.7</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=755 Kg/ha.; No. of trials=14

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₄K₄</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>164</td>
<td>147</td>
<td>231</td>
<td>305</td>
<td>251</td>
<td>382</td>
<td>412</td>
<td>25.7</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=760 Kg/ha.; No. of trials=19

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₃K₃</th>
<th>N₄P₄K₄</th>
<th>S.E.</th>
<th>Av. response of yield in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>165</td>
<td>40</td>
<td>83</td>
<td>134</td>
<td>193</td>
<td>318</td>
<td>377</td>
<td>22.8</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=1067 Kg/ha.; No. of trials=19
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>181</td>
<td>199</td>
<td>234</td>
<td>239</td>
<td>328</td>
<td>418</td>
<td>486</td>
<td>23.5</td>
<td></td>
</tr>
<tr>
<td>Control yield</td>
<td>1176 Kg/ha.</td>
<td>No. of trials</td>
<td>12</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td></td>
</tr>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>179</td>
<td>81</td>
<td>258</td>
<td>206</td>
<td>360</td>
<td>448</td>
<td>595</td>
<td>95.2</td>
<td></td>
</tr>
<tr>
<td>Control yield</td>
<td>811 Kg/ha.</td>
<td>No. of trials</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td></td>
</tr>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>164</td>
<td>16</td>
<td>126</td>
<td>255</td>
<td>318</td>
<td>487</td>
<td>431</td>
<td>79.5</td>
<td></td>
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<tr>
<td>Control yield</td>
<td>796 Kg/ha.</td>
<td>No. of trials</td>
<td>17</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td></td>
</tr>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>210</td>
<td>81</td>
<td>133</td>
<td>238</td>
<td>302</td>
<td>399</td>
<td>518</td>
<td>37.9</td>
<td></td>
</tr>
<tr>
<td>Control yield</td>
<td>1032 Kg/ha.</td>
<td>No. of trials</td>
<td>12</td>
<td></td>
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<tr>
<td>Treatment</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
</tr>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>218</td>
<td>117</td>
<td>134</td>
<td>279</td>
<td>235</td>
<td>330</td>
<td>328</td>
<td>37.5</td>
<td></td>
</tr>
<tr>
<td>Control yield</td>
<td>771 Kg/ha.</td>
<td>No. of trials</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td></td>
</tr>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>267</td>
<td>155</td>
<td>129</td>
<td>306</td>
<td>307</td>
<td>404</td>
<td>495</td>
<td>50.0</td>
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<tr>
<td>Control yield</td>
<td>597 Kg/ha.</td>
<td>No. of trials</td>
<td>21</td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Treatment</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td></td>
</tr>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>170</td>
<td>92</td>
<td>98</td>
<td>306</td>
<td>357</td>
<td>472</td>
<td>420</td>
<td>57.0</td>
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<tr>
<td>Control yield</td>
<td>694 Kg/ha.</td>
<td>No. of trials</td>
<td>20</td>
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<tr>
<td>Treatment</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td></td>
</tr>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>79</td>
<td>-33</td>
<td>71</td>
<td>181</td>
<td>228</td>
<td>357</td>
<td>499</td>
<td>41.8</td>
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<tr>
<td>Control yield</td>
<td>376 Kg/ha.</td>
<td>No. of trials</td>
<td>10</td>
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</tr>
</tbody>
</table>
Crop: Wheat (Rabi).
Ref. - H.P. 60(86).

Site: Shillaro (District Mahasu).
Type: 'D'.

Object: To test the efficacy of different seed dressing on the control of Hill burnt of Wheat at Shillaro Rabi 1961-62.

1. BASAL CONDITIONS:
(i) to (c) N.A.

2. TREATMENTS:
15 seed dressing chemicals: C₁=Control, C₂=Tillex, C₃=Lunacon, C₄=Thiram, C₅=Agrocon, C₆=Hexasan, C₇=Copper carbonate, C₈=Ceresan dry, C₉=Shell seed dresser, C₁₀=Shal seed dresser, C₁₁=Zepur, C₁₂=Ceresan, C₁₃=P.C.N.B. (Seed.), C₁₄=P.C.N.B. Soil, C₁₅=Control (Diseased) or located with the burnt spores.
3. DESIGN:
(i) R.B.D. (ii) 15. (b) N.A. (iii) 4. (iv) (a) and (b) 3'66m x 1'83m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv)(a) 1961—only. (b) No. (c) Nil (v) to (vii) Nil.

5. RESULTS:
(i) 1115 Kg/ha. (ii) 191·6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₀</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
<th>C₄</th>
<th>C₅</th>
<th>C₆</th>
<th>C₇</th>
<th>C₈</th>
<th>C₉</th>
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<th>C₁₂</th>
<th>C₁₃</th>
<th>C₁₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1203 1383 1043 974 1039 945 1145 1215 927 1018 1031 1166 1998 1091</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Crop: Barley.
Ref: H.P. 63(1951).
Type: 'M'.

Object: To find the effect of N, P and K applied individually and in combination for high yield of Barley.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 85 Kg/ha. of N, 202 Kg/ha. of Super and 37 Kg/ha. of Mur Pot.
(ii) Sandy loam.
(iii) 29,11.63.
(iv) (a) Ploughings and Subhaas. (b) N.A. (c) 74 Kg/ha.
(d) Rows 23 cm apart.
(ix) 10 cm. (x) 6/7.5.64.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N as CIA/N: Nₙ₀=Nᵢ—22·4 and Nₙ₋44·8 Kg/ha. of N
(2) 3 levels of P₂O₅ as Super: P₀₀=P₁=17·9 and P₋35·9 Kg/ha. of P₂O₅
(3) 3 levels of K₂O as Mur. Pot: K₀₀=K₁=11·2 and K₋22·4 Kg/ha. of K₂O
Fertilizers applied at the time of sowing.

3. DESIGN:
(i) 3 Factor. Partially confd. (ii) 3 blocks/replication and 9 plots/block. (b) N.A. (iii) 4. (iv) (a) 11'07m x 2'99m. (b) 10'06m x 1'82m. (v) 50 cm x 23 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—contd. (b) No. (c) Nil. (v) Nil. (vi) N.A
(vii) 60% loss due to frost in winter season.

5. RESULTS:
(i) 474 Kg/ha. (ii) 162·7 Kg/ha. (iii) None of the effects is significant. (iv) (a) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>489</td>
<td>439</td>
<td>499</td>
<td>460</td>
<td>462</td>
<td>505</td>
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<td>462</td>
<td>442</td>
<td>448</td>
<td>520</td>
<td>400</td>
<td>431</td>
<td>450</td>
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<tr>
<td>431</td>
<td>460</td>
<td>595</td>
<td>465</td>
<td>511</td>
<td>510</td>
<td>495</td>
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<tr>
<td>Mean</td>
<td>461</td>
<td>447</td>
<td>514</td>
<td>482</td>
<td>457</td>
<td>482</td>
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<tr>
<td>P₀</td>
<td>473</td>
<td>462</td>
<td>510</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₁</td>
<td>420</td>
<td>431</td>
<td>521</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₂</td>
<td>489</td>
<td>447</td>
<td>510</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop :- Barley (Rabi).

Site :- Govt. Reclamation Farm, Kama.

Object :- To study the effect of N, P, K and calcium on the yield of Barley.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A.
(ii) Saline-Alkaline soil.
(iii) 11.17.60.
(iv) to (vi) N.A.
(vii) Irrigated.
(viii) and
(ix) N.A.
(x) 12.4.61.

2. TREATMENTS:

Main-plot treatments:

5 calcium applications: 
T₁ = Control (No calcium applied), T₂ = 50%, T₃ = 75%, T₄ = 85% and T₅ = 100% application of calcium requirements.

Sub-plot treatments:

5 manures: 
F₁ = Control (No manure), F₂ = N, F₃ = NP, F₄ = NPK and F₅ = NPK + micronutrients.
N = 56 Kg/ha., P = 28 Kg/ha., K = 26 Kg/ha. and Micronutrients are Magnesium Sul. + Zinc Sul.

3. DESIGN:

(i) Split-plot.
(ii) 6 main-plots/replication, 5 sub-plots/main-plot.
(iii) N.A.
(iv) 1/791 ha.
(v) N.A.
(vi) Yes
(vii) N.A.

4 GENERAL:

(i) Normal.
(ii) N.A.
(iii) Yield of grain.
(iv) (a) 1960—only.
(b) No.
(c) Nil.
(v) to (vii) Nil.

5. RESULTS:

(i) 1383 Kg/ha.
(ii) (a) 653 Kg/ha.
(b) 266 Kg/ha.
(iii) Main effect of F alone is highly significant.
(iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
<th>F₅</th>
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<td>1560</td>
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<td>1390</td>
<td>1900</td>
<td>1631</td>
<td>1556</td>
<td>1560</td>
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</tbody>
</table>

Mean: 1123, 1171, 1649, 1408, 1565

C.D. for F marginal means =168·2 Kg/ha.

Crop :- Barley (Rabi).

Site :- Govt. Reclamation Farm, Kama.

Object :- To study the effect of dry leaves powder.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A.
(ii) Saline Alkaline soil.
(iii) 18.11.60.
(iv) to (vi) N.A.
(vii) Irrigated.
(viii) and
(ix) N.A.
(x) 12.4.61.

2. TREATMENTS:

10 manurai treatments: 
T₁ = Control (no application), T₂ = Agrosan maxicon dry powder 50 Q/ha., T₃ = Fobi maxicon dry powder 50 Q/ha., T₄ = Dry leaves maxicon dry powder 50 Q/ha., T₅ = Imperoni corneas maxicon dry powder 50 Q/ha., T₆ = Rice Husk maxicon dry powder 50 Q/ha., T₇ = Sarson straw chopped at 50 Q/ha., T₈ = Rice straw chopped at 50 Q/ha., T₉ = Dhiaenia (G. plan). at 251 Q/ha. and 
T₁₀ = Recommended Method.
3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/495 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 438 Kg/ha. (ii) 209 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
<th>T₈</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>358</td>
<td>363</td>
<td>482</td>
<td>340</td>
<td>457</td>
<td>477</td>
<td>262</td>
<td>340</td>
<td>582</td>
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</table>

Crop: Barley (Rabi).

Site: Govt. Reclamation Farm, Kama.

Ref.: H.P. 60(157).

Type: 'M'.

Object: To study the residual effect of different combinations of N, P and K.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Saline Alk. Soil. (iii) 1.12.66. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A.; (v) and (vi) N.A. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 6.5.61.

2. TREATMENTS:
All combinations of (1), (2) and (3)

Main-plot treatments:
(1) 2 levels of N as CAIN: N₀ and N₁ = 45 Kg/ha.
(2) 2 levels of P₂O₅ as super: P₀ = 21 and P₁ = 22·5 Kg/ha.
(3) 2 levels of K₂O as Muri Pot: K₀ = 0 and K₁ = 22·5 Kg/ha.

Sub-plot treatments:
2 levels of gypsum: G₀ = 0 and G₁ = 152·4 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 8 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/501·5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1077 Kg/ha. (ii) (a) 432·2 Kg/ha. (b) 254·1 Kg/ha. (iii) Main effect of G alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>N₀</th>
<th>N₁</th>
<th>K₀</th>
<th>K₁</th>
<th>G₀</th>
<th>G₁</th>
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<td>899</td>
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<td>998</td>
<td>1206</td>
<td>998</td>
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</tr>
</tbody>
</table>

C.D. for G marginal means = 131·1 Kg/ha.
Crop :- Barley (Rabi).
Site :- Govt. Reclamation Farm, Kama.
Object :- To study the residual effects of soil amendments, applied to the paddy crop, on the yield of Barley.

1. BASAL CONDITIONS:
   (i) (a) Paddy-Barley. (b) Paddy. (c) As per treatments. (ii) Saline Alk. soil. (iii) 27.11.60. (iv) (a) 4 to 5 ploughings. (b) to (c) N.A. (v) and (vi) N.A. (vii) Irrigated, (viii) 2 weedings. (ix) N.A. (a) 6.5.61.

2. TREATMENTS:
   11 manurial treatments: (Treatments were applied during 1958-59 kharif season). T0 =Control, T1=Gypsum at 101.6 Q/ha., T2=Sulphur at 896 Kg/ha., T3=H2SO4 at 3153 litre/ha. T4=HNO3 at 5119 litre/ha., T5=HCL at 3865 litre/ha., T6=Al. sul. at 6160 Kg/ha. T7=F.Y.M. at 375 Q/ha., T8=Press-mud at 101.6 Q/ha., T9=Mollases mud at 101.6 Q/ha., and T10=Mollases at 304.8 Q/ha.+Press-mud at 101.6 Q/ha.

3. DESIGN:
   (i) R.B.D. (ii) (a) 11. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/747-5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959-60. (b) Yes. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 904 Kg/ha. (ii) 242.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
<th>T10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>698</td>
<td>897</td>
<td>1146</td>
<td>847</td>
<td>424</td>
<td>797</td>
<td>822</td>
<td>872</td>
<td>1221</td>
<td>1271</td>
<td>947</td>
</tr>
<tr>
<td>C.D.</td>
<td>412.5 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Barley (Rabi).
Site :- District : Mahasa and Mandi.
Object :- Type A: To study the response of Barley to levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Hilly tract. (iii) to (a) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O=Control (no manure)
   N=22.4 Kg/ha. of N,
   P=22.4 Kg/ha. of P2O5,
   K=22.4 Kg/ha. of K2O,
   NP=22.4 Kg/ha. of N+22.4 Kg/ha. of P2O5,
   NK=22.4 Kg/ha. of N+22.4 Kg/ha. of K2O,
   PK=22.4 Kg/ha. of P2O5+22.4 Kg/ha. of K2O and
   NPK=22.4 Kg/ha. of N+33.6 Kg/ha. of P2O5+22.4 Kg/ha. of K2O.
3. DESIGN:

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and circle/ thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on a Kharif cereals, 8 on a Rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphorus application are studied on Type C trial in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1961-7 ha. (b) 1/1977 ha. (iv) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of barley. (iv) (a) 1961—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahasu</td>
<td>2</td>
<td>940</td>
<td>140</td>
<td>180</td>
<td>40</td>
<td>430</td>
<td>-40</td>
<td>10</td>
<td>-50</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Mandi</td>
<td>2</td>
<td>700</td>
<td>180</td>
<td>140</td>
<td>70</td>
<td>490</td>
<td>50</td>
<td>50</td>
<td>70</td>
<td>19</td>
<td>0</td>
</tr>
</tbody>
</table>

Crop: Barley (Rabi).
Site: (District): Mahasu.
Ref: H.P. 61(SFI) for Mahasu.
Type: 'M'.

Object: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:

(i) to (x) N.A.

2. TREATMENTS:

7 manurial treatments:
O—Control (no manure),
N₁ = 22-4 Kg/ha. of N as Urea,
N₂ = 44-8 Kg/ha. of N as Urea,
N₁' = 22-4 Kg/ha. of N as A/S/N,
N₂' = 44-8 Kg/ha. of N as A/S/N,
N₁'' = 22-4 Kg/ha. of N as C/A/N and
N₂'' = 44-8 Kg/ha. of N as C/A/N.

3. DESIGN:

Same as in type A conducted on Barley crop on page No. 230.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N₁</th>
<th>N₂</th>
<th>N₁'</th>
<th>N₂'</th>
<th>N₁''</th>
<th>N₂''</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahasu</td>
<td>2</td>
<td>1360</td>
<td>260</td>
<td>410</td>
<td>-170</td>
<td>350</td>
<td>310</td>
<td>430</td>
<td>31</td>
</tr>
</tbody>
</table>
Crop: Barley (Rabi).
Site: District: Mandi.

Ref: H.P. 61(SFT) for Mandi.
Type: 'M'.

Object:—Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:
7 manurial treatments:

\[ \begin{align*}
O &= \text{Control (no manure)}, \\
N_1 &= 22.4 \text{ Kg/ha. of N as A/S} \\
N_2 &= 44.8 \text{ Kg/ha. of N as A/S} \\
N_3 &= 22.4 \text{ Kg/ha. of N as A/S+N} \\
N_4 &= 44.8 \text{ Kg/ha. of N as A/S+N} \\
N_5 &= 22.4 \text{ Kg/ha. of N as C/A/N} \\
N_6 &= 44.8 \text{ Kg/ha. of N as C/A/N} \\
\end{align*} \]

3. DESIGN:
Same as in type A conducted on Barley crop on page No. 230.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961–only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

\[ \begin{align*}
&\text{Av. response in Kg/ha.} \\
&\text{District} & \text{No. of Main} & \text{Control} & N_1 & N_2 & N_3 & N_4 & N_5 & N_6 & \text{S.E.} \\
&\text{trial} & \text{yield in} & \text{yield in} & & & & & & & \\
& & \text{Kg/ha.} & \text{Kg/ha.} & & & & & & & \\
Mandi & 2 & 910 & 60 & 290 & 140 & 280 & 180 & 370 & 590 \\
\end{align*} \]

Crop: Barley (Rabi).
Site: Govt. Reclamation Farm, Kama.

Ref: H.P. 60(162).
Type: 'CM'.

Object:—To study the effect of different leaching levels on the yield of Barley.

1. BASAL CONDITIONS:
(i) to (c) N.A. (ii) Saline Alk. soil. (iii) 17.11.60. (iv) (a) 4 to 5 ploughings. (b) to (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) 2 sowings. (ix) N.A. (x) 9.4.61.

2. TREATMENTS:

Main-plot treatments:

All combinations of (1) and (2)

(1) 2 levels of gypsum: G_0 = 0 and G_1 = Gypsum at 101.4 Q/ha.
3 levels of leaching: L_0 = No leaching, L_1 = leaching at 30 cm, L_2 = leaching at 91 cm.

(2) Sub-plot treatments:
2 levels of N: N_0 = 0, and N_1 = 45 Kg/ha. of N as C/A/N.

3. DESIGN:
(i) Split-plot, (ii) (a) 6 main-plots/repetition, 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/897 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960–61. (b) No. (c) Nil. (v) to (vii) Nil.
3. RESULTS:
(i) 1180 Kg/ha. (ii) (a) 394.8 Kg/ha. (b) 232.7 Kg/ha. (iii) Main effect of N alone is highly significant.
(iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>N1</th>
<th>N2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>G0</td>
<td>970</td>
<td>1034</td>
<td>1202</td>
<td>687</td>
<td>1451</td>
<td>1069</td>
</tr>
<tr>
<td>G1</td>
<td>1345</td>
<td>1414</td>
<td>1115</td>
<td>827</td>
<td>1756</td>
<td>1391</td>
</tr>
<tr>
<td>Mean</td>
<td>1158</td>
<td>1224</td>
<td>1159</td>
<td>757</td>
<td>1604</td>
<td>1108</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=169.0 Kg/ha.

Crop : Maize (Kharif). Ref : H.P. 62(277).
Site : Auhar Farm, Bilaspur. Type : 'M'.

Object : To study the effect of Nitrogen on the yield of Maize.

1. BASAL CONDITIONS:
(i) and (ii) N.A. (iii) 17.7.62. (iv) and (v) N.A. (vi) Hybrid Ganga-101. (vii) to (ix) N.A. (x) 30.10.62.

2. TREATMENTS:
5 manurial treatments:—M0=Control. M1=75 Qtha. of F.Y.M. +45 Kg/ha. of P2O5 +22.5 Kg/ha. of K2O. M2=M1+90 Kg/ha. of N. M3=M1+180 Kg/ha. of N and M4=M1+270 Kg/ha. of N.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) and (b) 10'06m x 3'35m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) Haripura. (vi) and (vii) Nil.

5. RESULTS:
(i) 978 Kg/ha. (ii) 52.4 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of Maize in Kg/ha.

Treatment | M0 | M1 | M2 | M3 | M4
Av. yield  | 222| 445| 1075| 1446| 1705
C.D.—80.7 Kg/ha.

Crop : Maize (Kharif). Ref : H.P. 62(267), 64(173).
Site : Govt. Agri. Res. Stn., Dhaula Kuan. Type : 'M'.

Object : To study the effect of increased doses of N on the yield of Maize crop.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Nil; Berseem. (c) N.A. (ii) Clayey loam. (iii) N.A.; 23.6.64. (iv) (a) 4—5 Ploughings. (b) N.A. (c) 14'8 Kg/ha. (d) 61 cm between rows and 30 cm between plants. (e) N.A. (v) Nil. (vi) N.A. ; Ganga—101. (vii) Unirrigated. (viii) 3 weedings and 2 hoeings. (ix) N.A. ; 16'0 cm. (x) N.A.; Oct., 64.
2. TREATMENTS:

5 manurial treatments: M₀ = Control (no manure), M₁ = 185·3 Kg/ha. of F.Y.M. + 44·8 Kg/ha. of P₂O₅ + 22·4 Kg/ha. of K₂O, M₄ = M₁ + 89·6 Kg/ha. of N as C/A/N, M₅ = M₄ + 179·2 Kg/ha. of N as C/A/N and M₆ = M₅ + 268·8 Kg/ha. of N as C/A/N.

3. DESIGN:

(i) R.R.D. (ii) 5. (b) N.A. (iii) 4. (iv) (a) N.A.; 10'94 m x 3'05 m, (b) 1·554'6376 ha., 10'06 m x 1'83 m (v) 61 cm on both sides. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962–64 (63 N.A.). (b) No. (c) Results of combined analysis are presented under 5.Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:

Pooled results:

(i) 3153 Kg/ha. (ii) 1108·6 Kg/ha. (based on 4 d.f. made up of Treatments x years interaction), (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha,

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1962</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
<td>3824</td>
<td>250·4</td>
</tr>
<tr>
<td>1964</td>
<td>2304</td>
<td>2412</td>
<td>4145</td>
<td>5640</td>
<td>4621</td>
<td>**</td>
<td>2482</td>
<td>413·7</td>
</tr>
<tr>
<td>Pooled</td>
<td>1870</td>
<td>2144</td>
<td>3348</td>
<td>4360</td>
<td>4045</td>
<td>*</td>
<td>3153</td>
<td>1108·6</td>
</tr>
</tbody>
</table>

Crop: Maize (Kharif).


Object: To study the effect of levels of N and K in combination on the yield of Maize crop.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Berseem. (c) N.A. (ii) Sandy Loam. (iii) 29.6.64. (iv) (a) 4 ploughings. (b) to (e) N.A. (v) Nil. (vi) Ganga-101. (vii) Unirrigated. (viii) 3 weedings and 2 hoeings. (ix) 168 cm. (x) Oct. ’64.

2. TREATMENTS:

Main-plot treatments:

4 doses of N: N₁ = 44·8 Kg/ha. of N at sowing + 44·8 Kg/ha. of N after one month later, N₂ = 22·4 Kg/ha. of N at sowing + 33·6 Kg/ha. each at silking and one month later, N₄ = 67·3 Kg/ha. of N at sowing + 67·3 Kg/ha. of N one month later, and N₅ = 44·8 Kg/ha. of N at sowing + 44·8 Kg/ha. of N one month later + 44·8 Kg/ha. of N at silking.

Sub-plot treatments:

4 doses of K₂O: K₁ = 44·8 Kg/ha. of K₂O at sowing, K₂ = 22·4 Kg/ha. of K₂O at sowing + 22·4 Kg/ha. of K₂O one month later, K₃ = 22·4 Kg/ha. of K₂O at sowing + 33·6 Kg/ha. of K₂O one month later, and K₄ = 22·4 Kg/ha. of K₂O at sowing + 33·6 Kg/ha. of K₂O each one month later and silking N applied as C/A/N and K₂O as Mur. Pot.

Fertilizers applied at sowing, 3 one month after sowing.
3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 10'98m x 3'05m. (b) 1'06m x 8'3m. (v) 46 cm x 61 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964—Contd. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 241 Kg/ha. (ii) (a) 367'5 Kg/ha. (b) 616'2 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>2493</td>
<td>2750</td>
<td>1939</td>
<td>2140</td>
<td>2182</td>
</tr>
<tr>
<td>2265</td>
<td>2993</td>
<td>2667</td>
<td>2859</td>
<td>2912</td>
</tr>
<tr>
<td>1841</td>
<td>2793</td>
<td>2733</td>
<td>1366</td>
<td>2512</td>
</tr>
<tr>
<td>2130</td>
<td>2710</td>
<td>2711</td>
<td>3010</td>
<td>2419</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=293'9 Kg/ha.

---

Crop :- Maize (Kharif).

Site :- Agri. Res. Stn., (Chemistry Section) Dhaula Kuan.

Object:—To study the effect of micronutrients on Maize crop.

1. BASAL CONDITIONS :
(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) and (v) N.A. (vi) Ganga—101. (vii) Irrigated. (viii) and (ix) N.A. (x) 18.10.65.

2. TREATMENTS:
8 micronutrients: M1=Control, M2=Copper Sul. at 5'6 Kg/ha., M3=Copper Sul. at 11'2 Kg/ha., M4=Zinc Sul. at 11'2 Kg/ha., M5=Manganese Sul. at 16'8 Kg/ha., M6=Iron Sul. at 5'6 Kg/ha. and M7=M1+M2+M4+M5.

3. DESIGN:
(i) R.B.D. (ii) 8. (b) N.A. (iii) 9. (iv) (a) N.A. (b) 3'05m x 6'70m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 3477 Kg/ha. (ii) 607'1 Kg/ha. - (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment M1 M2 M3 M4 M5 M6 M7
Av. yield 2471 2722 3731 3691 4360 3466 3446 4039

C.D. =892'9 Kg/ha.
Crop: Maize (Kharif).
Site: Crop Res. Stn., Haripura.
Object: To study the effect of N, P and K on the yield of Maize.

1. BASAL CONDITIONS:
(i) and (ii) N.A. (iii) 14.7, 62; N.A. (iv) to (vi) N.A.

2. TREATMENTS:
- 5 manurial treatments: M₀ = Control, M₁ = 75 Q/ha. of FYM, M₂ = 45 Kgl/ha. of P₂O₅, M₃ = M₁ + 90 Kgl/ha. of K₂O, M₄ = M₂ + 110 Kgl/ha. of N and M₅ = M₁ + 270 Kgl/ha. of N.

3. DESIGN:
(i) R.B.D. (ii) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3·49m x 3·05m; 4·27m x 2·44m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) 1962–63. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) Bilaspur, Dhabula Kaun. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:
Pooled results (i) 2705 Kgl/ha. (ii) 920.3 Kgl/ha. (based on 4 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kgl/ha.

### Treatment Results

<table>
<thead>
<tr>
<th>Year</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
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<tr>
<td>1962</td>
<td>1323</td>
<td>1163</td>
<td>1392</td>
<td>1446</td>
<td>1628</td>
<td>N.S.</td>
<td>1390</td>
<td>380·4</td>
</tr>
<tr>
<td>1963</td>
<td>3380</td>
<td>3376</td>
<td>3652</td>
<td>5190</td>
<td>4301</td>
<td>*</td>
<td>4020</td>
<td>578·1</td>
</tr>
<tr>
<td>Pooled</td>
<td>2451</td>
<td>2269</td>
<td>2522</td>
<td>3318</td>
<td>2964</td>
<td>N.S.</td>
<td>2705</td>
<td>920·3</td>
</tr>
</tbody>
</table>

Crop: Maize (Kharif).
Site: Sunder Nagar Farm, Mandi.
Object: To study the effect of N, P and K on the yield of Maize.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:
- 5 manurial treatments: M₀ = Control, M₁ = 33·6 Kgl/ha. of P₂O₅, M₂ = M₁ + 22·5 Kgl/ha. of K₂O, M₃ = M₂ + 67 Kgl/ha. of K₂O and M₄ = M₂ + 90 Kgl/ha. of N.

3. DESIGN:
(i) R.B.D. (ii) 5. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4·27m x 2·44m. (v) N.A. (vi) Yes.
4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of grain.  (iv)(a) 1962—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
(i) 5800 Kg/ha.  (ii) 774.7 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of Maize in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M&lt;sub&gt;1&lt;/sub&gt;</th>
<th>M&lt;sub&gt;2&lt;/sub&gt;</th>
<th>M&lt;sub&gt;3&lt;/sub&gt;</th>
<th>M&lt;sub&gt;4&lt;/sub&gt;</th>
<th>Av. yield</th>
</tr>
</thead>
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<tr>
<td></td>
<td>4517</td>
<td>4661</td>
<td>5937</td>
<td>5262</td>
<td>5071</td>
</tr>
</tbody>
</table>

Crop :- Maize (Kharif).

Site :- District : Mahasu, Mandi, Chamba and Kangra.

Object :- Type A: To study the response of maize to levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  (iii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:

O=Control (no manure),
N=22.4 Kg/ha. of N,
P=22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
K=22.4 Kg/ha. of K<sub>2</sub>O,
NP=22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
NK=22.4 Kg/ha. of N+22.4 Kg/ha. of K<sub>2</sub>O,
PK=22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of K<sub>2</sub>O,
NPK=22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of K<sub>2</sub>O.

3. DESIGN:

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on cash crop, 4 on oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on Type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98 8 ha.  (b) 1/197.7 ha.  (iv) Yes.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of grain.  (iv)(a) 1960—61.  (b) and (e) N.A.  (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahasu</td>
<td>24</td>
<td>1160</td>
<td>260</td>
<td>150</td>
<td>120</td>
<td>41 0</td>
<td>—20</td>
<td>—20</td>
<td>50</td>
<td>60</td>
<td>37 0</td>
</tr>
<tr>
<td>Mandi</td>
<td>14</td>
<td>1610</td>
<td>350</td>
<td>200</td>
<td>110</td>
<td>71 0</td>
<td>—100</td>
<td>—30</td>
<td>90</td>
<td>130</td>
<td>67 0</td>
</tr>
<tr>
<td>Chamba</td>
<td>12</td>
<td>1450</td>
<td>220</td>
<td>50</td>
<td>—60</td>
<td>51 0</td>
<td>60</td>
<td>60</td>
<td>10</td>
<td>37 0</td>
<td></td>
</tr>
<tr>
<td>Kangra</td>
<td>12</td>
<td>960</td>
<td>350</td>
<td>180</td>
<td>51 0</td>
<td>—50</td>
<td>—60</td>
<td>30</td>
<td>—20</td>
<td>23 0</td>
<td></td>
</tr>
</tbody>
</table>

Ref :- H.P. 60 and 61(SFT) for Mahasu, Mandi, Chamba and Kangra.

Type :- ‘M’.
Crop: Maize (Kharif).
Ref: H.P. 61(SFT) for Mahasu and Chamba.

Site: District: Mahasu and Chamba.
Type: 'M'.

Object:— Type B: To investigate the relative efficiency of different fertilizers of N at different doses.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:
7 manurial treatments:
O—Control (no manure),
N1=22.4 Kg/ha. of N as A/S,
N2=44.8 Kg/ha. of N as A/S,
N3=22.4 Kg/ha. of N as A/S/Na,
N4=44.8 Kg/ha. of N as A/S/Na,
N5=22.4 Kg/ha. of N as C/A/N,
N6=44.8 Kg/ha. of N as C/A/N.

3. DESIGN:
Same as in type A conducted on Maize crop on page No. 237.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>N5</th>
<th>N6</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahasu  16</td>
<td>1560</td>
<td>320 580 300 590 580 730 95.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamba  18</td>
<td>1880</td>
<td>230 500 220 1120 260 990 116.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Maize (Kharif).
Ref: H.P. 60(SFT), 61(SFT) for Kangra.

Site: District: Kangra.
Type: 'M'.

Object:— Type B: To investigate the relative efficiency of different fertilizers of N at different doses.

1. BASAL CONDITIONS:
(i) to (x) N.A.
2. TREATMENTS:
7 manurial treatments:
O—Control (no manure)
N<sub>1</sub>=22.4 Kg/ha. of N as A/S,
N<sub>2</sub>=44.8 Kg/ha. of N as A/S,
N<sub>1</sub>'=22.4 Kg/ha. of N as urea,
N<sub>2</sub>'=44.8 Kg/ha. of N as urea,
N<sub>1</sub>''=22.4 Kg/ha. of N as A/S/N,
N<sub>2</sub>''=44.8 Kg/ha. of N as A/S/N,

3. DESIGN:
same as in type A Conducted on maize crop on page No. 237.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—61. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;'</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;'</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;''</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;''</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kangra</td>
<td>8</td>
<td>1500</td>
<td>420</td>
<td>840</td>
<td>370</td>
<td>700</td>
<td>500</td>
<td>830</td>
<td>570</td>
</tr>
<tr>
<td>Kangra</td>
<td>16</td>
<td>1280</td>
<td>500</td>
<td>100</td>
<td>330</td>
<td>703</td>
<td>520</td>
<td>1130</td>
<td>570</td>
</tr>
</tbody>
</table>

Crop :- Maize (Kharif).
Site :- District : Mandi.

Object :- Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (iii) Hilly tract. (iii) to (a) N.A.

2. TREATMENTS:
7 manurial treatments:
O—Control (no manure),
N<sub>1</sub>=22.4 Kg/ha. of N as urea,
N<sub>2</sub>=44.8 Kg/ha. of N as urea,
N<sub>1</sub>'=22.4 Kg/ha. of N as A/S/N,
N<sub>2</sub>'=44.8 Kg/ha. of N as A/S/N,
N<sub>1</sub>''=22.4 Kg/ha. of N as C/A/N,
N<sub>2</sub>''=44.8 Kg/ha. of N as C/A/N,

3. DESIGN:
Same as in type A conducted on Maize crop on Page No. 237.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) and (c) N.A. (v) to (vii) N.A.
5. RESULTS:

61(SFT): 

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;</th>
<th>N&lt;sub&gt;6&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kangra</td>
<td>4</td>
<td>1470</td>
<td>900</td>
<td>1120</td>
<td>870</td>
<td>990</td>
<td>940</td>
<td>1160</td>
<td>245.0</td>
</tr>
</tbody>
</table>

Crop: Maize (Kharif).
Site: (District) Kangra.
Ref: H.P. 62 to 65 (SFT) for Kangra.
Type: 'M'.

Object: Type A<sub>1</sub>: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) Nil, (vii) Unirrigated, (viii) to (x) N.A.

2. TREATMENTS:
   8 manural treatments:
   - O = Control (no manure)
   - N<sub>1</sub> = 60 Kg/ha. of N
   - N<sub>2</sub> = 120 Kg/ha. of N
   - P<sub>1</sub> = 35 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
   - N<sub>1</sub>P<sub>1</sub> = 60 Kg/ha. of N+35 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
   - N<sub>2</sub>P<sub>1</sub> = 120 Kg/ha. of N+35 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
   - N<sub>2</sub>P<sub>2</sub> = 120 Kg/ha. of N+70 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and
   - N<sub>2</sub>P<sub>2</sub>K<sub>1</sub> = 120 Kg/ha. of N+70 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+35 Kg/ha. of K<sub>2</sub>O.

3. DESIGN:
   (i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A<sub>1</sub>, 11 of type A<sub>2</sub>, 11 of type A<sub>3</sub> and 3 are of type C. The eleven experiments under type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are distributed as 3 on Kharif cereal, 3 on Rabi cereal, 3 on cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are laid out. For conducting the experiments three villages are randomly selected in each block. (iii) (a) 1/100 ha., (b) 1/200 ha. (iv) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-66. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

64(SFT):

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>774</td>
<td>1105</td>
<td>575</td>
<td>1080</td>
<td>1275</td>
<td>1732</td>
<td>1920</td>
<td>173.8</td>
</tr>
</tbody>
</table>

Control yield = 1577 Kg/ha.; No. of trials = 12

65(SFT):

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>566</td>
<td>1020</td>
<td>278</td>
<td>979</td>
<td>1207</td>
<td>1503</td>
<td>1642</td>
<td>103.0</td>
</tr>
</tbody>
</table>

Control yield = 1689 Kg/ha; No. of trials = 13
Crop: Maize (Kharif).

Site: District: Kaogra.

Ref: H.P. 62 to 65(SFT) for Kangra.

Type: "M".

Object: To study the response curves of important cereal, cash, and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A.
   (vii) Unirrigated.
   (viii) to (x) N.A.

2. TREATMENTS:
   8 manural treatments:
   O=Control (no manure)
   N1=60 Kg/ha. of N,
   P1=35 Kg/ha. of P2O5,
   N1P1=60 Kg/ha. of N+35 Kg/ha. of P2O5,
   N1P2=60 Kg/ha. of N+70 Kg/ha. of P2O5,
   N1P2K1=120 Kg/ha. of N+70 Kg/ha. of P2O5+70 Kg/ha. of K2O.
   N2P2K2=120 Kg/ha. of N+70 Kg/ha. of P2O5+70 Kg/ha. of K2O.

3. DESIGN:
   Same as in type A2, conducted under unirrigated conditions on Maize crop page No. 240.

4. GENERAL:
   (i) and (ii) N.A.
   (iii) Yield of grain.
   (iv) (a) 1962—65.
   (b) and (c) N.A.
   (v) to (vii) N.A.

5. RESULTS:

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>P1P1</th>
<th>P1P2</th>
<th>P1P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>360</td>
<td>708</td>
<td>105</td>
<td>668</td>
<td>366</td>
<td>1255</td>
<td>1420</td>
</tr>
</tbody>
</table>

Control yield=1781 Kg/ha.; No. of trials=10

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>P1P1</th>
<th>P1P2</th>
<th>P1P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>369</td>
<td>771</td>
<td>260</td>
<td>926</td>
<td>1094</td>
<td>1327</td>
<td>1357</td>
</tr>
</tbody>
</table>

Control yield=1295 Kg/ha.; No. of trials=9

Crop: Maize (Kharif).

Site: District: Kaogra.

Ref: H.P. 62 to 65(SFT) for Kangra.

Type: "M".

Object: To study the response curves of important cereal, cash, and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A.
   (vii) Unirrigated.
   (viii) to (x) N.A.

2. TREATMENTS:
   8 manural treatments:
   O=Control (no manure)
   N1=60 Kg/ha. of N,
   P1=35 Kg/ha. of P2O5,
   N1P1=60 Kg/ha. of N+35 Kg/ha. of P2O5,
   N1P2=60 Kg/ha. of N+70 Kg/ha. of P2O5,
   N1P2K1=120 Kg/ha. of N+70 Kg/ha. of P2O5+70 Kg/ha. of K2O.
   N2P2K2=120 Kg/ha. of N+70 Kg/ha. of P2O5+70 Kg/ha. of K2O.

3. DESIGN:
   Same as in type A2, conducted under unirrigated conditions on Maize crop page No. 240.

4. GENERAL:
   (i) and (ii) N.A.
   (iii) Yield of grain.
   (iv) (a) 1962—65.
   (b) and (c) N.A.
   (v) to (vii) N.A.

5. RESULTS:

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P1</th>
<th>P1P1</th>
<th>P1P2</th>
<th>P1P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>484</td>
<td>320</td>
<td>421</td>
<td>705</td>
<td>789</td>
<td>1217</td>
<td>1362</td>
</tr>
</tbody>
</table>

Control yield=1453 Kg/ha.; No. of trials=12

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P1</th>
<th>P1P1</th>
<th>P1P2</th>
<th>P1P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>546</td>
<td>254</td>
<td>415</td>
<td>746</td>
<td>911</td>
<td>1187</td>
<td>1341</td>
</tr>
</tbody>
</table>

Control yield=1710 Kg/ha.; No. of trials=14

66(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P1</th>
<th>P1P1</th>
<th>P1P2</th>
<th>P1P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>586</td>
<td>299</td>
<td>591</td>
<td>798</td>
<td>1036</td>
<td>1492</td>
<td>1445</td>
</tr>
</tbody>
</table>

Control yield=1945 Kg/ha.; No. of trials=10
Crop :- Maize (Kharif).
Ref :- H.P. 62 to 65(SFT) for Kangra.
Site :- District : Kangra.
Type :- 'M'.

Object :- Type A1 : To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :
(i) to (vi) N.A.  (vii) Unirrigated.  (viii) to (x) N.A.

2. TREATMENTS :
8 manurial treatments :
O=Control (no manure),  
N1 =60 Kg/ha. of N,  
K1 = 35 Kg/ha. of K2O,  
K2 = 70 Kg/ha. of K2O,  
N1K1=60 Kg/ha. of N+35 Kg/ha. of K2O,  
N2K1=60 Kg/ha. of N+70 Kg/ha. of K2O,  
N2K2=120 Kg/ha. of N+70 Kg/ha. of K2O and  
N1P1K1=60 Kg/ha. of N+35 Kg/ha. of P2O5+35 Kg/ha. of K2O.

3. DESIGN :
Same as in type A1 conducted under unirrigated conditions on Maize crop on page No. 240.

4. GENERAL :
(i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1962—66.  (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS :

65(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P1K3</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>631</td>
<td>339</td>
<td>617</td>
<td>1012</td>
<td>1167</td>
<td>1506</td>
<td>1675</td>
</tr>
</tbody>
</table>

Control yield=1293 Kg/ha.; No. of trials=11

63(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K3</th>
<th>N1K1</th>
<th>N3K3</th>
<th>N1P1K3</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>641</td>
<td>269</td>
<td>501</td>
<td>684</td>
<td>824</td>
<td>1209</td>
<td>1234</td>
</tr>
</tbody>
</table>

Control yield=1363 Kg/ha.; No. of trials=12

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K3</th>
<th>N1K1</th>
<th>N3K3</th>
<th>N1P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>649</td>
<td>86</td>
<td>295</td>
<td>616</td>
<td>813</td>
<td>1146</td>
<td>1187</td>
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</table>

Control yield=1778 Kg/ha.; No. of trials=13

64(SFT)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K3</th>
<th>N1K1</th>
<th>N3K3</th>
<th>N1P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>552</td>
<td>225</td>
<td>395</td>
<td>716</td>
<td>857</td>
<td>1289</td>
<td>1084</td>
</tr>
</tbody>
</table>

Control yield=1608 Kg/ha.; No. of trials=10
Crop : Maize (Kharif).
Site : Maize Breeding Sta., Bajama (Bhunta).
Object : To study a suitable date of planting and plant population for different varieties of Maize Crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) Mid June—65. (iv)(a) 2—3 ploughings. (b) Dibbling.  
   (c) 15 Kg/ha. (d) Raw 76 cms apart (e) N.A. (f) N.A. (g) As per treatments. (h) Irrigated. (i) 2 weedings.  

2. TREATMENTS:
   Main-plot treatments:
   5 dates of planting : D, = Normal Planting date. D, = 10 days earlier than Dp. D, = 20 days earlier than  
   Dp. D, = 20 days later than Dp and D, = 20 days later than Dp.

   Sub-plot treatments:
   All combinations of (1) and (2)
   (1) 2 varieties : V1 = Cumports Hyline and V2 = Recommended Hyline.
   (2) 3 plant populations : P1 = 30. P2 = 60 and P3 = 90 thousand plants/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 5 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A.  
   (b) 28'80 Sq. N. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1965—67. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 436 Kg/ha. (ii) (a) 143.8 Kg/ha. (b) 63.1 Kg/ha. (iii) Main effect of D and P are highly significant.  
   (iv) Av. yield of grain in Kg/ha.

   \[
   \begin{array}{cccccc|ccc}
   D_1 & D_2 & D_3 & D_4 & D_5 & V_1 & V_2 & \text{Mean} \\
   \hline
   P_1 & 431 & 454 & 421 & 319 & 226 & 354 & 401 & 378 \\
   P_2 & 483 & 525 & 462 & 429 & 360 & 462 & 442 & 452 \\
   P_3 & 553 & 533 & 491 & 457 & 361 & 475 & 483 & 479 \\
   \hline
   \text{Mean} & 489 & 504 & 458 & 402 & 328 & 430 & 442 & 436 \\
   \hline
   V_1 & 488 & 496 & 466 & 390 & 312 & & & \\
   V_2 & 490 & 511 & 450 & 414 & 344 & & & \\
   \end{array}
   \]

   C.D. for D marginal means=127.9 Kg/ha.
   C.D. for P marginal means= 30.8 Kg/ha.
Crop :- Maize (Kharif).
Site :- Agri. Res. Sta., Dhaula Kuan.
Object :- To study the effect of levels of N and dates of sowing on the yield of Maize.

1. BASAL CONDITIONS:
(i) (a) Nil, (b) Berseem, (c) N.A., (d) sandy loam. (iii) As per treatments. (iv) (a) 4 ploughings. (b) to (c) N.A. (v) 185 Q/ha. of F.Y.M. + 55 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 44.8 Kg/ha. of K<sub>2</sub>O. (vi) Ganga-101—hybrid. (vii) Unirrigated. (ix) 18 cm. (x) October, 64.

2. TREATMENTS:
Main-plot treatments :
4 dates of sowing : D<sub>1</sub> = 3.6.64, D<sub>2</sub> = 13.6.64, D<sub>3</sub> = 23.6.64 and D<sub>4</sub> = 3.7.64.

Sub-plot treatments :
5 levels of N as C/A/N: N<sub>1</sub> = 89.1, N<sub>2</sub> = 112, N<sub>3</sub> = 134.5, N<sub>4</sub> = 156.9, N<sub>5</sub> = 179.3 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication ; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 10.98 m × 3.6 m, (b) 10.06 m × 1.83 m. (v) 46 cm × 61 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964–65 (Modified joint—65). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 2550 Kg/ha. (ii) (a) 1158.7 Kg/ha. (b) 471.7 Kg/ha. (iii) Main effect of D is significant while interaction N × D is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;</th>
<th>Mean</th>
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<td>3952</td>
<td>3536</td>
<td>3644</td>
<td>2995</td>
<td>2891</td>
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<td>D&lt;sub&gt;2&lt;/sub&gt;</td>
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<td>2550</td>
<td>2434</td>
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<td>1688</td>
<td>2158</td>
<td>1950</td>
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<td>1977</td>
<td>2018</td>
<td>2360</td>
<td>2815</td>
</tr>
<tr>
<td>Mean</td>
<td>2494</td>
<td>2391</td>
<td>2592</td>
<td>2435</td>
<td>2550</td>
</tr>
</tbody>
</table>

C.D. for D marginal means = 837.4 Kg/ha.
C.D. for N means at the same level of D = 335.7 Kg/ha.
C.D. for D means at the same level of N = 1045.1 Kg/ha.

Crop :- Maize (Kharif).
Site :- Crop Res. Sta., Dhaula Kuan.
Object :- To find out the optimum date of sowing and Nitrogen doses for Maize crop.

1. BASAL CONDITIONS:
(i) (a) Wheat—Maize—Wheat. (b) Wheat. (c) 44.8 Kg/ha. of N + 22.4 Kg/ha. of C/A/N and Super respectively. (ii) Loam. (iii) As per treatments. (iv) (a) N.A. (b) Line sowing. (c) to (e) N.A. (v) 56 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 66 Kg/ha. of K<sub>2</sub>O as Mur. Pot. drilled at sowing. (vi) Hybrid maize—Ganga—101. (vii) Unirrigated. (viii) 2 weedings by hand khurpies. (ix) and (x) N.A.
2. TREATMENTS

Main-plot treatments:
4 dates of sowing: D1 = 10th June, D2 = 17th June, D3 = 24th June, D4 = 1st July.

Sub-plot treatments:
5 levels of N as C/AIN: N1 = 67·2, N2 = 89·7, N3 = 112·1, N4 = 134·5 and N5 = 156·9 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 10·97 m x 3·05 m. (b) 10·05 m x 1·83 m. (v) 46 cm x 61 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) No of cobs and yield of grain. (iv) (a) 1964–65 (modified in 65). (b) No. (c) Nil. (v) N.A. (vi) Drought during milling stage.

5. RESULTS:
(i) 4879 Kg/ha. (ii) (a) 987·7 Kg/ha. (b) 592·4 Kg/ha. (iii) Main effects of D and N are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>N5</th>
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<td>5249</td>
<td>5826</td>
<td>6192</td>
<td>6417</td>
<td>5716</td>
</tr>
<tr>
<td>D2</td>
<td>4561</td>
<td>5008</td>
<td>5696</td>
<td>5917</td>
<td>5940</td>
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<td>4415</td>
<td>5044</td>
<td>5177</td>
<td>5394</td>
<td>4864</td>
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<tr>
<td>D4</td>
<td>3045</td>
<td>3533</td>
<td>3766</td>
<td>3822</td>
<td>3360</td>
<td>3506</td>
</tr>
<tr>
<td>Mean</td>
<td>4198</td>
<td>4552</td>
<td>5083</td>
<td>5277</td>
<td>5287</td>
<td>4879</td>
</tr>
</tbody>
</table>

C.D. for D marginal means = 706·5 Kg/ha.
C.D. for N marginal means = 517·1 Kg/ha.

Crop :- Maize (Kharif).
Site :- Agri. Res. Sta., Dhaula Kuan.
Type :- 'M'.

Object :- To test efficacy of different seed dressings against germination and yield of Maize.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:
11 Seed dressing treatments: T1 = Control, T2 = Agrosan G.N., T3 = Copper carbonate, T4 = Cereson, T5 = Tillex, T6 = Hexason, T7 = Lunasan, T8 = Shell agrosan, T9 = Sulphur, T10 = Thiram and T11 = P.C.N.R.

3. DESIGN:
(i) R.B.D. (ii) 11. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3·05 m x 5·18 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960–only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 324 Kg/ha. (ii) 70·9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
Crop :- Maize (Kharif).
Site :- Agri. Res. Sta., Dhaula Kuan.
Ref :- H.P. 61 (193).

Object :- To test the efficacy of different seed dressings on germination, stand and yield of Maize.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:
   13 seed dressing treatments: S₀=Control, S₁=Agrosan G.N., S₂=Cereson Dry, S₃=Tility, S₄=Lunasol, S₅=Cereson wet, S₆=Hexosan, S₇=Shell seed Dresser 'B', S₈=Shell seed Dresser 101, S₉=Cereson wet, S₁₀=Copper carbonate, S₁₁=Sulphur, S₁₂=P.C.N.B. and S₁₃=Thlram.

3. DESIGN:
   (i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) N.A. (v) 9.75m x 1.83m. (vi) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) No. (c) Nil. (v) Solan. (vi) and (vii) Nil.

5. RESULTS:
   (i) 738 Kg/ha. (ii) 188.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

   Treatment
   S₀  S₁  S₂  S₃  S₄  S₅  S₆  S₇  S₈  S₉  S₁₀  S₁₁  S₁₂  S₁₃
   Av. yield 316 561 254 249 244 220 406 406 301 272 375 332 322

---

Crop :- Maize (Kharif).
Site :- Crop Res. Sta., Solan.
Ref :- H.P. 61(186).
Type :- 'D'.

Object :- To test the efficacy of different seed dressings on germination, stand and yield of Maize.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:
   Same as in exp. No. 61 (193) and presented above.

3. DESIGN:
   (i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 2.44m x 3.05m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) No. (c) Nil. (v) Dhaula Kuan. (vi) and (vii) N.A.

5. RESULTS:
   (i) 1993 Kg/ha. (ii) 403.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Maize in Kg/ha.

   Treatment
   S₀  S₁  S₂  S₃  S₄  S₅  S₆  S₇  S₈  S₉  S₁₀  S₁₁  S₁₂  S₁₃
   Av. yield 1819 2582 1906 1969 1615 1969 2148 2097 1589 1855 2036 2201 2124

---
Crop: Gram (Rabi). 
Object: To find optimum dose of P and K on the yield of Gram.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Maize (Ganga-101).
   (c) 112 Kg/ha. of N+56 Kg/ha. of P₂O₅+22.4 Kg/ha. of K₂O+123.6
   Qta. of F.Y.M. (ii) Clay loam. (iii) 24.10.63. (iv) (a) 2 ploughings. (b) N.A. (c) 1.8 Kg/ha. (d)
   30 cm x 30 cm. (e) N.A. (v) Nil. (vi) 23$. (vii) Unirrigated. (viii) 2 weedings. (ix) 9 cm.
   (x) 28.4.64.

2. TREATMENTS:
   All the combinations of (1) and (2).
   (1) 4 levels of P₂O₅ as super : P₀=0, P₁=22.4, P₂=44.8 and P₃=67.2 Kg/ha.
   (2) 2 levels of K₂O as Mur. Pot. : K₄=0 and K₅=22.4 Kg/ha.

3. DESIGN:
   (i) Past in R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) 1.05 m x 1.83 m. (b) 2.44 m x 1.22 m. (v) 30 cm
   around. (vi) Yes.

4. GENERAL:
   (i) Poor. (ii) Attacked by pests. Pash and Pod borer. (iii) Yield of grain. (iv) (a) 1963—only. (b) No.
   (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 500 Kg/ha. (ii) 24.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>K₄</td>
<td>512</td>
<td>509</td>
<td>581</td>
<td>427</td>
<td>512</td>
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<td>K₅</td>
<td>498</td>
<td>493</td>
<td>525</td>
<td>434</td>
<td>488</td>
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<tr>
<td>Mean</td>
<td>515</td>
<td>501</td>
<td>533</td>
<td>400</td>
<td>500</td>
</tr>
</tbody>
</table>
RESULTS:

(i) 14.64 Kg/ha. (ii) 22.38 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>D6</th>
<th>D7</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>21.61</td>
<td>19.24</td>
<td>14.13</td>
<td>33.86</td>
<td>5.25</td>
<td>3.45</td>
<td>4.93</td>
</tr>
</tbody>
</table>

Crop: Pea (Kharif).

Ref: H.P. 61(182).

Site: Crop Res. Stn., Solan.

Type: 'D'.

Object: To control powdery mildew of Pea by different chemicals and to study their effects on yield.

1. BASAL CONDITIONS:
   (i) to (a) N.A.

2. TREATMENTS:

   13 chemical treatments: T0 = Control, T1 = Kiri lopper W × FV 30, T2 = Fyrolan, T3 = Blicos, T4 = Karathane W.D., T5 = Wettable sulphur, T6 = S-Dust, T7 = Fliit-406, T8 = Slolban, T9 = Thioct, T10 = Ebasol, T11 = Sulaf and T12 = Line sulphur.

   Other details N.A.

3. DESIGN:

   (i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 3.05×1.37m. (v) N.A. (vi) Yes.

4. GENERAL:

   (i) and (ii) N.A. (iii) Yield of pea. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

   (i) 108.1 Q/ha. (ii) 8.53 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Q/ha.

   Treatment: T0 T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12
   Av. yield 92.4 91.7 109.4 125.4 108.5 93.8 107.3 107.1 121.1 120.0 108.9 110.5 109.8

Crop: Pea.

Ref: H.P. 61(187).

Site: Crop Res. Stn., Solan.

Type: 'D'.

Object: To study the efficacy of different seed-dressings on the control of Ascochyla of Pea.

1. BASAL CONDITIONS:
   (i) to (a) N.A.

2. TREATMENTS:

   13 seed-dressing treatments: T0 = Control (Diseased seeds), T1 = Healthy seeds, T2 = Thiram, T3 = P.C.N.B., T4 = Fliit-406, T5 = Cereson Dry, T6 = Cereson Wet, T7 = Copper carbonate, T8 = Sulphur, T9 = Aerosan O.N., T10 = Shell 'B', T11 = Tillex, T12 = Hexamain.

   No other details are available.

3. DESIGN:

   (i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 2. (iv) (a) 3.66m × 0.61m. (b) N.A. (v) N.A. (vi) Yes.
4. GENERAL:

(i) and (ii) N.A. (iii) Yield and % Infection of peas. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 158.1 Q/ha. (ii) 23.36 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of peas in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
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<th>T_8</th>
<th>T_9</th>
<th>T_{10}</th>
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<tr>
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<td>99.1</td>
<td>84.5</td>
<td>113.1</td>
<td>82.6</td>
<td>84.6</td>
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<td>103.5</td>
<td>140.4</td>
<td>115.0</td>
<td>117.0</td>
<td>106.0</td>
</tr>
</tbody>
</table>

Crop :- Bhindi.

Site :- Vegetable Res. Sta., Bhagot.

Ref :- H.P. 60(70).

Type :- 'M'.

Object :- To study the effect of N, P and K on the yield of Bhindi.

1. BASAL CONDITIONS:

(i) to (c) N.A. (ii) Loamy. (iii) 29.2.60. (iv) to (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) 4.6.60 to 5.7.60.

2. TREATMENTS:

All combinations of (1), (2) and (3) + one control (control check).

(1) 2 levels of N : N_1 = 33.6 and N_2 = 56.0 Kg/ha.

(2) 2 levels of P_2O_5 : P_1 = 53.8 and P_2 = 71.7 Kg/ha.

(3) 2 levels of K_2O : K_1 = 28.0 and K_2 = 39.2 Kg/ha.

3. DESIGN:

(i) Factor in R.B.D. (ii) 9. (b) N.A. (iii) 4. (iv) to (a) N.A. (b) 3.05m x 1.22m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) N.A. (iii) Yield of bhindi. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 978 Kg/ha. (ii) 708.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of bhindi in Kg/ha.

Control=1294

<table>
<thead>
<tr>
<th></th>
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<th>N_2</th>
<th>K_1</th>
<th>K_2</th>
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<tr>
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<td>1078</td>
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Crop :- Bhindi.

Site :- Vegetable Res. Sta., Bhagot.

Ref :- H.P. 62(135).

Type :- 'C'.

Object :- To study the effect of mulching (with black polythene) on the yield of Bhindi.
1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loamy. (iii) 16.4.62. (iv) (a) to (c) N.A. (d) 61 cm x 46 cm. (e) l. (v) N.A. (vi) Vermar Improved. (vii) Irrigated. (viii) 2 weeding. (ix) N.A. (x) 6.6.62 to 12.6.62.

2. TREATMENTS:
2 mulching treatments: M₀=Control (No mulching) and M₁=Mulching with black polythene.

3. DESIGN:
(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 2.44 m x 3.66 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of bhindi. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 82.0 Q/ha. (ii) 14.2 Q/ha. (iii) Treatment difference is not significant. (iv) Av. yield of bhindi in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>73.7</td>
<td>90.3</td>
</tr>
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</table>

Crop = Brinjal.  Ref : H.P. 60(68).
Site = Vegetable Res. Stn., Bhagot.  Type 1—'M'.

Object :—To study the effect of N, P and K on the yield of Brinjal.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loamy. (iii) 23.4.60. (iv) (a) N.A. (b) Transplanting. (c) and (d) N.A. (e) 1. (v) N.A. (vi) Black beauty. (vii) Irrigated. (viii) and (ix) N.A. (x) 15.6.60 to 6.8.60.

2. TREATMENTS:
All combinations of (1), (2) and (3)—one control (no manure)
(1) 2 levels of N : N₁=56 and N₂=84 Kg/ha.
(2) 2 levels of P₂O₅ as super : P₁=56 and P₂=84 Kg/ha.
(3) 2 levels of K₂O : K₁=28 and K₂=44.8 Kg/ha.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 3·05 m x 1·22 m. (v) Normal. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of brinjal. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 149.1 Q/ha. (ii) 53.6 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of brinjal in Q/ha.

Control=202.3

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<td>K₂</td>
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Crop :- Potato (Kharif).
Site :- Potato Develop. Sta., Ahla.
Object :- To study the effect of N, P and K applied individually and in combination on the yield of Potato.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy clay loam. (iii) 26.4.60. (iv) (a) 4 ploughings with 5-hd Plough, 4 Sulagars. (b) Flat sowing. (c) 85 Kgha. (d) Row to row 61 cm, Tuber to tuber 30 cm. (e) 138 Q/ha. of F.Y.M. (v) D.R.B. (vi) Unirrigated. (vii) 2 weedings, 2 hoeings and 2 earthing ups. (ix) N.A. (x) 5/7.10.60.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 Levels of N as A/S: \( N_0=0, N_1=84 \) and \( N_2=168 \) Kgha.
(2) 3 Levels of P \( \text{as Super}: \ P_0=0, P_1=84 \) and \( P_2=168 \) Kgha.
(3) 3 Levels of K \( \text{as Pot. Sul}: \ K_0=0, K_1=84 \) and \( K_2=168 \) Kgha.

3. DESIGN:
(i) Fert. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 4.5 m x 1.83 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good germination. (ii) N.A. (iii) Yield of potato. (iv) (a) 1960—Only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 83.4 Q/ha. (ii) 45.4 Q/ha. (iii) Main effects of N and P are significant. (iv) Av. yield of tuber in Q/ha.

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C.D. for N or P marginal means=24.8 Q/ha.

Crop :- Potato (Kharif).
Site :- Potato Develop. Sta., Ahla.
Object :- To study the efficacy of G.N.C. as manure in comparison to F.Y.M. on the yield of Potato.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy clay loam. (iii) 25.4.60. (iv) (a) 4 ploughings with 5-hd plough and 4 Sulagars. (b) Flat sowing. (c) N.A. (d) Row to row 61 cm and tuber to tuber 30 cm. (e) 1. (v) and (vi) N.A. (vii) Unirrigated. (viii) 2 weedings, 2 hoeings, and 2 earthing ups. (ix) N.A. (x) 7.10.60.
2. TREATMENTS:
All combinations of (1) and (2), and a control (no manure)
(1) 2 levels of N : N₁=112, and N₂=224 Kg/ha.
(2) 3 sources of N : S₁=F.Y.M., S₂=G.N.C., S₃=F.Y.M.+G.N.C. in 1:1 on N basis.

3. DESIGN:
(i) Fact. in R.B.D. (ii) 7. (b) N.A. (iii) 4. (iv) (a) 1960. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of potato. (iv) (a) 1963—Only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 88.2 Q/ha. (ii) 38.3 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of tuber in Q/ha.

```
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<td>74 4</td>
<td>86 6</td>
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Crop : Potato (Kharif).
Site : Potato Develop Stn., Abla.
Object : To study the effect of different fertilizers in combination with Zinc on the yield of Potato crop.
Ref : H.P. 63(68).
Type : ‘M’.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy clay loam. (iii) 30.4 63. (iv) to (vi) N.A. (vii) Irrigated. (viii) 2 Weeding, 2 hoeings and 2 earthing ups. (ix) and (x) N.A.

2. TREATMENTS:
All combinations of (1) and (2) + one Control
(1) 2 levels of fertilizer : F₁=112 Kg/ha. of N+84 Kg/ha. of P₂O₅ and F₂=112 Kg/ha. of N+84 Kg/ha. of P₂O₅+56 Kg/ha. of K₂O.
(2) 2 doses of Zinc : Z₀=0 and Z₁=0.34 Kg/ha.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 3.66 m x 3.05 m. (b) 2.44 m x 2.44 m. (v) 61 cm x 30 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of potato. (iv) (a) 1963—Only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 163.3 Q/ha. (ii) 24.75 Q/ha. (iii) Main effect of F and control vs. others are significant. (iv) Av. yield of tuber in Q/ha.

```
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<td>169 3</td>
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C.D. for control vs. Others = 30.15 Q/ha.
Crop: Potato (Kharif)
Site: Potato Develop. Stn., Ahla.

Object: To compare the efficiency of F.Y.M. with G.H.C. as a manure to Potato crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy clay loam. (iii) 18,4,64. (iv) (a) 4 ploughings, 4 subplough. (b) Flat sowing. (c) N.A. (d) 53 cm x 23 cm. (e) I. (v) 112 Kg/ha. of N as C/A/N, 84 Kg/ha. of P2O5 as S/P and 112 Kg/ha. of K2O as Pot. Sul. (vi) C.D. (vii) Unirrigated. (viii) 2 weedings, 2 hoeings and 2 earthings (ix) N.A. (x) 14 10.64.

2. TREATMENTS:
   All combinations of (1) and (2) + one control (no manure)
   (1) 2 sources of N: S1=G.N.C., S2=F.Y.M.
   (2) 2 levels of N: N1=33.6, N2=67.2 Kg/ha. N broadcasted in the field before planting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 3:20m x 3:20m. (b) 2:74m x 2:13m. (v) 23 cm x 53 cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of potato. (iv) (a) N.A. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 241.4 Q/ha. (ii) 72.9 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of tuber in Q/ha.

   Control=231 5.

<table>
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<td>241 2</td>
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<tr>
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<td>235 2</td>
<td>243 9</td>
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Crop: Potato (Kharif)
Site: Potato Develop. Stn., Bagpeshag.

Object: To find out the effect of N as A/S and C/A/N with and without P on the yield of Potato crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) N.A. (iii) 3,4,60. (iv) (a) 4 ploughings, (b) Furrow sowing. (c) 53 cm x 30 cm. (d) and (e) N.A. (v) to (vii) N.A. (viii) 2 earthings up. (ix) N.A. (x) 13 and 14th Sep., 60.

2. TREATMENTS:
   All combinations of (1), (2) and (3)+2 extra treatments.
   (1) 2 sources of N: S1=A/S and S2=C/A/N.
   (2) 2 levels of N: N1=56 and N2=112 Kg/ha. of N.
   (3) 2 levels of P2O5 as super : P1=0 and P1=112 Kg/ha.
   Extra treatments: C0=Control and C1=112 Kg/ha. of P2O5 as super.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3.05 m x 2.67 m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of potato. (iv) (a) 1960—Only. (b) No. (c) Nil. (v) to (vii) N.A.
5. RESULTS:
(i) 78.7 Q/ha.  (ii) 28.7 Q/ha. (iii) Main effect of P and interaction N×P are significant. (iv) Av. yield of tuber in Q/ha.

\[ C_0 = 58.8 \text{ and } C_1 = 54.7 \]

<table>
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C.D. for P marginal means=21.5 Q/ha.
C.D. for the body of N×P table=30.4 Q/ha.

Crop: Potato (Kharif)
Site: Potato Develop. Stn., Bagpashag.
(Dist. Sinnur).

Object: To find out a suitable fertilizer schedule for the important variety of Potato.

1. BASAL CONDITIONS:
(i) to (iv) N.A. (v) F.Y.M. at 24.5 Q/ha. (vi) Upto date. (vii) to (x) N.A.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N as C/A/N : N_0 = 0, N_1 = 56 and N_2 = 112 Kg/ha.
(2) 3 levels of P_0 as super : P_0 = 0, P_1 = 56 and P_2 = 112 Kg/ha.
(3) 3 levels of K_2 as Pot. Sol. : K_0 = 0, K_1 = 56 and K_2 = 112 Kg/ha.

3. DESIGN:
(i) 3rd Conf. (ii) (a) 3 blocks/repetition and 9 plots/block. (b) N.A. (iii) 1. (iv) (a) 2.74m×3.05m. (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
(i) to (iii) N.A. (iv) (a) 1963—Only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As net plot size is not available, the yield is calculated by taking gross plot size as net plot size.

5. RESULTS:
(i) 31.2 Q/ha. (ii) 16.6 Q/ha. (iii) None of the effects is significant. (iv) Av. yield. of tuber in Q/ha.

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Crop: Potato (Kharif).
Site: Potato Develop. Stn., Jhatingri.

Object: To find out the suitability of manuring the Potato with oil cake against F.Y.M.

1. BASAL CONDITIONS:
(i) and (ii) N.A. (iii) 4.4.61. (iv) (a) to (c) N.A. (v) 112 Kga/ha. of K<sub>2</sub>O as Pot. Sul. (vi) Up-to-date.

2. TREATMENTS:
Main-plot treatments:
F<sub>0</sub> = Control, F<sub>1</sub> = F.Y.M. at 56 Kga/ha. of N and F<sub>2</sub> = Oil cake at 56 Kga/ha. of N.

Sub-Plot treatments:
All combinations of (1) and (2)
(1) N<sub>1</sub>=0 and N<sub>2</sub>=112 Kga/ha.
(2) P<sub>1</sub>=0 and P<sub>2</sub>=112 Kga/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 5. (iv)(a) 366m x 305m. (b) 244m x 244m. (v) 61 cm x 30.5m. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of potato. (iv) (a) 1961—Only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 110·0 Q/ha. (ii) (a) 94·7 Q/ha. (b) 27·0 Q/ha. (iii) Main effect of N, P and Interaction N x P are highly significant. (iv) Av. yield of tuber in Q/ha.

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C.D. for N or P marginal means = 14·1 Q/ha.
C.D. for the body of N x P table = 20·0 Q/ha.

Crop: Potato (Kharif).
Site: Potato Develop. Stn., Kamra.

Object: To find out the efficiency of Groundnut cake as organic manure to F.Y.M. on the yield of Potato crop.

1. BASAL CONDITIONS:
(i) (a) Potato—Wheat—Potato. (b) and (c) N.A. (ii) N.A. (iii) 23.4.61. (iv) (a) to (c) N.A. (d) 61 cm x 30.5 cm. (e) N.A. (v) 112 Kga/ha. of K<sub>2</sub>O as Pot. Sul. (vi) Up-to-date. (vii) to (ix) N.A. (x) 11/12.10.61.
TREATMENTS:

Main-plot treatments:
- Organic manures: M₀ - No organic manure (control), M₁ - Groundnut cake at 56 Kg/ha. of N, M₂ - F.Y.M. at 56 Kg/ha. of N.

Sub-plot treatments:
- All combinations of (1) and (2)
  1. 2 levels of N: N₀ = 0, N₁ = 112 Kg/ha.
  2. 2 levels of P₂Ο₅: P₀ = 0, P₁ = 112 Kg/ha.

DESIGN:
- (i) Split-plot.
- (ii) (a) 3 main-plots/replication and 4 sub-plots/main-plot. (b) N.A.
- (iii) 6.
- (iv) (a) N.A. (b) 3'66m x 3'05m. (v) N.A. (vi) Yes.

GENERAL:
- (i) and (ii) N.A. (iii) Yield of potato. (iv) (a) 1961—Only. (b) No. (c) Nil. (v) to (vii) Nil.

RESULTS:
- (i) 57'2 Q/ha. (ii) (a) 18'4 Q/ha. (b) 18'3 Q/ha. (iii) Main effect of M, interaction M x N and M x P are highly significant and that of interaction N x P is significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>N₀</th>
<th>N₁</th>
<th>P₀</th>
<th>P₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>55.8</td>
<td>32.1</td>
<td>60.2</td>
<td>27.7</td>
<td>44.0</td>
</tr>
<tr>
<td>66.7</td>
<td>59.2</td>
<td>57.9</td>
<td>58.0</td>
<td>62.9</td>
</tr>
<tr>
<td>52.8</td>
<td>75.8</td>
<td>66.3</td>
<td>63.3</td>
<td>64.8</td>
</tr>
<tr>
<td>Mean</td>
<td>58.4</td>
<td>56.1</td>
<td>61.3</td>
<td>53.0</td>
</tr>
</tbody>
</table>

C.D. for M marginal means—11'8 Q/ha.
C.D. for the body of N x P table—12'3 Q/ha.
C.D. for M means at the same level of N or P=11'5 Q/ha.
C.D. for N or P means at the same level of M=16'6 Q/ha.
5. RESULTS:
(i) 43.6 Q/ha. (ii) 18.7 Q/ha. (iii) Main effect of N and P are highly significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>25.0</td>
<td>37.0</td>
<td>39.3</td>
<td>30.3</td>
<td>31.4</td>
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<td>34.0</td>
</tr>
<tr>
<td>N₁</td>
<td>33.4</td>
<td>43.5</td>
<td>56.5</td>
<td>51.0</td>
<td>44.1</td>
<td>37.5</td>
<td>44.5</td>
</tr>
<tr>
<td>N₂</td>
<td>36.0</td>
<td>58.3</td>
<td>61.6</td>
<td>42.0</td>
<td>57.1</td>
<td>57.4</td>
<td>52.2</td>
</tr>
<tr>
<td>Mean</td>
<td>32.0</td>
<td>46.2</td>
<td>52.5</td>
<td>41.4</td>
<td>44.2</td>
<td>45.1</td>
<td>43.6</td>
</tr>
</tbody>
</table>

C.D. for N or P marginal means = 10.2 Q/ha.

Crop: Potato (Kharif).
Object: To compare different doses of N with F.Y.M. and G.N.C.

1. BASAL CONDITIONS:
   (i) and (ii) N.A. (iii) 24.4.60. (iv) (a) to (c) N.A. (v) Nil. (vi) Craig Defiance. (vii) to (ix) N.A. (x) 29.10.60

2. TREATMENTS:
   All combinations of (1) and (2)+one control
   (1) 3 sources of N: S₁=F.Y.M., S₂=Cake and S₃=F.Y.M.+C. Cake.
   (2) 2 levels of N: N₁=112 and N₂=224 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) 7. (iii) N.A. (iv) 488m×3.35m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of potato. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 34.5 Q/ha. (ii) 16.1 Q/ha. (iii) Main effect of N and control Vs. others are highly significant. (iv) Av. yield of tuber in Q/ha.

Control=14.3

<table>
<thead>
<tr>
<th></th>
<th>N₁</th>
<th>N₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>22.3</td>
<td>34.6</td>
<td>28.4</td>
</tr>
<tr>
<td>S₂</td>
<td>31.6</td>
<td>49.9</td>
<td>40.8</td>
</tr>
<tr>
<td>S₃</td>
<td>30.8</td>
<td>58.3</td>
<td>44.9</td>
</tr>
<tr>
<td>Mean</td>
<td>28.2</td>
<td>47.6</td>
<td>37.9</td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 34.4 Q/ha.
C.D. for Control Vs. others = 18.3 Q/ha.
Crop: Potato

Ref: H.P. 60 (SFT) Mahasu, Mandi and 61(SFT) for Mahasu, Mandi and Kangra.

Site: District: Mahasu, Mandi and Kangra.

Type: 'M'.

Object:—Type A: To study the response of Potato to levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Hilly. (iii) to (v) N.A.

2. TREATMENTS:
8 manurial treatments:
O=Control (no manure),
N=56 Kg/ha. of N,
P=28 Kg/ha. of P₂O₅,
K=56 Kg/ha. of K₂O,
NP=56 Kg/ha. of N+28 Kg/ha. of P₂O₅,
NK=56 Kg/ha. of N+56 Kg/ha. of K₂O,
PK=28 Kg/ha. of P₂O₅+56 Kg/ha. of K₂O and
NPK=56 Kg/ha. of N+28 Kg/ha. of P₂O₅+56 Kg/ha. of K₂O.

3. DESIGN:
(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) to (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahasu</td>
<td>4</td>
<td>6920</td>
<td>0</td>
<td>480</td>
<td>710</td>
<td>6270</td>
<td>1850</td>
<td>480</td>
<td>280</td>
<td>1570</td>
<td>7910</td>
</tr>
<tr>
<td>Mandi</td>
<td>5</td>
<td>10290</td>
<td>460</td>
<td>1370</td>
<td>820</td>
<td>5720</td>
<td>540</td>
<td>500</td>
<td>930</td>
<td>200</td>
<td>5420</td>
</tr>
<tr>
<td></td>
<td>61(SFT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mahasu</td>
<td>6</td>
<td>7430</td>
<td>340</td>
<td>1950</td>
<td>1110</td>
<td>4960</td>
<td>640</td>
<td>190</td>
<td>990</td>
<td>520</td>
<td>2850</td>
</tr>
<tr>
<td>Mandi</td>
<td>8</td>
<td>7670</td>
<td>1970</td>
<td>1170</td>
<td>280</td>
<td>2560</td>
<td>920</td>
<td>260</td>
<td>1600</td>
<td>1060</td>
<td>4550</td>
</tr>
<tr>
<td>Kangra</td>
<td>14</td>
<td>11380</td>
<td>6170</td>
<td>2780</td>
<td>2480</td>
<td>6820</td>
<td>430</td>
<td>330</td>
<td>980</td>
<td>1440</td>
<td>4960</td>
</tr>
</tbody>
</table>

Crop: Potato

Ref: H.P. 60 and 61(SFT) for Mandi.

Site: District: Mandi.

Type: 'M'.

Object:—Type B: To investigate the relative efficiency of different N fertilizers at different doses.
1. **BASAL CONDITIONS:**
   (i) to (x) N.A.

2. **TREATMENTS:**
   7 manurial treatments:
   - **O=Control (no manure),**
   - **N₁=56 Kg/ha. of N as A/S,**
   - **N₂=112 Kg/ha. of N as A/S,**
   - **N₃=56 Kg/ha. of N as A/S/N,**
   - **N₄=112 Kg/ha. of N as A/S/N,**
   - **N₅=56 Kg/ha. of N as C/A/N,**
   - **N₆=112 Kg/ha. of N as C/A/N,**

3. **DESIGN:**
   Same as in type A conducted on Potato crop on page No. 258.

4. **GENERAL:**
   (i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1960—61. (b) and (c) N.A. (v) to (vii) N.A.

5. **RESULTS:**

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
<th>N₆</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandi</td>
<td>5</td>
<td>11920</td>
<td>-920</td>
<td>-590</td>
<td>-850</td>
<td>920</td>
<td>-1140</td>
<td>520</td>
<td>450</td>
</tr>
<tr>
<td>Mandi</td>
<td>8</td>
<td>4630</td>
<td>460</td>
<td>320</td>
<td>360</td>
<td>240</td>
<td>1600</td>
<td>4270</td>
<td>376</td>
</tr>
</tbody>
</table>

   **Crop:** Potato.  
   **Ref:** H.P. 61(SFT) for Kangra.  
   **Site:** District: Kangra.  
   **Type:** 'M'.

Object:—Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. **BASAL CONDITIONS:**
   (i) to (x) N.A.

2. **TREATMENTS:**
   7 manurial treatments:
   - **O=Control (no manure),**
   - **N₁=56 Kg/ha. of N as A/S,**
   - **N₂=112 Kg/ha. of N as A/S,**
   - **N₃=56 Kg/ha. of N as Urea,**
   - **N₄=112 Kg/ha. of N as Urea,**
   - **N₅=56 Kg/ha. of N as C/A/N,**
   - **N₆=112 Kg/ha. of N as C/A/N,**

3. **DESIGN:**
   Same as in type A conducted on Potato crop on page No. 258.

4. **GENERAL:**
   (i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1960—Only. (b) and (c) N.A. (v) to (vii) N.A.

5. **RESULTS:**

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
<th>N₆</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kangra</td>
<td>10</td>
<td>11670</td>
<td>4140</td>
<td>8680</td>
<td>2890</td>
<td>6460</td>
<td>3960</td>
<td>8150</td>
<td>784</td>
</tr>
</tbody>
</table>
Crop: Potato (Rabi)

Site: District: Kangra

Object: Type A1: To study the response curves of important cereal, cash and oilseed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O=Control (no manure),
   N1=60 Kg/ha. of N,
   N2=120 Kg/ha. of N,
   P1=35 Kg/ha. of P2O5,
   N1P1=60 Kg/ha. of N+35 Kg/ha. of P2O5,
   N2P1=120 Kg/ha. of N+35 Kg/ha. of P2O5,
   N1P2=120 Kg/ha. of N+70 Kg/ha. of P2O5 and
   N2P2K1=120 Kg/ha. of N+70 Kg/ha. of P2O5 + 60 Kg/ha. of K2O.

3. DESIGN:
   (i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A1, 11 of type A2 and 11 of type C. The eleven experiments under type A1, A2, A3 are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A2, A3 and A4 experiments, 11 villages are randomly selected in each block and in each village 3 experiments each of type A1, A2 and A3 are laid out. For conducting the three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of Potato. (iv) (a) 1962—66 (64 N.A.) (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>3847</td>
<td>7824</td>
<td>1717</td>
<td>4732</td>
<td>7690</td>
<td>9024</td>
<td>10413</td>
<td>2287.5</td>
</tr>
<tr>
<td>Control yield=12145 Kg/ha.; No. of trials=8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>4491</td>
<td>8310</td>
<td>1667</td>
<td>7244</td>
<td>10990</td>
<td>11547</td>
<td>14129</td>
<td>812.0</td>
</tr>
<tr>
<td>Control yield=11304 Kg/ha.; No. of trials=7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>2287</td>
<td>3106</td>
<td>1400</td>
<td>1445</td>
<td>5182</td>
<td>7031</td>
<td>8351</td>
<td>906.5</td>
</tr>
<tr>
<td>Control yield=5718 Kg/ha.; No. of trials=9</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Potato (Kharif).

Site: District: Kangra.

Object: Type A2: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A.  (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O = Control (no manure),
N1 = 90 Kg/ha. of N,
P1 = 35 Kg/ha. of P2O5,
P2 = 70 Kg/ha. of P2O5,
N2P1 = 90 Kg/ha. of N+35 Kg/ha. of P2O5,
N1P2 = 90 Kg/ha. of N+70 Kg/ha. of P2O5,
N2P2 = 180 Kg/ha. of N+70 Kg/ha. of P2O5,
N1P1 = 180 Kg/ha. of N+70 Kg/ha. of P2O5 and
N1P1K2 = 180 Kg/ha. of N+70 Kg/ha. of P2O5+70 Kg/ha. of K2O.

3. DESIGN:
Same as in type A1 conducted under irrigated conditions on Potato crop on page No. 260.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of Potato.  (iv) (a) 1963.—Only,  (b) and (c) N.A.  (v) to (viii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P1K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response in Kg/ha.</td>
<td>2517</td>
<td>1812</td>
<td>2958</td>
<td>5152</td>
<td>6773</td>
<td>8098</td>
<td>8842</td>
</tr>
</tbody>
</table>

Control yield=1176 Kg/ha.;  No. of trials=3

Crop: Potato (Summer).

Site: District: Kangra

Object: Type A2: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O = Control (no manure),
N1 = 60 Kg/ha. of N,
P1 = 35 Kg/ha. of P2O5,
P2 = 70 Kg/ha. of P2O5,
N1P1 = 60 Kg/ha. of N+35 Kg/ha. of P2O5,
N1P2 = 60 Kg/ha. of N+70 Kg/ha. of P2O5,
N1P1K2 = 120 Kg/ha. of N+70 Kg/ha. of P2O5 and
N1P1K2 = 120 Kg/ha. of N+70 Kg/ha. of P2O5+120 Kg/ha. of K2O.
3. DESIGN:
Same as in type A1 conducted under irrigated conditions on Potato crop on page No. 260.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of tuber. (iv) (a) 1962—Only. (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:

**Av. response in Kg/ha.**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>43(SFT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>5913</td>
<td>2053</td>
<td>4576</td>
<td>7989</td>
<td>10138</td>
<td>11609</td>
<td>13042</td>
<td>10153</td>
</tr>
</tbody>
</table>

Control yield = 12434 Kg/ha.; No. of trials = 8

Crop = Potato (Rabi).  
Site = District: Kangra.  
Ref: H.P. 63 and 65(SFT).  
Type = 'M'.

Object:—Type A2: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vii) N.A.  (viii) to (x) N.A.

2. TREATMENTS:
Treatments are same as in type A1 conducted under irrigated conditions on Potato crop in summer on page No. 261.

3. DESIGN:
Same as in type A1 conducted under irrigated conditions on Potato crop on page No. 260.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of tuber.  (iv) (a) 1963 to 66 (64 N.A.) (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:

**Av. response in Kg/ha.**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>43(SFT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>5866</td>
<td>2100</td>
<td>3739</td>
<td>7289</td>
<td>8413</td>
<td>11136</td>
<td>11980</td>
<td>6310</td>
</tr>
</tbody>
</table>

Control yield = 14101 Kg/ha.; No. of trials = 7

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>65(SFT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>2897</td>
<td>2445</td>
<td>3531</td>
<td>5454</td>
<td>6808</td>
<td>8974</td>
<td>6964</td>
<td>9846</td>
</tr>
</tbody>
</table>

Control yield = 6464 Kg/ha.; No. of trials = 8

---

Crop = Potato (Rabi).  
Site = District: Kangra.  
Ref: H.P. 62(SFT) for Kangra.  
Type = 'M'.

Object:—Type A2: To study the response curves of important cereal, cash and oilseed crops to K applied singly and in combination with other nutrients.
3. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
- O = Control (no manure),
- N₁ = 60 Kg/ha. of N,
- K₁ = 60 Kg/ha. of K₂O,
- N₂K₁ = 60 Kg/ha. of N+60 Kg/ha. of K₂O,
- N₁K₂ = 60 Kg/ha. of N+120 Kg/ha. of K₂O,
- N₂K₂ = 120 Kg/ha. of N+120 Kg/ha. of K₂O and
- N₁P₁K₁ = 60 Kg/ha. of N+15 Kg/ha. of P₂O₅+60 Kg/ha. of K₂O.

3. DESIGN:
Same as in type A₁ conducted under irrigated conditions on potato crop on page No. 260.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1962—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₂K₁</th>
<th>N₁K₂</th>
<th>N₂K₂</th>
<th>N₁P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>6088</td>
<td>2997</td>
<td>4865</td>
<td>8933</td>
<td>9991</td>
<td>14447</td>
<td>13113</td>
<td>840.2</td>
</tr>
</tbody>
</table>

Control yield = 12145 Kg/ha.; No. of trials = 7

Crop : Potato (Kharif).
Ref: H.P. 63(SFT) for Kangra.
Site : District : Kangra.
Type : ‘M’.

Object : Type A₁ : To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
Treatments are same as in type A₁ conducted under irrigated conditions on potato crop in summer on page No. 262.

3. DESIGN:
Same as in type A₁ conducted on potato crop on page No. 260.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1962—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₂K₁</th>
<th>N₁K₂</th>
<th>N₂K₂</th>
<th>N₁P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>2747</td>
<td>474</td>
<td>1251</td>
<td>4401</td>
<td>5159</td>
<td>6642</td>
<td>8131</td>
<td>711.0</td>
</tr>
</tbody>
</table>

Control yield = 10542 Kg/ha.; No. of trials = 3
Crop: Potato (Kharif).
Site: Potato Develop. Stn., Jhatangiri
Joginder Nagar.

Object:—To study the effect of different levels of N, P and K on the yield of different varieties of Potato crop.

1. BASAL CONDITIONS:
(i) and (ii) N.A. (iii) 3.4.61. (iv) (a) 61 cm × 23 cm. (v) 18 Q/ha. of F.Y.M. (vi) 22/23.9.61.

2. TREATMENTS:
All combinations of (1), (2), (3) and (4)
(1) 3 varieties: V₁=up-to-date, V₂=Craig's defiance and V₃=local.
(2) 3 levels of N as A/S: N₁=0, N₂=84·1 and N₃=168·2 Kg/ha.
(3) 3 levels of P₂O₅ as Super: P₁=0, P₂=84·1 and P₃=168·2 Kg/ha.
(4) 3 levels of K₂O as Pot. Sol.: K₁=0, K₂=84·1 and K₃=168·2 Kg/ha.
3. DESIGN
(i) 3° confounding. (ii) 9 plots/block and 9 blocks/repetition. (b) N.A. (iii) 1. (iv) (a) N.A. (b) 2.44m x 2.44m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of Potato. (iv) 1961—Only. (b) No. (c) Nil. (v) Kharadhar. (vi) and (vii) Nil.

5. RESULTS:
(i) 127.8 Q/ha. (ii) 31.7 Q/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P_0</th>
<th>P_1</th>
<th>P_2</th>
<th>K_0</th>
<th>K_1</th>
<th>K_2</th>
<th>V_1</th>
<th>V_2</th>
<th>V_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N_1</td>
<td>116</td>
<td>107</td>
<td>117</td>
<td>115</td>
<td>110</td>
<td>115</td>
<td>56</td>
<td>148</td>
<td>132</td>
<td>112.4</td>
</tr>
<tr>
<td>N_2</td>
<td>121</td>
<td>160</td>
<td>144</td>
<td>140</td>
<td>129</td>
<td>155</td>
<td>74</td>
<td>172</td>
<td>179</td>
<td>142.0</td>
</tr>
<tr>
<td>N_3</td>
<td>123</td>
<td>128</td>
<td>135</td>
<td>154</td>
<td>117</td>
<td>115</td>
<td>95</td>
<td>163</td>
<td>128</td>
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<tr>
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<td>127</td>
<td>136</td>
<td>119</td>
<td>127</td>
<td>75</td>
<td>161</td>
<td>146</td>
<td>127.8</td>
</tr>
<tr>
<td>V_1</td>
<td>57.5</td>
<td>84.0</td>
<td>84.3</td>
<td>70.7</td>
<td>78.1</td>
<td>77.0</td>
<td>57.5</td>
<td>84.0</td>
<td>84.3</td>
<td>77.0</td>
</tr>
<tr>
<td>V_2</td>
<td>162.7</td>
<td>170.5</td>
<td>160.5</td>
<td>193.0</td>
<td>174.7</td>
<td>165.9</td>
<td>162.7</td>
<td>170.5</td>
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<td>165.9</td>
</tr>
<tr>
<td>V_3</td>
<td>140.8</td>
<td>136.4</td>
<td>163.5</td>
<td>146.7</td>
<td>154.2</td>
<td>159.6</td>
<td>140.8</td>
<td>136.4</td>
<td>163.5</td>
<td>159.6</td>
</tr>
<tr>
<td>K_0</td>
<td>123.4</td>
<td>145.2</td>
<td>141.7</td>
<td>137.0</td>
<td>108.9</td>
<td>111.0</td>
<td>123.4</td>
<td>145.2</td>
<td>141.7</td>
<td></td>
</tr>
<tr>
<td>K_1</td>
<td>137.0</td>
<td>108.9</td>
<td>111.0</td>
<td>140.8</td>
<td>136.4</td>
<td>163.5</td>
<td>140.8</td>
<td>136.4</td>
<td>163.5</td>
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<tr>
<td>K_2</td>
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<td>145.3</td>
<td>123.4</td>
<td>145.2</td>
<td>141.7</td>
<td>123.4</td>
<td>145.2</td>
<td>141.7</td>
<td></td>
</tr>
</tbody>
</table>

C.D. for V marginal means=29.4 Q/ha.

Crop: Potato (Kharij)
Site: Potato Develop. Stn., Kharadhar

Object: To study the effect of different fertilizers on the yield of different varieties of Potato crop.

1. BASAL CONDITIONS:
(i) and (ii) N.A. (iii) 9.4.61. (iv) to (x) N.A.

2. TREATMENTS:
All combinations of (1), (2), (3) and (4)
(1) 3 varieties: V_1=up to date, V_2=Kufri Kandee and V_3=Local.
(2) 3 levels of N as A/S: N_0=0, N_1=84.1 and N_2=168.2 Kg/ha.
(3) 3 levels of P_2O_5 as Super: P_0=0, P_1=84.1 and P_2=168.2 Kg/ha.
(4) 3 levels of K_2O as Potash: K_0=0, K_1=84.1 and K_2=168.2 Kg/ha.

3. DESIGN:
(i) 3° confounded. (ii) 9 blocks/repetition and 9 plots/block. (b) N.A. (iii) 1. (iv) (a) N.A. (b) 2.44m x 2.44m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of Potato. (iv) (a) 1961—Only. (b) No. (c) Nil. (v) Joginder Nagar. (vi) and (vii) Nil.
5. RESULTS:

(i) 66.6 Q/ha. (ii) 26.05 Q/ha. (iii) Main effect of V is highly significant while interaction V x N is significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N3</th>
<th>P0</th>
<th>P1</th>
<th>P3</th>
<th>V0</th>
<th>V1</th>
<th>V3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>113.0</td>
<td>88.0</td>
<td>113.3</td>
<td>105.5</td>
<td>101.7</td>
<td>107.1</td>
<td>103.5</td>
<td>85.7</td>
<td>125.1</td>
<td>104.8</td>
</tr>
<tr>
<td>V2</td>
<td>55.0</td>
<td>67.5</td>
<td>38.6</td>
<td>44.5</td>
<td>63.9</td>
<td>52.7</td>
<td>62.0</td>
<td>47.4</td>
<td>51.8</td>
<td>53.7</td>
</tr>
<tr>
<td>V3</td>
<td>39.0</td>
<td>51.6</td>
<td>33.5</td>
<td>39.7</td>
<td>46.5</td>
<td>37.9</td>
<td>48.6</td>
<td>37.0</td>
<td>38.5</td>
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<tr>
<td>Mean</td>
<td>69.0</td>
<td>69.1</td>
<td>61.8</td>
<td>63.2</td>
<td>70.7</td>
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<td>71.3</td>
<td>56.7</td>
<td>71.8</td>
<td>66.6</td>
</tr>
</tbody>
</table>

C.D. for the body of V x N table=24.82 Q/ha.

---

Crop: Potato (Rabi).
Site: Potato Develop. Stn., Abla.
Object: To find out the suitable depth and method of planting of Potato.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) sandy clay loam. (iii) 21.4.64. (iv) (a) 4 Ploughings and 4 Subhar. (b) As per treatments. (c) and (d) N.A. (e) One. (v) 112 Kq/ha. of N+84 Kg/ha. of P2O5+112 Kg/ha. of K2O.

C.D. (vi) un-irrigated. (vii) 2 weedings, 2 hoeings and 2 earthing up. (viii) N.A. (x) 24.10.64.

2. TREATMENTS:

All combinations of (1), (2) and (3)
(1) 2 depths of planting:—D1=8 and D2=15 cm deep.
(2) 2 methods of planting: M1=flat and M2=ridge.
(3) No of rows of planting: R1=Single and R2=double row planting.

3. DESIGN:

(i) Fact in R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) 66x30cm. (b) 83x2.44cm. (v) 91 cm x 30 cm. (vi) Yes.

4. GENERAL

(i) Normal. (ii) N.A. (iii) Yield of potato. (iv) (a) 1964—Gathy. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 176.4 Q/ha. (ii) 31.2 Q/ha. (iii) Mean of the effects is significant. (iv) Table of Mean and differential response in Q/ha.
### Table: Mean & Differential Response

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th></th>
<th>M</th>
<th></th>
<th>R</th>
<th></th>
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</thead>
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<td>Present</td>
<td>Absent</td>
<td>Present</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>D</td>
<td>-0.6</td>
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<td>50.8</td>
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<td>-14.8</td>
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<tr>
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<td>74.7</td>
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<td>-52.1</td>
</tr>
<tr>
<td>R</td>
<td>-17.8</td>
<td>37.7</td>
<td>-31.8</td>
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</tbody>
</table>

### Object
-To find out the best sowing time for up-to-date variety of Potato seed.

### 1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) N.A. (iii) As per treatments. (iv) (a) 4 ploughings. (b) Furrow sowing. (c) N.A. (d) 53cm x 30cm. (e) - (v) 30.5 Q/ha of A/S and 61 Q/ha of Super. (vi) Up-to-date. (vii) N.A. (viii) 3 earthings up. (ix) N.A. (x) 10 to 13th Sept., 61 : 5.9.62.

### 2. TREATMENTS:
5 dates of sowing: D1 - 28th March, D2 - 5th April, D3 - 13th April, D4 - 21st April and D5 - 29th April.

### 3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 5. (iv) N.A. (v) 3.66m. x 3.05m. (vi) N.A. (vii) Yes.

### 4. GENERAL:
(i) N.A. (ii) Nil. (iii) Yield of tuber. (iv) 1961 - 62. (v) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

### 5. RESULTS:
#### Pooled results
(i) 132.5 Q/ha. (ii) 54.5 Q/ha (based on 32 d.f., made up of Pooled error and Treatments x Years interaction).
(iii) Treatment differences are highly significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1961</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1961</td>
<td>171.9</td>
<td>161.9</td>
<td>182.0</td>
<td>112.5</td>
<td>41.0</td>
<td>**</td>
<td>133.9</td>
<td>50.5</td>
</tr>
<tr>
<td>1962</td>
<td>225.9</td>
<td>141.5</td>
<td>156.3</td>
<td>58.8</td>
<td>78.9</td>
<td>*</td>
<td>130.9</td>
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<tr>
<td>Pooled</td>
<td>195.8</td>
<td>152.8</td>
<td>170.6</td>
<td>85.5</td>
<td>57.8</td>
<td>**</td>
<td>132.5</td>
<td>54.5</td>
</tr>
</tbody>
</table>
1. **Crop**: Potato.  
2. **Site**: Potato Develop. Sta., Baghpashog.  
3. **Object**: To find out best cultivation practices in Baghpashog conditions for Potato crop.

### BASAL CONDITIONS:
- (i) to (iii) N.A.  
- (iv) N.A.  
- (v) As per treatments.  
- (vi) 56 Kg/ha of N + 90 Kg/ha of P<sub>2</sub>O<sub>5</sub> + 112 Kg/ha of K<sub>2</sub>O + 24.5 Q/ha of F.Y.M.  
- (vii) to (ix) N.A.  
- (x) As per treatments.

### TREATMENTS:
- All combinations of (1), (2) and (3)
  - (1) 3 methods of sowing: M<sub>1</sub>- Flat sowing, M<sub>2</sub>- Flat sowing-cum-ridging and M<sub>3</sub>- ridge sowing followed by 18.3 Q/ha of mulch.
  - (2) 3 spacings: S<sub>1</sub>= 30 cm. x 30 cm, S<sub>2</sub>= 45 cm. x 45 cm, and S<sub>3</sub>= 60 cm. x 60 cm.
  - (3) 3 harvesting dates: D<sub>1</sub>= 31st August, D<sub>2</sub>= 15th November and D<sub>3</sub>= 30th November.

### DESIGN:
- (i) 3<sup>rd</sup> confounded (MSD<sup>2</sup> confounded).  
- (ii) (a) 9 plots/block and 3 blocks/replication.  
- (b) N.A.  
- (iii) 30 cm. x 274 m.  
- (iv) N.A.  
- (v) N.A.  
- (vi) Yes.

### GENERAL:
- (i) and (ii) N.A.  
- (iii) Yield of tuber.  
- (iv) (a) 1963 -only.  
- (b) No  
- (c) Nil.  
- (v) to (vii) N.A.

### RESULTS:
- (i) 34.0 Q/ha  
- (ii) 12.1 Q/ha  
- (iii) Main effect of M and interaction S X D are significant.  
- (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S&lt;sub&gt;3&lt;/sub&gt;</th>
<th>D&lt;sub&gt;1&lt;/sub&gt;</th>
<th>D&lt;sub&gt;2&lt;/sub&gt;</th>
<th>D&lt;sub&gt;3&lt;/sub&gt;</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>M&lt;sub&gt;1&lt;/sub&gt;</td>
<td>62.6</td>
<td>33.9</td>
<td>25.1</td>
<td>37.1</td>
<td>54.2</td>
<td>30.3</td>
<td>40.5</td>
</tr>
<tr>
<td>M&lt;sub&gt;2&lt;/sub&gt;</td>
<td>41.1</td>
<td>29.9</td>
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<td>31.9</td>
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<td>39.9</td>
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<tr>
<td>M&lt;sub&gt;3&lt;/sub&gt;</td>
<td>21.5</td>
<td>22.3</td>
<td>20.7</td>
<td>23.5</td>
<td>21.9</td>
<td>19.1</td>
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<td>Mean</td>
<td>41.7</td>
<td>28.7</td>
<td>31.5</td>
<td>30.8</td>
<td>43.6</td>
<td>27.5</td>
<td>34.0</td>
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<tr>
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<td>23.5</td>
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<td>33.5</td>
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<td>42.2</td>
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<td>D&lt;sub&gt;3&lt;/sub&gt;</td>
<td>35.5</td>
<td>28.3</td>
<td>18.7</td>
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<td></td>
</tr>
</tbody>
</table>

C.D. for M marginal means—14.0 Q/ha  
C.D. for the body of S x D table—24.2 Q/ha

---

**Crop**: Potato.  
**Site**: Potato Develop. Sta., Kheradkar  
**Object**: To study the effect of different methods of planting.

### BASAL CONDITIONS:
- (i) and (ii) N.A.  
- (iii) N.A.  
- (iv) and (v) N.A.  
- (vi) Up-to-date.  
- (vii) to (x) N.A.
2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 2 times of planting: T₁ = Early and T₂ = Late planting.
(2) 2 depths of planting: D₁ = Shallow planting and D₂ = Deep planting.
(3) 2 methods of planting: M₁ = Flat and M₂ = Ridge planting.

3. DESIGN:

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1961—only. (b) Nil. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 200·2 Q/ha. (ii) 54·3 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>D₁</th>
<th>D₂</th>
<th>M₁</th>
<th>M₂</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>T₁</td>
<td>191·9</td>
<td>192·9</td>
<td>221·7</td>
<td>163·4</td>
<td>192·4</td>
</tr>
<tr>
<td>T₂</td>
<td>202·9</td>
<td>213·0</td>
<td>274·4</td>
<td>151·4</td>
<td>207·9</td>
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<tr>
<td>Mean</td>
<td>197·4</td>
<td>203·0</td>
<td>223·0</td>
<td>177·3</td>
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<td>M₁</td>
<td>209·6</td>
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</tr>
<tr>
<td>M₂</td>
<td>185·2</td>
<td>169·4</td>
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</tr>
</tbody>
</table>

Crop: Potato (Kharif).
Site: Potato Develop. Stn., Kheradhar.
Object: To find the effective date of harvesting Potato crop.

Ref: H.P. 61(189)
Type: 'C'.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) N.A. (iii) H.461. (iv) and (v) N.A. (vi) Up-to-date. (vii) to (ix) N.A. (x) As per treatments.

2. TREATMENTS:
8 harvesting dates: H₁ = 10.11.61, H₂ = 17.7.61, H₃ = 24.7.61, H₄ = 31.7.61, H₅ = 7.8.61, H₆ = 14.8.61, H₇ = 21.8.61 and H₈ = 28.8.61.

3. DESIGN:
(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 2·44 m. x 2·44 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1961-62 (modified in 62). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 244·2 Q/ha. (ii) 55·6 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>H₁</th>
<th>H₂</th>
<th>H₃</th>
<th>H₄</th>
<th>H₅</th>
<th>H₆</th>
<th>H₇</th>
<th>H₈</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>117·7</td>
<td>282·5</td>
<td>172·6</td>
<td>149·1</td>
<td>141·2</td>
<td>431·6</td>
<td>337·4</td>
<td>321·7</td>
</tr>
<tr>
<td>C.D.</td>
<td>131·5 Q/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Potato (Kharif).  
Site: Potato Develop. Sta., Kheradhar.  
Object: To find the effective date of harvesting Potato crop.

1. BASAL CONDITIONS:
   (i) to (iv) N.A.  (v) 112 Kg/ha of N+84 Kg/ha of P₂O₅+84 Kg/ha of K₂O.  (vi) 1, (Up-to-date.  (vii) to (ix) N.A.  (x) As per treatments.

2. TREATMENTS:

3. DESIGN:
   (i) R.B.D.  (ii) (a) 12.  (b) N.A.  (iii) (a) 3'66m. x 2'44m.  (b) 2'44m x 2'44m.  (v) 61 cm.  (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of tuber.  (iv) (a) 1961-62 (modified in 1962).  (b) No.  (c) Nil.  (v) and (vi) N.A.  (vii) Yields for treatments H₈ to H₁₂ are not available.

5. RESULTS:
   (i) 246'0 Q/ha.  (ii) 24'6 Q/ha.  (iii) Treatment differences are significant.  (iv) Av. yield of tuber in Q/ha.
   Treatment: H₁ H₂ H₃ H₄ H₅ H₆ H₇ H₈ H₉ H₁₀ H₁₁ H₁₂ 
   Av. yield: 227'0 201'8 185'0 210'2 232'3 361'6 241'9 285'9 
   C.D. = 59'2 Q/ha.

---

Crop: Potato (Kharif).  
Site: Potato Develop. Sta., Kheradhar.  
Object: To study the effect of seasons, times, depths and methods of planting on the yield of Potato crop.

1. BASAL CONDITIONS:
   (i) and (ii) N.A.  (iii) As per treatments.  (iv) (a) N.A.  (b) As per treatments.  (c) to (e) N.A.  (vi) 112 Kg/ha. of N+84 Kg/ha. of P₂O₅+112 Kg/ha. of K₂O.  (vi) Up-to-date.  (vii) to (ix) N.A.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4):
   (1) 2 seasons of planting: S₁-Spring and S₂-Monsoon.
   (2) 2 times of planting: T₁-Early and T₂-Late.
   (3) 2 depths of planting: D₁-Shallow and D₂-Deep.
   (4) 2 methods of planting: M₁-Flat and M₂-Ridge.
3. DESIGN:
   (i) 2\(^{nd}\) confounding. (ii) (a) 2 blocks/repllication and 4 plots/block. (iii) 3. (iv) (a) and (b) 4\(^{th}\) m. x 5\(^{th}\)m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1962-only. (b) Nil. (c) No. (v) and (vi) N.A. (vii) As the planting was not done in spring season, hence the results are given for monsoon only with 2\(^{nd}\) fact. in R.B.D. design.

5. RESULTS:
   (i) 89.0 Q/ha. (ii) 28.2 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>D(_1)</th>
<th>D(_2)</th>
<th>M(_1)</th>
<th>M(_2)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T(_1)</td>
<td>91.9</td>
<td>118.2</td>
<td>102.4</td>
<td>107.8</td>
<td>105.1</td>
</tr>
<tr>
<td>T(_2)</td>
<td>79.1</td>
<td>66.5</td>
<td>56.5</td>
<td>89.1</td>
<td>72.6</td>
</tr>
<tr>
<td>Mean</td>
<td>85.5</td>
<td>92.4</td>
<td>79.4</td>
<td>98.4</td>
<td>89.0</td>
</tr>
<tr>
<td>M(_1)</td>
<td>85.7</td>
<td>73.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M(_2)</td>
<td>85.4</td>
<td>111.5</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Crop :- Potato.  Ref :- H.P. 62(262).

Site :- Potato Develop. Stn., Shilaroo.  Type :- 'C'.

Object :- To find the optimum date of sowing for Potato crop.

1. BASAL CONDITIONS:
   (i) and (ii) N.A. (iii) As per treatments. (iv) to (x) N.A.

2. TREATMENTS:

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 2\(^{nd}\)m. x 2\(^{nd}\)m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1962-63 (modified in 63). (b) Nil. (c) No. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 24.8 Q/ha. (ii) 18.6 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D(_1)</th>
<th>D(_2)</th>
<th>D(_3)</th>
<th>D(_4)</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>29.3</td>
<td>22.7</td>
<td>25.3</td>
<td>22.6</td>
<td></td>
</tr>
</tbody>
</table>
Crop: Potato (Kharif).
Site: Potato Develop. Sta., Shilaroo.
Object: To find out the effective date of planting on Potato crop.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:
   5 dates of sowing: D₁ = 13.4.63, D₂ = 21.4.63, D₃ = 29.4.63, D₄ = 7.5.63, and D₅ = 15.5.63.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 3'66m. x 2'44m. (b) 2'44m. x 2'44m. (v) 61cm. row to row. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1962-63 (Modified in 63). (b) and (c) −. (v) to (vii) N.A.

5. RESULTS:
   (i) 57.7 Q/ha. (ii) 16.6 Q/ha. (iii) Treatment differences are significant. (iv) Av. yield of tuber in Q/ha.
   Treatment: D₁   D₂   D₃   D₄   D₅
   Av. yield: 64.1 81.9 55.0 50.7 36.5
   C.D. = 25.6 Q/ha.

Crop: Potato.
Site: Potato Develop. Sta., Baghpashog.
Object: To find out the best method of preserving soil moisture to grow Potato crop.

1. BASAL CONDITIONS:
   (i) to (iii) N.A. (iv) (a) 4 ploughings. (b) to (e) N.A. (v) 30'6 Q/ha. of F.Y.M +4 Q/ha of A/S +6 Q/ha of Super. (vi) Up-to-date. (vii) N.A. (viii) 2 earthings up. (ix) N.A. (x) 14 to 17th Sept., 60.

2. TREATMENTS:
   Main-plot treatments: 2 land preparation treatments: B₁ = No breaking and B₂ = Breaking up of land to a depth of 22.5 to 30.5 cm deep.
   Sub-plot treatments: 4 mulching treatments: M₁ = Control, M₂ = Compost-mulch, M₃ = Dry leaves of Chil and Bam mulch 812, and M₄ = Polyethylene cloth.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 3'05m x 2'67m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1962-only. (b) Nil. (c) Nil. (v) to (viii) Nil.
5. RESULTS:
(i) 50·6 Q/ha. (ii) (a) 10·0 Q/ha. (b) 16·2 Q/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>B₀</td>
<td>38·3</td>
<td>66·2</td>
<td>62·6</td>
<td>40·2</td>
<td>51·8</td>
</tr>
<tr>
<td>B₁</td>
<td>30·6</td>
<td>68·2</td>
<td>65·8</td>
<td>34·7ₜₚ</td>
<td>49·3</td>
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<td>34·4</td>
<td>67·2</td>
<td>63·2</td>
<td>37·4</td>
<td>50·6</td>
</tr>
</tbody>
</table>

C.D. for M marginal means = 20·4 Q/ha.

---

Crop: Potato  
Site: Potato Develop. Stn., Baghpessagog.  
Ref: H.P. 62(270).  
Type: 'CM'.

Object: To find the effect of different methods of planting and manuring on the yield of Potato crop.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:
Main-plot treatments:
3 methods of planting: M₁=Flat planting, M₂=Raised bed with 1·23m. breadth and M₃=Raised bed with 2·46m. breadth.

Sub-Plot treatments:
6 applications of organic manure at 30·6 Q/ha of compost + 12·2 Q/ha of mulch: — A₀=Control, A₁=mixing of compost with soil & preparation, A₂=Localised application of compost after planting, A₃=Application of compost at preparation & mulch after planting, A₄=Application of compost at preparation & mulch at earthing up and A₅=Application of compost at preparation + mulching in mid August.

3. DESIGN:
(i) Split-plot (ii) (a) 3 main-plots/replication and 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A (b) 2·74m. x 3·05m. (v) N.A. (vi) Yₚ.a.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1962 only. (b) and (c) (v) to (vi) Nil.

5. RESULTS:
(i) 106·1 Q/ha. (ii) (a) 51·7 Q/ha. (b) 32·8 Q/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>A₀</th>
<th>A₁</th>
<th>A₂</th>
<th>A₃</th>
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<td>94·2</td>
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<td>75·6</td>
<td>101·1</td>
<td>110·0</td>
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<td>106·0</td>
<td>94·3</td>
<td>106·7</td>
<td>113·6</td>
<td>106·1</td>
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</tbody>
</table>

C.D. for M marginal means = 36·5 Q/ha.
Crop :- Potato.  
Ref :- H.P. 60(183).

Site :- Potato Develop. Stn., Baghpashog.  
Type :- 'C'.

Object :- To study the efficacy of different fungicides against late blight on Potato crop.

1. BASAL CONDITIONS : 
   (i) to (x) N.A.

2. TREATMENTS : 

10 Chemical treatments :-\(C_0\)=Control, \(C_1\)=Blue Copper, \(C_2\)=Fungimar, \(C_3\)=Bilitox-I, \(C_4\)=Bord Mixture, 
\(C_5\)=Filt-406, \(C_6\)=Kirti Copper \(W \times P50\), \(C_7\)=Dithane D-14, \(C_8\)=Shell Copper and \(C_9\)=Fytelan.

Doses or concentrations are N.A.

3. DESIGN: 
   (i) R.B.D. (ii) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3'05m. \times 2'74m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) Late blight attack. (iii) Yield of tuber. (iv) (a) 1960-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 6'18 Q/ha. (ii) 25'3 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>(C_0)</th>
<th>(C_1)</th>
<th>(C_2)</th>
<th>(C_3)</th>
<th>(C_4)</th>
<th>(C_5)</th>
<th>(C_6)</th>
<th>Av, yield</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>34'9</td>
<td>35'4</td>
<td>70'4</td>
<td>72'5</td>
<td>68'4</td>
<td>65'6</td>
<td>63'8</td>
<td>53'7</td>
</tr>
</tbody>
</table>

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Crop :- Potato \((\textit{Kharij})\).  
Ref :- H.P. 61(196).

Site :- Potato Develop. Stn., Baghpashog.  
Type :- 'D'.

Object :- To study the effect of different chemicals on the yield of Potato.

1. BASAL CONDITIONS : 
   (i) to (x) N. A.

2. TREATMENTS : 

11 Chemicals :-\(C_0\)=Control, \(C_1\)=F.C.N.B., \(C_2\)=F.C.N.B. \((\text{Plantings}+\text{Cuelting})\), \(C_3\)=Cheshnut Compound. \(C_4\)=Copper sul.; \(C_5\)=Copper sul. & Birc acid, \(C_6\)=Cuproxiol, \(C_7\)=Arasan, 
\(C_8\)=Aldrin, \(C_9\)=Aldrin+F.Y.M. and \(C_{10}\)=F.Y.M.

3. DESIGN : 
   (i) R.B.D. (ii) 11. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3'05 m. \times 2'74 m. (v) N.A. (vi) Yes

4. GENERAL:
   (i) and (ii) N. A. (iii) Yield of tuber. (iv) (a) 1961-only. (b) No. (c) Nil. (v) to (vii) Nil
5. RESULTS:
(i) 30.6 Q/ha. (ii) 18.7 Q/ha. (iii) Treatment differences are not significant (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₄</th>
<th>C₁</th>
<th>C₃</th>
<th>C₅</th>
<th>C₄</th>
<th>C₅</th>
<th>C₆</th>
<th>C₇</th>
<th>C₈</th>
<th>C₉</th>
<th>C₁₀</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>19.4</td>
<td>28.8</td>
<td>24.9</td>
<td>23.1</td>
<td>31.6</td>
<td>25.6</td>
<td>24.2</td>
<td>31.0</td>
<td>26.4</td>
<td>50.5</td>
<td>51.5</td>
</tr>
</tbody>
</table>

Crop :- Potato
Site :- Potato Develop. Stn., Baghpashog.
Ref :- H.P. 61(197)
Type :- 'D'.
Object:- To test the relative efficiency of different chemicals to control early Blight of Potato.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:
16 chemical treatments :- C₅ = Control, C₁ = Cuproxol, C₃ = Copesan, C₄ = Shell Copper, C₅ = Vitagram, C₆ = Kirti Copper, WₓP 50-1, C₇ = Blitox, C₈ = Fytelan, C₉ = Blue Copper, C₁₀ = Cuprancer, C₁₁ = Bardeans mixture 4 : 4 : 50, C₁₂ = Kirti Copper WₓP 50-2, C₁₃ = Fungimar, C₁₄ = Dithane M-22, C₁₅ = Dithane Z-78 and C₁₆ = Flit-406.

3. DESIGN:
(i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) and (b) 3x65m x 2.74m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1961-only. (b) No. (c) Nil (v) Shillaroo. (vi) and (vii) Nil.

5. RESULTS:
(i) 27.3 Q/ha. (ii) 12.2 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₄</th>
<th>C₁</th>
<th>C₃</th>
<th>C₅</th>
<th>C₆</th>
<th>C₇</th>
<th>C₈</th>
<th>C₉</th>
<th>C₁₀</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>22.3</td>
<td>27.4</td>
<td>27.6</td>
<td>30.4</td>
<td>18.3</td>
<td>21.6</td>
<td>26.9</td>
<td>26.5</td>
<td>22.3</td>
</tr>
</tbody>
</table>

Crop :- Potato (Kharif)
Site :- Potato Develop. Stn., Jhatingri.
Ref :- H.P. 61(200)
Type :- 'D'.
Object:- To assess the utility of Pre-emergence application of Amines and Sodium salts, form of 2,4-D acetic acid, in the presence and absence of weeding on weed growth of Potato crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) N.A. (iii) 9.4.61 (iv) (a) to (e) N.A. (v) N.P.K. mixture at 112 kg/ha as A/S, 84.5 kg/ha of P₂O₅ and 112 kg/ha of K₂O (vi) UP—to—date. (vii) to (ix) N.A. (x) 27.11.61.

2. TREATMENTS:
10. weedicidal treatments :-
W₃ = No weeding & no application, W₄ = No weeding + Amine of 2,4-D at 0.57 Kg. acid equivalent seven days after sowing, W₅ = No weeding + Sodium salt of 2,4-D—7 days after sowing, W₆ = Weeding + Amine of 2,4-D—14 days after sowing, W₇ = Weeding + Sodium salt of 2,4-D—14 days after sowing, W₈ = Weeding + 2,4-D amine salt—7 days after sowing, W₉ = Weeding + 2,4-D amine salt—14 days after sowing, W₁₀ = Weeding + Sodium salt of 2,4-D—7 days after sowing and W₁₁ = Weeding + Sodium salt of 2,4-D—14 days after sowing.
Crop : Potato.  
Site : Potato Develop. Stn., Shillaroo.  
Ref : H.P. 60(199).  
Type : 'D'.

Object : To compare the efficacy of different chemicals to control Blight disease of Potato crop.

1. BASAL CONDITIONS :  
(i) to (x) N.A.

2. TREATMENTS :  
18 Chemicals : C0 = Control, C1 = Blue Copper, C2 = Kirti Copper W x P. 30-1, C3 = Dithane M 20, C4 = Blitox, C5 = Cuprosol, C6 = Coppersan, C7 = Cupraman, C8 = Fungimar, C9 = Shell Copper, C10 = Fytelan, C11 = Dithane Z-78, C12 = Vitigran, C13 = Ziram, C14 = Kirti Copper W x P. 30-1, C15 = Bordeaux mixture, C16 = Flit-406, and C17 = Dithane D-14.

Note : Concentrations and Method of application N.A.

3. DESIGN :  
(i) R.B.D. (ii) 18. (b) 4. (iii) 4. (iv) (a) N.A. (b) 3.66m. x 2.74m. (v) N.A. (vi) Yes.

4. GENERAL :  
(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1961 — only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :  
(i) 172 '8 Q/ha. (ii) 44 '5 Q/ha. (iii) Treatment differences are significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
<th>W9</th>
<th>Av. yield</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>135 '1</td>
<td>131 '2</td>
<td>145 '2</td>
<td>170 '2</td>
<td>141 '7</td>
<td>165 '9</td>
<td>182 '2</td>
<td>239 '3</td>
<td>201 '1</td>
<td>217 '0</td>
<td>C.D = 64 '6 Q/ha.</td>
</tr>
</tbody>
</table>

Early Blight :  
(i) 13 '6 degrees. (ii) 2 '7 degrees. (iii) Treatment differences are highly significant. (iv) Mean angle in degree.
Crop : Potato  
Site : Potato Develop Strn., Shillaroe.  
Ref : H.P. 60(200).  
Type : 'D'.

Object : To test the efficacy of different stickers on the control of Blights of Potato crop.

1. BASAL CONDITIONS:
   (i) to (x) N. A.

2. TREATMENTS:
   7 treatments of sticker :- $T_1$=Control, $T_2$=Tenac, $T_3$=Wheat flour, $T_4$=Triton, $T_5$=Kirti Sticker, $T_6$=Linseed oil and $T_7$=Albolineum.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 7  (b) N.A.  (iii) 4  (iv) (a) N.A.  (b) 3-66m. x 2-74 m.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) N.A., (ii) As per treatments.  (iii) Yield and incidence of disease.  (iv) (a) 1960-only,  (b) No, (c) Nil.  (v) N.A.  (vi) Nil.

5. RESULTS:
   (i) 155.9 Q/ha.  (ii) 22.5 Q/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of tuber in Q/ha.
Object: To test the relative efficacy of different sticky materials for the control of late Blight of Potato.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:
9 Sticky matters:—

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 2.74 m x 3.66 m. (b) N.A. (v) N.A. (vi) N.A.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1961-only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 74.2 Q/ha. (ii) 24.5 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₀</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
<th>C₄</th>
<th>C₅</th>
<th>C₆</th>
<th>C₇</th>
<th>C₈</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>97.9</td>
<td>67.5</td>
<td>68.8</td>
<td>65.3</td>
<td>49.7</td>
<td>91.3</td>
<td>61.0</td>
<td>77.9</td>
<td>73.3</td>
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</tbody>
</table>

Early Blight:
(i) 18.58 degrees. (ii) 2.27 degrees. (iii) Treatment differences are highly significant. (iv) Mean angle of Infection in degree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₀</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
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<th>C₅</th>
<th>C₆</th>
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<tbody>
<tr>
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<td>15.03</td>
<td>14.99</td>
<td>17.73</td>
<td>18.11</td>
<td>16.00</td>
<td>24.46</td>
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<td>Transformed</td>
<td>16.76</td>
<td>6.73</td>
<td>6.69</td>
<td>9.28</td>
<td>9.67</td>
<td>7.23</td>
<td>17.15</td>
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<tr>
<td>C.D. = 3.27 degrees</td>
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</tbody>
</table>

Late Blight:
(i) 11.39 degrees. (ii) 1.69 degrees. (iii) Treatment differences are not significant. (iv) Mean angle in degree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₀</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
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<th>C₅</th>
<th>C₆</th>
<th>C₇</th>
<th>C₈</th>
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<tbody>
<tr>
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<td>11.25</td>
<td>11.04</td>
<td>11.49</td>
<td>11.04</td>
<td>11.46</td>
<td>11.54</td>
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<tr>
<td>Transformed</td>
<td>4.25</td>
<td>3.31</td>
<td>3.66</td>
<td>3.97</td>
<td>3.66</td>
<td>3.94</td>
<td>4.00</td>
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-object-
Crop : Potato.
Ref : H.P. 61(179).
Site : Potato Develop. Sta., Shillong.
Tyre : 'D'.

Object : To test the relative efficiency of different chemicals to control the blights of Potato crop.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:
   16 Chemicals : C₀-Control, C₁=Cupronol, C₂=Copperax, C₃=Shell Copper, C₄=Vitagram, C₅=Kirti Copper W×P 50-1, C₆=Bilox, C₇=Fytalan, C₈=Blue Copper, C₉=Cupermar, C₁₀=Bordeaux mixture, C₁₁=Kirti Copper W×P 50-2, C₁₂=Fungimar, C₁₃=Dithane M. 22, C₁₄=Dithane-Z. 78 and C₁₅=Filt-406.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 16.  (b) N.A.  (iii) 4.  (iv) (a) 3·66 m.×2·74m.  (b) N.A.  (v) N.A.  (vi) Yes

4. GENERAL:
   (i) and (ii) N.A.  (iii) Incidence of blight and yield of tuber.  (iv) (a) 1961-only.  (b) No.  (v) Nil.  (vi) Bagh-panchayat.  (vii) and (viii) N.A.

5. RESULTS:
   (i) 81·8 Q/ha.  (ii) 16·8 Q/ha.  (iii) Treatment differences are not significant, (iv) Av. yield of tuber in Q/ha.

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<th>Early Blight</th>
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<td>C₀</td>
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<td>80·2</td>
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<tr>
<td>C₁</td>
<td>81·1</td>
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<tr>
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<td>97·0</td>
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<td>C₆</td>
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</tr>
<tr>
<td>C₁₀</td>
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<table>
<thead>
<tr>
<th>Late Blight</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) 20·2 degrees, (ii) 34 degrees, (iii) Treatment differences are highly significant, (iv) Mean angle in degree.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
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<tbody>
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<td>C₁₀</td>
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<th>Mean angle</th>
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<tr>
<td>17·2</td>
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<tr>
<td>15·5</td>
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</tbody>
</table>

C.D.=4·8 degrees
Crop :- Radish.  
Ref :- H.P. 62(133).  
Site :- Vegetable Res. Stn., Kalpa.  
Type :- 'C'.  
Object :- To study the effect of cut radish sown on the yield of Radish seed.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  
   (ii) Sandy loam.  
   (iii) June, 62.  
   (iv) and (v) N.A.  
   (vi) French Breakfast.  
   (vii) Irrigated.  
   (viii) and (ix) N.A.  
   (x) Nov., 62

2. TREATMENTS:
   5 models of seed material:-Fig. Whole root (control) T1=root tips cut, T2=1/2 root length cut, T3=1/4 root length cut and T4=3/4 root length cut.

3. DESIGN:
   (i) R.B.D.  
   (ii) (a) 5.  
   (b) N.A.  
   (iii) 6.  
   (iv) (a) N.A.: (b) 2.44 m x 1.83 m.  
   (v) N.A.  
   (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  
   (ii) N.A.  
   (iii) Yield of radish seed.  
   (iv) (a) 1962-only.  
   (b) No.  
   (c) Nil.  
   (v) to (vii) Nil.

5. RESULTS:
   (i) 77.0 kg/ha, (ii) 52.5 kg/ha, (iii) Treatment differences are highly significant, (iv) Av. yield of Radish seed in kg/ha.

   Treatment  | T0  | T1  | T2  | T3  | T4  |
   Av. yield  | 138 | 105 | 60  | 28  | 54  |
   C.D. = 63.2 kg/ha

---

Crop :- Tomato  
Ref :- HP 60(72).  
Site :- Vegetable Res. Stn., Bhagot.  
Type :- 'M'.  
Object :- To study the effect of different levels of N, P and K. on the yield of Tomato.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  
   (ii) Loamy.  
   (iii) 19.6.60.  
   (iv) (a) N.A.  
   (b) Transplanting.  
   (c) --.  
   (d) 61 cm x 61 cm.  
   (e) 1.  
   (f) N.A.  
   (vi) Marglobe.  
   (vii) Irrigated.  
   (viii) 1 weeding.  
   (ix) N.A.  
   (x) 17.6.60 to 18.8.60.

2. TREATMENTS:
   All combinations of (1), (2) and (3)+control.  
   (1) 2 levels of N: N1=56 and N2=84 kg/ha.  
   (2) 2 levels of P2O5: P1=56 and P2=84 kg/ha.  
   (3) 2 levels of K2O: K1=28, and K2=44.8 kg/ha.  
Sources of N, P, K and time of Application --- N.A.
3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 3'05m. X 2.44m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of tomato. (iv) (a) 1960-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 49.7 Q/ha. (ii) 26.7 Q/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of tomato in Q/ha.

   Control—53.1 Q/ha

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>K1</th>
<th>K2</th>
<th>Mean</th>
</tr>
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<tbody>
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<td>72</td>
<td>38</td>
<td>63</td>
<td>47</td>
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<td>60</td>
<td>33</td>
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</tr>
</tbody>
</table>

   C.D. for P marginal means—22.19 Q/ha.

Crop :— Tomato

Site :— Vegetable Res. Stn., Katrain.

Object :— To find the N and P requirements of Tomato crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 10.5.64. (iv) (a) to (e) N.A. (v) N.A. (vi) Marglobe.
   (vii) Irrigated. (viii) and (ix) N.A. (x) July & Aug. 64.

2. TREATMENTS
   All Combinations of (1) and (2)
   (1) 3 levels of N :— N0 = 0, N1 = 49.4 and N2 = 98.8 kg/ha.
   (2) 2 levels of P :— P0 = 0 and P1 = 49.4 kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) and (c) 1709-99 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of tomato. (iv) (a) 1964-only. (b) Nil. (v) to (vii) Nil.

RESULTS:
   (i) 1966 Q/ha. (ii) 30.3 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of tomato in Q/ha.

Ref.— H.P. 64(287). Type :— 'M'.
Crop : Tomato.
Site : Vegetable Res. Stn., Bhagot.

Object :-To study the effect of polythene mulching on the yield of Tomato.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Loamy. (b) N.A. (iii) 23.4.62. (iv) (a) N.A. (b) Transplanting; (c) and (d) —
(e) 1. (v) and (vi) N.A. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 16.7.62 to 19.8.62.

2. TREATMENTS:
2 mulching treatments :—M₀ = No mulching and M₁ = Mulching with polythene.

3. DESIGN:
(i) Paired plot. (ii) 2. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 3'66m.×1'83m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of tomato. (iv) (a) 1962-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 118'0 Q/ha, (ii) 17'1 Q/ha. (iii) Treatment differences are not significant, (iv) Av. yield of tomato in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>107'0</td>
<td>129'1</td>
</tr>
</tbody>
</table>

Crop : Tomato.
Site : Vegetable Res. Stn., Bhagot.

Object :-To study the effect of spacings on the yield of Tomato.

1. BASAL CONDITIONS
(i) (a) to (c) N.A. (ii) Loamy. (iii) Last week of April, (iv) (a) N.A. (b) Transplanting. (c) and (d) As per treatments. (e) 1. (v) 454 gm. of Super and 58 gm. of Mur. pot. per plot applied before sowing and
340 gm. of A/s applied on 11.5.60. (vi) N.A. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 23.6.60 to 20.8.60.

2. TREATMENTS:
5 spacings: $- S_1=76cm. \times 46cm$, $S_2=76cm. \times 61cm$, $S_3=76cm. \times 76cm$, $S_4=76cm. \times 91cm$ and $S_5=76cm. \times 106cm$.

3. DESIGN:
(i) R.B.D. (ii) 5. (b) N.A. (iii) 3. (iv) N.A. (b) 4.88m. x 2.13m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of tomato. (iv) (a) 1960-only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 66.7 Q/ha, (ii) 20.2 Q/ha, (iii) Treatment differences are not significant, (iv) Av. yield of tomato in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$T_1$</th>
<th>$T_2$</th>
<th>$T_3$</th>
<th>$T_4$</th>
<th>$T_5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>92.0</td>
<td>94.4</td>
<td>69.7</td>
<td>53.8</td>
<td>40.2</td>
</tr>
</tbody>
</table>

Site: Vegetable Res. Sta. Bhagot. Type: 'C'.

Object: To study the effect of pruning on the yield of Tomato.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loamy. (iii) 20.5.62. (iv) (a) N.A. (b) Transplanting. (c) — (d) N.A. (e) 1. (v) and (vi) N.A. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (a) 10 to 26.8.62.

2. TREATMENTS:
2 pruning treatments: $P_0$—No pruning and $P_1$—Pruning.

3. DESIGN:
(i) Paired plot. (ii) 2. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 4.88m. x 1.22m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of tomato. (iv) (a) 1962-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 21.8 Q/ha, (ii) 10.3 Q/ha, (iii) Treatment difference is not significant, (iv) Av. yield of tomato in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$P_0$</th>
<th>$P_1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>28.1</td>
<td>15.4</td>
</tr>
</tbody>
</table>
Crop :: Tomato. 
Site :: Vegetable Res. Stn., Bbagot. 

Object :: To study the different dates of picking on the yield of Tomato.

1. BASAL CONDITIONS
   (i) (a) to (c) N.A. (ii) Loamy. (iii) Last week of April. (iv) (a) N.A. (b) Transplanting. (c) and (d) N.A. (e) I. (v) and (vi) N.A. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) As per treatments.

2. TREATMENTS:
   All combinations of (1) and (2).
   (1) 4 dates of picking: -- T1=22.7.60, T2=1.8.60, T3=6.8.60 and T4=15.8.60.
   (2) 3 types of tomato picked: -- V1=Light red, V2=Half red and V3=Full red.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3·05m.x1·22m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of tomato. (iv) (a) 1960—only. (b) No (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 11·5 Q/ha, (ii) 6·7 Q/ha, (iii) Main effect of T alone is highly significant, (iv) Av. yield of tomato in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>3'9</td>
<td>6'3</td>
<td>14'1</td>
<td>15'7</td>
<td>10'0</td>
</tr>
<tr>
<td>V2</td>
<td>6'7</td>
<td>12'9</td>
<td>14'9</td>
<td>22'0</td>
<td>14'1</td>
</tr>
<tr>
<td>V3</td>
<td>3'1</td>
<td>5'1</td>
<td>13'7</td>
<td>19'6</td>
<td>10'4</td>
</tr>
<tr>
<td>Mean</td>
<td>4'6</td>
<td>8'1</td>
<td>14'2</td>
<td>19'1</td>
<td>11'5</td>
</tr>
</tbody>
</table>

C.D. for T marginal means=5·6 Q/ha.

Crop :: Tomato. (Kharij)
Site :: Vegetable Res. Stn., Solan.

Object :: To study the effect of cultural methods to control Fruit-rot disease of Tomato.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:
   All combinations of (1) and (2).
   (1) 2 stakings: -- S0=No staking and S1=Staking.
   (2) 2 mulching treatments: -- M0=No mulch and M1=Mulch.

No other details are available.
3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) and (b) 3'66 m. x 1'83 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield and No. of healthy & diseased fruits. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 30'04 Q/ha. (ii) 34'04 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of tomato in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>M1</th>
<th>M2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>65'99</td>
<td>48'46</td>
<td>52'22</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>50'04</td>
<td></td>
</tr>
</tbody>
</table>

Crop: Tomato. Ref: H.P. 60(378).

Object: To test the efficacy of different fungicides against Fruit rot of Tomato crop.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:
9 fungicidal treatments: - F1=Control, F2=Dithane-1, F3=Vitgarum, F4=Bod mixture, F5=Cuprooxol, F6=Hiltex, F7=Kifri Copper, F8=Flit—406 and F9=Dithane-2

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 3. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Lot of diseased fruits and defoliation percentage. (iv) (a) 1960—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 44'39 degrees. (ii) 5'32 degrees. (iii) Treatment differences are significant. (iv) Mean angle in degree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
<th>T10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean angle</td>
<td>70'33</td>
<td>29'57</td>
<td>45'43</td>
<td>50'87</td>
<td>30'63</td>
<td>48'46</td>
<td>39'72</td>
<td>42'60</td>
<td>40'33</td>
<td></td>
</tr>
</tbody>
</table>
Crop: Cabbage  
Site: Vegetable Res. Sub-Stn., Kalpa

Object: To study the effect of different levels of N, P and K on the yield of Cabbage.

1. BASAL CONDITIONS:
   (a) to (c) N.A.  
   (ii) Sandy loam.  
   (iii) 10.4.63.  
   (iv) (a) N.A.  
   (b) Transplanting.  
   (c) —.  
   (d) N.A.  
   (e) 1.  
   (f) 92-2 Q/ha of F.M.M.  
   (vi) Pride of India.  
   (vii) Irrigated.  
   (viii) N.A.

2. TREATMENTS:
   All combinations of (1), (2) and (3).

   (1) 3 levels of N: N1=56, N2=112 and N3=168 Kg/ha.
   (2) 3 levels of P2O5: P1=28, P2=56 and P3=113 Kg/ha.
   (3) 3 levels of K2O: K1=112, K2=280 and K3=448 Kg/ha.

3. DESIGN:
   (i) 3x3 factorial confounding, (Z-effect confd.).  
   (ii) 3 blocks/replication and 9 plots/block.  
   (b) N.A.  
   (iii) 3x3 M.m. x 3 x 3m.  
   (vi) N.A.  
   (v) Yes.

4. GENERAL:
   (i) Normal.  
   (ii) N.A.  
   (iii) Yield of seed.  
   (iv) (a) 1963-only.  
   (b) No.  
   (c) Nil.  
   (v) to (vii) N.A.

5. RESULTS:
   (i) 658 Kg/ha.  
   (ii) 181'9 Kg/ha.  
   (iii) Interaction N x K is significant.  
   (iv) Av. yield of seed in Kg/ha.

<table>
<thead>
<tr>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>725</td>
<td>699</td>
<td>671</td>
<td>549</td>
<td>686</td>
<td>849</td>
<td>695</td>
</tr>
<tr>
<td>671</td>
<td>738</td>
<td>655</td>
<td>659</td>
<td>725</td>
<td>471</td>
<td>685</td>
</tr>
<tr>
<td>707</td>
<td>529</td>
<td>543</td>
<td>715</td>
<td>534</td>
<td>531</td>
<td>593</td>
</tr>
<tr>
<td>Mean</td>
<td>701</td>
<td>649</td>
<td>623</td>
<td>641</td>
<td>648</td>
<td>684</td>
</tr>
</tbody>
</table>

C.D. for the body of N x K table=88.5 Kg/ha.

Crop: Cabbage  
Site: Vegetable Res. Stn., Katrain

Object: To study the effect of different levels of N, P and K levels on the yield of Cabbage.

1. BASAL CONDITIONS:
   (a) to (c) N.A.  
   (ii) Clay loam.  
   (iii) 12.9.63.  
   (iv) (a) N.A.  
   (b) Transplanting.  
   (c) to (e) N.A.  
   (vi) Pride of India.  
   (vii) Irrigated.  
   (viii) and (ix) N.A.  
   (x) 6.7.64.
2. TREATMENTS:

6 manurial treatments:  
M₀=0, M₁=100 kg/ha of N, M₂=M₁+80 kg/ha of P₂O₅, M₃=M₁+40 kg/ha of K₂O, M₄=M₁+40 kg/ha of K₂O and M₅=80 kg/ha of P₂O₅.

3. DESIGN:

(i) R.B.D. (ii) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 20 m X 1.83 m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of seed. (iv) (a) 1963—only, (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 1240 Kg/ha. (ii) 215.0 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of seed in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>895</td>
<td>1110</td>
<td>1271</td>
<td>1052</td>
<td>1378</td>
<td>1736</td>
</tr>
<tr>
<td>C.D.</td>
<td>324.0 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Cabbage (Kharif).

Site: Vegetable Res. Sta., Kalpa.

Object: To find the optimum spacing for the seed of Cabbage crop.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 5.4.65. (iv) (a) 2 to 3 diggings. (b) Transplanting. (c) N.A. (d) As per treatments. (e) 1. (v) N.A. (vi) Pride of India. (vii) Irrigated. (viii) 2 weedings. (b) N.A. (x) Aug., 65.

2. TREATMENTS:

Main-plot treatments:

3 row to row spacings: S₃=61 cm - S₃=91 cm and S₄=122 cm.

Sub-plot treatments:

2 plant to plant spacings: R₄=51 cm and R₅=62 cm.

3. DESIGN:

(i) Split-plot (ii) 3 main-plots/replication and 2 sub-plots/main-plot: (b) N.A. (iii) 7. (iv) (a) N.A. (b) 3.66 m X 3.66 m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of seed. (iv) (a) 1965—contd. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 1640 Kg/ha. (ii) 409.9 Kg/ha. (b) 213.9 Kg/ha. (iii) Main effect of R alone is highly significant. Interaction S X R is significant. (iv) Av. yield of seed in Kg/ha.
Crop :- Cabbage.  
Ref :- H.P. 65(196).

Site :- Cabbage Res. Stn., Kalpa.  
Type :- 'C'.

Object :- To see the effect of depths of planting at head on the seed yield of Cabbage.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 20.4.65.  (iv) (a) 2 to 3 diggings.  (b) Transplanting.  (c) N.A.  
(d) 61cm.×61cm.  (e) One  (v) N.A.  (vi) Pride of India.  (vii) Irrigated.  (viii) 2 weedings.  (ix) N.A.  
(v) Aug., 65.

2. TREATMENTS:
4 methods of planting :- M₁ = Head and whole stem above ground,  M₂ = Only head above ground  
M₃ = Half stem and head above the ground and  M₄ = Stem and above head 2.5 cm, deep in soil.

3. DESIGN
(i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 2.46m.×1.83m.  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of seed.  (iv) (a) 1965—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
(i) 2820 Kg/ha.  (ii) 688 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of seed in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2352</td>
<td>3163</td>
<td>2967</td>
<td>2799</td>
</tr>
</tbody>
</table>

Crop :- Cabbage.  
Ref :- H.P. 62(139), 63(160), 64(150), 65(185).

Site :- Vegetable Res. Stn., Kalpa.  
Type :- 'C'.

Object :- To study the effect of Cut-cabbage sown on the yield of Cabbage seed.
**1. BASAL CONDITIONS:**

(i) (a) to (c) N.A.  
(ii) Sandy loam.  
(iii) April for 62 and 63; In the last week of March for 64; 13.4.65.  
(iv) (c) N.A.  
(v) Transplanting.  
(vi) Saltdy loam.  
(vii) G.f.60 cm x 61 cm.  
(viii) I. N.A.  
(ix) Pride of India for 62 and 65; Large drum (late) head for others.  
(x) N.A.  
(xi) Month of August.

**2. TREATMENTS:**

3 types of seeds:  
T1=Whole head (Control),  
T2=Control Core and  
T3=Stumps.

**3. DESIGN:**

(i) R.B.D.  
(ii) (a) 3.  
(iii) 2 for 62; 4 for 63; 8 for 64 and 65.  
(iv) N.A.  
(v) 3.05 m x 1.83 m.  
(vi) N.A.  
(vii) Yes.

**4. GENERAL:**

(i) Normal  
(ii) N.A.  
(iii) Yield of seed.  
(iv) (a) 1962—Contd.  
(b) No.  
(c) Nil.  
(v) N.A.  
(vi) Nil.  
(vii) Since exp't is continued beyond 65, hence individual year results are presented under 5. Results.

**5. RESULTS:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>Treatment Differences</th>
<th>Av. Yield of Seed in Kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>(139)</td>
<td>230 Kg/ha.</td>
<td>100·0 Kg/ha.</td>
<td>300·0 Kg/ha.</td>
<td>not significant</td>
<td>100·0 Kg/ha.</td>
</tr>
<tr>
<td>63</td>
<td>(160)</td>
<td>440 Kg/ha.</td>
<td>200·0 Kg/ha.</td>
<td>240 Kg/ha.</td>
<td>not significant</td>
<td>240 Kg/ha.</td>
</tr>
<tr>
<td>64</td>
<td>(150)</td>
<td>200 Kg/ha.</td>
<td>101·0 Kg/ha.</td>
<td>99 Kg/ha.</td>
<td>significantly</td>
<td>99 Kg/ha.</td>
</tr>
<tr>
<td>65</td>
<td>(185)</td>
<td>1869 Kg/ha.</td>
<td>394·3 Kg/ha.</td>
<td>1475 Kg/ha.</td>
<td>significantly</td>
<td>1475 Kg/ha.</td>
</tr>
</tbody>
</table>

Crop: Cauliflower *(Rabi)*.  
Ref: H.P. 64(139).  
Site: Agri. Res. Farm, Dhaula Kuan.  
Type: *M*.  
Object: To study the effect of N, P and K applied individually and in combination on the yield of Cauliflower.
1. BASEL CONDITIONS:

(i) (a) N.A. (b) Tomato. (c) N.A. (ii) Sandy. (iii) 29.5.64/24.10.64. (iv) (a) N.A. (b) Transplanting. (c) to (e) N.A. (v) N.A. (vi) Snowball. (vii) Irrigated. (viii) 3 hoeings and 3 weedings. (ix) and (x) N.A.

2. TREATMENTS:

All combinations of (i), (2) and (3).

(1) 3 levels of N as A/S: N₁=0, N₂=56, and N₃=112 Kg/ha.

(2) 3 levels of P₂O₅ as Super: P₀=0, P₁=44·8, and P₂=67·2 Kg/ha.

(3) 3 levels of K₂ as Mur. Pot: K₀=0, K₁=22·4, and K₂=44·8 Kg/ha. N applied in two doses on 14.11.64 and 14.12.64.

3. DESIGN:

(i) 3° Fact. confd. (W-effect completely confd.). (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 2

(iv) (a) N.A. (b) 3·05 m. x 2·44 m. (v) N.A. (vi) Yes

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of Cauliflower. (iv) (a) 1964-only. (b) No. (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:

(i) 89·4 Q/ha. (ii) 43·2 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of Cauliflower in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>58·1</td>
<td>84·1</td>
<td>94·3</td>
<td>70·4</td>
<td>79·3</td>
<td>87·5</td>
<td>79·1</td>
</tr>
<tr>
<td>N₁</td>
<td>85·2</td>
<td>83·0</td>
<td>92·4</td>
<td>63·1</td>
<td>106·4</td>
<td>91·1</td>
<td>96·9</td>
</tr>
<tr>
<td>N₂</td>
<td>75·0</td>
<td>118·8</td>
<td>113·0</td>
<td>81·3</td>
<td>120·0</td>
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<td>102·3</td>
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<td>99·9</td>
<td>71·6</td>
<td>101·9</td>
<td>94·7</td>
<td>89·4</td>
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</table>

K₀    | 56·1 | 63·8 | 94·9 |
K₁    | 96·5 | 105·5 | 103·7 |
K₂    | 66·4 | 116·5 | 101·1 |

Crop : Cauliflower (Rabi).

Site : Agri. Res. Farm, Dhaula Kuan.

Object : To study the effect of P on the yield of Cauliflower.

1. BASEL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 5.11.64. (iv) (a) to (c) N.A. (v) 112 Kg/ha. of N as A/S applied in two doses on 4.1.65 and 15.1.65 to all plots. (vi) Snowball. (vii) Irrigated. (viii) and (ix) N.A.

2. TREATMENTS:

4 doses of P₂O₅ as Super: P₀=control (no manure), P₁=28, P₂=56 and P₃=84 Kg/ha.

Ref : H.P. 64(138).

Type : 'M'.

Object :—To study the effect of P on the yield of Cauliflower.
3. DESIGN:
   (i) R.B.D. (ii) 4. (b) N.A. (iii) 7 (iv) (a) N.A. (b) 3'05 m. x 1'83 m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cauliflower. (iv) (a) 1964—only (b) No. (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:
   (i) 3948 Kg/ha. (ii) 1139·2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of cauliflower in Kg/ha.

   Treatment   P₀   P₁   P₂   P₃
   Av. yield   3971  4212  3953  4054

Crop: Cauliflower.  Ref: H.P. 62(231),
Site: Agri. Res. Sta., Dhaula Kuan,  Type: 'M'.
Object: To study the effect of micronutrients on the yield of Cauliflower.

1. BASAL CONDITIONS:
   (iv) (a) to (c) N.A. (d) 61cm. x 45cm. (e) — (v) 400 Kg/ha. of F.Y.M. raised before transplanting. (vi) Snow ball (Late). (vii) Irrigated. (viii) 8 weedings and one hoeing. (ix) 15 cm. (x) 4 to 18.12.63.

2. TREATMENTS:
   All combinations of (1) and (2).
   (1) 3 levels of boron:—B₀=Control (no boron), B₁=6·7 Kg/ha. and B₂=8·0 Kg/ha.
   (2) 3 levels of molybdenum:—M₀=Control, M₁=1·1 and M₂=1·7 Kg/ha.
   Micronutrients sprayed before planting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 2·44 m. x 1'83 m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Poor. (ii) Aphids attack and B.H.C. dusted. (iii) Yield of cauliflower. (iv) (a) 1962—only. (b) No. (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:
   (i) 2936 Kg/ha. (ii) 1708 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of cauliflower in Kg/ha.

<table>
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<tr>
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<td>3317</td>
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Crop: Cauliflower.
Site: Vegetable Res. Sta., Bhagot.
Object: To study the effect of once and twice transplanting on the yield of Cauliflower.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Loamy. (iii) 21.7.61. (iv) (a) N.A. (b) Transplanting. (c) 45cm. (d) Plant to plant, Row to row, 61cm. (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) 7.9.61 to 26.10.61.

2. TREATMENTS:
   2 planting treatments: T1=Once transplanting and T2=Twice transplanting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 6'0m×1'83m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cauliflower. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 3633 Kg/ha. (ii) 93.7 Kg/ha. (iii) Treatment difference is highly significant. (iv) Av. yield of cauliflower in Kg/ha.
   Treatment  | T1    | T2    | C.D.  
------------|-------|-------|------
Av. yield   | 3153  | 4113  | 1443

Crop: Cauliflower.
Site: Vegetable Res. Sta., Bhagot.
Object: To study the effect of Bora spray on the yield of Cauliflower.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) N.A. (iii) 30.7.62. (iv) (a) — (b) Transplanting. (c) N.A. (d) and (a) N.A. (e) to (ix) N.A. (x) Sept., and Oct., 62.

2. TREATMENTS:
   T0=Control (no bora applied), T1=11'2 Kg/ha, of Bora sprayed twice—15 days and 30 days after transplanting.

3. DESIGN:
   (i) Paired-plot. (ii) (a) 2. (b) N.A. (iii) 7. (iv) (a) N.A. (b) 5'03m×1'22m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cauliflower. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.
5. RESULTS:

(i) 4158 Kg/ha, (ii) 833.9 Kg/ha, (iii) Treatment differences is not significant, (iv) Av. yield of cauliflower in Kg/ha.

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<tr>
<th>Treatment</th>
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Crop = Turnip.  
Site = Vegetable Res. Sta., Kalpa.

Object: To study the effect of N, P and K applied individually and in combination on the yield of Turnip.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  
   (ii) Sandy loam.  
   (iii) 2nd week of April.  
   (iv) and (v) N.A.  
   (vi) P.T.W. Globe (Late)  
   (vii) Irrigated.  
   (viii) N.A.  
   (ix) 15cm. to 20 cm.  

2. TREATMENTS:

   All combinations of (1), (2) and (3)

   (1) 3 levels of N: N₁=56, N₂=112 and N₃=168 Kg/ha.

   (2) 3 levels of P₂O₅: P₁=28, P₂=56 and P₃=112 Kg/ha.

   (3) 3 levels of K₂O: K₁=11.2, K₂=28 and K₃=44.8 Kg/ha.

   Sources of N, P, K and time of application— N.A.

3. DESIGN:

   (i) 3 comp. (Z-effect compd.).  
   (ii) (a) 3 blocks/replication and 9 plots/block.  
   (b) N.A.  
   (iii) 2.  
   (iv) (a) N.A.  
   (b) 1.83m. x 1.83m.  
   (v) N.A.  
   (vi) Yes.

4. GENERAL:

   (i) Normal.  
   (ii) N.A.  
   (iii) Yield of turnip.  
   (iv) (a) 1966—only.  
   (b) No.  
   (c) Nil.  
   (v) to (vii) N.A.

5. RESULTS:

   (i) 22.3 Q/ha.  
   (ii) 6.8 Q/ha.  
   (iii) None of the effects is significant.  
   (iv) Av. yield of turnip in Q/ha.

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</table>
Crop : - Turnip.  
Ref : - H.P. 64(286).

Site : Vegetable Res. Sta., Katrain.  
Type : 'M'.

Object : To study the effect of different levels of N and P on the yield of Turnip.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 26.11.64 (date of transplanting is N.A.).  (iv) and (v) N.A.  (vi) Purple Top White.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 2nd week of June, 65.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of N : - N₁ = 0, N₂ = 62 and N₃ = 124 Kg/ha.
   (2) 2 levels of P₀₂ : - P₀ = 0, and P₁ = 99 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D.  (ii) 6.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/1630 = 941 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of seed.  (iv) (a) 1964-66 (Expt. not conducted in 65).  (b) N.A.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
   (i) 1656 Kg/ha.  (ii) 1590 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of seed in Kg/ha.

\[
\begin{array}{|c|c|c|c|}
\hline
\text{N₀} & \text{N₁} & \text{N₂} & \text{Mean} \\
\hline
\text{P₀} & 722 & 1639 & 3404 & 1922 \\
\text{P₁} & 754 & 1708 & 1708 & 1390 \\
\hline
\text{Mean} & 738 & 1674 & 2556 & 1655 \\
\hline
\end{array}
\]

---

Crop : - Turnip.  
Ref : - H.P. 65(192).

Site : Vegetable Res. Sta., Kalpa.  
Type : ‘C’.

Object : To see the best spacing for the seed production of Turnip crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 12.4.65.  (iv) (a) 2 diggings.  (b) Planting.  (c) N.A.  (d) As per treatments.  (e) one  (v) N.A.  (vi) Purple Top White Globe.  (vii) Unirrigated.  (viii) 1 Weeding  (ix) N.A.  (x) July, 65.

2. TREATMENTS:
   Main-plot treatments:
   3 spacings between rows : - S₁ = 46, S₂ = 61, and S₃ = 76 cm.

   Sub-plot treatments:
   3 plant spacings : - P₁ = 30.5, P₂ = 45 and P₃ = 61 cm.
3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication and 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) plots lying in main-plots 3.66 m x 2.29 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of turnip seed. (iv) (a) 1965—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 313 Kg/ha. (ii) (a) 201.5 Kg/ha. (b) 74.1 Kg/ha (iii) Main effect of P alone is highly significant (iv) Av. yield of seed in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>Mean</th>
</tr>
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<td>275</td>
<td>288</td>
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<tr>
<td>S2</td>
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<td>335</td>
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<td>259</td>
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<tr>
<td>Mean</td>
<td>373</td>
<td>313</td>
<td>252</td>
<td>313</td>
</tr>
</tbody>
</table>

C.P. for P marginal means = 63.5 Kg/ha.

Crop: Turnip.
Site: Vegetable Res. Stn., Kalpa.
Object: To find out the optimum spacing for seed yield of Turnip crop.

1 BASAL CONDITIONS:
(i) N.A. (ii) Clay loam. (iii) 1.4.65. (iv) (a) 2 to 3 diggings. (b) Transplanting. (c) N.A. (d) As per treatments. (e) One. (v) N.A. (vi) Purple Top White Globe. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) Last week of July, 65.

2 TREATMENTS:
Main-plot treatments:
3 spacings between rows: S1 = 45, S2 = 61 and S3 = 91 cm.

Sub-plot treatments:
3 spacings within rows: R1 = 20, R2 = 30 and R3 = 45 cm.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication and 3 sub-plots/main-plot. (b) N.A. (iii) 8. (iv) (a) N.A. (b) 1.81 m x 1.83 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of seed. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) to (vii) Nil.

5 RESULTS:
(i) 985 Kg/ha. (ii) (a) 309.3 Kg/ha. (b) 294.0 Kg/ha. (iii) Main effects of S and R are highly significant. Interaction S x R is significant. (iv) Av. yield of seed in Kg/ha.
Object: - To see the effect of different sizes of the roots on the seed production of Turnip.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A, (ii) Clay loam. (iii) 14.4.65. (iv) (a) 2 to 3 diggings. (b) Transplanting. (c) N.A. (d) 61cm. x 61cm. (e) One. (v) N.A. (vi) Purple Top White Globe. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 1.7.65.

2. TREATMENTS:
3 root sizes in diameters for transplanting: - R₁ = 2.5cm. to 5cm., R₂ = 5cm. to 7.5cm. and R₃ = 7.5cm. of diameter.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 5 (iv) (a) N.A. (b) 1.83m. x 1.83m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of seed. (iv) (a) 1965-contd. (b) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 1135 Kg/ha. (ii) 258.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of seed in Kg/ha.

Site: - Vegetable Res. Sta. Kalpa. Type: - 'C'.

Site: - Agri. Res. Sta. Dhaula Kuan. Type: - 'M'.

Object: - To study the effect of different levels of N, P and K on the yield of Carrot crop.
1. BASAL CONDITIONS:
   (i) (a) Cabbage-Capsicum-Carrot. (b) Capsicum. (c) 500 Kg. of FYM, before transplanting + 4 Kg. of A/S after 1 and 2 months, later 4 Kg. of S/F followed by ploughing. (ii) Sandy loam. (iii) 4.10.62. (iv) (a) 4 ploughings and plankings. (b) and (c) N.A. (d) 3cm. x 3cm. (e) - (v) Nil. (vi) Ch. Scarlet (Mid-late) (vii) Irrigation by Tubewell, Girrigation. (viii) 3 hoeings and weeding. (ix) 13 cm. (x) 30.1.63 to 24.2.63.

2. TREATMENTS:
   Main-plot treatments:
   2 levels of N : N1 = 28 and N2 = 56 Kg/ha. of N
   Sub-plot treatments:
   All combinations of (1) and (2)
   (1) 3 levels of P2O5 : P1 = 17.7, P2 = 35.9 and P3 = 55.2 Kg/ha.
   (2) 3 levels of K2O : K1 = 26.9, K2 = 53.8 and K3 = 80.7 Kg/ha.
   P2O5 applied followed by ploughing while N and K2O applied in two lots first with sowing and second 40 days after it.

3. DESIGN:
   (i) Split-plot. (ii) 2 main-plots/replcation ; 9 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) and (b) 305m x 1.83m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of Carrot. (iv) (a) 1962-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 211.8 Q/ha. (ii) (a) 17.7 Q/ha. (b) 28.5 Q/ha. (iii) Interaction P x K is significant. (iv) Av. yield of Carrot in Q/ha.

<table>
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<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>K1</th>
<th>K2</th>
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C.D. for the body of P x K table—3.75 Q/ha.

Crop : Carrot. 
Site : Vegetable Res. Sta., Kalpa.
Object : To study the effect of different levels of N, P and K on the yield of Carrot.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 12.4.65; 1st week of April 64. (iv) (a) to (e) N.A. (v) N.A. (vi) Chantenary. (vii) Irrigated. (viii) N.A. (ix) 13 cm. to 28 cm. (x) N.A.
2. TREATMENTS:

All combinations of (1), (2) and (3).

(1) 3 levels of N : $N_1=56$, $N_2=112$ and $N_3=168$ Kg/ha.

(2) 3 levels of $P_2O_5 : P_1=28$, $P_2=56$ and $P_3=112$ Kg/ha.

(3) 3 levels of $K_2O : K_1=11.2$, $K_2=28$ and $K_3=44.8$ Kg/ha.

3. DESIGN:

(i) 3\(^{rd}\) confd. (Z-effect completely confd.), (ii) 3 blocks/repl. , 9 plots/block. (b) N.A. (iii). 2, (iv) a N.A. (b) 1/1993 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of seed. (iv) (a) 1963-64. (b) N.A. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) N.A. (vii) Error Variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:

Pooled results:

(1) 541 Kg/ha. (ii) 225.4 Kg/ha. (based on 65 d.f. made up of Treatments x Years interaction and pooled error.). (iii) None of the effect is significant. (iv) Av. yield of seed in Kg/ha.

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<td>479</td>
<td>632</td>
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<td>$N_2$</td>
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Individual results

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<th>$P_1$</th>
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<th>$P_3$</th>
<th>Sig.</th>
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<th>Sig.</th>
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<tr>
<td>Year</td>
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<td></td>
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<td>949</td>
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<td>N.S.</td>
<td>54</td>
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</tbody>
</table>

Crop :- Carrot (Rabi).

Site :- Vegetable Res. Sta., Katrian.

Object :- To study the effect of different levels of N, P and K on the seed yield.
1. **BASAL CONDITIONS:**

   (i) (a) to (c) N.A.  
   (ii) Sandy loam.  
   (iii) N.A.  
   (iv) (a) to (e) N.A.  
   (v) N.A.  
   (vi) Irrigated.  
   (vii) N.A.  
   (viii) N.A.  
   (ix) 12.7.64.

2. **TREATMENTS:**

   5 manurial treatments: M<sub>1</sub>=control, M<sub>2</sub>=28Kg/ha. of N+90Kg/ha of P<sub>2</sub>O<sub>5</sub>+45Kg of K<sub>2</sub>O, M<sub>3</sub>=56 Kg/ha of N+90Kg/ha of P<sub>2</sub>O<sub>5</sub>+45Kg/ha of K<sub>2</sub>O, M<sub>4</sub>=84Kg/ha of N+90Kg/ha of P<sub>2</sub>O<sub>5</sub> +45Kg/ha of K<sub>2</sub>O.

3. **DESIGN:**

   (i) R.B.D.  
   (ii) (a) 5.  
   (iii) 4.  
   (iv) (a) N.A.  
   (v) Non-t.  
   (vi) N.A.  
   (vii) Irrigated.  
   (viii) N.A.  
   (ix) 12.7.64.

4. **GENERAL:**

   (i) and (ii) N.A.  
   (iii) Yield of seed.  
   (iv) 1963-only.  
   (v) N.A.  
   (vi) N.A.  
   (vii) N.A.  
   (viii) N.A.  
   (ix) N.A.

5. **RESULTS:**

   (i) 301 Kg/ha.  
   (ii) 126.5 Kg/ha.  
   (iii) N.A. 

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M&lt;sub&gt;0&lt;/sub&gt;</th>
<th>M&lt;sub&gt;1&lt;/sub&gt;</th>
<th>M&lt;sub&gt;2&lt;/sub&gt;</th>
<th>M&lt;sub&gt;3&lt;/sub&gt;</th>
<th>M&lt;sub&gt;4&lt;/sub&gt;</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>171</td>
<td>247</td>
<td>350</td>
<td>554</td>
<td>648</td>
</tr>
</tbody>
</table>

C.D. = 215.9 Kg/ha.

**Crop:** Carrot.  
**Site:** Vegetable Res. Stn., Kalpa.  
**Ref:** H.P. 65(194).  
**Type:** -0 'C'.
Crop: Carrot.  
Site: Vegetable Res. Sta., Kalpa.

Object: To study the effect of cut carrot on the yield of Carrot.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) April, 62; June, 63. (iv) (a) to (c) N.A. (v) N.A. (vi) Tender sweet for 62 and chanting for 63. (vii) Irrigated. (viii) and (ix) N.A. (x) September, 62, October 63.

2. TREATMENTS:
   5 methods of carrot cuttings at sowing:—T0—Whole root (control), T1—Root tips cut, T2—1/4 in root length cut, T3—1/2 in root length cut and T4—3/4 in root length cut.

3. DESIGN:
   (i) R.B.D. (ii) 5. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 2·44m. x 1·22m.; 3·05m. x 1·83m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) N.A. (iii) Yield of carrot seed. (iv) 1962-63. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:
Pooled results
(i) 566 Kg/ha. (ii) 221·4 Kg/ha (based on 28 d.f. made up of pooled error and Treatments x Years interaction.) (iii) Treatment differences are not significant. (iv) Av. yield of carrot seed in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0</td>
<td>715</td>
<td>581</td>
<td>512</td>
<td>497</td>
<td>504</td>
<td>494</td>
</tr>
<tr>
<td>Year 1962</td>
<td>660</td>
<td>462</td>
<td>505</td>
<td>484</td>
<td>357</td>
<td>N.S. 238'8</td>
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<tr>
<td>Year 1963</td>
<td>770</td>
<td>700</td>
<td>540</td>
<td>510</td>
<td>650</td>
<td>N.S. 110'0</td>
</tr>
<tr>
<td>Pooled</td>
<td>715</td>
<td>581</td>
<td>512</td>
<td>497</td>
<td>504</td>
<td>N.S. 221'4</td>
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</tbody>
</table>

Individual results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>Sig.</th>
<th>S.E./plot</th>
<th>G.M.</th>
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</thead>
<tbody>
<tr>
<td>Year 1962</td>
<td>660</td>
<td>462</td>
<td>505</td>
<td>484</td>
<td>357</td>
<td>N.S.</td>
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<tr>
<td>Year 1963</td>
<td>770</td>
<td>700</td>
<td>540</td>
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<td>N.S.</td>
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<td>581</td>
<td>512</td>
<td>497</td>
<td>504</td>
<td>N.S.</td>
<td>221'4</td>
<td>556</td>
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</tbody>
</table>
Crop: Carrot.  
Site: Vegetable Res. Sub-Stn., Kulpur.

Object: To study the effect of spacings on the yield of Carrot.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 11.4.63.  (iv) (a) to (c) N.A.  (v) As per treatments  (vi) N.A.  
   (v) to (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   3 spacings between rows: R₁ = 46, R₂ = 61, and R₃ = 76 cm.
   Sub-plot treatments:
   3 spacings within rows: S₁ = 38, S₂ = 58, and S₃ = 66 cm.

3. DESIGN:
   (i) Split-plot.  (ii) 3 main-plots/replication and 3 sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  
   (b) 3'05 m x 2'29 m.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  (ii) N.A.  (iii) Yield of Carrot.  (iv) (a) 1963-only.  (b) No.  (c) Nil.  (v) to (vii) N.A.

5. RESULTS:
   (i) 1030 Kgable.  (ii) (a) 427.8 Kgable.  (b) 120.1 Kgable.  (iii) Main effect of S is highly significant and interaction R × S is significant.  
   (iv) Av. yield of carrot in Kgable.

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
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<th>S₃</th>
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<td>R₁</td>
<td>1285</td>
<td>1109</td>
<td>888</td>
<td>1094</td>
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<tr>
<td>R₂</td>
<td>1195</td>
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<tr>
<td>R₃</td>
<td>1211</td>
<td>836</td>
<td>1025</td>
<td>1024</td>
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<tr>
<td>Mean</td>
<td>1230</td>
<td>961</td>
<td>999</td>
<td>1030</td>
</tr>
</tbody>
</table>

C.D. for S marginal means = 1090 Kgable.
C.D. for S means at the same level of R means = 1784 Kgable.
C.D. for R means at the same level of S means = 4308 Kgable.

Crop: Beans.  
Site: Vegetable Res. Sta., Shagat.  
Ref: H.P. 60(69).  
Type: ‘M’.

Object: To study the effect of different levels of N, P, and K on the yield of Beans.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Loamy.  (iii) 29.2.60.  (iv) and (by) N.A.  (v) As paragus beans.  (vii) to (ix) N.A.  
   (x) 16.6.60 to 6.7.60.

2. TREATMENTS:
   All combinations of (1), (2), and (3) + a control (no measure)
   (1) 2 levels of N := N₁ = 15.6 and N₂ = 56.9 Kgable.
   (2) 2 levels of P₂/5 := P₁ = 53.8 and P₂ = 71.7 Kgable.
   (3) 2 levels of K₂/3 := K₁ = 28 and K₂ = 56 Kgable.
3. DESIGN:
(i) R.B.D. (ii) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3'05m.×1'22m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Yield of beans (iv) (a) 1960-only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 3010 Kg/ha. (ii) 1223 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of beans in Kg/ha.

Control yield=3333 Kg/ha

<table>
<thead>
<tr>
<th></th>
<th>$N_1$</th>
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<th>$K_1$</th>
<th>$K_2$</th>
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<td>2685</td>
<td>3333</td>
<td>2579</td>
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<td>$P_2$</td>
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<td>2676</td>
<td>3342</td>
<td>3009</td>
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<tr>
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<td>2936</td>
<td>3004</td>
<td>3004</td>
<td>2936</td>
<td>2970</td>
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Crop : Vegetable Marrow  
Site : Vegetable Res. Stn., Katran.  
Ref : H.P. 64(284).  
Type : 'M'.  
Object : To study the effect of different levels of N and P on the seed yield.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 7.4.64. (iv) (a) to (e) N.A. (v) N.A. (vi) White Bush. (vii) Irrigated. (viii) and (ix) N.A. (x) Aug. to Sep. 64.

2. TREATMENTS:
All combinations of (1) and (2).
(1) 3 levels of $N$ : $N_0=0$, $N_1=25$ and $N_2=50$ Kg/ha.
(2) 2 levels of $P_0$ : $P_0=0$ and $P_1=25$ Kg/ha.

3. DESIGN
(i) R.B.D. (ii) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/1709'99 ha. (v) N.A. (vi) Yes.

4. GENERAL
(i) and (ii) N.A. (iii) Yield of seed and No. of fruits. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 216 Kg/ha. (ii) 55.1 Kg/ha. (iii) Main effect of $N$ alone is highly significant. (iv) Av. yield of Marrow in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$N_0$</th>
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<td>212</td>
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<td>$P_1$</td>
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<td>221</td>
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<tr>
<td>Mean</td>
<td>103</td>
<td>194</td>
<td>352</td>
<td>216</td>
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</table>

C.D. for $N$ marginal means=59.7 Kg/ha.
Crop: Sugarbeet.  
Site: Vegetable Res. Sub-Stn., Bunch.  
Type: 'M'.

Object: To see the effect of Nitrogen in the absence or presence of common salt.

1. BASAL CONDITIONS:
   (i) (a) Peas—Tomato—Sugarbeet.  (b) Tomato.  (c) F.Y.M. was applied.  (ii) N.A.  (iii) 18.03.  (iv) (a) to (c) N.A.  (d) 45cm. between rows.  (e) N.A.  (v) 46Q/ha of F.Y.M. was applied.  (vi) Erotype E.  (vii) Irrigated.  (viii) Weedig.  (ix) 153x4 cm. to 177x4 cm.  (x) N.A.

2. TREATMENTS and DESIGN
   Same as in Expt. No. 63 (152) conducted at Solan and presented on page No. 304.

4. GENERAL:
   (i) N.A.  (ii) N.A.  (iii) Yield of sugarbeet.  (iv) (a) 19b3—only.  (b) No.  (c) Nil.  (v) Sclan (vi) and (vii) Nil.

5. RESULTS:
   (i) 147.5Q/ha.  (ii) (a) 23.7Q/ha.  (b) 2.0Q/ha.  (iii) Main effect of S is highly significant and interaction T x S is significant.  (iv) Av. yield of sugarbeet in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>Mean</th>
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<tr>
<td>S0</td>
<td>127.6</td>
<td>139.2</td>
<td>143.4</td>
<td>147.1</td>
<td>148.9</td>
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<tr>
<td>S1</td>
<td>140.8</td>
<td>150.5</td>
<td>152.6</td>
<td>163.7</td>
<td>164.1</td>
</tr>
<tr>
<td>Mean</td>
<td>134.2</td>
<td>144.9</td>
<td>148.0</td>
<td>155.4</td>
<td>155.0</td>
</tr>
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</table>

C.D. for S marginal means=1.3Q/ha.
C.D. for S means at the same level of T means=3.0Q/ha.
C.D. for T means at the same level of S means=18.0Q/ha.

Crop: Sugarbeet.  
Site: Agri. Farm, Dhaulu Kuan.  
Type: 'M'.

Object: To study the optimum dose of F.Y.M. for sugarbeet crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy.  (iii) 3.10.04 ; N.A.  (iv) (a) 3 ploughings.  (b) and (c) N.A.  (d) 46cm. apart.  (e) N.A.  (vi) As per treatments.  (vii) Romoea Keys; Erotyku (mid-season).  (viii) N.A.  (ix) N.A.  (x) 153x4.  (xi) 26.10.65; N.A.

2. TREATMENTS:
   4 doses of F.Y.M. :=F0=control, F1=18.4, F2=32.2 and F4=46.1 Kg/ha.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 6.  (iv) (a) and (b) 3:05m. x 1:33m.  (v) Nil.  (vi) Yes.
4. GENERAL:
(i) and (ii) N.A. (iii) Yield of sugarbeet. (iv) (a) 1964-65. (b) N.A. (c) Results of combined analysis are presented under 5. Results. (v) Soln. (vi) N.A. (vii) Error variances are homogeneous and Treatment x Years interaction is absent.

5. RESULTS:
Pooled Results
(i) 274.1 Q/ha. (ii) 92.5 Q/ha (based on 33 d.f. made up of Treatments x Years interaction and pooled error).
(iii) Treatment differences are significant. (iv) Av. yield of Sugarbeet in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$F_0$</th>
<th>$F_1$</th>
<th>$F_2$</th>
<th>$F_3$</th>
<th>Sig.</th>
<th>O.M.</th>
<th>S.E./plot</th>
</tr>
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<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1964</td>
<td>212.9</td>
<td>292.4</td>
<td>305.0</td>
<td>289.1</td>
<td>N.S.</td>
<td>274.8</td>
<td>82.6</td>
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<tr>
<td>1965</td>
<td>221.9</td>
<td>279.6</td>
<td>387.2</td>
<td>205.1</td>
<td>*</td>
<td>273.5</td>
<td>95.9</td>
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<tr>
<td>Pooled</td>
<td>217.4</td>
<td>286.0</td>
<td>346.1</td>
<td>247.1</td>
<td>*</td>
<td>274.1</td>
<td>92.5</td>
</tr>
</tbody>
</table>

Crop : Sugarbeet. Ref : H.P. 63(152), 64(140).
Site : Vegetable Res. Stn., Solan. Type : 'M'.
Object : To study the comparison of A/s vet. Sodium Nitrato in the presence and absence of common salt on the yield of Sugarbeet.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loamy. (iii) 25.7.63; 5.8.64. (iv) (a) to (e) N.A. (v) 461.1 Q/ha of F.Y.M.; 184.5 Q/ha of F.Y.M. (vi) Romona Kayas. (vii) Irrigated; Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
Main-plot treatments:
5 nitrogenous treatments: $T_1$=control, $T_2$=251'1 Kg/ha of A/s, $T_3$=502'1 Kg/ha of A/s, $T_4$=313'8 Kg/ha of sod. nitrate and $T_5$=627'6 Kg/ha of sod. nitrate.

Sub-plot treatments:
2 salt treatments: $S_1$=No salt and $S_2$=499'4 Kg/ha of common salt was applied in half plot objects treatment.

3. DESIGN:
(i) Split-plot. (ii) (a) 5 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 610 m x 3'66 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of sugarbeet. (iv) (a) 1963-64. (b) No. (c) Nil. (v) Bosch. (vi) Nil. (vii) Sub-plot error variances are heterogeneous. Hence individual years results are presented under 5. Results.
5. RESULTS:

63 (182)

(i) 145·7Q/ha. (ii) (a) 31·9Q/ha. (b) 41Q/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of Sugar beet in Q/ha.

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>135·3</td>
<td>142·9</td>
<td>147·7</td>
<td>146·0</td>
<td>147·3</td>
</tr>
<tr>
<td>S3</td>
<td>129·2</td>
<td>147·6</td>
<td>150·6</td>
<td>161·6</td>
<td>154·1</td>
</tr>
<tr>
<td>Mean</td>
<td>142·4</td>
<td>149·5</td>
<td>154·2</td>
<td>153·9</td>
<td>157·6</td>
</tr>
</tbody>
</table>

C.D. for S marginal means=2·05Q/ha.

64 (140)

(i) 147·5Q/ha. (ii) (a) 23·8Q/ha. (b) 2·9Q/ha. (iii) Main effect of S is highly significant and interaction T×S is significant. (iv) Av. yield of sugar beet in Q/ha.

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
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<td>139·3</td>
<td>143·4</td>
<td>147·1</td>
<td>148·9</td>
</tr>
<tr>
<td>S3</td>
<td>141·1</td>
<td>150·5</td>
<td>152·6</td>
<td>163·4</td>
<td>151·8</td>
</tr>
<tr>
<td>Mean</td>
<td>138·0</td>
<td>144·9</td>
<td>148·0</td>
<td>155·2</td>
<td>155·2</td>
</tr>
</tbody>
</table>

C.D. for S marginal means=1·23Q/ha.

C.D. for S means at the same level of T means=2·86Q/ha.

C.D. for T means at the same level of S means=25·9 Q/ha.

---

Crop : Sugarcane, (Baloon).
Site : Crop. Res. Stn., Dhaula Kuan (Sirmaur).
Object : To find out the optimum seed rate and spacing for Sugarcane crop.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Sugarcane. (c) 67Kg/ha of N as CA/N. (ii) Sandy loam. (iii) N.A. (iv) (a) and (b) Nil. (c) Nil as raatoo crop. (d) As per treatments. (e) — (v) 67Kg/ha of N, ½ at early rains and ½ at earthing up (vi) Coj. 46. (vii) Irrigated. (viii) 3 hoeings and one earthing up. (ix) N.A. (x) 17.3.66 to 25.3.66.

2. TREATMENTS:

All combinations of (1) and (2)

1) 3 seed rates: R1=74000, R2=86000 and R3=99000 two budded seta/ha.
2) 3 spacings: S1=45·7, S2=61·0 and S3=76·2cm.

3. DESIGN:

(i) Pact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 9·14m.×3·66m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of sugarcane. (iv) (a) 1965—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.
5. RESULTS:

(i) 700.9 Q/ha. (ii) 122.9 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of sugarcane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>R_1</td>
<td>632.3</td>
<td>649.9</td>
<td>633.9</td>
<td>659.0</td>
</tr>
<tr>
<td>R_2</td>
<td>618.2</td>
<td>769.9</td>
<td>749.0</td>
<td>712.4</td>
</tr>
<tr>
<td>R_3</td>
<td>710.8</td>
<td>791.6</td>
<td>691.4</td>
<td>733.1</td>
</tr>
<tr>
<td>Mean</td>
<td>660.8</td>
<td>750.5</td>
<td>691.4</td>
<td>700.9</td>
</tr>
</tbody>
</table>

Crop :- Sugarcane.
Site :- Crop. Res. Sta. Dhaula Kuan (Sirmur).
Object :- To find out the spaces and seed rate for Sugarcane crop.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 10, 11, 3.65. (iv) (a) 5 ploughings. (b) N.A. (c) and (d) As per treatments. (e) N.A. (v) 67 Kg/ha. of N, P at sowing and 1 at earthing up. (vi) N.A. (vii) Unirrigated. (viii) 3 hoeings and 1 earthing up. (ix) 132.7 cm. (x) 25 to 30.3.66.

2. TREATMENTS:

2 Treatments to 4. General :- Same as in Expt. no. H.P. 65 (176) conducted on page no. 305.

5. RESULTS:

(i) 528.5 Q/ha. (ii) 128.5 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of sugarcane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>R_1</td>
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<td>533.0</td>
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<td>483.9</td>
</tr>
<tr>
<td>R_2</td>
<td>514.3</td>
<td>469.4</td>
<td>559.1</td>
<td>512.3</td>
</tr>
<tr>
<td>R_3</td>
<td>547.1</td>
<td>611.4</td>
<td>609.2</td>
<td>589.3</td>
</tr>
<tr>
<td>Mean</td>
<td>523.7</td>
<td>535.9</td>
<td>525.7</td>
<td>528.5</td>
</tr>
</tbody>
</table>

Crop :- Groundnut (Kharif).
Site :- Agri. Farm Haripura.
Object :- To find out the effect of earthing up and spacing on the yield of Groundnut.

1. BASAL CONDITIONS :

(i) to (x) N.A.
2. TREATMENTS:

All combinations of (1) and (2)
(1) 2 earthingup : Eo = No earthingup and E1 = Earthingup.
(2) 4 spacings : S1 = 60 cm. x 10 cm., S2 = 46 cm. x 10 cm., S3 = 30 cm. x 15 cm. and S4 = 23 cm. x 20 cm.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 3'05m. x 3'05m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of pod (iv) (a) 1964-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 964 Kg/ha. (ii) 171'6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eo</td>
<td>1022</td>
<td>1009</td>
<td>909</td>
<td>997</td>
<td>984</td>
</tr>
<tr>
<td>E1</td>
<td>909</td>
<td>972</td>
<td>922</td>
<td>972</td>
<td>944</td>
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<tr>
<td>Mean</td>
<td>966</td>
<td>990</td>
<td>916</td>
<td>984</td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Sesamum.  Ref :- P.L. 64(253).
Site :- Agri. Farm, Haripura.  Type :- 'C'.
Object :- To find out the suitable date of sowing for Sesamum.

1. BASAL CONDITIONS:

(i) to (x) N.A.

2. TREATMENTS:

5 dates of sowing : D1 = 25.5.64, D2 = 4.6.64, D3 = 14.6.64, D4 = 25.6.64 and D5 = 3.7.64.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3'66m. x 2'44m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of sesamum. (iv) (a) 1964-only. (b) No. (c) Nil. (v) N.A. (vi) Nil, (vii) Treatment D5 failed and hence the analysis was carried out with 4 treatments only.

5. RESULTS:

(i) 307 Kg/ha. (ii) 170'8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of sesamum in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>C.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>575</td>
<td>266</td>
<td>252</td>
<td>134</td>
<td>273'2 Kg/ha.</td>
</tr>
</tbody>
</table>
Crop : Sarson (Rabi).

Ref :- H.P. 62(111).

Site :- Agri. Res. Farm, Dhaula Kuan.

Type :- ‘M’.

Object :— To study the effect of different levels of N & P on the yield of Sarson.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 2.1.62. (iv) (a) and (b) N.A. (c) 7 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) B.S.G.—I. (vii) Irrigated. (viii) and (ix) N.A. (a) 21.3.63.

2. TREATMENTS:
   All combinations of (1) and (2) :
   (1) 4 levels of N as A/S : N₀=O, N₁=22'4, N₂=33'6 and N₃=44'8 Kg/ha.
   (2) 4 levels of P₂O₅ as Super : P₀=O, P₁=17'9, P₂=26'9 and P₃=35'9 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) 6'71m. x 1'83m. (b) 5'49m. x 1'37m. (v) 61cm. x 23cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of Sarson. (iv) (a) 1962-63 (Design modified in 63). (b) No. (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:
   (i) 201 Kg/ha. (ii) 91'6 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of Sarson in Kg/ha.

<table>
<thead>
<tr>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>227</td>
<td>164</td>
<td>177</td>
<td>150</td>
</tr>
<tr>
<td>154</td>
<td>120</td>
<td>182</td>
<td>153</td>
</tr>
<tr>
<td>226</td>
<td>229</td>
<td>129</td>
<td>178</td>
</tr>
<tr>
<td>228</td>
<td>291</td>
<td>351</td>
<td>258</td>
</tr>
</tbody>
</table>

Mean 209 201 210 185 201

C.D. for N marginal means—65'3 Kg/ha.

---

Crop :- Brown Sarson (Rabi).

Ref :- H.P. 63(196).

Site :- Agri. Res. Stn., Dhaula Kuan.

Type :- ‘M’.

Object :— To find out the Optimum dose of N and P for the Sarson Crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sunn hemp (G.M.). (c) 112'1 Kg/ha, of P₂O₅. (ii) Sandy loam. (iii) 31.10.63. (iv) (a) 4 ploughings. (b) and (c) N.A. (d) 30cm. x 23cm. (e) N.A. (v) Nil. (vi) B.S.G.—I. (vii) Un irrigated. (viii) 2 weodings and 2 hoeings. (ix) 17cm. (x) 30.3.64.

2. TREATMENTS:
   Main-plot treatments: 4 levels of N as C/A/N : — N₀=0. N₁=22'4. N₂=33'7 and N₃=44'8 Kg/ha.
Sub-plot treatments:

4 levels of P<sub>0</sub> as Super: P<sub>0</sub>=0, P<sub>1</sub>=17.9, P<sub>2</sub>=36.9, and P<sub>3</sub>=55.9 Kg/ha.

3. DESIGN:

(i) Split-plot, (ii) 4 main-plots/replication and 4 sub-plots/main-plot. (b) N.A. (iii) 30 cm. (iv) 4.8 cm. × 3.05 m. (b) 4.27 m. × 2.44 m. (v) Yes.

4. GENERAL:

(i) Poor. (ii) Nil. (iii) Yield of season. (iv) 1962-63 (Design modified in 63). (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) Failed due to pest. (vii) Nil.

5. RESULTS:

(i) 41 Kg/ha. (ii) (a) 22.6 Kg/ha. (b) 9.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of season in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N&lt;sub&gt;0&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P&lt;sub&gt;0&lt;/sub&gt;</td>
<td>40</td>
<td>46</td>
<td>39</td>
<td>46</td>
<td>43</td>
</tr>
<tr>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>36</td>
<td>49</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
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<td>45</td>
<td>46</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>P&lt;sub&gt;3&lt;/sub&gt;</td>
<td>36</td>
<td>42</td>
<td>44</td>
<td>44</td>
<td>41</td>
</tr>
</tbody>
</table>

Mean 35 42 44 44 | 41

Crop :- Linseed (Robi).
Site :- Oilseed Sub-Sta., Kangra.

Object :- To study the effect of different levels of N, P and K on the yield of Linseed.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 22.9.62. (iv) (a) 3 ploughings. (b) Broadcasting. (c) to (e) N.A. (v) Nil. (vi) K<sub>1</sub>-22.4. (vii) Irrigated. (viii) 1 hoeing and 3 weedings. (ix) N.A. (x) 2nd week of April.

2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8Kg/ha.

(2) 3 levels of P<sub>0</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8Kg/ha.

(3) 3 levels of K<sub>0</sub> as Pot. sul. : K<sub>0</sub>=0, K<sub>1</sub>=22.4, K<sub>2</sub>=44.8Kg/ha.

3. DESIGN:

(i) 3<sup>2</sup> conf. (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) 1/449.5. ha. (v) Nil. (vi) Yes.

4. GENERAL:

5. RESULTS:

(i) 698 Kg/ha. (ii) 96.7 Kg/ha. (iii) Main effects of N and P are highly significant while that of K is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>N&lt;sub&gt;a&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>603</td>
<td>806</td>
<td>907</td>
<td>683</td>
<td>821</td>
<td>772</td>
</tr>
<tr>
<td>541</td>
<td>678</td>
<td>806</td>
<td>646</td>
<td>667</td>
<td>712</td>
</tr>
<tr>
<td>521</td>
<td>595</td>
<td>819</td>
<td>597</td>
<td>648</td>
<td>690</td>
</tr>
<tr>
<td>Mean</td>
<td>555</td>
<td>693</td>
<td>844</td>
<td>642</td>
<td>712</td>
</tr>
<tr>
<td>K&lt;sub&gt;3&lt;/sub&gt;</td>
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<td>671</td>
<td>764</td>
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</tr>
<tr>
<td>K&lt;sub&gt;4&lt;/sub&gt;</td>
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<td>693</td>
<td>899</td>
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<td></td>
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<td>K&lt;sub&gt;5&lt;/sub&gt;</td>
<td>630</td>
<td>716</td>
<td>869</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N or P or K marginal means = 66.8 Kg/ha.

Crop :- Linseed (Rabi)

Ref :- H.P. 63(69), 64(47), 65(118).

Site :- Oil Seed Sub-Strn., Kangra.

Type :- 'M'.

Object :- To study the effect of graded doses of Nitrogen on the yield of Linseed crop.

1. BASAL CONDITIONS:

(i) (a) Soyabean-Linseed. (b) Soyabean. (c) N.A. (ii) Clay Loam. (iii) 18,10,61; 6.11,64; 15,11,65.
(iv) (a) 3 ploughings. (b) Broadcasting; Kernel. (c) 59 Kg/ha. (d) 23cm. x 10cm. (e) N.A. (vi) Nil.
(vi) K-2. (vii) Irrigated. (viii) 1 hoeing and 3 weedings. (ix) N.A. (x) Last week of April.

2. TREATMENTS:

6 levels of N as C/A/N :- N<sub>0</sub> = 0, N<sub>1</sub> = 22.4, N<sub>2</sub> = 44.8, N<sub>3</sub> = 67.2, N<sub>4</sub> = 89.6 and N<sub>5</sub> = 112 Kg/ha.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/398.4 ha, for 63, 7'7'7m. x 2'82m. for others. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of seed. (iv) (a) 1963-65. (b) No. (c) Results of combined analysis are presented under 5 Results. (v) and (vii) N.A. (vii) Error variances are homogeneous and 'Treatments X Years interaction is present.

5. RESULTS:

(i) 578 Kg/ha. (ii) 1497 Kg/ha. (based on 10 d.f., made up of Treatments X Years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of linseed in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;</th>
<th>N&lt;sub&gt;6&lt;/sub&gt;</th>
<th>N&lt;sub&gt;7&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>383</td>
<td>492</td>
<td>552</td>
<td>638</td>
<td>643</td>
</tr>
</tbody>
</table>

C.D. = 156.8 Kg/ha.
Individual results:

<table>
<thead>
<tr>
<th>Year</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
<th>N₆</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
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<tbody>
<tr>
<td>1963</td>
<td>351</td>
<td>474</td>
<td>513</td>
<td>581</td>
<td>702</td>
<td>906</td>
<td></td>
<td>**</td>
<td>588</td>
<td>881</td>
</tr>
<tr>
<td>1964</td>
<td>465</td>
<td>563</td>
<td>569</td>
<td>701</td>
<td>620</td>
<td>764</td>
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<td>*</td>
<td>614</td>
<td>1188</td>
</tr>
<tr>
<td>1965</td>
<td>337</td>
<td>439</td>
<td>574</td>
<td>632</td>
<td>607</td>
<td>611</td>
<td></td>
<td>**</td>
<td>533</td>
<td>1888</td>
</tr>
<tr>
<td>Pooled</td>
<td>385</td>
<td>492</td>
<td>552</td>
<td>638</td>
<td>643</td>
<td>760</td>
<td></td>
<td>**</td>
<td>578</td>
<td>1497</td>
</tr>
</tbody>
</table>

Crop: Linseed.

Site: District: Kangra.

Object: Type A: To study the response of different levels of N, P and K applied individually and in combination on the yield of Groundnut crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Hilly. (iii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   - O = Control (no manure).
   - N = 22.4 Kg/ha. of N.
   - P = 22.4 Kg/ha. of P₂O₅.
   - K = 22.4 Kg/ha. of K₂O.
   - NP = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P₂O₅.
   - NK = 22.4 Kg/ha. of N + 22.4 Kg/ha. of K₂O.
   - PK = 22.4 Kg/ha. of P₂O₅ + 22.4 Kg/ha. of K₂O.
   - NPK = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P₂O₅ + 22.4 Kg/ha. of K₂O.

3. DESIGN:
   (i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C, residual effects of Phosphate application are studied on Type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1960 ha. (b) 1967 ha. (iv) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of Linseed. (iv) (a) 1960 to 61. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of</th>
<th>Control yield in Kg/ha</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kangra</td>
<td>4</td>
<td>400</td>
<td>190</td>
<td>170</td>
<td>100</td>
<td>110</td>
<td>0</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>140</td>
</tr>
</tbody>
</table>

61 (S.F.T.):

| Kangra | 5 | 500 | 210 | 40 | 110 | 470 | -10 | 40 | -30 | -40 | 410 |

Ref: H.P. 60 and 61 (S.F.T.) for Kangra, Type: 'M'.
Object: Type B — To investigate the relative efficiency of different fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Hilly. (iii) to (x) N.A.

2. TREATMENTS:
   7 manural treatments:
   • O = Control (No manure).
   • N_1 = 22.4 Kg/ha. of N as A/S.
   • N_2 = 44.8 Kg/ha. of N as A/S.
   • N'_1 = 22.4 Kg/ha. of N as urea.
   • N'_2 = 44.8 Kg/ha. of N as urea.
   • N''_1 = 22.4 Kg/ha. of N as C/A/N.
   • N''_2 = 44.8 Kg/ha. of N as C/A/N.

3. DESIGN:
   Same as in type A conducted on Linseed crop on page No. 311.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of Linseed.  (iv) (a) 1960 to 61.  (b) and (c) N.A.  (v) to (vii) Nil.

5. RESULTS:
   Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of Control trials</th>
<th>Yield in Kg/ha.</th>
<th>N_1</th>
<th>N_2</th>
<th>N'_1</th>
<th>N'_2</th>
<th>N''_1</th>
<th>N''_2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kangra</td>
<td>5</td>
<td>160</td>
<td>380</td>
<td>340</td>
<td>60</td>
<td>270</td>
<td>160</td>
<td>350</td>
<td>53.0</td>
</tr>
<tr>
<td>H.P. 62(S.F.T)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>District</th>
<th>No. of Control trials</th>
<th>Yield in Kg/ha.</th>
<th>N_1</th>
<th>N_2</th>
<th>N'_1</th>
<th>N'_2</th>
<th>N''_1</th>
<th>N''_2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kangra</td>
<td>4</td>
<td>170</td>
<td>320</td>
<td>460</td>
<td>110</td>
<td>250</td>
<td>250</td>
<td>400</td>
<td>53.0</td>
</tr>
</tbody>
</table>

Object: Type B: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.
2. TREATMENTS:

8 manurial treatments:

- **O** = Control (no manure).
- **N** = 35Kg/ha. of N, 70Kg/ha. of P,
- **P** = 25Kg/ha. of P,
- **N1P1** = 35Kg/ha. of N+25 Kg/ha. of P,
- **N2P2** = 70Kg/ha. of N+50Kg/ha. of P,
- **N1P1K1** = 70Kg/ha. of N+50Kg/ha. of P+25Kg/ha. of K.

3. DESIGN:

(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A1, 11 of type A2, 11 of type A3 and 3 are of type C. The eleven experiments under type A1, A2 and A3 are distributed as 3 on a Kharif cereal, 3 on Rabi cereal, 3 on cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A1 and A2 and A3 experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A1, A2 and A3 are laid out. For conducting the three villages are randomly selected in each block. (iii) (a) 1/100 ha, (b) 1/200 ha, (iv) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N3P3</th>
<th>N1P3K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>60</td>
<td>193</td>
<td>16</td>
<td>119</td>
<td>141</td>
<td>169</td>
<td>190</td>
<td>27.2</td>
</tr>
</tbody>
</table>

Control yield = 255Kg/ha. No of trials = 2

Crop : Wheat (Rabi).

Site : District : Kangra.

Ref : H.P. 62(S.F.T.) for Kangra.

Type : 'M'.

Object :—Type A2 : To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:

(i) to (v) N.A. (vii) Irrigated. (viii) to (x) N.A.
2. TREATMENTS:
8 manurial treatments:

- Control (no manure)
- N<sub>1</sub> = 35 Kg/ha. of N
- P<sub>1</sub> = 25 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
- P<sub>2</sub> = 50 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
- N<sub>1</sub>P<sub>1</sub> = 35 Kg/ha. of N + 25 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
- N<sub>1</sub>P<sub>2</sub> = 35 Kg/ha. of N + 50 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
- N<sub>2</sub>P<sub>2</sub> = 70 Kg/ha. of N + 50 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
- N<sub>2</sub>P<sub>2</sub>K<sub>2</sub> = 70 Kg/ha. of N + 50 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 50 Kg/ha. of K<sub>2</sub>O.

3. DESIGN:
Same as in type A<sub>1</sub> conducted on linseed crop on page No. 313.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) 1962 only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>108</td>
<td>114</td>
<td>49</td>
<td>169</td>
<td>190</td>
<td>255</td>
<td>255</td>
<td>591</td>
</tr>
</tbody>
</table>

Control yield = 233 Kg/ha. No. of trials = 2

Crop : Linseed (Rabi).
Site : Distrett : Kangra.
Ref : H.P. 62(SFT) for Kangra.
Type : 'M'.

Object : Type A<sub>3</sub> : To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:

- Control (no manure),
- N<sub>1</sub> = 35 Kg/ha. of N,
- K<sub>1</sub> = 25 Kg/ha. of K<sub>2</sub>O,
- K<sub>2</sub> = 50 Kg/ha. of K<sub>2</sub>O,
- N<sub>1</sub>K<sub>1</sub> = 35 Kg/ha. of N + 25 Kg/ha. of K<sub>2</sub>O,
- N<sub>1</sub>K<sub>2</sub> = 35 Kg/ha. of N + 50 Kg/ha. of K<sub>2</sub>O,
- N<sub>2</sub>K<sub>2</sub> = 70 Kg/ha. of N + 50 Kg/ha. of K<sub>2</sub>O and
- N<sub>2</sub>P<sub>2</sub>K<sub>2</sub> = 35 Kg/ha. of N + 25 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 25 Kg/ha. of K<sub>2</sub>O.

3. DESIGN:
Same as in type A<sub>1</sub> conducted on Linseed crop on page No. 313.
4 GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₂K₂</th>
<th>N₁P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>130</td>
<td>15</td>
<td>32</td>
<td>157</td>
<td>168</td>
<td>331</td>
<td>228</td>
</tr>
</tbody>
</table>

Control yield = 358 Kg/ha.; No. of trials = 2

Crop: Linseed.
Site: Crop Res. Sub-Stn., Sundernagar.
Object: To find out a suitable date of sowing.

1. BASAL CONDITIONS
(i) (a) Nil. (b) Paddy. (c) 45 Kg/ha. of N+28 Kg/ha. of P₂O₅+28 Kg/ha. of K₂O. (ii) Clay. (iii) As per treatments (iv) (a) and (b) N.A. (c) 20 Kg/ha. (d) 23 cm. between rows (e) N.A. (f) N.A. (v) K-2 (medium) (vi) Undugted. (vii) Weeding. (viii) N.A. (x) During the months of April and May.

2. TREATMENTS:

3. DESIGN:
(i) R.B.D. (ii) (a) 4 (b) N.A. (iii) 5. (iv) (a) 4.37 m. x 2.29 m. (b) 3.96 m. x 1.83 m. (v) 30.5 cm. x 23 cm. (vi) Yes.

4. GENERAL:
(i) Normal (ii) Nil (iii) Yield of linseed. (iv) (a) 1963—only (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 696 Kg/ha. (ii) 113/0 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of Linseed in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>D₄</th>
<th>C.D. = 183 Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>999</td>
<td>856</td>
<td>599</td>
<td>331</td>
<td>183 Kg/ha.</td>
</tr>
</tbody>
</table>

Crop: Linseed (Rabi).
Object: To find out the optimum dose of fertilizers and seed rate for Linseed crop.
1. BASAL CONDITIONS:

(i) (a) Nil. (b) Sunnhemp (G.M.). (c) 2471Kg/ha. of Super. (ii) Sandy loam (iii) 28.10.63. (iv) (a) 4 ploughings. (b) N.A. (c) As per treatments. (d) 23 cm. between rows. (e) 1. (v) Nil. (vi) K-2 (Medium). (vii) Un-irrigated (viii) 2 weedings. (ix) 17 cm. (x) 29/30.4.64.

2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) 3 seed rates :- S1=37, S2=49 and S3=62 kg/ha.

(2) 3 levels of N as C/A/N :- N1 =22.4, N2 =44.8 and N3 =67.3Kg/ha.

(3) 3 levels of P2O5 :- P1 =0, P2 =17.9 and P3 =35.9Kg/ha.

3. DESIGN:

(i) 39 partially balanced confd. (ii) (a) 3 blocks/replication and 9 plots/block. (b) N.A. (iii) 4. (iv) (a) 6.70m. x 1.83m. (b) 6.10m. x 1.37m. (v) 30cm. x 23cm. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) Linseed rust infection. (iii) Yield of Linseed. (iv) (a) 1963—only. (b) No. (c) Nil. (v) Nil. (vi) N.A. (vii) Crop almost failed due to frost and Linseed rust.

5. RESULTS:

(i) 381Kg/ha. (ii) 108.0Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of linseed in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>386</td>
<td>338</td>
<td>351</td>
<td>342</td>
<td>334</td>
<td>379</td>
<td>358</td>
</tr>
<tr>
<td>S2</td>
<td>422</td>
<td>378</td>
<td>400</td>
<td>410</td>
<td>406</td>
<td>385</td>
<td>400</td>
</tr>
<tr>
<td>S3</td>
<td>449</td>
<td>380</td>
<td>325</td>
<td>382</td>
<td>402</td>
<td>370</td>
<td>385</td>
</tr>
<tr>
<td>Mean</td>
<td>419</td>
<td>365</td>
<td>359</td>
<td>378</td>
<td>387</td>
<td>378</td>
<td>381</td>
</tr>
<tr>
<td>P0</td>
<td>391</td>
<td>350</td>
<td>364</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>445</td>
<td>344</td>
<td>373</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>422</td>
<td>372</td>
<td>340</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N marginal means=50.9Kg/ha.

Crop :- Linseed (Rahi).

Site :- Oilseed Sub-Stn., Kangra.

Ref :- H.P. 64(48).

Type :- 'CM'.

Object :-To study the effect of different seed—rates and different times of application of N on the yield of Linseed.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 30.9.64. (iv) one ploughing by soil turning plough, 2 ploughings by demi plough. (b) Broadcasting. (c) As per treatments. (d) and (e) N.A. (v) Nil. (vi) LC-385. (vii) Irrigated. (viii) 1 hoeing and 3 weedings. (ix) N.A. (x) 2nd week of April.
2. TREATMENTS:

All combinations of (1) and (2)

(1) 3 seed rates: S₁=10'5, S₂=24'7, and S₃=30'9 Kg/ha.

(2) 2 spacings between rows: S₁=15cm. and S₂=23cm.

2 times of application of N at sowing time, T₁=At sowing time, T₂=One month after sowing and T₃=Two months after sowing.

3. DESIGN:

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) and (b) 2'74m. x 4'91m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of Linseed. (iv) (a) No. (b) Nil. (c) Nil. (d) to (vil) Nil.

5. RESULTS:

(i) 427 Kg/ha. (ii) 102'2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of linseed in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>334</td>
<td>361</td>
<td>408</td>
<td>368</td>
</tr>
<tr>
<td>S₂</td>
<td>463</td>
<td>426</td>
<td>463</td>
<td>451</td>
</tr>
<tr>
<td>S₃</td>
<td>445</td>
<td>454</td>
<td>491</td>
<td>463</td>
</tr>
<tr>
<td>Mean</td>
<td>414</td>
<td>414</td>
<td>454</td>
<td>427</td>
</tr>
</tbody>
</table>

---

Crop :- Linseed (Rabi).

Site :- Oilseed Sub-Sta., Kangra.

Ref :- H.P. 63(61).

Type :- 'CM'.

Object :- To study the effect of different spacings and different times of application of N on the yield of Linseed.

1. BASAL CONDITIONS:

(i) (a) Paddy-linseed. (b) Paddy. (c) Nil. (ii) Clay loam. (iii) 10.11.63. (iv) (a) one ploughing by soil turning plough, 2 ploughings by deshi plough. (b) Kera. (c) 49'4 Kg/ha. (d) 10cm. x 28cm. (e) N.A. (f) Nil. (g) K-2. (h) Irrigated. (i) one hoeing, 2 weedings. (j) N.A. (k) Last week of April.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 2 spacings between rows: S₁=15cm. and S₂=23cm.

(2) 4 times of application of N: T₁=No N, T₂=full dose of N at sowing, T₃=Full dose of N after one month and T₄=½ dose of N at sowing + ½ dose after one month.

3. DESIGN:

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 2'74m. x 4'91m. (b) 6'31m. x 3'20m. (v) N.A. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of linseed. (iv) (a) 1963—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 338 Kg/ha. (ii) 64′3 Kg/ha. (iii) Main effect of T alone is highly significant. (iv) Av. yield of linseed in Kg/ha.

<table>
<thead>
<tr>
<th>T_0</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S_1</td>
<td>219</td>
<td>410</td>
<td>356</td>
<td>414</td>
</tr>
<tr>
<td>S_2</td>
<td>220</td>
<td>331</td>
<td>387</td>
<td>367</td>
</tr>
<tr>
<td>Mean</td>
<td>220</td>
<td>370</td>
<td>372</td>
<td>390</td>
</tr>
</tbody>
</table>

C.D. for T marginal means—66′9 Kg/ha.

Crop : Chillies (Capsicum)

Site : Vegetable Res. Sta., Bhagot.

Ref. : H.P. 60(71).

Type : 'M'.

Object: To study the effect of different levels of N, P and K on the yield of Capsicum.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loamy. (iii) 19′4′60. (iv) and (v) N.A. (vi) California wonder. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 29′6′60 to 20′8′60.

2. TREATMENTS:
All combinations of (1), (2) and (3)+control (no manure)
(1) 2 levels of N :—N_1=56, N_2=84 Kg/ha.
(2) 2 levels of P_2O_5 :—P_1=56, P_2=84 Kg/ha.
(3) 2 levels of K_2O :—K_1=28, K_2=64 Kg/ha.
Sources of N, P and K and time of Application—N.A.

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 3′05 m x 1′22 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of Capsicum. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 63′3 Q/ha. (ii) 23′1 Q/ha. (iii) Only control vs. others effect is highly significant. (iv) Av. yield of capsicum in Q/ha.

Control yield=116′6 Q/ha.
Crop: Chillies (Capsicum) (Kharif).

Site: Vegetable Res. Stn., Katrian.

Object: To study the N and P requirements of chillies.

1. **BASAL CONDITIONS:**
   - (i) (a) to (c) N.A.
   - (ii) Clay loam.
   - (iii) 30, 5, 6.
   - (iv) (a) N.A.
   - (b) Transplanting.
   - (c) to (e) N.A.
   - (vi) California wonder.
   - (vii) Erigaster, and (ix) N.A.
   - (x) During the months of September and October 64.

2. **TREATMENTS:**
   - All combinations of (1) and (2)
     - (1) 3 levels of N: N₀=0, N₁=49 and N₂=98 Kg/ha.
     - (2) 2 levels of P: P₀=0 and P₁=49 Kg/ha.

3. **DESIGN:**
   - (i) Fact. in R.B.D.
   - (ii) 6.
   - (b) N.A.
   - (iii) 4.
   - (iv) (a) N.A.
   - (b) 1/170.99 ha.

4. **GENERAL:**
   - (i) and (ii) N.A.
   - (iii) Yield of Capsicum.
   - (iv) (a) 1964-65 (Expt. failed in 65).
   - (b) No.
   - (c) Nil.
   - (v) to (vii) Nil.

5. **RESULTS:**
   - (i) 67 Kg/ha.
   - (ii) 21 Kg/ha.
   - (iii) Main effect of N alone is significant.
   - (iv) Av. yield of Capsicum in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>39</td>
<td>52</td>
<td>45</td>
</tr>
<tr>
<td>N₁</td>
<td>67</td>
<td>81</td>
<td>74</td>
</tr>
<tr>
<td>N₂</td>
<td>77</td>
<td>86</td>
<td>82</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=22.5 Kg/ha.
Crop : Chillies (Kharif).

Object: To study the effect of different levels of N, P and K on the yield of Chillies crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 17.3.62.  (iv) (a) to (c) N.A.  (d) 61cm.×45cm.  (e) N.A.  (v) N.A.
   (vi) Solan yellow.  (vii) Irrigated.  (viii and (ix) N.A.  (x) 2.10.62 to 24.11.62.

2. TREATMENTS:
   All combinations of (1), (2) and (3)+control,
   (1) 2 levels of N as C/N: N₀=0 and N₁=56Kg/ha.
   (2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=56Kg/ha.
   (3) 2 levels of K₃O as Mur. pot.: K₀=0 and K₁=56Kg/ha.

   280 Kg/ha. of F.Y.M. applied to all treatments except control.

3 DESIGN:
   (i) R.B.D.  (ii) (a) 9. (b) N.A.  (iii) 4. (iv) (a) N.A.  (b) 1149sha.  (v) N.A.  (vi) Yes.

4 GENERAL:
   (i) Normal.  (ii) Nil.  (iii) Yield of Capsicum.  (iv) (a) 1962—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
   (i) 532Kg/ha.  (ii) 328'9Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of Capsicum in Kg/ha.

   Control=392Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>K₀</th>
<th>K₁</th>
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</tr>
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<tr>
<td>N₀</td>
<td>494</td>
<td>481</td>
<td>371</td>
<td>603</td>
<td>487</td>
</tr>
<tr>
<td>N₁</td>
<td>614</td>
<td>614</td>
<td>781</td>
<td>447</td>
<td>614</td>
</tr>
<tr>
<td>Mean</td>
<td>554</td>
<td>547</td>
<td>576</td>
<td>525</td>
<td>550</td>
</tr>
<tr>
<td>K₀</td>
<td>593</td>
<td>559</td>
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<td></td>
</tr>
<tr>
<td>K₁</td>
<td>515</td>
<td>535</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Crop : Zira (Beldseed).
Site : Zira and Saffron Res. Sta., Sangla District (Kinnaur).

Object: To assess the best date of fertilizer.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy (iii) 11.10.64  (iv) (a) to (c) N.A.  (d) 30'5 cm.×7'6 cm.  (e) N.A.  (v) N.A.
   (vi) Reckchan.  (vii) Irrigated.  (viii) Weedings.  (ix) 43'6 cm.  (x) 13.7.66.
2. TREATMENTS:
All Combinations of (1) and (2).

(1) 4 levels of N: -N₁ = 0, N₂ = 22.4, N₃ = 44.8 and N₄ = 67.2 Kg/ha.
(2) 4 levels of P₂O₅: -P₁ = 0, P₂ = 17.9, P₃ = 35.9 and P₄ = 55.9 Kg/ha.

3. DESIGN:
(i) R.R.D. (a) 4, (b) 3, (c) 3. (iv) (a) 3.05 m x 2.44 m. (b) 3.05 m x 2.13 m. (v) 15 cm x 15 cm. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of zira. (iv) (a) 1964-66 (data for 65 is N.A.). (b) No. (c) Nil (v) to (vii) Nil.

5. RESULTS:
(i) 638 Kg/ha. (ii) 212.5 Kg/ha (iii) Main effect of N alone is highly significant (iv) Av. yield of zira in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>436</td>
<td>924</td>
<td>667</td>
<td>1026</td>
<td>763</td>
</tr>
<tr>
<td>P₂</td>
<td>436</td>
<td>339</td>
<td>402</td>
<td>769</td>
<td>507</td>
</tr>
<tr>
<td>P₃</td>
<td>436</td>
<td>539</td>
<td>539</td>
<td>1026</td>
<td>635</td>
</tr>
<tr>
<td>P₄</td>
<td>487</td>
<td>390</td>
<td>744</td>
<td>975</td>
<td>649</td>
</tr>
</tbody>
</table>

C. D. for N or P marginal means = 177.1 Kg/ha.

Crop : Zira (bold seed).
Site :- Zira and Saffron Res. Sta., Sangla.
District : Kisanwar.

Object :- To find out the best date of sowing.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy. (iii) As per treatments. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) 30 cm x 7.5 cm. (e) N.A. (f) N.A. (v) Rakchham. (vii) 3 weedings (v) 43 cm. (x) 12.7.66

2. TREATMENTS:
4 dates of sowing: -D₁ = 10.10.64, D₂ = 25.10.64, D₃ = 9.11.64 and D₄ = 24.11.64.

3. DESIGN:
(i) R.R.D. (a) 4, (b) N.A. (ii) 4 (iv) (a) 3.05 m x 2.44 m. (b) 3.05 m x 2.44 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of zira. (iv) (a) 1964-66 (1965 is N.A.). (b) No. (c) Nil. (v) to (vii) Nil.

Ref :- H.P. 64(289).
Type :- "C".

C. D. for N or P marginal means = 177.1 Kg/ha.
5. RESULTS:
(i) 355 Kg/ha. (ii) 120 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of zira in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>309</td>
<td>642</td>
<td>266</td>
<td>202</td>
</tr>
<tr>
<td>C.D.=</td>
<td>192.2 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Tea.
Site: Govt. Tea Farm, Palampur.
Object: To study the effect of different times of manuring on the yield of Tea.

1. BASAL CONDITIONS:
(i) N.A. (ii) Heavy clay. (iii) By seed. (iv) China Hybrid. (v) 19 42., 1.52m. x 0.76m. (vi) 1½ to 2 years. (vii) Nil. (viii) N.A. (ix) Nil. (x) Un-irrigated. (xi) N.A. (xii) April to Oct. during every year.

2. TREATMENTS:
5 different times of application of 134.4 Kg/ha. of N as A/S T1=Whole in February, T2=Whole in March, T3=Whole in July, T4=Half in February and half in July and T5=Half in March and half in July.

3. DESIGN:
(i) R.B.D. (ii) 5. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 32. (v) and (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Weight of Tea leaves. (iv) 1963-contd. (v) to (viii) Nil.

5. RESULTS:
63(156):
(i) 5164 Kg/ha. (ii) 915.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green tea leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>5851</td>
<td>5368</td>
<td>4936</td>
<td>4984</td>
<td>4680</td>
</tr>
</tbody>
</table>

64(144):
(i) 760 Kg/ha. (ii) 750 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of tea leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>7696</td>
<td>8196</td>
<td>7519</td>
<td>7504</td>
<td>7335</td>
</tr>
</tbody>
</table>

Crop: Tea.
Site: Govt. Tea Farm, Palampur.
Object: To study the effect of different methods of application of manures on the yield of Tea.
1. BASAL CONDITIONS:
(i) N.A. (ii) Heavy clay. (iii) By seed. (iv) China Hybrid. (v) N.A. (vi) 1.52m. x 1.52m. (vii) 1. to 2 years. (viii) Nil. (ix) N.A. (x) Un-irrigated. (xi) N.A. (xii) April to Oct. during every year.

2. TREATMENTS:
5 methods of application of manures: — M_1 = Broad casing, M_2 = Disc, M_3 = Eye brow, M_4 = Half Disc and M_5 = Bangle.

Details of manures applied not available.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 36. (v) and (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Weight of tea leaves, (iv) 1963-contd. (v) to (viii) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Treatment Differences</th>
<th>Yield (Kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M_1</td>
<td></td>
<td>2501</td>
</tr>
<tr>
<td>M_2</td>
<td></td>
<td>2342</td>
</tr>
<tr>
<td>M_3</td>
<td></td>
<td>2583</td>
</tr>
<tr>
<td>M_4</td>
<td></td>
<td>2824</td>
</tr>
<tr>
<td>M_5</td>
<td></td>
<td>2727</td>
</tr>
</tbody>
</table>

Crop: Tea.  Ref :— H.P. 64(247), 65(202).

Site: Tea Exptl. Farm, Palampur.  Type :— ‘M’.

Object: To find the suitable method of fertilizer application for Tea plantation.

1. BASAL CONDITIONS:
(i) N.A. (ii) (a) Heavy clay (b) Nil. (iii) By seed (iv) China hybrid. (v) Planted in 1850 with 1.53m. x 0.61 m. spacing (vi) 1. to 2 years. (vii) and (viii) N.A. (ix) Nil. (x) Un-irrigated. (xi) 126.8cm. (xii) Plucking from April to Oct. at an interval of 10 days.

2. TREATMENTS:
5 times of application of 135 Kg/ha. of N: — T_1 = Full dose in Feb, T_2 = Full dose in March, T_3 = Full dose in July, T_4 = Half dose in Feb + half dose in July and T_5 = Half dose in March + half dose in July.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 30 bushes. (v) and (vi) Yes.

4. GENERAL:
(i) Fair. (ii) Nil. (iii) Yield of green leaves. (iv) 1964-65. (v) to (viii) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (Kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>602</td>
</tr>
<tr>
<td></td>
<td>52.9</td>
</tr>
</tbody>
</table>

(iii) Treatment differences are not significant. (iv) Av. yield of green leaves in Kg/ha.
Object: To study the effect of different doses of N on the yield of Tea.

1. BASAL CONDITIONS:
   (i) N.A. (ii) (a) Heavy clay. (b) N.A. (iii) By seed. (iv) China Hybrid. (v) Planted in 1850 in pits with 1.52m x 1.52m. spacing and one seedling per hole. (vi) 1½ to 2 years. (vii) to (ix) Nil. (x) Un-irrigated. (xi) N.A. (xii) April to end of Oct.

2. TREATMENTS:
   4 levels of N as A/S: \( N_0 = 0, \ N_1 = 44.8, \ N_2 = 89.6, \ N_3 \) changed every year. It is 67.2 Kg/ha, 89.6 Kg/ha, 112.0 Kg/ha, 134.4 Kg/ha, and 134.4 Kg/ha, in 1963, 1964, 1965, 1966 and 1967 respectively.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4 (iv) (a) N.A. (b) 36. (v) and (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Wt. of tea leaves. (iv) 1962-67 (1962 is N.A.) (v) No. (vi) and (vii) Nil (viii) N.A.

5. RESULTS:

   **63(157)**
   (i) 6233 Kg/ha. (ii) 1133.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green tea leaves in Kg/ha.

   Treatment
   \[ N_0 \ N_1 \ N_2 \ N_3 \]
   Av. yield 6151 6162 6070 6551

   **64(146)**
   (i) 3449 Kg/ha. (ii) 501.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green tea leaves in Kg/ha.

   Treatment
   \[ N_0 \ N_1 \ N_2 \ N_3 \]
   Av. yield 3056 3452 3875 3412

   **65(193)**
   (i) 3122 Kg/ha. (ii) 450.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green tea leaves in Kg/ha.

   Treatment
   \[ N_0 \ N_1 \ N_2 \ N_3 \]
   Av. yield 2931 3071 3388 3098
Crop :- Tea.  
Ref :- H.P. 62(138), 63(153), 64(143).  
Site :- Govt. Tea Farm, Palampur.  
Type :- 'C'.

Object:—To study the effect of pruning at distances from the ground on the yield of Tea.

1. BASAL CONDITIONS:
   (i) N.A. (ii) (a) Heavy clay. (b) N.A. (iii) By seeds. (iv) China Hybrid. (v) N.A.; 1'5cm. x 1'5cm. spacing. (vi) 1½ to 2 years. (vii) Nil. (viii) Pruning done as per treatments. (ix) Nil. (a) Un-irrigated. (x) N.A. (xi) April to October.

2. TREATMENTS:
   4 distances of pruning from the ground;—D₁=8, D₂=15, D₃=23 and D₄=30 cm.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 3; 3 ; 2. (iv) (a) N.A. (b) 25. (v) N.A. (vii) Nil. (x) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Weight of tea leaves. (iv) 1962-contd. (1965-N.A.) (v) to (vii) Nil.

5. RESULTS:

62(138)
   (i) 864Kg/ha. (ii) 170'4Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>D₄</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>835</td>
<td>984</td>
<td>841</td>
<td>796</td>
</tr>
</tbody>
</table>

63(153)
   (i) 2034Kg/ha. (ii) 529'7Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>D₄</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1948</td>
<td>1994</td>
<td>2383</td>
<td>1813</td>
</tr>
</tbody>
</table>

64(143)
   (i) 2574Kg/ha. (ii) 304'8Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of green leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>D₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2422</td>
<td>1776</td>
<td>3506</td>
<td>2593</td>
</tr>
<tr>
<td>C.D. = 686'0Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Crop :- Tea.  
Ref :- H.P. 62(131), 63(149), 64(142).  
Site :- Govt. Tea Farm, Palampur.  
Type :- 'C'.

Object:—To study the effect of different levels of pruning in different years on the yield of Tea.

1. BASAL CONDITIONS:
   (i) N.A. (ii) (a) Heavy clay. (iii) By seed. (iv) China Hybrid. (v) N.A.; 1'52cm. x 1'52cm. spacing. (vi) 1½ to 2 years. (vii) Nil. (viii) N.A. (ix) Nil. (x) Un-irrigated. (xi) N.A. (xii) April to end of October.
2. TREATMENTS:

4 levels of pruning: T1 = Biennial pruning: 1st year prune 2.5 cm above the last pruning level and 2nd year unpruned. T2 = Triennial pruning: 1st year prune at 2.5 cm new wood, 2nd and 3rd year unpruned but levelling of skiff. T3 = Triennial pruning: 1st year prune at 2.5 cm new wood, 2 year unpruned but levelling off skiff and 3rd year skiff lighting to about 5 cm above the 2nd year tipping level and T4 = Quadriennial pruning: 1st year prune at 2.5 cm new wood, 2nd year unpruned but levelling off skiff, 3rd year medium skiff to initial heights of plucking is the 2nd year and 4th year unpruned but levelling off skiff.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 3 for 62 and 64; 4 for 63. (iv) 24 for 62 and 64; 30 for 63. (v) N.A. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Weight of tea leaves. (iv) 1962—contd. (Data for 1965—N.A.) (v) to (viii) Nil.

5. RESULTS:

62(131)

(i) 1227 Kg/ha. (ii) 69.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of tea leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1333</td>
<td>1328</td>
<td>1246</td>
<td>1000</td>
</tr>
<tr>
<td>C.D.</td>
<td>86.6 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

63(149)

(i) 1621 Kg/ha. (ii) 178 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of tea leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1625</td>
<td>1649</td>
<td>1575</td>
<td>1635</td>
</tr>
<tr>
<td>C.D.</td>
<td>201.7 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

64(142)

(i) 2990 Kg/ha. (ii) 310.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2870</td>
<td>2881</td>
<td>3116</td>
<td>3291</td>
</tr>
</tbody>
</table>

Crop: | Tea.
Site: | Govt. Tea Farm, Palampur.
Type: | 'C'.

Ref: | H.P. 62(130), 63(155), 64(141).

Object:- To study the effect of pruning on different dates on the yield of Tea.

1. BASAL CONDITIONS:

(i) N.A. (ii) (a) Heavy clay. (b) N.A. (iii) By seed. (iv) China Hybrid. (v) N.A.; 1.52 m x 0.76 m, for spacing. (vi) 1½ to 2 years. (vii) Nil. (viii) N.A. (ix) Nil. (x) Un-irrigated. (xi) N.A. (xii) April to October.
2. TREATMENTS:
4 dates of pruning: $D_1=15$th November, $D_2=18$th December, $D_3=15$th January and $D_4=15$th June.

3. DESIGN:

(i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 30.  (v) N.A.  (vi) Yes.

4. GENERAL:

(i) and (ii) N.A.  (iii) Weight of green leaves.  (iv) 1963-contrd. (65 N.A.)  (v) to (viii) Nil.

5. RESULTS:

62(130)

(i) 4155Kg/ha.  (ii) 688.9Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of green leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$D_1$</th>
<th>$D_2$</th>
<th>$D_3$</th>
<th>$D_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3106</td>
<td>3137</td>
<td>2852</td>
<td>7527</td>
</tr>
<tr>
<td>C.D.</td>
<td>779.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

62(155)

(i) 3140Kg/ha.  (ii) 399.8Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of green leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$D_1$</th>
<th>$D_2$</th>
<th>$D_3$</th>
<th>$D_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3329</td>
<td>3352</td>
<td>3125</td>
<td>2756</td>
</tr>
</tbody>
</table>

64(141)

(i) 2630Kg/ha.  (ii) 2460Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of green leaves in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$D_1$</th>
<th>$D_2$</th>
<th>$D_3$</th>
<th>$D_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2184</td>
<td>2291</td>
<td>2414</td>
<td>3629</td>
</tr>
<tr>
<td>C.D.</td>
<td>278.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Apple.  Ref: H.P. 60(180).

Site: Reg. Fruit Res. Sta., Mashobra.  Type: 'CV'.

Object: To study the effect of root stock of Apple.

1. BASAL CONDITIONS:

(i) to (iii) N.A.  (iv) As per treatments.  (v) Spring 57.  (vi) to (x) N.A.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 6 root stocks: $R_1=$Red delicious, $R_2=$Golden delicious, $R_3=$Royal delicious, $R_4=$Rus pippia, $R_5=$Crabapple Machoba and $R_6=$Crabapple pistali.

(2) 3 varieties: $V_1=$Red delicious, $V_2=$Golden delicious and $V_3=$Granny smith.

3. DESIGN:

(i) Fact. in R.B.D.  (ii) (a) 18.  (b) N.A.  (iii) 4.  (iv) (a) -- (b) 4 (v) -- (vi) Yes.
4. GENERAL

(i) and (ii) Nil. (iii) Av. increase in cm. of scion portion and Av. increase in cm. of root stock portion.
(iv) N.A. (v) and (vi) Nil. (vii) and (viii) —

5. RESULTS:

Girth (Scion)

(i) 1.73 cm./tree. (ii) 0.46 cm./tree. (iii) Main effect of V alone is highly significant. (iv) Av. increase in girth in cm. of scion portion of plants.

<table>
<thead>
<tr>
<th></th>
<th>$V_1$</th>
<th>$V_2$</th>
<th>$V_3$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_1$</td>
<td>2.03</td>
<td>1.61</td>
<td>1.22</td>
<td>1.82</td>
</tr>
<tr>
<td>$R_2$</td>
<td>2.40</td>
<td>1.34</td>
<td>1.69</td>
<td>1.88</td>
</tr>
<tr>
<td>$R_3$</td>
<td>1.50</td>
<td>1.88</td>
<td>1.61</td>
<td>1.66</td>
</tr>
<tr>
<td>$R_4$</td>
<td>1.07</td>
<td>1.36</td>
<td>1.38</td>
<td>1.53</td>
</tr>
<tr>
<td>$R_5$</td>
<td>1.97</td>
<td>1.95</td>
<td>1.33</td>
<td>1.75</td>
</tr>
<tr>
<td>$R_6$</td>
<td>2.11</td>
<td>2.20</td>
<td>1.57</td>
<td>1.96</td>
</tr>
</tbody>
</table>

Mean | 1.94    | 1.79    | 1.47    | 1.73 |

C.D. for V marginal means = 2.66 cm./tree.

Girth (Stock)

(i) 2.21 cm./tree. (ii) 0.59 cm./tree. (iii) Main effect of V alone is significant. (iv) Av. increase of girth in cm. of root stock portion of plants.

<table>
<thead>
<tr>
<th></th>
<th>$V_1$</th>
<th>$V_2$</th>
<th>$V_3$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_1$</td>
<td>2.45</td>
<td>1.98</td>
<td>1.67</td>
<td>2.04</td>
</tr>
<tr>
<td>$R_2$</td>
<td>2.49</td>
<td>1.99</td>
<td>2.18</td>
<td>2.45</td>
</tr>
<tr>
<td>$R_3$</td>
<td>1.92</td>
<td>2.51</td>
<td>2.25</td>
<td>2.23</td>
</tr>
<tr>
<td>$R_4$</td>
<td>2.01</td>
<td>2.19</td>
<td>1.88</td>
<td>2.02</td>
</tr>
<tr>
<td>$R_5$</td>
<td>2.63</td>
<td>2.55</td>
<td>1.98</td>
<td>2.39</td>
</tr>
<tr>
<td>$R_6$</td>
<td>2.35</td>
<td>2.39</td>
<td>1.77</td>
<td>2.17</td>
</tr>
</tbody>
</table>

Mean | 2.43    | 2.27    | 1.95    | 2.21 |

C.D. for V marginal means = 3.42 cm./tree

Crop := Apricot. Ref := H.P. 64(245), 65(114).

Site := Reg. Fruit Res. Sub-Sta., Kandoghat. Type := 'M'.

Object := To study the effect of different levels of N, P and K on the cumulative girth of Apricot.

1. BASAL CONDITIONS:

2. TREATMENTS:

All combinations of (1), (2) and (3) with one extra treatment:
(1) 2 levels of N: N₀ = 0 and N₁ = 56 gm/plant.
(2) 2 levels of P₂O₅: P₀ = 0 and P₁ = 56 gm/plant.
(3) 2 levels of K₂O: K₀ = 0 and K₁ = 168 gm/plant.
Extra treatment: E₁ = 56 gm/plant of F.Y.M.
Fertilizer applied at the time of planting.

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 6. (iv) and (v) N.A. (vi) Yst.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Girth measurements in cm. and yield of fruits. (iv) 1964—cond, (v) to (vi) N0.

5. RESULTS:

64(245)
(i) 4.97 Kg/plant. (ii) 4.19 Kg/plant. (iii) Main effect of N alone is highly significant. (iv) Av. yield of Apricot in Kg/plant.

Extra treatment—2.72 Kg/plant.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>K₀</th>
<th>K₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>2.25</td>
<td>3.22</td>
<td>2.56</td>
<td>2.91</td>
<td>2.74</td>
</tr>
<tr>
<td>N₁</td>
<td>7.79</td>
<td>8.26</td>
<td>6.75</td>
<td>8.80</td>
<td>7.77</td>
</tr>
<tr>
<td>Mean</td>
<td>4.77</td>
<td>5.74</td>
<td>4.66</td>
<td>5.85</td>
<td>5.26</td>
</tr>
<tr>
<td>K₀</td>
<td>4.64</td>
<td>4.67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K₁</td>
<td>4.90</td>
<td>6.81</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for marginal means—2.44 Kg/plant.

65(114)
(i) 5.29 Kg/plant. (ii) 0.82 Kg/plant. (iii) Main effects of N, P, K and interaction N×P, P×K, and control Vs others are highly significant while N×P×K interaction is significant. (iv) Av. yield of Apricot in Kg/plant.

Extra treatment—3.50 Kg/plant.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>K₀</th>
<th>K₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>4.49</td>
<td>4.54</td>
<td>3.60</td>
<td>5.42</td>
<td>4.51</td>
</tr>
<tr>
<td>N₁</td>
<td>5.24</td>
<td>7.80</td>
<td>5.07</td>
<td>7.97</td>
<td>6.52</td>
</tr>
<tr>
<td>Mean</td>
<td>4.86</td>
<td>6.37</td>
<td>4.34</td>
<td>6.70</td>
<td>5.52</td>
</tr>
<tr>
<td>K₀</td>
<td>2.94</td>
<td>5.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K₁</td>
<td>6.78</td>
<td>6.61</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for any marginal mean=0.23 Kg/plant.
C.D. for any the body of N×P or P×K table=0.55 Kg/plant.
C.D. for control Vs others=0.66 Kg/plant.
Girth

64(345)

(i) 15·97 cm./plant. (ii) 2·79 cm./plant. (iii) Main effect of N and extra V.s. others are highly significant while that of P and interaction N x P x K is significant. (iv) Av. girth of plant in cm.

E₁=12·90 cm.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>K₀</th>
<th>K₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>13·66</td>
<td>15·34</td>
<td>14·12</td>
<td>14·90</td>
<td>14·50</td>
</tr>
<tr>
<td>N₁</td>
<td>16·93</td>
<td>19·48</td>
<td>17·50</td>
<td>18·92</td>
<td>18·20</td>
</tr>
<tr>
<td>Mean</td>
<td>15·29</td>
<td>17·41</td>
<td>15·81</td>
<td>16·91</td>
<td>16·35</td>
</tr>
<tr>
<td>K₀</td>
<td>14·01</td>
<td>16·99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K₁</td>
<td>15·98</td>
<td>17·83</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N or P marginal means=1·62 cm./plant.

C.D. for extra V.s. others=2·76 cm./plant.

65(114)

(i) 20·32 cm./plant. (ii) 3·56 cm./plant. (iii) Main effects of N, P and Extra V.S. others are highly significant. (iv) Av. girth of plant in cm.

E₂=16·53 cm.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>K₀</th>
<th>K₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>17·60</td>
<td>20·16</td>
<td>17·44</td>
<td>20·31</td>
<td>18·88</td>
</tr>
<tr>
<td>N₁</td>
<td>21·46</td>
<td>23·98</td>
<td>22·38</td>
<td>22·86</td>
<td>22·72</td>
</tr>
<tr>
<td>Mean</td>
<td>19·53</td>
<td>22·07</td>
<td>20·01</td>
<td>21·99</td>
<td>20·80</td>
</tr>
<tr>
<td>K₀</td>
<td>18·96</td>
<td>21·07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K₁</td>
<td>21·10</td>
<td>23·08</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N or P marginal means=2·08 cm./plant.

C.D. for extra V.s. others=3·52 cm./plant.

Crop :- Malta.

Site :- Fruit Res. Stn., Dhaulag Kuan.

Ref :- H.P. 61(79).

Type :- 'M'.

Object :- To study the effect of different manures on the girth of Malta trees.

1. BASAL CONDITIONS

2. TREATMENTS:


Dose of manures—N.A.

3. DESIGN:

(i) R.B.D. (ii) 9. (iii) 4. (iv) 3. (v) 6' 10 m. x 24' 38 m. (vi) 4. (vii) N.A. (viii) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) G. data, 7' 6 cm. above the bud. (iv) 1961. (v) to (viii) Nil.

5. RESULTS:

(i) 4' 96 cm./plant. (ii) 1' 36 cm./plant. (iii) Treatment differences are not significant. (iv) Av. girth of the plant (7' 6 cm. above the bud) in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>4'99</td>
<td>4'32</td>
<td>3'70</td>
<td>4'62</td>
<td>4'72</td>
<td>6'15</td>
<td>5'61</td>
<td>4'84</td>
</tr>
</tbody>
</table>

Crop: Malta. Ref: H.P. 61(78), 62(176).

Site: Fruit Res. Stn., Dhaula Kuan. Type: ‘M’.

Objcct: To study the effect of different manures on the girth of the Malta trees.

1. BASAL CONDITIONS:


2. TREATMENTS:

Same as in exp. no. 61(79) on page No. 130.

3. DESIGN:

(i) R.B.D. (ii) 9. (iii) 4. (iv) 3. (v) 6'10 m. x 24'38 m. (vi) 4. (vii) Pine-apple/Jambari. (viii) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Girth data, 7'6 cm. above the bud. (iv) 1959-62 (60 N.A.) (v) to (viii) Nil.

5. RESULTS:

61(78)

(i) 4' 68 cm./tree. (ii) 1' 23 cm./tree. (iii) Treatment differences are not significant. (iv) Av. girth of the plant (90 cm. above the bud) in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. girth</td>
<td>3'41</td>
<td>4'70</td>
<td>4'61</td>
<td>6'01</td>
<td>4'79</td>
<td>4'97</td>
<td>3'89</td>
<td>5'39</td>
</tr>
</tbody>
</table>

62(176)

(i) 10' 38 cm./plant. (ii) 6' 77 cm./plant. (iii) Treatment differences are not significant. (iv) Av. girth of the plant in cm. (90 cm. above plant).

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. girth</td>
<td>10'17</td>
<td>9'92</td>
<td>10'22</td>
<td>9'69</td>
<td>10'38</td>
<td>9'11</td>
<td>11'70</td>
<td>11'05</td>
</tr>
</tbody>
</table>
Crop :- Malta.
Ref :- H.P. 61(80).
Site :- Fruit Res. Sta., Dhaula Kuan.
Type :- 'C'.

Object :- To study the effect of spacing between plants on the growth of the tree.

4. BASAL CONDITIONS :

2. TREATMENTS :
   3 spacings between plants :- \( S_1 = 3.05 \text{ m. x } 3.05 \text{ m.}, S_2 = 4.57 \text{ m. x } 4.57 \text{ m.} \) and \( S_3 = 6.10 \text{ m. x } 6.10 \text{ m.} \).

3. DESIGN :
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) 18.29 m. \times 18.29 m.; (b) Number of plants according to spacing are 16,16,9/plot. (v) N.A. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) N.A. (iii) Girth Data, 7.6 cm. above the bud. (iv) 1959-63 (60 N.A.). (v) to (viii) Nil.

RESULTS :
(i) 12.35 cm/plant. (ii) 3042 fruits. (iii) Treatments are highly significant. (iv) Av. height of the plant (7-6 cm. above the bud) in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( S_1 )</th>
<th>( S_2 )</th>
<th>( S_3 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. girth</td>
<td>12.37</td>
<td>12.92</td>
<td>11.76</td>
</tr>
</tbody>
</table>

Crop :- Malta.
Ref :- H.P. 63(198).
Site :- Fruit Res. Sta., Dhaula Kuan.
Type :- 'C'.

Object :- To study the effect of different spacings on the number of fruits.

1. BASAL CONDITIONS :

2. TREATMENTS and 3. DESIGN.
   Same as in exp. no. 61(80) given above.

4. GENERAL :

5. RESULTS :
   (i) 3042 fruits, (ii) 249 fruits. (iii) Treatment differences are highly significant. (iv) Av. number of fruits per plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( S_1 )</th>
<th>( S_2 )</th>
<th>( S_3 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>5280</td>
<td>2542</td>
<td>1303</td>
</tr>
</tbody>
</table>

C.D.—430.8 fruits
Object: To study the effect of different measures on the growth of Sweet Orange trees.

1. BASAL CONDITIONS:

2. TREATMENTS
   Same as in exp. no. 61 (79) on Malta crop. at page no. 331.

3. DESIGN:
   (i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 6\(\times\)10 m. x 24\(\times\)38 m. (b) 4. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Girth data, 7·6 cm. above the bud. (iv) 1962-only. (v) to (vii) Nil.

5. RESULTS:
   (i) 16·25 cm./plant. (ii) 2·14 cm./plant. (iii) Treatment differences are not significant. (iv) Av. girth of the plant (90 cm. above the bud) in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
<th>T_8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. girth</td>
<td>15'59</td>
<td>16'07</td>
<td>16'12</td>
<td>14'62</td>
<td>15'51</td>
<td>15'40</td>
<td>19'04</td>
<td>16'44</td>
</tr>
</tbody>
</table>

---

Crop :- Sweet Orange.

Site :- Fruit Res. Sta., Dhaula Kuan.

Object :- To study the effect of different spacings in trees on the yield of Sweet orange.

1. BASAL CONDITIONS:

2. TREATMENTS AND DESIGN:
   Same as in exp. no. 61 (80) on page No. 332.

3. GENERAL:
   (i) Normal. (ii) N.A. (iii) Number of fruits/plant (iv) 1962-only. (v) to (viii) Nil.

4. RESULTS:
   (i) 22\(\times\)90 fruits/plant. (ii) 3\(\times\)26 fruits/plant. (iii) Treatment differences are not significant. (iv) Av. no. of fruits per plant.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. no.</td>
<td>21'80</td>
<td>24'96</td>
<td>21'94</td>
</tr>
</tbody>
</table>
Object:—To study the effect of different spacings between plants on the girth measurements.

1. **BASAL CONDITIONS:**

2. **TREATMENTS to 4. GENERAL**
   Same as in exp. no. 61(80) on page No. 332.

5. **RESULTS**:
   (i) 19'08 cm./plant.  (ii) 18'30 cm/plant.  (iii) Treatment differences are not significant.  (iv) Av. girth of the plant in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. girth</td>
<td>18'90</td>
<td>20'38</td>
<td>17'95</td>
</tr>
</tbody>
</table>

### Crop :— Sweet Orange.  
**Site :— Fruit Res. Stn., Dhaula Kuan.**  
**Ref :— H.P. 62(179).**  
**Type :— 'C'.**

### Crop :— Sweet Orange.  
**Site :— Fruit Res. Stn., Dhaula Kuan.**  
**Ref :— H.P. 62(182).**  
**Type :— 'C'.**

Object:—To study the effect of different spacings between trees, on the growth and yield of sweet orange trees.

1. **BASAL CONDITIONS**:

2. **TREATMENTS to 4. GENERAL**
   Same as in exp. no. 61(80) on page No. 332.

5. **RESULTS**:
   (i) 116 fruits/plant.  (ii) 15'7 fruits/plant.  (iii) Treatment differences are not significant.  (iv) Av. number of fruits/plant.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number of fruits</td>
<td>112</td>
<td>131</td>
<td>106</td>
</tr>
</tbody>
</table>

Girth measurements
   (i) 24'52 cm./plant.  (ii) 1'53 cm./plant.  (iii) Treatment differences are not significant.  (iv) Av. girth of the plant in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. girth</td>
<td>23'91</td>
<td>26'15</td>
<td>23'49</td>
</tr>
</tbody>
</table>
Crop: Orange.  
Site: Fruit Res. Sta., Dhaala Kuan.

Object: To study the effect of different manural treatments on the growth of Orange trees.

1. BASAL CONDITIONS:

2. TREATMENTS and 3 DESIGN.
Same as in exp't. no. 61(79) on Malta at page no. 331.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Girth data, 90 cm. above the bud.  (iv) 1962-63.  (v) to (viii) Nil.

5. RESULTS:
   (i) 9-63 cm./plant.  (ii) 8-49 cm./plant.  (iii) Treatment differences are not significant.  (iv) Av. girth of plant (90 cm. above the bud) in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
<th>T₈</th>
</tr>
</thead>
</table>

Crop: Orange.  
Site: Fruit Res. Sta., Dhaala Kuan.

Object: To study the effect of fertilizers on the growth of Orange trees.

1. BASAL CONDITIONS:

2. TREATMENTS and 3 DESIGN
   Same as in exp't. no. 61(79) on Malta at page no. 331.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Girth measurement (90 cm. above the bud).  (iv) 1962-63.  (v) to (viii) Nil.

5. RESULTS:
   (i) 9-98 cm./plant.  (ii) 2-15 cm./plant.  (iii) Treatment differences are not significant.  (iv) Av. girth of the plant (90 cm. above the bud) in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
<th>T₈</th>
</tr>
</thead>
</table>
Object: — To assess the performance of Klim trees raised from one tree by 3 different methods of propagation.

1. BASAL CONDITIONS:
   (i) N.A. (ii) Clayey loam. (iii) As per treatments. (iv) K-lims. (v) 30.6.51. (vi) N.A. (vii) 28gm./plant of N as F.Y.M. (viii) 1 Weeding and 1 hoeing. (ix) Nil. (x) Irrigated. (xi) 175 cm.; N.A. (xii) 1st week of Nov.

2. TREATMENTS:
   3 methods of propagations: \( P_1 = \text{Seedlings} \), \( P_2 = \text{Layered} \) and \( P_3 = \text{Budded} \).

3. DESIGN:
   (i) R.B.D. (ii) (a) 3, (b) N.A. (iii) 5. (iv) (a) 4.57m. x 18.19m. (b) 4. (v) N.A. (vi) Yes.

4. GENERAL:

5. RESULTS:
   \[ \text{Crop: Plum. Site: Reg. Fruit Res. Sub-Stn., Kandaghat. Object: To study the effect of manures on the yield of Plum.} \]

   \[ \text{Ref: H.P. 64(246), 65(115). Type: 'M'.} \]

   \[ \text{Crop: Orange. Site: Fruit Res. Sta., Dhaula Kuan. Type: 'O'.} \]

   \[ \text{Ref: H.P. 61(81), 63(197).} \]

   \[ \text{Object: — To assess the performance of K-lims trees raised from one tree by 3 different methods of propagation.} \]

   \[ \text{1. BASAL CONDITIONS:} \]
   \[ \text{(i) N.A. (ii) Clayey loam. (iii) As per treatments. (iv) K-lims. (v) 30.6.51. (vi) N.A. (vii) 28gm./plant of N as F.Y.M. (viii) 1 Weeding and 1 hoeing. (ix) Nil. (x) Irrigated. (xi) 175 cm.; N.A. (xii) 1st week of Nov.} \]

   \[ \text{2. TREATMENTS:} \]
   \[ \text{3 methods of propagations: \( P_1 = \text{Seedlings} \), \( P_2 = \text{Layered} \) and \( P_3 = \text{Budded} \).} \]

   \[ \text{3. DESIGN:} \]
   \[ \text{(i) R.B.D. (ii) (a) 3, (b) N.A. (iii) 5. (iv) (a) 4.57m. x 18.19m. (b) 4. (v) N.A. (vi) Yes.} \]

   \[ \text{4. GENERAL:} \]
   \[ \text{(i) Normal. (ii) N.A. (iii) Girth data, 90cm. above the bud. (iv) 1961 63(62-N.A.). (v) to (viii) Nil.} \]

   \[ \text{5. RESULTS:} \]
   \[ \text{\( \text{| Treatment | \( P_1 \) | \( P_2 \) | \( P_3 \) | C.D. |} \]
   \[ \text{| Av. girth | 1.40 | 2.31 | 1.89 | 0.64 cm./plant |} \]
   \[ \text{\( \text{| Treatment | \( P_1 \) | \( P_2 \) | \( P_3 \) | C.D. |} \]
   \[ \text{| Av. girth | 1.00 | 1.81 | 0.60 | 0.60 cm./plant. |} \]

   \[ \text{\( \text{Crop: Plum. Site: Reg. Fruit Res. Sub-Stn., Kandaghat. Object: To study the effect of manures on the yield of Plum.} \]

   \[ \text{Ref: H.P. 64(246), 65(115). Type: 'M'.} \]

   \[ \text{Object: — To assess the performance of K-lims trees raised from one tree by 3 different methods of propagation.} \]

   \[ \text{1. BASAL CONDITIONS:} \]
   \[ \text{(i) N.A. (ii) Loam. (b) N.A. (iii) N.A. (iv) Santa rosa. (v) Planted in 1961, 6m. spacing from plant to plant. (vi) to (vii) N.A. (ix) Nil. (x) Irrigated. (xi) N.A. (xii) April, 65.} \]

   \[ \text{2. TREATMENTS:} \]
   \[ \text{Treatments are same as in Expt. no. 64(245) and 65 (114) on page No. 328.} \]

   \[ \text{3. DESIGN:} \]
   \[ \text{(i) R.B.D. (ii) (a) 9, (b) N.A. (iii) 5. (iv) and (v) N.A. (vi) Yes.} \]
4. GENERAL:
(i) Normal. (ii) N.A. (iii) Girth measurements and yield of fruits. (iv) (a) 1964-contd. (b) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

64 (246)
(i) 18·28Kg/plant. (ii) 7·21Kg/plant. (iii) None of the effects is significant. (iv) Av. yield of plum in Kg/plant.

Extra treatment=18·66Kg/plant.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>K₀</th>
<th>K₁</th>
<th>Me</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>13·00</td>
<td>19·10</td>
<td>15·00</td>
<td>17·10</td>
<td>15·5</td>
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<td>20·20</td>
<td>20·20</td>
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<td>20·35</td>
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<tr>
<td>Mean</td>
<td>16·75</td>
<td>19·65</td>
<td>17·60</td>
<td>18·80</td>
<td>18·20</td>
</tr>
</tbody>
</table>

65 (115)
(i) 10·86 Kg/plant. (ii) 4·58Kg/plant. (iii) All effects are highly significant while P × K interaction is not significant. (iv) Av. yield of plum in Kg/plant.

Extra treatment=42·58Kg/plant.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>K₀</th>
<th>K₁</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>43·03</td>
<td>50·69</td>
<td>40·68</td>
<td>53·04</td>
<td>46·86</td>
</tr>
<tr>
<td>N₁</td>
<td>57·93</td>
<td>60·07</td>
<td>58·36</td>
<td>59·64</td>
<td>59·00</td>
</tr>
<tr>
<td>Mean</td>
<td>50·48</td>
<td>55·38</td>
<td>49·52</td>
<td>56·34</td>
<td>52·93</td>
</tr>
</tbody>
</table>

C.D. for any marginal mean=2·95Kg/plant
C.D. for the body of N × P, N × K table=4·18Kg/plant.
C.D. for control VS. others=4·43 Kg/plant.

Girth
64 (246)
(i) 28·28cm./plant. (ii) 4·97cm./plant. (iii) None of the effects is significant. (iv) Av. girth of plum in cm. plant.

Extra treatment=27·78cm./plant.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>K₀</th>
<th>K₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>27·89</td>
<td>29·40</td>
<td>27·50</td>
<td>29·79</td>
<td>28·64</td>
</tr>
<tr>
<td>N₁</td>
<td>28·40</td>
<td>27·97</td>
<td>26·64</td>
<td>29·73</td>
<td>28·18</td>
</tr>
<tr>
<td>Mean</td>
<td>28·14</td>
<td>28·08</td>
<td>27·07</td>
<td>29·76</td>
<td>28·41</td>
</tr>
</tbody>
</table>

K₀  27·49 | 26·65
K₁  28·80 | 30·72
65 (115)

(i) 36.16cm./plant. (ii) 5.11cm./plant. (iii) Main effect of K and interaction N×P and N×P×K are highly significant.

Extra treatment = 37.10cm./plant.

<table>
<thead>
<tr>
<th></th>
<th>P₄</th>
<th>P₅</th>
<th>K₀</th>
<th>K₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₄</td>
<td>31.75</td>
<td>38.65</td>
<td>31.50</td>
<td>38.90</td>
<td>35.20</td>
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<td>N₅</td>
<td>38.15</td>
<td>35.15</td>
<td>33.55</td>
<td>39.75</td>
<td>36.65</td>
</tr>
<tr>
<td>Mean</td>
<td>34.95</td>
<td>36.90</td>
<td>32.52</td>
<td>39.32</td>
<td>35.92</td>
</tr>
<tr>
<td>K₄</td>
<td>31.65</td>
<td>33.40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K₅</td>
<td>38.25</td>
<td>40.40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for K marginal means = 3.30cm./plant.
C.D. for the body of N×P table = 4.66cm./plant.
JAMMU & KASHMIR
Crop: Paddy (Kharif).

Site: Jammu Provincial Agri. Resptl. Farm, Jammu.

Object: To study the effect of different fertilizers and their times of application on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Berseem. (c) N.A. (ii) Sandy loam. (iii) Mid of June, 64 and 65. (iv) (a) 2 ploughings and 2 puddlings, and 2 transplanting. (b) 25 Kg/ha. in nursery. (c) 25 cm x 20 cm. (d) 2-3. (v) Nil. (vi) Basmati-370. (vii) Irrigated. (viii) 2 hand weeding. (ix) N.A. (x) Mid of Nov. 64 and 65.

2. TREATMENTS:

   Main-plot treatments:
   3 sources of N: \( S_1 = \text{A/S, } S_2 = \text{Urea and } S_4 = \text{C/A/N.} \)

   Sub-plot treatments:
   2 levels of N: \( L_1 = 22 \) and \( L_4 = 44 \) Kg/ha. of N.

   Sub-Sub-plot treatments:
   3 times of application. \( T_1 = \text{In two-split doses, half at puddling stage and other half at pre-flowering stage;} \) \( T_2 = \text{In one dose at puddling stage and } T_3 = \text{In one dose at pre-flowering stage.} \)

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 2 sub-plots/main-plot; 3 sub-sub-plots/sub-plot. (b) N.A. (ii) 4. (iv) (a) N.A. (b) 300 m. x 100 m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1965--only. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 2434 Kg/ha. (j) (a) 316 Kg/ha. (b) 272 Kg/ha. (c) 452 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>L_1</th>
<th>L_2</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( S_1 )</td>
<td>2487</td>
<td>2559</td>
<td>2644</td>
<td>2330</td>
<td>2594</td>
<td>2523</td>
</tr>
<tr>
<td>( S_2 )</td>
<td>2450</td>
<td>2272</td>
<td>2514</td>
<td>2230</td>
<td>2339</td>
<td>2361</td>
</tr>
<tr>
<td>( S_3 )</td>
<td>2359</td>
<td>2478</td>
<td>2289</td>
<td>2378</td>
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<tr>
<td>( T_2 )</td>
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<td>2391</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>( T_3 )</td>
<td>2499</td>
<td>2515</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

---

Crop: Paddy (Kharif).

Site: Regional Paddy Res. Stn., Pennechik.

Object: To study the effect of different levels of \( N, P \) and \( K \) on the yield of Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Berseem. (c) N.A. (ii) Sandy loam. (iii) Mid of June, 64 and 65. (iv) (a) 2 ploughings, and 2 puddlings, and 2 transplanting. (b) 25 Kg/ha. in nursery. (c) 25 cm x 20 cm. (d) 2-3. (v) Nil. (vi) Basmati-370. (vii) Irrigated. (viii) 2 hand weeding. (ix) N.A. (x) Mid of Nov. 64 and 65.
2. TREATMENTS:
All combinations of (1), (2) and (3).
(1) 3 levels of N: N_1=50, N_2=100 and N_3=150 Kg/ha.
(2) 3 levels of P_2O_5: P_1=0, P_2=50 and P_3=100 Kg/ha.
(3) 3 levels of K_2O. K_1=0, K_2=50 and K_3=100 Kg/ha.
(1/3) N applied at puddling and 1/3 N at pre-flowering stage. P and K applied at sowing.

3. DESIGN:
(i) 3 confd. (effects W, X and Y confd.) (ii) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 3
(iv) (a) 4.60 m x 2.44 m; 5.06 m x 2.70 m. (b) 4.10 m x 2.44 m; 4.56 m x 2.30 m. (v) 25 cm x 20 cm.
(vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964-66. (b) No. (c) Nil. (v) No. (vi) Nil. (vii) Since
the exp. is continued beyond 65, results of individual years are presented under 5. Results.

5. RESULTS:

(i) 2566 Kg/ha. (ii) 405.9 Kg/ha. (iii) Main effect of N and interactions N x P, N x K and P x K are
significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P_1</th>
<th>P_2</th>
<th>P_3</th>
<th>K_0</th>
<th>K_1</th>
<th>K_2</th>
<th>Mean</th>
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<td>Mean</td>
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<td>2548</td>
<td>2714</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N marginal means =222.5 Kg/ha.
C.D. for the body of any table =385.5 Kg/ha.

(i) 3307 Kg/ha. (ii) 124.6 Kg/ha. (iii) Main effects of N and P are significant. (iv) Av. yield of grain in
Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P_1</th>
<th>P_2</th>
<th>P_3</th>
<th>K_0</th>
<th>K_1</th>
<th>K_2</th>
<th>Mean</th>
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<td>3347</td>
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C.D. for N or P marginal means =63.8 Kg/ha.
Crop: Paddy (Kharif).
Site: Paddy Res. Stn., Poonchik

Object: To study the effect of different levels of N, P and K on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil (b) Clay loam. (iii) June, 64. (iv) (a) N.A. (b) Transplanting. (c) to (e) N.A. (v) N.A.
   (vi) Basmati-379. (vii) Irrigated. (viii) and (ix) N.A. (x) Nov., 64.

2. TREATMENTS:
   All combinations of (1), (2) and (3).
   (1) 3 levels of N: N₁=22, N₂=44 and N₃=66 Kg/ha.
   (2) 3 levels of P₂O₅: P₀=0, P₁=22 and P₂=44 Kg/ha.
   (3) 3 levels of K₂O: K₀=0, K₁=22 and K₂=44 Kg/ha.

3. DESIGN:
   (i) 34 cond. (effects X, Y and Z are confd.). (ii) (a) 3 blocks/replication; 9 plots/block. (b) N.A. (iii) 3.
   (iv) (a) 4'58 m. x 2'74 m. (b) 4'12 m. x 2'44 m. (v) 23 cm. x 15 cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964—only. (b) N.A. (c) to (vii) N.A.

5. RESULTS:
   (i) 2717 Kg/ha. (ii) 224'4 Kg/ha. (iii) Main effects of N and P are highly significant. Interactions N x P
   N x K and P x K are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th></th>
<th>P₀</th>
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<th>P₂</th>
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K₀: 2600 2633 2789
K₁: 2606 2855 2796
K₂: 2544 2515 3093

C.D. for N or P marginal means=123'0 Kg/ha.
C.D. for the body of N x P, N x K or P x K table=213'1 Kg/ha.
2. TREATMENTS:

15 micronutrient treatments: T₀ = Control (no fertilizer), T₁ = NPK applied to soil only, T₂ = T₁ + Sparrin at 395Kg/ha. by soil application, T₃ = T₁ + Manganese as Mn SO₄ at 60 Kg/ha, T₄ = T₁ + Zn as Zn SO₄ at 50Kg/ha, T₅ = T₁ + Cu as Cu SO₄ at 30Kg/ha, T₆ = T₁ + Molybdenum as Sod. Molybdate at 1/25Kg/ha, T₇ = T₁ + Mn + Zn + Cu + B + Mn, T₈ = T₂ + Mn as Mn SO₄ at 17.5Kg/ha, T₉ = T₁ + Cu as Cu SO₄ at 12.5Kg/ha, T₁₀ = T₁ + B as Borax at 6.2Kg/ha. T₁₁ = T₁ + Cu as Cu SO₄ at 12.5Kg/ha, T₁₂ = T₁ + Zn as Zn SO₄ at 6.2Kg/ha.

Treatments T₄ to T₉ by soil application and T₁₀ to T₁₄ by foliar spray.

3. DESIGN


4. GENERAL

(i) To study the effect of different methods of application of N on Paddy. (ii) N.A. (iii) Type - V. (iv) N.A. (v) Nil. (vi) N.A.

5. RESULTS

63 (M.A.E.)

(i) 4858Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of grain in Kg/ha.

<table>
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<th>Treatment</th>
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65 (M.A.E.)

(i) 3293 Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of grain in Kg/ha.

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Crop :- Paddy. (Kharif)

Site :- M A E. Centre, Khudwani.

Ref :- J. & K. 65(M.A.E.). Type :- 'M'.

Object :- Type V (a) To study the effect of different methods of application of N on Paddy.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sub-mountain brown hill soil. (iii) N.A. (iv) (a) to (e) N.A. (v) 33.6Kg/ha. of P₂O₅ as Super. (vi) to (s) N.A.

2. TREATMENTS:

All combinations of (1) and (2) + a control.

(1) 3 levels of N : N₁ = 33.6, N₂ = 50.4 and N₃ = 67.2Kg/ha.

(2) 4 methods of application: M₀ = Broadcast just before last puddling and incorporated in the soil (sub-surface application), M₁ = Broadcast at planting, M₂ = Broadcast half at planting and half about a month after planting and M₃ = Application in the form of pellets about three weeks after planting.
3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 15. (b) N.A. (iii) to (vi) N.A.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) N.A. (b) No. (c) Nil. (v) N.A. (vi) N.A. (vii) Nil.

5. RESULTS:
(i) 3252Kg/ha. (ii) N.A. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha. Control—2676Kg/ha.

<table>
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C.D. — 328 Kg/ha.

Crop :- Paddy (Kharif).

Site :- M.A.E. Centre, Khudwan.

Object — To study the effect of different times of application of N on the yield of Paddy.

1. BASAL CONDITIONS:
(i) Paddy-Fallow for 60; N.A. for others. (b) Fallow for 60 ; N.A. for others. (e) Nil for 60; N.A. for others. (ii) Loamy clay (for 60; N.A. for others. (iii) 5.5.60/10.6.60; 6.5.61/6.6.61; 5.5.62/6.6.62. (iv) (a) 4 ploughings and 3 hoeings for 60; N.A. for others. (b) Transplanting for 60; N.A. for others. (c) 22.4 Kg/ha. 44.8 Kg/ha; N.A. (d) 75cm x 15cm. for 60 and 61; N.A. (e) Nil. (v) 5604Kg/ha of F.Y.M and Super applied at transplanting. (vi) Ch.—1039. (vii) Irrigated. (viii) 3 weedings for 60; N.A. for others. (ix) N.A. (x) N.A. 15.9.61; 19.9.62.

2. TREATMENTS:
All combinations of (1) and (2) + a control.
(1) 2 sources of 44.8Kg/ha. of N: S1 = A/S and S2 = Urea.
(2) 7 times of application: T1 = Full dose before planting, T2 = Full dose at planting, T3 = Full dose at tillering, T4 = 1 before planting and 1 at tillering. T5 = 1 at tillering + 1 at flowering and T6 = 1 at planting + 1 at tillering + 1 at flowering.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 15. (b) N.A. (iii) N.A. for 60 and 61; 3. (iv) (a) 17.7Hm x 3.05 m. (b) 17.71m x 3.05m.; 16.95m x 1.95m.; 17.26m x 2.39m. (v) Nil; 38cm x 38cm.; 22.5cm x 38cm. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1900-62. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
60 (M.A.E.)
(i) 6266Kg/ha. (ii) 1234Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha. Control—4932

<table>
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<tr>
<th></th>
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<th>T3</th>
<th>T4</th>
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Crop :- Paddy (Kharif)  
Ref :- J. & K 60, 61, 62, 63, 64 (M.A.E.)  
Site :- M.A.E. Centre, Khudwani.  
Type :- 'M'.

Object :- Type II :- To study the effect of N, P, K and P.Y.M. on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy-Fallow for 0; N.A., for others. (b) Fallow for 60 ; N.A. for others. (c) Nil for 60 ; N.A. for others. (ii) Loamy clay. (iii) 5.60/10.60; 6.5.61/6.6.61; 7.6.62/6.6.62; 8.6.63; 9.6.64. (iv) 4 ploughings and 3 hoeings for 60: N.A. for others. (b) Transplanting for 60; N.A. for others. (c) 22.4Kg/ha. ; 44.8Kg/ha. N.A. for others (d) 32cm. x 15cm. for 60 and 61 : N.A. for others. (e) Nil. (v) As per treatments. (vi) Ch. -10.9.60. (vii) Irrigated. (viii) 3 weedings for 60; N.A. for others. (ix) N.A. (x) 15.9.60; 15.9.61; 20.9.62; 21.9.63; 20.9.64.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4).
   (1) 3 levels of N as As : Nₐ=0, Nₐ=33.6 and Nₐ=67.2Kg/ha.  
   (2) 3 levels of P₂O₅ as super : P₁=0, P₁=33.6 and P₁=67.2Kg/ha.  
   (3) 3 levels of K₂O as pot. chloride : K₂ₐ=0, K₂ₐ=33.6 and K₂ₐ=67.2Kg/ha.  
   (4) 2 levels of P.Y.M. : Fₐ=0 and Fₐ=5604 Kg/ha.
AIS applied in two doses, 1st at transplanting and 2nd one month after transplanting. Potash and Super applied at transplanting.

3. DESIGN:
(i) 3\times 2 confd. (ii) (a) 9 plots/block, 6 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 17'71m. \times 3'05m. for 60 to 62; N.A. for others. (b) 16'95m. \times 1'99m.; 17'26m. \times 2'29m.; N.A. for 63 and 64. (v) Nil; 1'8km. \times 2'3km.; 2'25m. \times 3'6cm.; N.A. for 63 and 64. (vi) Yes.

4. GENERAL:
(i) Normal for 60; N.A. for others. (ii) Nil for 60, N.A. for others. (iii) Yield of grain. (iv) (a) 1960-64 (b) N.A. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

60 (M.A.E.)

\[\begin{align*}
\text{N}_4 & | \text{N}_1 & \text{N}_2 & \text{P}_4 & \text{P}_1 & \text{P}_2 & \text{K}_4 & \text{K}_1 & \text{K}_2 & \text{Mean} \\
\hline
\text{F}_4 & 4651 & 5772 & 6463 & 5434 & 5660 & 5773 & 5529 & 5641 & 5716 & 5629 \\
\text{F}_3 & 4670 & 5417 & 5997 & 5249 & 5361 & 5473 & 5287 & 5249 & 5547 & 5361 \\
\text{Mean} & 4660 & 5594 & 6230 & 5351 & 5510 & 5623 & 5408 & 5445 & 5631 & 5495 \\
\text{K}_6 & 4540 & 5407 & 6277 & 5210 & 5296 & 5688 & 5490 & 5742 & 5661 \\
\text{K}_1 & 4791 & 5744 & 5800 & 5223 & 5492 & 5520 & 5490 & 5742 & 5661 \\
\text{K}_2 & 4649 & 5631 & 6613 & 5490 & 5742 & 5661 & 5490 & 5742 & 5661 \\
\text{P}_6 & 4287 & 5548 & 6218 & 4215 & 5506 & 6318 & 4215 & 5506 & 6318 & 5346 \\
\text{P}_1 & 4875 & 5091 & 6164 & 5573 & 6392 & 6878 & 5573 & 6392 & 6878 & 5814 \\
\text{P}_2 & 4818 & 5743 & 6308 & 4888 & 5967 & 6604 & 4888 & 5967 & 6604 & 5903 \\
\end{align*}\]

C.D. for N marginal means=302.3Kg/ha.
C.D. for F marginal means=246.9Kg/ha.

61 (M.A.E.)

\[\begin{align*}
\text{N}_4 & | \text{N}_1 & \text{N}_2 & \text{P}_4 & \text{P}_1 & \text{P}_2 & \text{K}_4 & \text{K}_1 & \text{K}_2 & \text{Mean} \\
\hline
\text{F}_6 & 4215 & 5506 & 6318 & 5202 & 5451 & 5386 & 5574 & 5460 & 5405 & 5346 \\
\text{F}_1 & 5573 & 6392 & 6878 & 6296 & 6237 & 6340 & 6208 & 6400 & 6235 & 6281 \\
\text{Mean} & 4894 & 5949 & 6598 & 5734 & 5844 & 5863 & 5691 & 5930 & 5820 & 5814 \\
\text{K}_6 & 4897 & 5783 & 6392 & 5626 & 5663 & 5783 & 5574 & 5603 & 5902 & 5903 \\
\text{K}_1 & 4887 & 6097 & 6797 & 5857 & 6032 & 5902 & 5913 & 5303 & 5902 & 5903 \\
\text{K}_2 & 4888 & 5967 & 6604 & 5718 & 5838 & 5903 & 5718 & 5838 & 5903 & 5903 \\
\text{P}_6 & 4831 & 5792 & 6558 & 4831 & 5792 & 6558 & 4831 & 5792 & 6558 & 5346 \\
\text{P}_1 & 4768 & 6152 & 6613 & 4768 & 6152 & 6613 & 4768 & 6152 & 6613 & 5346 \\
\text{P}_2 & 5063 & 5903 & 6621 & 5063 & 5903 & 6621 & 5063 & 5903 & 6621 & 5346 \\
\end{align*}\]

C.D. for N marginal means=204.6Kg/ha.
C.D. for the body of NxF table=416.6Kg/ha.

\(\geq 2\) (M.A.E.)

(i) 5912Kg/ha. (ii) 4292Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.
### Table 1: Yield of Grain

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<th>N₂</th>
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C.D. for N marginal means = 296.1 Kg/ha.

63 (M.A.E.)
(i) 4558 Kg/ha.  (ii) 357.9 Kg/ha.  (iii) Main effect of N alone is highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
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C.D. for N marginal means = 247.0 Kg/ha.

64 (M.A.E.)
(i) 4716 Kg/ha.  (ii) 576.6 Kg/ha.  (iii) Main effect of N alone is highly significant.  (iv) Av. yield of grain in Kg/ha.

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C.D. for N marginal means = 397.8 Kg/ha.
Crop :- Paddy (Kharif).

Site :- Kashmir Provincial Agri. Exptl. Farm, Shalimar

Object :- To study the effect of different varieties and manures on the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy-fallow-paddy. (b) Fallow. (c) Nil. (ii) N.A. (iii) 3rd week of May, 63. (iv) 3 ploughings. (b) Transplanting. (c) 46Kg/ha. (d) 15cm x 23cm. (e) 5-3. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 3 weedings. (ix) N.A. (x) Last week of Sept., 63.

2. TREATMENTS:

Main-plot treatments
8 varieties :- V,=K 60-8, V2=K 60-32, V3=K 60-42, V4=K 60 Bulk, V5=Norm x Ch. 47-34-36-46-67-10, V6=Zinho x Ch. 972-8-30-71-28, V7=Zinho x Ch. 972-8-30-76-32 and V8=Ch.-1039.

Sub-plot treatments
All combinations of (I) and (2)
(1) 3 levels of N as A/S: N1 = 22.4, N2 = 44.8 and N3 = 67.3Kg/ha.
(2) 3 manures : M0 = control, M1 = 22.4Kg/ha of P2O5 and M2 = M1 + 22.4Kg/ha of K2O.

3. DESIGN:

(i) Split-plot. (ii) 3 main-plots/replication, 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 1.83 m x 3.66m. (b) 1.52m x 3.20m. (v) 15cm x 23cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—only. (b) No. (c) Nil. (v) Shalimar. (vi) and (vii) Nil.

5. RESULTS:

(i) 548Kg/ha. (ii) (a) 468.7 Kg/ha. (b) 468.1Kg/ha. (iii) Main effects of V, N and M are highly significant while interaction V x N x M is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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C.D. for V marginal means = 229.8 Kg/ha.
C.D. for M or N marginal means = 1319 Kg/ha.
1. BASAL CONDITIONS:

(i) (a) Paddy-fallow-paddy, (b) Fallow, (c) Nil. (ii) Clay loam. (iii) 1.5:62. (iv) (a) 3 ploughings 3-clod breakings, 2-puddlings. (b) Transplanting. (c) 46Kg/ha. (d) 15cm. x 23cm. (e) 3-3. (v) 184.5 Q/ha. of F.Y.M. (vi) As per treatments. (vii) Irrigated. (viii) 3 weedings. (ix) 11,14, 10.62.

2. TREATMENTS:

All combinations of (1), (2) and (3).

(1) 3 varieties: V₁=Ch.-103.9, V₃=K-60 (Ch. 47×Rikee 132) and V₄=Norix 8xCh. 47-34-46-67-10.

(2) 3 levels of N: N₁=22.4, N₃=44.8 and N₅=67 3 Kg/ha.

(3) 2 levels of P₂O₅: P₁=20 2 and P₂=40 4 Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) (a) 4'27m. x 3'66m. (b) 3'96m. x 3'20m. (v) 15cm. x 23cm. (vi) Yes.

4. GENERAL:

(i) Fair. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 3006Kg/ha. (ii) 348.0Kg/ha. (iii) Main effects of V and N are highly significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for V or N marginal means=201.8Kg/ha.

Crop :- Paddy (Kharif)

Site :- Kashmir Provincial Agri. Exptl. Farm, Shalimar.

Ref : J.&K. 63(11)

Type : 'MV'.

Object:-To study the effect of different varieties and manures on the yield of Paddy,
3. DESIGN:
(i) Split-plot (ii) 8 main-plots/replication; 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 2.74m. X 2.74 m. (b) 2.44m. X 2.29m. (v) 15cm. X 23cm. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) Khudwani. (vi) and (vii) Nil.

5. RESULTS:
(i) 4058 Kg/ha. (ii) (a) 686'8 Kg/ha. (b) 375-4 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av yield of grain in Kg/ha.

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C.D. for N marginal means=106.2 Kg/ha.

Crop : Paddy (Kharif)
Site : Paddy Res. Sta. Ponnechik (Jammu)
Ref : J.K.64(220)
Type : 'C'.

Object : To study the effect of spacings and seedlings on Paddy crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Clay loam. (iii) June, 64. (iv) (a) N.A. (b) Transplanting. (c) — (d) and (e) As per treatments (v) 22 Kg/ha. of N applied at puddling+22 Kg/ha. of N applied at pre-flowering, 22 Kg/ha. of P₂O₅ at puddling. (vi) Basmati—370. (vii) Irrigated, (viii) and (ix) N.A. (x) Nov., 64.

2. TREATMENTS:
Main-plot treatments : —
3 levels of spacing ; D₁=15cm. X 15cm., D₂=15cm. X 23cm., and D₃=23cm. X 23cm.
Sub-plot treatments : —
3 no. of seedlings per hole :: S₁=2, S₂=3 and S₃=4 seedlings/ hole

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main—plot. (b) N.A. (iii) 3. (iv) (a) 4'57m. X 3'46m. (b) 4'11m. X 3'35m. (v) 23cm. X 15cm. (vi) Yes.
4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964-only (b) No. (c) Nil. (v) Shalimar, Khudwani. (vi) and (vii) Nil.

5. RESULTS:

(i) 1611 Kg/ha. (ii) (a) 639.2 Kg/ha. (b) 308.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

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Crop: Paddy. (Kharij)

Site: Paddy Res. Stn., Khudwani.

Ref: J.&K.64(222).

Type: 'CV'.

Object: To study the effect of spacings and seedlings on different varieties of paddy.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 1.7.64. (iv) (a) N.A. (b) Transplanting. (c) — (d) and (e) As per treatments. (v) 22 Kg/ha. of N at puddling + 22 Kg/ha. of N at pre-flowering + 20 Kg/ha. of P_2O_5 at puddling. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) Nov., 64.

2. TREATMENTS:

Main-plot treatments:

2 varieties: V_1 = China-1039 and V_2 = K-60-42.

Sub-plot treatments:

3 levels of spacing; D_1 = 15cm. x 15cm, D_2 = 15cm. x 23cm, and D_3 = 23cm. x 23cm.

Sub-sub-plot treatments:

3 levels of seedlings: S_1 = 2, S_2 = 3, and S_3 = 4.

3. DESIGN:

(i) Split-plot. (ii) (a) 2 main-plots/replication, 2 sub-plots/main-plot, 3 sub-sub-plots/sub-plot (b) N.A. (iii) 4. (iv) (a) 3 60cm. x 3 60cm. (b) 3 35cm. x 3 35cm. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) Shalimar (vi) and (vii) Nil.
5. RESULTS:

(i) 5460 Kg/ha. (ii) (a) 6071 Kg/ha. (b) 7187 Kg/ha. (c) 7886 Kg/ha. (iii) Main effect of D is highly significant and that of S is significant. (iv) Av. yield of grain in Kg/ha.

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C.D for D marginal means = 422.1 Kg/ha.
C.D for S marginal means = 451.7 Kg/ha.

Crop : Paddy (Kharif).
Site : Kashmir Provincial Agrl. Exptl. Farm, Shalimar.
Type : CV.

Ref : J&K. 64(221).

Object : To study the effect of spacing and seedlings on different varieties of Paddy.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 1.7.64. (iv) (a) N.A. (b) Transplanting. (c) - (d) and (e) As per treatments (v) 22 Kg/ha of N at puddling + 22 Kg/ha of N at pre-flowering + 20 Kg/ha of P_2O_5 at puddling. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) Nov., 64.

2. TREATMENTS:

Main-plot treatments:
2 varieties: V_1 = Norain-S and V_2 = China-1039.

Sub-plot treatments:
3 spacings: D_1 = 15cm. x 15cm. D_2 = 25cm. x 15cm. and D_3 = 25cm. x 25cm.

Sub-Sub-plot treatments:
3 no. of seedlings/hole: S_1 = 2, S_2 = 3 and S_3 = 4 seedlings/hole.

3. DESIGN:

(i) Split-plot. (ii) (a) 2 main—plots/replication, 3 sub-plots/main-plot and 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 4. (iv) (a) 2.74m. x 2.74m. (b) 2.44m. x 2.29m. (v) 15cm. x 23cm. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) Khudwas. (vi) and (vii) Nil.

5. RESULTS:

(ii) 3649 Kg/ha. (iii) (a) 6342 Kg/ha. (b) 2098 Kg/ha. (c) 2685 Kg/ha. (iii) Main effect of D is highly significant and that of S is significant. (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Kharif).
Site: M.A.E. Centre, Khudwani.
Object: Type VII—To study the effect of manures and cultural practices on Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (e) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) and (b) N.A. (c) = (d) and (e) As per treatments. (v) N.A. (vi) CH-1039. (vii) Irrigated.

2. TREATMENTS:
   Main-plot treatments:
   All combinations of (1), (2) and (3).
   (1) 3 dates of planting: D₁ = 15 days before normal, D₂ = Normal and D₃ = 15 days after normal.
   (2) 3 spacings: S₁ = 15 cm. x 15 cm., S₂ = 20 cm. x 20 cm. and S₃ = 25 cm. x 25 cm.
   (3) 3 rates of planting: R₁ = 2, R₂ = 4 and R₃ = 6 seedlings/hole.
   Sub-plot treatments:
   All combinations of (1) and (2).
   (1) 2 levels of N as A/S: N₀ = 0 and N₁ = 44.8 Kg/ha.
   (2) 2 levels of P₀ as Super: P₀ = 0 and P₁ = 44.8 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 blocks/replication, 9 main-plots/block, 4 sub-plots/main-plot. (b) N.A. (iii) I. (iv) to (vi) N.A.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) to (vii) N.A.

5. RESULTS:
   (i) 4152 Kg/ha. (ii) (a) 1155.5 Kg/ha. (b) 410.5 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>S₁</th>
<th>S₂</th>
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<tr>
<td>V₁</td>
<td>3602</td>
<td>3662</td>
<td>3328</td>
<td>3447</td>
<td>3574</td>
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<tr>
<td>V₂</td>
<td>3964</td>
<td>3813</td>
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<td>3703</td>
<td>3901</td>
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<tr>
<td>Mean</td>
<td>3828</td>
<td>3737</td>
<td>3383</td>
<td>3570</td>
<td>3639</td>
<td>3781</td>
<td>3649</td>
</tr>
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</table>

C.D. for D marginal means = 169.7 Kg/ha.
C.D. for S marginal means = 157.3 Kg/ha.
Crop :- Paddy (Kharif).

Site :- Seed Multiplication Farm, Chogal Hardwara.

Object:—To study the effect of weedicide as against local method of weeding on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A.  (ii) Clay loam  (iii) Last week of June, 64.  (iv) (a) N.A.  (b) Transplanting.
   (c) — (d) 23 cm. (e) 2-3. (v) Nil  (vi) Ca-109. (vii) Irrigated. (viii) As per treatments. (ix) N.A.
   (c) Oct., 64.

2. TREATMENTS:
   6 weedicide treatments :  
   T₀ = Control,  T₁ = Local method (hand weeding),  T₂ = 1 post-emergence application of weedicide, 
   T₃ = 2 post-emergence application of weedicide,  T₄ = T₂ + cultural method of weeding and 
   T₅ = Cultural method of weeding.

Weedicide, Sod, Salt 2,4 D applied at 1.12 Kg/ha. 4 and 6 weeks after transplanting.

3. DESIGN:
   (i) R.B.D.  (ii) 6.  (b) N.A.  (iii) 4.  (iv) (a) 24.69 m. × 2.74 m.  (b) 24.38 m. × 2.44 m.  (v) 15 cm. × 15 cm.
   (vi) Yes.

4 GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1964 only.  (b) No.  (c) Nil.  (v) Shalimar. (vi) and 
   (vii) Nil.
5. RESULTS:

(i) 2554 Kg/ha. (ii) 493.4 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
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<td>3740</td>
<td>2250</td>
<td>2594</td>
<td>3052</td>
<td>2157</td>
</tr>
</tbody>
</table>

C.D.=737.3 Kg/ha.

Crop :- Paddy (Kharif).

Site :- Seed Multiplication Farm, Pombay (Kulgaon).

Object :- To study the method of application of weedicides.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) N.A. (iv) (a) 3 to 4 ploughings & puddling. (b) Transplanting (c) — (d) 23cm. (e) 2-3. (v) Nil. (vi) Ch-1039 (vii) Irrigated. (viii) As per treatments. (ix) and (x) N.A.

2. TREATMENTS

10 weedicidal treatments: T0=Control, T1=Local method, T1-1 pre-emergence application of weedicide., T1-2 post-emergence application of weedicide, T2 post-emergence applica­tions of weedicide, T3=T1+T1, T4=T1+T1, T4=T1+T1+T1 and T8=Local method (twice).

Weedicide: Tropotox applied at 1-40 litre/ha. pre-emergence 3 days after sowing. Post emergence 4 and 6 weeks after sowing.

3. DESIGN :

(i) R.B.D. (ii) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 7.62m. x 3.96m. (v) N.A. (vi) Yea.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 2600 Kg/ha. (ii) 198-6. Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2028</td>
<td>2864</td>
<td>2272</td>
<td>2657</td>
<td>2582</td>
<td>2704</td>
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<tr>
<td>T7</td>
<td>T8</td>
<td>T9</td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td>2779</td>
<td>2657</td>
<td>2817</td>
<td>2638</td>
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</tbody>
</table>

C.D.=286.1 Kg/ha.

Crop :- Paddy (Kharif).

Site :- Seed Multiplication Farm Pombay (Kulgaon).

Object :- To determine the optimum dose and suitable time of spraying of herbicides on the yield of Paddy.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) 23/24.6.64. (iv) (a) N.A. (b) Transplanting (c) — (d) 23 cm. (e) 2-3. (v) N.A. (vi) Ch-1039. (vii) Irrigated. (viii) As per treatments, (ix) and (x) N.A.

2. TREATMENTS:
   6 weedicidal treatments: T₀ =Control, T₁ =Post-emergence application, T₂ =Transplanting. T₃ =22 post-emergence applications, T₄ =Cultural method and T₅ =Cultural method.
   Weedicide-Salt 2,4-D applied at 1·12 Kg/ha. (4 and 6 weeks after transplanting).

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 7·62m x 4·57m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) Hardwara and Shalimar. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1706 Kg/ha. (ii) 1017 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.
   Treatment Av. yield 1497 2018 1465 1660 1872 1725
   C.D. =153·1 Kg/ha.

Crop :- Paddy.  
Site :- Seed Multiplication Farm, Padyampara.  
Ref :- J.&K. 63(245).  
Type :- 'D'.

Object :- To compare the effect of different weedicides against local method of weeding on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) N.A. (iv) (a) 2 — 3 ploughings and puddling. (b) Transplanting. (c) — (d) 23cm. (e) 2-3. (v) Nil. (vi) Ch-1039. (vii) Irrigated. (viii) As per treatments, (ix) and (x) N.A.

2. TREATMENTS
   8 weedicidal treatments: T₀ =Control, T₁ =Local method (Hand weeding), T₂ =Fenoxone at 0·56 Kg/ha., T₃ =Fenoxone at 1·12 Kg/ha., T₄ =Fenoxone at 2·6 Kg/ha., T₅ =Dicotox acid at 0·56 Kg/ha., T₆ =Dicotox acid at 1·12 Kg/ha. and T₇ =Dicotox acid at 1·68 Kg/ha.
   Weedicides were sprayed, 4 weeks after transplanting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 5. (iv) (a) 8·53m x 7·62m. (b) 1/296.5ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—only. (b) No. (c) Nil. (v) Shalimar. (vi) and (vii) Nil.
5. RESULTS:
(i) 2662 Kg/ha.  (ii) 2678 Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2286</td>
<td>3040</td>
<td>2483</td>
<td>2811</td>
<td>2690</td>
<td>2542</td>
<td>2838</td>
</tr>
<tr>
<td>C.D. = 346 Kg/ha.</td>
<td></td>
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</tbody>
</table>

Crop: Paddy (Khajf).
Object: To study the effect of weedicides on Paddy crop.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A.  (ii) Clay loam.  (iii) June, 64.  (iv) (a) 3-4 ploughings and diggings.  (b) Transplanting.  (c) 25 Kg/ha.  (d) 23 cm.  (e) 2-3 (v) 22-4 Kg/ha. of N, P, K each as basal dose + 22-4 Kg/ha. of N at pre-flowering.  (vi) Basmati-370.  (vii) Irrigated.  (viii) As per treatments.  (ix) N.A.  (x) Nov., 64.

2. TREATMENTS:
6 weedicidal treatments: T1=Control, T2=Copper, Mur. 1%, T3=Dithine Z-78.3%, T4=Blitex, 2%, T5=Fytolene, 0.002%, and T6=Blue copper.

3. DESIGN:
(i) R.B.D.  (ii) (a) 6.  (b) N.A.  (iii) 4.  (iv) (a) 7.32 m. x 2.74 m.  (b) 7.01 m. x 2.29 m.  (v) 15 cm. x 23 cm.  (vi) Yes.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1964—only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
(i) 2250 Kg/ha.  (ii) 37.9 Kg/ha.  (iii) Treatment differences are highly significant  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2228</td>
<td>2331</td>
<td>2246</td>
<td>2250</td>
<td>2254</td>
<td>2219</td>
</tr>
<tr>
<td>C.D. = 57 Kg/ha.</td>
<td></td>
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</table>

Crop: Paddy (Khajf).
Site: Paddy Res. Stn., Ponnechik.
Object: To control the stem borers by spraying insecticides on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Wheat.  (c) N.A.  (ii) Clay loam.  (iii) June, 65.  (iv) (a) 3 to 4 ploughings and diggings.  (b) Transplanting.  (c) 2-3 (v) 22-4 Kg/ha. of N, P, K each as basal dose + 22-4 Kg/ha. of N as top dressing.  (vi) Basmati—370.  (vii) Irrigated.  (viii) As per treatments.  (ix) N.A.  (x) Nov., 65.
2. TREATMENTS:
6 weedicidal treatments: \( T_0 \)-Control, \( T_1 \)-Endosul, \( T_2 \)-Foliodol, \( T_3 \)-Dimecron, \( T_4 \)-E kotox and \( T_5 \)-B amina.

3. DESIGN:
(i) R.B.D (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 7.32m x 1.93m. (b) 7.01m x 1.37m. (v) 15cm x 23cm. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1965-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 205.5Kg/ha. (ii) 252.56Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( T_0 )</th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
<th>( T_5 )</th>
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<tr>
<td>Av yield</td>
<td>1932</td>
<td>2124</td>
<td>2243</td>
<td>1687</td>
<td>1963</td>
<td>2101</td>
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<tr>
<td>C.D.</td>
<td>302.5Kg/ha.</td>
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</tbody>
</table>

Crop: Paddy (Kharif).
Type: 'D'.

Object: To study the effect of seed treatments in different chemicals on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) Mid of June, 65. (iv) (a) 2 to 3 ploughings and 8 diggings. (b) Transplanting. (c) - (d) 20cm x 15cm. (e) 2-3. (v) and (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (a) Last week of Sept. 65.

2. TREATMENTS:
9 seed treatments: \( T_0 \)-Control, \( T_1 \)-Seed treatment (seed soaked for 12 hours in mixture of copper-1000 ppm and Streptocycline 25ppm at room temperature), \( T_2 \)=\( T_1 \)+ spraying the crop with Agtron 100 ppm, \( T_3 \)=\( T_1 \)+ spraying the crop with Streptocycline 25ppm, \( T_4 \)=\( T_1 \)+ spraying the crop with Dithane-Z-78 0.03%, \( T_5 \)=\( T_1 \)+ spraying the crop with Cunor 1%, \( T_6 \)=\( T_1 \)+ spraying the crop with Flit-406 0.2%, \( T_7 \)=\( T_1 \)+ spraying the crop with Pyrodon 0.2% and \( T_8 \)=Only spraying with Streptocycline 100 ppm.

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A (iii) 4. (iv) (a) N.A. (b) 3.00m x 1.50m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1965-only. (b) No. (c) Nil. (v) to (vii) Nil.
5. RESULTS:
(i) 3875 Kg/ha. (ii) 8270 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
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<td>3550</td>
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Crop: Paddy (Kharif)
Site: Kashmir Provincial Agri. Exptl. Farm, Shalimar

Object: To compare the local method of weeding with weedicides for the yield of Paddy.

1. BASAL CONDITIONS:
(i) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) 4.6.60; 16.4.61. (iv) 2--3 ploughings and puddlings (b) Broadcasting (c) 91Kg/ha. (d) 23cm. (e) 2--3. (v) Nil. (+i) Ch-109. (vi) Irrigated. (vii) As per treatments (a) N.A. (b) Last week of Sept., 60; Oct., 61.

2. TREATMENTS:
10 weedicidal treatments:
- Control, T1 = Local method (hand weeding), T2 = Pre-emergence spraying application of 2, 4-D at 1-68Kg/ha. 3 days after germination, T3 = Post-emergence application of Fenoxone at 2.68 Kg/ha. 44 days after sowing, T4 = Post-emergence application of Fenoxone at 2.68 Kg/ha. twice, 44 and 71 days after sowing, T5 = T2 + T3, T6 = T1 + T6, T7 = T1 + T2 + T3 + T4 + T5 and T9 = Local method (twice).

3. DESIGN:
(i) R.B.D. (ii) (a) 40. (b) N.A. (iii) 4. (iv) (a) 8.53m. x 4.11m. (b) 7.92m. x 3.66m. (v) 30cm. x 23cm. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-61. (b) No. (c) Results of combined analysis are given under 5. Results. (v) No. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x Years interaction is present.

5. RESULTS:
Pooled results
(i) 3775 Kg/ha. (ii) 11211 Kg/ha. (with 9 d.f. based on Treatments x Years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
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<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
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<td></td>
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<td>Year</td>
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<td>4186</td>
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<tr>
<td>1961</td>
<td>3364</td>
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<tr>
<td>Pooled</td>
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Individual results

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<th>T3</th>
<th>T4</th>
<th>T5</th>
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<td>3042</td>
<td>3854</td>
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<td>3946</td>
<td>4362</td>
<td>4555</td>
<td>4650 N.S.</td>
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</table>
Crop: Paddy (Kharif).

Ref: J.&K. 60(172), 61(171)

Site: Kashmir Provincial Agri. Expd. Farm, Shalimar.

Object: To compare the effect of different weedicides against local method of weeding on the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam (iii) N.A. (iv) (a) 2-3 ploughings and puddlings. (b) Transplanting. (c) - (d) 25cm. (e) Nil. (vi) Ch-1039. (vii) Irrigated. (viii) As per treatments (ix) N.A. (x) Last week of Sept. 00, N.A.

2. TREATMENTS:

8 weedicidal treatments: 
- T0=Control, T1=Local method (hand weeding), T2=Fernoxone at 0.56 Kg/ha., T3=Fernoxone at 1.12 Kg/ha., T4=Fernoxone at 1.68Kg/ha., T5=Dicotox acid at 0.56Kg/ha., T6=Dicotox acid at 1.12Kg/ha., T7=Dicotox acid at 1.68Kg/ha.

Spraying of the weedicides was done 4 weeks after transplanting.

3. DESIGN:

(i) R.B D. (ii) 8. (b) N.A. (iii) 5. (iv) (a) 8.53m.x4.57m. (b) 8.08m.x4.11m. (v) N.A, (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-61. (b) No. (c) Results of combined analysis are given under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:

Pooled Results

(i) 3179Kg/ha. (ii) 5392Kg/ha. (based on 63 d.f. made up of pooled error and Treatments x Years interaction). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>2864</td>
<td>3638</td>
<td>3275</td>
<td>2940</td>
<td>2954</td>
<td>3257</td>
<td>3256</td>
<td>3250</td>
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<tr>
<td>C.D.</td>
<td>478 Kg/ha.</td>
<td></td>
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Individual Results

<table>
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<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
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<td>3179</td>
<td>5352</td>
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Crop: Paddy. (Kharif)

Ref: J.&K, 65(141).

Site: Kashmir Provincial Agri. Expd. Farm, Shalimar.

Object: To find out the effective dose of weedicide in controlling weeds.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) N.A. (iv) (a) 3 to 4 ploughings & puddlings. (b) Transplanting. (c) (d) 23 cm. (e) 2-3. (v) N.A. (vi) Ch-1039. (vii) Irrigated. (viii) As per treatments. (ix) N.A. (x) Sep. 65.

2. TREATMENTS
8 weedicidal treatments: T<sub>0</sub>=Control, T<sub>1</sub>=Local method, T<sub>2</sub>=Sod. Salt, 2,4-D at 0.56 Kg/ha. T<sub>1</sub>=Sod. Salt, 2,4-D at 1.12 Kg/ha., T<sub>3</sub>=Ethyle ester of 2,4-D at 0.56 Kg/ha., T<sub>4</sub>=Ethyle ester of 2,4-D at 1.12 Kg/ha. and T<sub>5</sub>=Ethyle ester of 2,4-D at 1.68 Kg/ha.
Weedicides sprayed 4 weeks after transplanting.

3. DESIGN:
(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 8.53m. x 7.62m. (b) 8.08m. x 7.62m. (v) 23cm. x 23cm. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain (iv) (a) 1965—only. (b) and (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 1545 Kg/ha. (ii) 1136 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T&lt;sub&gt;0&lt;/sub&gt;</th>
<th>T&lt;sub&gt;1&lt;/sub&gt;</th>
<th>T&lt;sub&gt;2&lt;/sub&gt;</th>
<th>T&lt;sub&gt;3&lt;/sub&gt;</th>
<th>T&lt;sub&gt;4&lt;/sub&gt;</th>
<th>T&lt;sub&gt;5&lt;/sub&gt;</th>
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<td>1823</td>
<td>1441</td>
<td>1558</td>
<td>1400</td>
<td>1480</td>
<td>1705</td>
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<td>C.D.</td>
<td>=167.0 Kg/ha</td>
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CROP: Paddy (Kharif)
Site: Kashmir Provincial Agri. 
Exptl. Farm, Shalimar.
Type: - 'D'.

Object:—To compare the different methods of weed control on the yield of Paddy.
5. RESULTS:

Pooled Results

(i) 3625 Kg/ha. (ii) 889.1 Kg/ha. (based on 20 d. f. made up of Treatments x Years interaction) (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

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<th>$T_1$</th>
<th>$T_2$</th>
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C.D. = 514.3 Kg/ha.

Individual Results

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Crop:- Wheat (Rai). Ref:- J. & K. 62(258), 63(251), 64(260), 65(146).

Site:- Kashmir Provincial Agri. Exptl. Farm, Shalimar.

Type:- 'D'.

Object:- To compare the effect of various weedicides with local method on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) N.A. (iv) (a) 3-4 ploughings, (b) Line sowing. (c) 100 Kg/ha. (d) 24 cm. (e) - (v) Nil. (vi) N.A. (vii) Irrigated (viii) As per treatments. (ix) and (x) N.A.

2. TREATMENTS:

5 weedicide treatments: $T_5$-Control, $T_1$-Local method, $T_2$-one post-emergence application of sod. Salt 2,4-D at 0.6 Kg/ha. $T_3$=2 applications of $T_5$. $T_0$=Control $+T_1$-cultural method.

Post-emergence application 3 weeks after sowing.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 9.02 cm. x 4.58 cm.; 9.28 cm. x 4.98 cm.; 9.28 cm. x 4.8 cm.; 9.4 cm. x 4.58 cm.; (b) 8.54 cm. x 4.30 cm.; 8.54 cm. x 4.70 cm.; 8.54 cm. x 4.40 cm.; 8.70 cm. x 4.54 cm.; (c) 48 cm. x 48 cm.; 64 cm. x 48 cm.; 64 cm. x 48 cm.; 48 cm. x 48 cm. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain (iv) (a) 1962 to 65 (b) No. (c) Results of combined analysis are given under 5 Results. (v) No. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x Years interaction is present.

5. RESULTS:

Pooled Results

(i) 116 Kg/ha. (ii) 1276 Kg/ha. (based on 2 d. f. made up of Treatments x Years interaction). (iii) Treatment differences are highly significant (iv) Av. yield of grain is Kg/ha.
Crop: Maize (Kharif).

Site: Seed Multiplication Farm, Chogal, Hardawara. Type: 'D'.

Object: To study the efficiency of chemical, cultural and local methods for controlling weeds.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Clay loam (iii) May, 64. (iv) (a) 3 to 4 ploughings (b) Line sowing (c) 15 Kg/ha. (d) 61cm. (e) (v) Nil. (vi) Anantnag (Local) (vii) Unirrigated. (viii) As per treatments. (ix) N.A. (x) Sept., 64.

2. TREATMENTS:
   10 weedicidal treatments: 
   \( T_0 \) = Control, \( T_1 \) = Local method, \( T_2 \) = pre-emergence application of weedicide, \( T_3 \) = 1 post-emergence application, \( T_4 \) = 2 post-emergence applications, \( T_5 \) = \( T_3 + T_4 \), \( T_6 \) = \( T_2 + T_3 + T_4 \) cultural method, \( T_7 \) = \( T_3 + T_4 \) cultural method and \( T_8 \) = Cultural method.

   Weedicide Ethyle Ester 2,4-D applied at 1-49 litre/ha. Pre-emergence application 3 days after sowing and post-emergence application 4 and 6 weeks after sowing.

3. DESIGN:
   (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 12'19m. x 3'0m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 126 Kg/ha. (ii) 26-9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Year</th>
<th>( T_0 )</th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
<th>( T_5 )</th>
<th>( T_6 )</th>
<th>( T_7 )</th>
<th>( T_8 )</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<td>1962</td>
<td>449</td>
<td>504</td>
<td>381</td>
<td>442</td>
<td>438</td>
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<td>443</td>
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<tr>
<td>1963</td>
<td>549</td>
<td>735</td>
<td>630</td>
<td>573</td>
<td>666</td>
<td>**</td>
<td>630</td>
<td>80-3</td>
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<tr>
<td>1964</td>
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<td>458</td>
<td>162</td>
<td>341</td>
<td>386</td>
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<td>300</td>
<td>50-9</td>
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<td>825</td>
<td>751</td>
<td>812</td>
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<td>826</td>
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</table>
Crop: Maize (Kharif).

Site: Seed Multiplication Farm, Chogali

Hardawara.

Object — To study the efficiency of chemical, cultural and local methods for controlling weeds.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) Ist week of May, 60; May, 61; June, 62; N.A. (iv) (a) 2 and 3 ploughings. (b) Line sowing. (c) 15 Kg/ha. (d) 60cm. between rows for 61 to 63; 30cm. for 65. (e) — (v) Nil. (vi) Anant nag (Local). (vii) Unirrigated. (viii) As per treatments. (ix) N.A. (x) Sept., 64.

2. TREATMENTS TO:

   Same as in exp. no. 64 (269) on page No. 364.

3. RESULTS:
   (i) 444 Kg/ha. (ii) 630 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

   Treatment
   T₀  T₁  T₂  T₃  T₄  T₅  T₆  T₇  T₈
   Av. yield 267 287 336 465 496 450 427 488 465 458
   C.D.=91.4 Kg/ha.

Crop: Maize. (Kharif)

Site: Damodar Kuwa Farm, Srinagar.

Object: To compare the effect of weedicide with local method of weeding on the yield of Maize.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) Ist week of May, 60; May, 61; June, 62; N.A. (iv) (a) 2 and 3 ploughings. (b) Line sowing. (c) 15 Kg/ha. (d) 60cm. between rows for 61 to 63; 30cm. for 65. (e) — (v) N.A. (vi) Anant nag (Local). (vii) Unirrigated. (viii) As per treatments. (ix) N.A. (x) Last week of Sept., 60, Oct., 61, Nov., 62, and N.A. for 63 & 65.

2. TREATMENTS:

   10 weedical treatments: $T₀$=Control, $T₁$=Local method, $T₂$=1 pre-emergence application of weedicide, $T₃$=1 post-emergence application of weedicide, $T₄$=2 post-emergence applications of weedicide, $T₅$=$T₂+T₄$, $T₆$=$T₁+T₅$, $T₇$=Cultural method, $T₈$=$T₁+T₇+T₆$, $T₉$=Cultural method and $T₁₀$=Cultural method

   Sed. Salt 2,4-D applied at N 56 Kg/ha. pre-emergence applicion 3 days after sowing. Post emergence application 4 and 8 weeks after sowing.

3 DESIGN:

   (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 8:82m. x 7:30m; 10:66m. x 5:08m. for 61 and 62; 1:153 ha; 9:14m. x 6:10m. (b) 7:62m. x 6:10m.; 9:76m. x 4:80m. for 61 and 62; 1:215 ha; 8 54m. x 5:30m. (v) 60cm. x 60cm; 45cm. x 60cm. for 61 and 62; N.A.; 30cm. x 30cm. (vi) Yes.

4 GENERAL:

   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-65 (in 1964 different treatments were tried). (b) No. (c) Results of combined analysis are given under 5. Results. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatments x Years interaction is present.
5. RESULTS:

Pooled Results
(i) 683 Kg/ha. (ii) 297.0 Kg/ha. (based on 36 d. f. made up of Treatments x Years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<th>Treatment</th>
<th>T_6</th>
<th>T_7</th>
<th>T_8</th>
<th>T_9</th>
<th>T_10</th>
<th>T_11</th>
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<td>502</td>
<td>665</td>
<td>710</td>
<td>658</td>
<td>638</td>
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| C.D. = 190.6 Kg/ha

Individual Results

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<td>1549</td>
<td>1758</td>
<td></td>
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</tr>
</tbody>
</table>

| Pooled    | 873 | 524 | 172 | 187 | 191  | 184  | 178  | 181  | 183  |
| Sig.      | **  | **  | **  | **  | **   | **   | **   | **   | **   |
| G.M.      |     |     |     |     |      |      |      |      |      |
| S.E./plot |     |     |     |     |      |      |      |      |      |

Crop : Maize (Kharif)
Site : Damodar Kuwa Farm, Srinagar.
Object : To compare the weedicides with local methods on the yield of Maize.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam (iii) N.A. (iv) (a) 3 and 4 ploughings. (b) Line sowing. (c) 16 Kg/ha. (d) 61cm. (e) — (v) Nil. (vi) Anantnag (local). (vii) Un-irrigated. (viii) As per treatments. (ix) — (x) N.A.

2. TREATMENTS:
10 weedicidal treatments : T_6 = Control, T_7 = Local method, T_8 = Pre-emergence application of weedicide, T_9 = 1 post-emergence application, T_10 = 2 post-emergence applications, T_11 = T_9 + T_8, T_12 = T_8 + Cultural method, T_13 = T_11 + Cultural method, T_14 = T_9 + T_10 + Cultural method and T_15 = Cultural method.

Planox applied at 2.10 litre/ha.
Pre-emergence application 3 days after sowing and post-emergence application 4 and 8 weeks after sowing.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1614m x 610m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1964-only (b) N.A. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 1014 Kg/ha. (ii) 435.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_6</th>
<th>T_7</th>
<th>T_8</th>
<th>T_9</th>
<th>T_10</th>
<th>T_11</th>
<th>T_12</th>
<th>T_13</th>
<th>T_14</th>
<th>T_15</th>
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<th>T_20</th>
<th>T_21</th>
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<td>Av. yield</td>
<td>661</td>
<td>1393</td>
<td>956</td>
<td>641</td>
<td>854</td>
<td>722</td>
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</table>

Ref : J. & K. 64(382).
Type : 'D'.

Object : To compare the weedicides with local methods on the yield of Maize.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam (iii) N.A. (iv) (a) 3 and 4 ploughings. (b) Line sowing. (c) 16 Kg/ha. (d) 61cm. (e) — (v) Nil. (vi) Anantnag (local). (vii) Un-irrigated. (viii) As per treatments. (ix) — (x) N.A.

2. TREATMENTS:
10 weedicidal treatments : T_6 = Control, T_7 = Local method, T_8 = Pre-emergence application of weedicide, T_9 = 1 post-emergence application, T_10 = 2 post-emergence applications, T_11 = T_9 + T_8, T_12 = T_8 + Cultural method, T_13 = T_11 + Cultural method, T_14 = T_9 + T_10 + Cultural method and T_15 = Cultural method.

Planox applied at 2.10 litre/ha.
Pre-emergence application 3 days after sowing and post-emergence application 4 and 8 weeks after sowing.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1614m x 610m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1964-only (b) N.A. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 1014 Kg/ha. (ii) 435.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_6</th>
<th>T_7</th>
<th>T_8</th>
<th>T_9</th>
<th>T_10</th>
<th>T_11</th>
<th>T_12</th>
<th>T_13</th>
<th>T_14</th>
<th>T_15</th>
<th>T_16</th>
<th>T_17</th>
<th>T_18</th>
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<th>T_20</th>
<th>T_21</th>
<th>T_22</th>
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<td>Av. yield</td>
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</table>
Crop: Maize (Kharif).

Site: Damodar Kuwa Farm, Srinagar.

Method: To study the effect of different weedicides on the yield of Maize.

BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) May, 64. (iv) (a) 3 to 4 ploughings. (b) Line sowing (c) 15 Kg/ha. (d) 60 cm. (e) — (v) Nil. (vi) Anantnag (local) (vii) Unirrigated. (viii) As per treatments. (ix) N.A. (x) Sept., 64.

TREATMENTS:

12 weedicide treatments: T₀=Control, T₁=Local method, T₂=Fernox at 0.56 Kg/ha., T₃=Fernox at 1.12 Kg/ha., T₄=Dicotox at 0.70 Kg/ha., T₅=Dicotox at 0.98 Kg/ha., T₆=Tropox at 1.12 Kg/ha., T₇=Plantox at 0.84 Kg/ha., T₈=Plantox at 1.12 Kg/ha., T₉=Spontox at 0.70 Kg/ha. and T₁₀=Spontox at 0.98 Kg/ha.

Weedicides sprayed 4 weeks after sowing in T₁ to T₁₀ and 3 weeks after sowing in T₁₁.

DESIGN:

(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 10 x 4 x 4 ft. (v) N.A. (vi) Yes.

GENERAL:

(i) and (ii) N.A. (iii) Yield of grain (iv) (a) 19.4 cm. (b) No. (c) Nil. (v) No. (vi) and (vii) N.A.

RESULTS:

(i) 119 Kg/ha. (ii) 154 Kg/ha. (iii) Treatment differences are highly significant. (iv) A.V. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
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<td>1330</td>
<td>1177</td>
<td>1193</td>
<td>1210</td>
<td>1106</td>
<td>1003</td>
<td>1101</td>
<td>1286</td>
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<td>T₉</td>
<td>T₁₀</td>
<td>T₁₁</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>1052</td>
<td>1019</td>
<td>1177</td>
<td></td>
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</tbody>
</table>

C.D.=22.5 Kg/ha.

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Crop: Maize (Kharif). Site: Damodar Kuwa Farm, Srinagar.

Method: To compare the weedicides with local method for controlling weeds in Maize crop.

BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam (iii) N.A. (iv) (a) 3 to 4 ploughings. (b) Line sowing. (c) 15 Kg/ha. (d) 60 cm. (e) — (v) Nil. (vi) Anantnag (local). (vii) Unirrigated. (viii) As per treatments. (ix) N.A. (x) Sept., 64.

TREATMENTS TO 4, GENERAL:

Same as in exp. no 64(302) on page No. 366.

Weedicide was Tropox applied at 2.10 litre/ha.

Pre-emergence application 3 days after sowing and post-emergence application 4 and 8 weeks after sowing.

RESULTS:

(i) 1437 Kg/ha. (ii) 665 Kg/ha. (iii) Treatment differences are not significant. (iv) A.V. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
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</tr>
<tr>
<td></td>
<td>T₉</td>
<td>T₁₀</td>
<td>T₁₁</td>
<td></td>
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<td>1019</td>
<td>1177</td>
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</table>
Crop :- Maize. (Kharif)

Site :- Damodar Kuwa Farm Shriuagar.

Object:—To find out the optimum dose of weedicides in controlling weeds in Maize crop.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) June, 60; May, 61; May, 62; June, 63. (iv) (a) 3 to 4 ploughings. (b) Line sowing. (c) 15 Kg/ha. (d) 61cm. (e) — (v) Nil. (vi) Anant nag (Local). (vii) Unirrigated. (viii) As per treatments. (ix) N.A. (x) Sept, 60; Sept., 61; Sept., 62; Oct, 63.

2. TREATMENTS:

8 weedicial treatments: T0 = Control, T1 = Local method, T2 = Fenoxone at 0·56 Kg/ha, T3 = Fenoxone at 1·12 Kg/ha., T4 = Fenoxone at 1·68 Kg/ha, T5 = Dicotox at 0·56 Kg/ha, T6 = Dicotox at 1·12 Kg/ha. and T7 = Dicotox at 1·68 Kg/ha.

Weedicides sprayed 4 weeks after sowing.

3. DESIGN:

(i) R.B.D. (ii) 8. (b) N.A. (iii) 6 for 62; 5 for others: (iv) (a) 7·32m. x 7·0 lm. (b) 6 71m. X 5·79m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 63. (b) No. (c) Results of combined analysis are given under 5. Results. (v) No. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x Years Interaction is present.

5. RESULTS:

Pooled Results

(i) 730 Kg/ha. (ii) 439·5 Kg/ha. (based on 21 d. f. made up of Treatments x Years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<tr>
<td>1960</td>
<td>261</td>
<td>1105</td>
<td>394</td>
<td>790</td>
<td>1010</td>
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<td>841</td>
<td>537</td>
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<td>606</td>
<td>414 4</td>
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<td>1565</td>
<td>1437</td>
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<td>1588</td>
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<td>N.S.</td>
<td>1464</td>
<td>608 6</td>
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<tr>
<td>1962</td>
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<td>457</td>
<td>477</td>
<td>584</td>
<td>540</td>
<td>599</td>
<td>564</td>
<td>**</td>
<td>615</td>
<td>80 2</td>
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<tr>
<td>1963</td>
<td>111</td>
<td>292</td>
<td>128</td>
<td>210</td>
<td>228</td>
<td>182</td>
<td>257</td>
<td>204</td>
<td>**</td>
<td>202</td>
<td>51 3</td>
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<tr>
<td>Pooled</td>
<td>430</td>
<td>1085</td>
<td>627</td>
<td>717</td>
<td>765</td>
<td>736</td>
<td>811</td>
<td>734</td>
<td>**</td>
<td>734</td>
<td>439 5</td>
</tr>
</tbody>
</table>

C.D.=282·0 Kg/ha.

Individual results
Crop: Maize

Site: Kashmir Provincial Agric.

Exptl. Farm, Shallmar.

Object: To compare the effect of weedicides with local method on the yield of Maize.

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) and (c) N.A.  (ii) Clay loam.  (iii) End of Nov., 64 and 65.  (iv) 4-5 ploughings.  (b) Line sowing.  (c) 100 Kg/ha.  (d) 23 cm.  (v) Nil.  (vi) NP—818.  (vii) Irrigated.  (viii) As per treatments.  (ix) N.A.  (a) July, 65; June, 66.

2. TREATMENTS:
   8 weedicidal treatments: T1=Control, T2=Local method, T3=Sod. Salt, 2,4-D at 0.56 Kg/ha., T4=Sod. Salt 2,4-D at 0.56 Kg/ha., T5=Ethyle ester, 2,4-D at 0.56 Kg/ha., T6=Ethyle ester, 2,4-D at 1.32 Kg/ha. and T7=Ethyle ester, 2,4-D at 1.32 Kg/ha.

   Weedicides sprayed 6 weeks after sowing.

3. DESIGN:
   (i) R.B.D.  (ii) 8.  (b) N.A.  (iii) 4.  (iv) > 9.4m.  (v) 23cm.  (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1964-65  (b) No.  (c) Results of combined analysis are given under 5. Results.  (v) and (vi) Nil.  (vii) Error variances are homogeneous and Treatments x Years interaction is present.

5. RESULTS:
   Pooled Results
   (i) 208 Kg/ha.  (ii) 87.8 Kg/ha. (based on 7 d.f. made up of Treatments x Years interaction).  (iii) Treatment differences are significant.  (iv) Av. yield of grain in Kg/ha.

   Treatment  T1  T2  T3  T4  T5  T6  T7
   Av. yield  123  280  150  201  198  168  268  278
   C.D.—103.8 Kg/ha.

   Individual Results

   Treatment  T1  T2  T3  T4  T5  T6  T7  Sig.  G.M.  S.E./plot
   Years
   1964  143  291  149  172  190  184  220  214  **  195  30.5
   1965  103  270  151  230  206  151  317  341  **  221  42.4
   Pooled  123  280  150  201  198  168  268  278  **  208  87.8

Crop: Peas (Kabli).

Site: Kashmir Provincial Agric.

Exptl. Farm, Shallmar.

Object: To study the effect of different levels of Dal weed and F.Y.M. on the yield of Peas.
1. BASAL CONDITIONS
   (i) to (e) N.A.  (ii) Clay loam.  (iii) 26.11.63.  (iv) (a) to (c) N.A.  (v) N.A.  (vi) T-163.  (vii) Unirrigated.  (viii) N.A.  (ix) 53cm.  (x) June, 64

2. TREATMENTS:
   **Main-plot treatments:**
   3 levels of Dalweed: \( D_1 = 92.2, \ D_2 = 184.4 \) and \( D_3 = 276.6 \) Q/ha.
   **Sub-plot treatments:**
   3 levels of F.Y.M.: \( F_1 = 92.2, \ F_2 = 184.4 \) and \( F_3 = 276.6 \) Q/ha.

3. DESIGN:
   (i) Split-plot.  (ii) 3 main-plots/replication, 3 sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 3.96m. x 2.13m.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) Nil.  (iii) Yield of green pods.  (iv) (a) 1963-only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
   (i) 2370 Kg/ha.  (ii) (a) 544.0 Kg/ha.  (b) 780.2 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of green pods in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( D_1 )</th>
<th>( D_2 )</th>
<th>( D_3 )</th>
<th>Mean</th>
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<td>2306</td>
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<tr>
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<td>2227</td>
<td>2369</td>
<td>2370</td>
</tr>
<tr>
<td>( F_3 )</td>
<td>2114</td>
<td>2679</td>
<td>2511</td>
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</tr>
<tr>
<td>Mean</td>
<td>2106</td>
<td>2367</td>
<td>2637</td>
<td>2370</td>
</tr>
</tbody>
</table>

*Crop:* Pea (Rabi).
*Site:* Kashmir Provinicial Agri. Exptl. Farm, Shalimar.
*Object:* To study the effect of different levels and methods of application of 'P' on the yield of Pea.

Ref.: J.&K. 63(219)  
Type: 'M'.

---

370
5. RESULTS:

(i) 393 Kg/ha.  (ii) 1069 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of peas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>A₃</th>
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<tr>
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<td>3710</td>
<td>4205</td>
<td>3934</td>
</tr>
</tbody>
</table>

Crop: Peas (Rahi).
Site: Kashmir Provincial Agri. Exptl. Farm, Shallmar.
Object: To study the effect of phosphorus and methods of its application.

1. BASAL CONDITIONS
(i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 5.11.64; 21.10.65.  (iv) (a) to (e) N.A.  (v) N.A.  (vi) T-163.  (vii) Un-irrigated.  (viii) N.A.  (ix) T-163.  (x) 23.6.65; 10.6.66.

2. TREATMENTS:
Main-plot treatments:
4 levels of P₂O₅: P₀=0, P₁=50, P₂=112, and P₃=168 Kg/ha.

Sub-plot treatments:
4 methods of application of P₂O₅: M₁=Broad casting, M₂=5 cm. on both sides of the row, M₃=5 cm. on one side of the row and M₄=5 cm. under the seed.

3. DESIGN:
(i) Split-plot.  (ii) 4 main-plots/replication; 4 sub-plots/main-plot.  (b) N.A.  (iii) 3.  (iv) (a) N.A.  (b) 2.44 m. x 2.44 m.  (v) N.A.  (vi) Yes.

4. GENERAL
(i) Normal.  (ii) N.A.  (iii) Green pods.  (iv) (a) 1963—65 (Treatments modified in 1964).  (b) No.  (v) to (vii) N/A.

5. RESULTS:
Pooled Results
(i) 64.2 Q/ha.  (ii) 16.87 Q/ha.  (based on 15 d.f, made up of Pooled error and Treatments x Years interaction).  (b) 17.28 Q/ha (based on 60 d.f made up of Pooled error and Treatments x Years Interaction)  (iii) None of the effects is significant.  (iv) Av. yield of peas in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
</tr>
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</tr>
<tr>
<td>M₂</td>
<td>65'0</td>
<td>67'0</td>
<td>57'5</td>
<td>66'4</td>
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<td>M₃</td>
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<td>59'4</td>
<td>67'0</td>
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<td>M₄</td>
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<td>61'5</td>
<td>64'5</td>
<td>61'6</td>
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Individual results.

<table>
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<th>Treatments</th>
<th>S.E./plot</th>
<th>Main-plot</th>
<th>Sub-plot</th>
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Crop :-Potato (*Kharif*)
Site :- Potato Res.Stn.Gulmarg.

Object :- To study the effect of fertilizers on the yield of Potato.

1. BASAL CONDITIONS
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 19.6.60. (iv) (a) to (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) 20.10.60.

2. TREATMENTS :
   All combinations of (1) and (2)
   (1) 4 levels of N as F.Y.M.: N0 = 0, N1 = 56, N2 = 112 and N3 = 168 Kg/ha.
   (2) 3 levels of P2O5 as Super : P0 = 0, P1 = 54 and P2 = 168 Kg/ha.

3. DESIGN :
   (i) Fact. in R.B.D. (ii) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3'66m. x 2.43m. (v) N.A. (vi) Yes.

4. GENERAL :
   (i) Good. (ii) N.A. (iii) Yield of tuber. (iv) (a) N.A. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :
   (i) 183.9 Q/ha. (ii) 37.2 Q/ha. (iii) Interaction N x P alone is significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>Mean</th>
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<td>151</td>
<td>205</td>
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<td>P1</td>
<td>165</td>
<td>228</td>
<td>182</td>
<td>162</td>
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<td>P2</td>
<td>183</td>
<td>154</td>
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<tr>
<td>Mean</td>
<td>166</td>
<td>195</td>
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<td>183</td>
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</table>

C.D. for the body of N x P table = 53.5 Q/ha.

Crop :-Potato (*Kharif*)
Site :- Potato Res. Sta. Gulmarg

Object :- To study the effect of different levels of N and P on the yield of Potato.

1. BASAL CONDITIONS
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 8.6.61. (iv) (a) and (b) N.A. (c) 18-4 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) Up-to-date. (vii) to (ix) N.A. (x) 21.10.61.
2. TREATMENTS

Main-plot treatments:
3 levels of P<sub>0</sub>: P<sub>0</sub>=0, P<sub>1</sub>=90 and P<sub>2</sub>=180 Kg/ha.

Sub-plot treatments:
4 levels of N : N<sub>0</sub>=0, N<sub>4</sub>=56, N<sub>6</sub>=112 and N<sub>8</sub>=168 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 6.17m x 2.06m. (v) N.A. (vi) Yes.

4. GENERAL
(i) Normal. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1961-62 (modified in 62). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS
(i) 189.4 Q/ha. (ii) (a) 43.5 Q/ha. (b) 22.3 Q/ha. (iii) Main effect of N is highly significant. Interaction P x N is highly significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P&lt;sub&gt;0&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
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<td>N&lt;sub&gt;0&lt;/sub&gt;</td>
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<td>177.5</td>
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</tr>
<tr>
<td>N&lt;sub&gt;4&lt;/sub&gt;</td>
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<td>170.6</td>
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<td>167.6</td>
<td>187.4</td>
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<tr>
<td>N&lt;sub&gt;8&lt;/sub&gt;</td>
<td>215.8</td>
<td>191.4</td>
<td>225.7</td>
<td>211.0</td>
</tr>
</tbody>
</table>

Mean 185.7 197.2 185.4 189.4

C.D for N marginal means=18.1 Q/ha.
C.D for N means at the same level of P=32.3 Q/ha.
C.D for P means at the same level of N=48.6 Q/ha.

Crop: Potato (Kharij)

Ref: J & K 62(239) Type: 'M'.

Object: —To study the effect of different levels of N and P on the yield of Potato.

1. BASAL CONDITIONS
(i) (a) to (c) N.A. (ii) Clay loam. (iii) 29.5.62. (iv) (a) and (b) N.A. (c) 18'4 Q/ha. (d) and (e) N.A. (v) N.A. (vi) Up-to-date (vii) to (ix) N.A. (x) 20.10.62.

2. TREATMENTS
Main-plot treatments:
3 levels of P<sub>0</sub>: P<sub>0</sub>=0, P<sub>1</sub>=90 and P<sub>2</sub>=180 Kg/ha.

Sub-plot treatments:
4 levels of N : N<sub>0</sub>=0, N<sub>4</sub>=56, N<sub>6</sub>=112 and N<sub>8</sub>=168 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 6.17m x 2.44m. (v) N.A. (vi) Yes.

4. GENERAL
(i) Normal. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1961-62 (modified in 62). (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS
(i) 162.7 Q/ha. (ii) (a) 36.0 Q/ha. (b) 36.5 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of tuber in Q/ha.
Crop: Potato (Kharif)
Site: Potato Res. Stn, Gulmarg

Object: To study the effect of different levels of N, P and K on the yield of Potato.

1. BASAL CONDITIONS
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 20.6.63. (iv) (a) and (b) N.A. (c) 18.4 Q/ha. (d) and (e) N.A.
   (v) 376.7 Q/ha. of F.Y.M. (vi) Up-to-date. (vii) Irrigated. (viii) Weeding. (ix) 32.6 cm. (x) 29.10.63.

2. TREATMENTS
   Main-plot treatments: 3 levels of N: N1 = 56, N2 = 140, and N3 = 224 Kg/ha.
   Sub-plot treatments: 3 levels of P2O5: P1 = 56, P2 = 140 and P3 = 224 Kg/ha.
   Sub-Sub-plot treatments: 3 levels of K2O: K1 = 56, K2 = 140 and K3 = 224 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot, 3 sub-sub-plots/sub-plot. (b) N.A.
   (iii) 3. (iv) (a) N.A. (b) 4.27 m. x 2.13 m. (v) N.A. (vi) Yes.

4. GENERAL
   (i) Normal. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1963-only. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS
   (i) 215.2 Q/ha. (ii) (a) 59.6 Q/ha. (b) 53.4 Q/ha. (c) 50.5 Q/ha. (iii) None of the effects is significant.
   (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
<th>Mean</th>
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<tr>
<td>N2</td>
<td>196</td>
<td>204</td>
<td>226</td>
<td>238</td>
<td>246</td>
<td>247</td>
<td>213.8</td>
</tr>
<tr>
<td>N1</td>
<td>191</td>
<td>204</td>
<td>238</td>
<td>238</td>
<td>246</td>
<td>247</td>
<td>213.8</td>
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<td>246</td>
<td>215</td>
</tr>
</tbody>
</table>

Crop: Potato (Kharif)
Site: Potato Res. Stn, Gulmarg

Object: To study the effect of different levels of N, P and K on the yield of Potato.
1. **BASAL CONDITIONS**
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 3.64.  (iv) (a) N.A.  (b) Tubering.  (c) 18.4 Q/ha.  (d) 53cm. x 22cm.  (e) N.A.  (v) N.A.  (vi) S-4234.  (vii) to (ix) N.A.  (x) 29 10.64.

2. **TREATMENTS**
   All combinations of (1), (2) and (3)
   (1) 3 levels of N: \( N_1 = 156.0 \), \( N_2 = 210.2 \) and \( N_4 = 224.2 \) Kg/ha.
   (2) 3 levels of \( P_2 O_5 \): \( P_1 = 56.0 \), \( P_2 = 112.0 \) and \( P_4 = 168.0 \) Kg/ha.
   (3) 3 levels of \( K_2 O \): \( K_1 = 56.0 \), \( K_2 = 112.0 \) and \( K_4 = 168.0 \) Kg/ha.

3. **DESIGN**:
   (i) 3\(^3\) Fact.  (ii) (a) 27.  (b) N.A.  (iii) 3.  (iv) (a) N.A.  (b) 5.49m. x 2.44m.  (v) N.A.  (vi) Yes.

4. **GENERAL**
   (i) Normal.  (ii) N.A.  (iii) Yield of tuber.  (iv) (a) 1964-only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. **RESULTS**
   (i) 76.5 Q/ha.  (ii) 22.9 Q/ha.  (iii) only interaction \( P \times K \) is significant  (iv) Av. yield of tuber in Q/ha,

<table>
<thead>
<tr>
<th>( P_1 )</th>
<th>( P_2 )</th>
<th>( P_4 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( K_4 )</th>
<th>Mean</th>
</tr>
</thead>
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<tr>
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<td>74.4</td>
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<td>77.6</td>
</tr>
<tr>
<td>( N_2 )</td>
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<td>79.6</td>
<td>79.9</td>
<td>73.6</td>
<td>81.0</td>
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<tr>
<td>( N_4 )</td>
<td>82.0</td>
<td>86.6</td>
<td>74.1</td>
<td>67.1</td>
<td>92.7</td>
<td>82.9</td>
</tr>
<tr>
<td>Mean</td>
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<td>77.3</td>
<td>76.0</td>
<td>71.4</td>
<td>77.5</td>
<td>80.5</td>
</tr>
</tbody>
</table>

C.D. for the body of \( P \times K \) table-21.7 Q/ha.

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**Crop** - Potato (‘Kharif’).  
**Site** - Potato Res. Stn., Galmarg.  
**Ref** - J.&K. 63(226).  
**Type** - ‘M’.

Object :- To study the effect of potash on the yield of Potato.

1. **BASAL CONDITIONS**:
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 20.64.  (iv) (a) N.A.  (b) Tubering.  (c) 19.4 Q/ha.  (d) 53cm. x 23cm.  (e) N.A.  (v) N.A.  (vi) S-4215.  (vii) to (ix) N.A.  (x) 26th Oct., 1963.

2. **TREATMENTS**:
   5 levels of \( K_2 O \): \( K_4 = 56 \), \( K_2 = 112 \), \( K_4 = 168 \) and \( K_4 = 224 \) Kg/ha.

3. **DESIGN**:
   (i) R.B.D.  (ii) (a) 5.  (b) N.A.  (iii) 14.  (iv) (a) N.A.  (b) 3.66m. x 2.74m.  (v) N.A.  (vi) Yes.

4. **GENERAL**:
   (i) Normal.  (ii) N.A.  (iii) Yield of tuber.  (iv) (a) 1963-only.  (b) No.  (c) Nil.  (v) to (vii) Nil.
5. RESULTS:
   (i) 240.5 Q/ha.  (ii) 38.21 Q/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>K₃</th>
<th>K₄</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>204.7</td>
<td>208.8</td>
<td>251.4</td>
<td>276.8</td>
<td>228.6</td>
</tr>
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</table>

Crop: Potato (Kharif)
Site: Kashmir Provincial Agric.
Exptl. Farm, Shalimar.

Object: To study the effect of different levels of F.Y.M. and Dal-weed on the yield of Potato.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 1.5.64; 25.3.65.  (iv) (a) and (b) N.A.  (c) 18.4 Q/ha.  (d) and (e) N.A.  (v) N.A.  (vi) S.234  (vii) Irrigated.  (viii) N.A.; 4-5 weedings.  (ix) 32.3cm; N.A.  (x) 29.9.64; 10.9.65.

2. TREATMENTS:
   Main-plot treatments: 3 levels of F.Y.M.: F₁=129.6, F₂=247.1 and F₃=370.7 Q/ha.
   Sub-plot treatments: 3 levels of Dalweed: D₁=123.6, D₂=247.1 and D₃=370.7 Q/ha.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot, (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 3.96m. x 2.13m; 4.1lm. x 2.29m.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) Nil.  (iii) Yield of tuber.  (iv) (a) 1964-continued.  (b) No.  (c) Nil.  (v) and (vi) Nil.  (vii) Since the expt. is continued beyond 1965, hence individual years results are presented under Results.

5. RESULTS:
64(256)
   (i) 108.1 Q/ha.  (ii) 23.6 Q/ha.  (b) 21.9 Q/ha.  (iii) None of the effects is significant.  (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
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<th>F₂</th>
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<td>109.8</td>
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<tr>
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<tr>
<td>Mean</td>
<td>108.3</td>
<td>108.3</td>
<td>108.3</td>
<td>108.3</td>
</tr>
</tbody>
</table>

65(113)
   (i) 107.7 Q/ha.  (ii) (a) 26.5 Q/ha.  (b) 14.9 Q/ha.  (iii) Main effect of D is highly significant. Interaction F×D is significant.  (iv) Av. yield of tuber in Q/ha.
Crop: Potato (Rabi)
Site: Kashmir Provincial Agric.
Exptl. Farm, Shalimar.

Object:—To study the effect of different times of application of manures on the yield of Potato.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Clay loam. (iii) 30.4.64; 15.3.65 (iv) (a) and (b) N.A. (c) 18.4 Q/ha. (d) and (e) N.A. (v) N.A. (vi) S—4234. (vii) Irrigated. (viii) and (ix) N.A. (x) 27.9.64; 19.9.65.

2. TREATMENTS:
6 times of application of N : T₁ = Full dose at basal dressing. T₂ = Full dose after complete germination, T₃ = 1/3 at basal dressing + 1/3 at germination + 1/3 after germination, T₄ = 1/2 at basal dressing + 1/2 after complete germination, T₅ = 1/2 at germination + 1/2 2 weeks after germination and T₆ = 1/2 at basal dressing + 1/2 4 weeks after germination.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3.96m. x 3.05m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1964—contd. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Since the exp is contd. beyond 1965, hence individual years results are presented under 5. RESULTS.

5. RESULTS:

<table>
<thead>
<tr>
<th>64(225)</th>
<th></th>
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<td>F₂</td>
<td>F₃</td>
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<td></td>
</tr>
<tr>
<td>D₁</td>
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<td>111.8</td>
<td></td>
<td>107.7</td>
</tr>
</tbody>
</table>

C.D for D marginal mean= 12.8 Q/ha.
C.D for D means at the same level of F= 22.1 Q/ha.
C.D for F means at the same level of D= 34.9 Q/ha.

Ref:—J.&K. 64(225), 65(112).
Crop :- Potato (Kharif)

Ref :- J.&K. 64(229).

Site :- Potato Res. Stn., Gulmarg.

Type :- 'C'.

Object :—To see the effect of different dates of sowing on the yield of Potato.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) N.A. (b) Tubering. (c) 18/4 Q/ha. (d) 56cm x 24cm. (e) N.A. (f) N.A. (g) S—4234. (h) to (ix) N.A. (x) 30.10.64.

2. TREATMENTS :
   5 dates of sowing : D1 = 2.6.64. \( D_2 = 9.6.64. \) \( D_3 = 18.6.64. \) \( D_4 = 23.6.64. \) \( D_5 = 30.6.64. \)

3. DESIGN :
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 1/1107 ha. (v) N.A. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) N.A. (iii) Yield of tuber, (iv) (a) 1964—only. (b) Nil. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :
   (i) 111'9 Q/ha. (ii) 40'8 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of tuber in Q/ha.

   Treatment          | D1 | D2 | D3 | D4 | D5
---|---|---|---|---|---
Av. yield              | 91'9 | 136'2 | 116'8 | 128'4 | 86'3

Crop :- Potato (Kharif)

Ref :- J.&K. 64(231).

Site :- Potato Res. Stn., Gulmarg.

Type :- 'C'.

Object :—To study the effect of spacings between rows and plants on the yield of Potato.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) N.A. (iv) (a) N.A. (b) Tubering. (c) 18/4 Q/ha. (d) As per treatments. (e) N.A. (f) N.A. (g) S—4234. (h) to (ix) N.A. (x) Nil.

2. TREATMENTS :
   All Combinations of (1) and (2).
   (1) 2 row spacings: \( R_1 = 61, R_2 = 46 \) cm.
   (2) 3 plant spacings: \( P_1 = 15, P_2 = 23 \) and \( P_3 = 30 \) cm.

3. DESIGN :
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 5'49m x 1'98m. (v) N.A. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) N.A. (iii) Yield of tuber. (iv) (a) 1964—only. (b) Nil. (c) N.A. (d) and (e) Nil.

5. RESULTS :
   (i) 181'9 Q/ha. (ii)42'32 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>( R_1 )</th>
<th>( P_1 )</th>
<th>( P_2 )</th>
<th>( P_3 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>182'8</td>
<td>162'2</td>
<td>153'0</td>
<td>160'0</td>
<td></td>
</tr>
<tr>
<td>200'1</td>
<td>187'8</td>
<td>210'4</td>
<td>197'8</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>119'4</td>
<td>172'5</td>
<td>181'7</td>
<td>181'9</td>
</tr>
</tbody>
</table>
Crop: Potato (Rabi).
Ref: J.&K. 65(171)

Site: Kashmir Provincial Agri.
Expt. Farm, Shalimar.
Type: 'C'.

Object—To study the effect of seasons and methods of sowing on the yield of Potato.

1. BASAL CONDITIONS:
(i) (a) Nil, (b) and (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) N.A. (b) As per treatments. (c) to (e) N.A. (v) N.A. (vi) 4.234. (vii) to (ix) N.A. (x) 13.66.

2. TREATMENTS:
All combinations of (1) and (2).
(1) 2 seasons of sowing: \( D_1 \) = Tubers sown in Autumn, \( D_2 \) = Tubers sown in spring.
(2) 4 methods of sowing: \( T_1 \) = full tuber-sud of Shalimar, \( T_2 \) = cut tuber—of sud of Shalimar, \( T_3 \) = Full tuber seed of Galmarg, \( T_4 \) = cut tuber sud of Galmarg.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) \& (b) N.A. (iii) As per treatments. (iv) (a) N.A. (b) 1.83m. x 2.14m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1965 only. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 142.2 Q/ha. (ii) 33.38 Q/ha. (iii) Main effects of D is significant and that of T is highly significant, (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( D_1 )</td>
<td>146.7</td>
<td>93.6</td>
<td>151.4</td>
<td>132.1</td>
<td>130.9</td>
</tr>
<tr>
<td>( D_2 )</td>
<td>159.9</td>
<td>122.7</td>
<td>178.3</td>
<td>152.6</td>
<td>153.4</td>
</tr>
<tr>
<td>Mean</td>
<td>153.3</td>
<td>122.7</td>
<td>178.3</td>
<td>142.4</td>
<td>142.2</td>
</tr>
</tbody>
</table>

C.D. for D marginal means = 19.57 Q/ha.
C.D. for T marginal means = 27.68 Q/ha.

Crop: Potato (Rabi).
Ref: J.&K. 64(288).

Site: Potato Res. Sta., Galmarg.
Type: 'CV'.

Object—To see the effect of seed treatments on different varieties of Potato.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) 3-4 diggings. (b) on the ridges (c) to (e) N.A. (vi) As per treatments. (vii) to (x) N.A.

2. TREATMENTS:
Main-plot treatments:
4 varieties: \( V_1 \)=S-4234; \( V_2 \)=S-4215, \( V_3 \)=S-41g2 and \( V_4 \)=S-4252.
Sub-plot treatments:
2 seed treatments: \( T_1 \)=Untreated and \( T_2 \)=Treated.
3. DESIGN:
(i) Split-plot. (ii) 4 main-plots/replication 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) Nil. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1964-65. (b) N.A. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 54.9 Q/ha. (ii) (a) 24.33 Q/ha. (b) 12.13 Q/ha. (ii) Mean effects of T alone is significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>380</td>
<td>459</td>
<td>450</td>
<td>645</td>
<td>506</td>
</tr>
<tr>
<td>T2</td>
<td>453</td>
<td>599</td>
<td>636</td>
<td>690</td>
<td>592</td>
</tr>
<tr>
<td>Mean</td>
<td>417</td>
<td>529</td>
<td>588</td>
<td>663</td>
<td>549</td>
</tr>
</tbody>
</table>

C.D. for T marginal means=8.13 Q/ha.

Crop: Potato (Rabi)  Ref: J.&K. 64(224), 65(111)
Site: Jammu Provincial Agri. Exptl. Farm, Jammu  Type := ‘CM’.

Objective: To study the effect of different levels of N and spacing on the yield of Potato.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Clay loam. (iii) 18.10.64; 13.11.65. (iv) (a) and (b) N.A. (c) 18.4 Q/ha. (d) As per treatments. (v) 277 Q/ha. o. F.Y.M; N.A. (vi) S-2434. (vii) Irrigated. (viii) N.A. (x) 3.3.65; 16.4.66

2. TREATMENTS:
Main-plot treatments:
4 levels of N: N1=O, N2=56, N3=112 and N4 =168 Kg/ha.
Sub-plot treatments:
3 levels of spacing. S1 = 46cm. x 15cm., S2=46cm. x 22cm. and S3 =46cm. x 30cm.

3. DESIGN:
(i) Split-plot. (ii) 4 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3.66m. x 2.74m. (v) N.A. (vi) Yes.

4. GENERAL
(i) Normal. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1964-65. (b) N.A. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances of main-plots as well as sub-plots are homogeneous and Treatments X Years Interactions are present in sub-plot but not present in main-plot.

5. RESULTS:
Pooled results
(i) 66.2 Q/ha. (ii) (a) 19.82 Q/ha. (based on 21 d.f. made up of pooled error and Treatments X Years interaction) (b) 45.42 Q/ha. (based on 8 d.f. made up of Treatments X Years interaction.) (iii) Main effect of N alone is highly significant. (iv) Av. yield of tuber in Q/ha.
Crop: Potato. (Kharif)
Site: Potato Res. Sta., Gulmarg.
Object—To study the effect of Alglol application on Potato.

1. BASAL CONDITIONS:
(a) to (e) N.A. (ii) Clay loam. (iii) 21.5.63. (iv) (a) and (b) N.A. (c) 18.4 Q/ha. (d) and (e) N.A. (v) N.A. (vi) S—4215. (vii) to (ix) N.A. (x) 30-10-63.

2. TREATMENTS:
5 insecticidal treatments: T0=Control. T1=0·12% Alglol with water. T2=0·25% Alglol with water. T3=0·37% Alglol with water. T4=0·50% Alglol with water.

3. DESIGN:
(i) R.B.D. (ii) a. 5. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 2·44 m X 1·07 m. (c) N.A. (v) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of tuber. (iv) (a) 1963-only. (b) and (c) No. (v) to (vii) Nil.

5. RESULTS:
(i) 138·6 Q/ha. (ii) 87·85 Q/ha. (iii) Treatment differences are not significant (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>117·0</td>
<td>143·3</td>
<td>153·8</td>
<td>130·6</td>
<td>148·9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E.</th>
<th>S.E. plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1964</td>
<td>35·0</td>
<td>64·9</td>
<td>73·1</td>
<td>37·9</td>
<td>**</td>
<td>44·4</td>
<td>56·4</td>
<td>72·4</td>
<td>**</td>
<td>57·7</td>
</tr>
<tr>
<td>1965</td>
<td>61·0</td>
<td>73·1</td>
<td>83·5</td>
<td>81·0</td>
<td>**</td>
<td>90·0</td>
<td>74·4</td>
<td>59·5</td>
<td>**</td>
<td>74·6</td>
</tr>
<tr>
<td>Pooled</td>
<td>48·0</td>
<td>69·0</td>
<td>78·3</td>
<td>69·6</td>
<td>**</td>
<td>67·2</td>
<td>65·3</td>
<td>66·1</td>
<td>N.S.</td>
<td>66·2</td>
</tr>
</tbody>
</table>

C.D. for 5 marginal means=26·2 Q/ha.
Crop: Potato (Kharif)

Site: Potato Res. Sta., Gulmarg.

Ref: J. & K. 64(230).

Type: 'D'.

Object: To study the effective use of weedicides on the yield of Potato.

1. BASAL CONDITIONS
   - (i) (a) to (e) N.A.
   - (ii) Clay loam
   - (iii) N.A.
   - (iv) (a) N.A. (b) Tubering
   - (c) 18'4 Q/ha
   - (d) 47 cm. x 22cm
   - (e) N.A.
   - (v) N.A.
   - (vi) S-4234
   - (vii) N.A.
   - (viii) As per treatments
   - (ix) and (x) N.A.

2. TREATMENTS:
   - 6 weedicidal treatments: T0=Control. T1=Local method of weeding. T11=Pre-emergence application of weedicidal of the 5 days of planting. T111=Pre-emergence application of weedicidal of the 10 days of planting. T1111=T11+Cultural method of weeding and T3=T1+Cultural method of weeding.

3. DESIGN:
   - (i) R.B.D.
   - (ii) (a) 6
   - (b) N.A.
   - (iii) 4
   - (iv) (a) N.A. (b) 5'18m. x 1'99m
   - (v) N.A.
   - (vi) Yes.

4. GENERAL:
   - (i) Normal
   - (ii) N.A.
   - (iii) Yield of tuber
   - (iv) (a) 1964-only
   - (b) Nil
   - (v) N.A.
   - (vi) and (vii) Nil

5. RESULTS:
   - (i) 188'9 Q/ha
   - (ii) 48'8 Q/ha
   - (iii) Treatment differences are not significant
   - (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>132'5</td>
<td>211'0</td>
<td>186'6</td>
<td>211'0</td>
<td>216'4</td>
<td>175'8</td>
</tr>
</tbody>
</table>

Crop: Potato (Kharif)

Site: Potato Res. Sta., Gulmarg.

Ref: J. & K. 63(223), 64(227).

Type: 'D'.

Object: To study the effect of fungicides and its time of application on the yield of Potato.

1. BASAL CONDITIONS:
   - (i) to (c) N.A.
   - (ii) Clay loam
   - (iii) 6.6.63; 18.5.64
   - (iv) (a) N.A. (b) Tubering
   - (c) 18.4 Q/ha.
   - (d) 52 cm. x 22cm
   - (e) N.A.
   - (v) N.A.
   - (vi) S-4102; alunaria soloni
   - (vii) to (ix) N.A.
   - (x) 14.10.63; 19.10.64.

2. TREATMENTS:
   - Main-plot treatments:
     - 4 fungicidal treatments: S0=control, S1=33% of fytolan in 112.2 lit. of water/ha., S2=12% of Flit-406 at 2.24 Kg/ha. S3=Bardeaux mixture at 112Kg/ha.
   - Sub-plot treatments:
     - 3 intervals of spray: T0=10, T1=15 and T2=20 days.

3. DESIGN:
   - (i) Split-plot
   - (ii) (a) 4 main-plots/replication, 3 sub-plots/main-plot.
   - (b) N.A.
   - (iii) 3
   - (iv) (a) N.A.
   - (b) 3'66m. x 2'13m
   - (v) N.A.
   - (vi) Yes.
4. GENERAL:
(i) Normal. (ii) As per treatments. (iii) Yield of tuber. (iv) (a) 1963-64. (b) No. (c) Results of combined analysis are presented under S. Results. (v) and (vi) Nil. (vii) Error variances of main-plots as well as subplots are homogeneous, and Treatments x Years interactions are absent.

3. RESULTS:
pooled results.
(i) 111 Q/ha.  
(ii) (a) 51·2 Q/ha. (based on 15d.v. made up of Pooled error and Treatments x Year interaction.)  
(b) 50·84 Q/ha. (based on 40d.f. made up of Pooled error and Treatments x Years Interaction.)  
(iii) None of the effects is significant. (iv) Av. yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1963</td>
<td>102·5</td>
<td>81·5</td>
<td>96·5</td>
<td>139·0</td>
</tr>
<tr>
<td>Year 1964</td>
<td>122·0</td>
<td>103·0</td>
<td>116·0</td>
<td>101·0</td>
</tr>
</tbody>
</table>

Mean 104·5 100·6 110·0 129·1 111·0

Crop: Potato (Khurif).
Site: Potato Development Farm Gulmarg.
Object: To see the efficiency of weedicides on the yield of Potato.

1. BASAL CONDITIONS
(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) May, 64, N.A. (iv) (a) N.A. (b) Line in furrows. (c) 12 to 15 Q/ha. (d) 6 · 9 m. (e) 1. (f) Nil. (g) 5 · 4234. (h) Irrigated. (i) As per treatments. (ix) N.A. (x) Oct 64.; N.A.

2. TREATMENTS:
6 weedicidal treatments: To—Control, T1—Local method. T2—Pre-emergence application of weedicides 5 days after planting, T3—Pre-emergence application of weedicides 10 days after planting; T4—T1 + Cultural method., T5=T2+Cultural method. Weedicides: Soda Salt 2·4·D; applied at 1·68 kg/ha in 899 litres of water.

3. DESIGN:
(i) R.B.D. (ii) 1:6. (b) N.A. (iii) 4. (iv) (a) 5·18m. x 1·98m. (b) 472m. x 1·32m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of Tuber. (iv) (a) 1964-65. (b) No. (c) Nil. (v) No. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.
Pooled Results

(i) 47.3 Q/ha. (ii) 90.2 Q/ha. (based on 35 d.f. made up of Pooled error and Treatments x Years interaction). (iii) Treatment differences are highly significant. (iv) Av yield of tuber in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>299.8</td>
<td>569.1</td>
<td>415.6</td>
<td>495.0</td>
<td>488.2</td>
<td>572.4</td>
</tr>
<tr>
<td>C.D.</td>
<td>91.6 Q/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

Individual Results

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>Sig</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1964</td>
<td>299.8</td>
<td>517.0</td>
<td>398.4</td>
<td>495.0</td>
<td>487.8</td>
<td>571.4</td>
<td>*</td>
<td>461.7</td>
<td>100.5</td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>299.8</td>
<td>621.2</td>
<td>432.8</td>
<td>495.0</td>
<td>486.5</td>
<td>572.4</td>
<td>**</td>
<td>484.9</td>
<td>87.9</td>
<td></td>
</tr>
<tr>
<td>Pooled</td>
<td>299.8</td>
<td>569.1</td>
<td>415.6</td>
<td>495.0</td>
<td>488.2</td>
<td>572.4</td>
<td>**</td>
<td>473.3</td>
<td>90.2</td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Raddish (Rabi).
Site :- Kashmir Provincial Agric. Exp. Farm, Shalimar.

Object :- To study the effect of F.Y.M. and Dalweed on the yield of Raddish.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil. (ii) Clay loam. (iii) 10.9.63. (iv) (a) N.A. (b) Transplanting. (c) to (e) N.A. (v) N.A. (vi) Irrigated. (vii) N.A. (ix) 2.4cm. (x) 26.10.63.

2. TREATMENTS
   Main-plot treatments :-
   3 levels of F.Y.M.: F1 =92.2, F2 =184.5 and F3 =276.7 Q/ha.
   Sub-plot treatments :-
   3 levels of Dalweed: D1 =92.2, D2 =184.5 and D3 =276.7 Q/ha.

DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 3.05 x 1.34 m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of roots. (iv) (a) 1963—only. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 117 Q/ha. (ii) 8.27 Q/ha. (b) 22.81 Q/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of raddish in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>114.9</td>
<td>97.5</td>
<td>113.8</td>
<td>114.7</td>
</tr>
<tr>
<td>D2</td>
<td>100.7</td>
<td>109.2</td>
<td>118.5</td>
<td>109.5</td>
</tr>
<tr>
<td>D3</td>
<td>114.2</td>
<td>120.7</td>
<td>145.5</td>
<td>126.8</td>
</tr>
<tr>
<td>Mean</td>
<td>109.9</td>
<td>109.1</td>
<td>131.9</td>
<td>117.0</td>
</tr>
</tbody>
</table>

C.D. for F marginal means=10.83 Q/ha.
Object:—To study the effect of F.Y.M. and Dalweed on the yield of Tomato.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 20.5.64. (iv) (a) to (e) N.A. (v) N.A. (vi) Meerutii. (vii) Irrigated. (viii) N.A. (ix) 25cm. (v) 20.9.64.

2. TREATMENTS:
   Main-plot treatments:
   3 levels of F.Y.M.: F₁ = 125, F₂ = 250 and F₃ = 375 Q/ha.
   Sub-plot treatments:
   3 levels of Dalweed: D₁ = 125, D₂ = 250 and D₃ = 375 Q/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3’6m x 2’74m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of fruit. (iv) (a) 1964—contd. (Design changed in 65). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 93.8 Q/ha. (ii) (a) 18.65 Q/ha. (b) 17.46. Q/ha. (iii) None of the effects is significant. (iv) Av. yield of fruits in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>Mean</th>
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<tbody>
<tr>
<td>D₁</td>
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<td>D₃</td>
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<td>98.6</td>
<td>94.6</td>
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<tr>
<td>Mean</td>
<td>94.3</td>
<td>96.3</td>
<td>99.7</td>
<td>93.8</td>
</tr>
</tbody>
</table>

Object:—To study the effect of F.Y.M. and Dalweed on the yield of Tomato.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) 22.6.65. (iv) (a) N.A. (b) Transplanting. (c) — (d) and (e) N.A. (iv) Meerutii. (vii) Irrigated. (viii) 4-5 weeding. (ix) N.A. (a) 5.10.65.

2. TREATMENTS:
   All combinations of (1) and (2).
   (1) 3 levels of F.Y.M.: F₁ = 125, F₂ = 250 and F₃ = 375 Q/ha.
   (2) 3 levels of Dalweed: D₁ = 125, D₂ = 250 and D₃ = 375 Q/ha.
3. DESIGN:
(i) Fact. in R.B.D.  (ii) 9.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 3-96m. x 2-74m.  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of fruit.  (iv) (a) 1964-66.  (Design changed to 65.)  (b) Nil.  (c) N.A.  (v) and (vi) Nil.

5. RESULTS:
(i) 110.4 Q/ha.  (ii) 17.01 Q/ha.  (iii) None of the effects is significant.  (iv) Av. yield of tomato in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
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<td>111.2</td>
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<tr>
<td>Mean</td>
<td>108.7</td>
<td>103.6</td>
<td>118.8</td>
<td>110.4</td>
</tr>
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**Crop**: Cabbage.  **(Kharif)**  
**Site**: Kashmir Provincial Agri.  
**Exptl. Farm, Shalimar.**  
**Ref**: J.&K. 62(238), 63(217)  
**Type**: ‘M’.

Object—To study the effect of different levels of N and P on Cabbage crop.

1. **BASAL CONDITIONS:**
(i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 6.8, 18.8, 63.  (iv) (a) N.A.  (b) Transplanting.  (c) to (e) N.A.  (v) N.A.  (vi) Drum head (early).  (vii) Irrigated.  (viii) N.A.  (ix) 30-5cm.; 37-1cm.  (x) 20.2, 63; March, 64.

2. **TREATMENTS:**
Main-plot treatments:
3 levels of P₂O₅: P₀=0, P₁=84 and P₂=168 Kg/ha.

Sub-plot treatments:
4 levels of N: N₀=0, N₁=56, N₂=112 and N₃=168 Kg/ha.

3. **DESIGN:**
(i) Split-plot.  (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot.  (b) N.A.  (iii) 4; 2.  (iv) (a) N.A.  (b) 3. 0m. x 1.83m.  (v) and (vi) N.A.

4. **GENERAL:**
(i) Normal.  (ii) N.A.  (iii) Yield of cabbage.  (iv) (a) 1962-63.  (b) No.  (c) Results of combined analysis are presented under 5. Results.  (v) and (vi) Nil.  (vii) Both the error variances are homogeneous. Main-plot Treatments x Years interaction is absent while Sub-plot Treatments x Years interaction is present.

5. **RESULTS:**
Pooled results
(i) 34.9 Q/ha.  (ii) (a) 73.44 Q/ha.  (based on 10 d.f. made up of Pooled error and Treatments x Years Interaction.)  (b) 91.57 Q/ha.  (based on 9 d.f. made up of Treatments x Years Interaction.)  (iii) None of the effects is significant.  (iv) Av. yield of cabbage in Q/ha.
Object: To study the effect of different levels of N, P and K on the yield of Cauliflower.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 10.10.65. (iv) (a) N.A. (b) Transplanting. (c) N.A. (d) 61cm. x 61cm. (e) — (v) Nil. (vi) Snow ball. (vii) Irrigated. (viii) 3 weedings, 1-2 hoeings (ix) 4.9cm. (x) 17.7.66.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N : N₁ = 37.5, N₂ = 75 and N₃ = 112.5 Kg/ha.
   (2) 3 levels of P₂O₅ : P₁ = 50, P₂ = 62.5 and P₃ = 75 Kg/ha.
   (3) 3 levels of K₂O : K₁ = 50, K₂ = 62.5 and K₃ = 75 Kg/ha.

3. DESIGN :
   (i) Fast. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 4.27m. x 2.44m. (v) N.A. (v) Yes.

4. GENERAL :
   (i) Good. (ii) N.A. (iii) Yield of flower. (iv) (a) 1965—only. (b) No. (v) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 62.1 Kg/ha. (ii) 19.38 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cauliflower in Kg/ha.
Crop: Cauliflower.  
Site: Kashmir Provincial Agric.  
Exptl. Farm, Shalimar.  
Type: 'M'.

Object: To study the effect of F.Y.M and Dalweed on Cauliflower yield.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  
   (ii) Clay loam.  
   (iii) 15.8.63; 25.8.64; 20.10.65.  
   (iv) (a) N.A.  
   (b) Planting.  
   (c) N.A.  
   (d) 60cm x 90cm.  
   (e) N.A.  
   (f) N.A.  
   (vi) Snow-ball-16.  
   (vii) Irrigated.  
   (viii) and (ix) N.A.  
   (x) 3rd week of July, 64; 65; 66.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of F.Y.M.: F₁=92.2, F₂=184.4 and F₃=368.8 Q/ha
   (2) 3 levels of Dalweed: D₁=92.2, D₂=184.4 and D₃=368.8 Q/ha.

3. DESIGN:
   (i) Fact. in R.B.D.  
   (ii) 9.  
   (iii) 3.  
   (iv) (a) N.A.  
   (b) +88m x 2.44m.  
   (v) N.A.  
   (vi) Yes.

4. GENERAL:
   (i) Normal.  
   (ii) Nil.  
   (iii) Yield of flower seeds.  
   (iv) 1963—contd.  
   (v) N.A.  
   (vi) Nil.  
   (vii) As the experiment is continued beyond 65, the results of individual years are given under 5. Results.

5. RESULTS:
   63 (227)
   (i) 239.7 Kg/ha.  
   (ii) 57-39 Kg/ha.  
   (iii) None of the effects is significant.  
   (iv) Av. yield of seeds in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>Mean</th>
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</thead>
<tbody>
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<td>D₁</td>
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<td>246</td>
<td>250</td>
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<tr>
<td>D₂</td>
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<td>D₃</td>
<td>242</td>
<td>211</td>
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<td>246</td>
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<tr>
<td>Mean</td>
<td>257</td>
<td>212</td>
<td>264</td>
<td>239</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=10.5 Kg/ha.
Crop: Cauliflower (Kharij).
Site: Kashmir Provincial Agri. Exptl. Farm, Shalimar.
Object: To study the effect of different dates of sowing and transplanting on the yield of Cauliflower.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Cauliflower. (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) N.A. (b) Transplanting. (c) to (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) 6 weedings. (ix) N.A. (x) July, 61.

2. TREATMENTS:

<table>
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<tr>
<th>Time of sowing in the nursery</th>
<th>Time of transplanting</th>
</tr>
</thead>
<tbody>
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<td>$T_2=15.8.60$</td>
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<td>20.10.60</td>
</tr>
<tr>
<td>$T_5=15.9.60$</td>
<td>5.11.60</td>
</tr>
</tbody>
</table>

Ref: J.&K. 60(80). Type: 'C'.
3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4’27m. x 4’27m. (v) N.A (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Yield of cauliflower seed. (iv) (a) N.A. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 85 Kg/ha. (ii) 29.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of seed in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>108</td>
<td>91</td>
<td>88</td>
<td>69</td>
<td>67</td>
</tr>
</tbody>
</table>

Crop : Cauliflower (Kharif)
Site : Kashmir Provincial Agri.
Exptl. Farm, Shalimar.

Object : To find out the best sowing time of Cauliflower for seed production under opened and covered conditions.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Cauliflower. (c) N.A. (ii) Clay loam. (iii) As per treatments (iv) 'a) N.A. (b) Transplanting. (c) - (d) 61cm. x 61cm. (e) - (v) Nil. (vi) Snow ball-16. (vii) Irrigated. (viii) 6 weedicings. (ix) N.A. (x) 20.6.64 to 10.7.64.

2. TREATMENTS:
Main-plot treatments :
All combinations of (1) and (2)
(1) 4 dates of sowing : D₁=5.8.63, D₂=15.8.63, D₃=25.8.63 and D₄=5.9.63
(2) 2 types of protection during winter : C₁=Uncovered and C₂=Covered
Sub-plot treatments : 3 types of seed of 1962-63 : Q₁=A-grade, Q₂=B-grade and Q₃=C-grade.

3. DESIGN:
(i) Split-plot. (ii) (a) 8 main-plots/replcation, 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 7 32m. x 4’88m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good. (ii) 2 sprays of fyrolan against green aphids. (iii) Cauliflower yield/plot. (iv) (a) 1963-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 78.9 Kg/ha. (ii) (a) 34.2 Kg/ha. (b) 26.9 Kg/ha. (iii) Main effects of D, C and interaction CxD are highly significant. (iv) Av. yield of cauliflower in Kg/ha.
### BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 10.9.63. (iv) (a) N.A. (b) Transplanting. (c)-(d) and (e) N.A. (v) N.A. (vi) Purple top. (vii) to (ix) N.A. (x) 11.1.64.

### TREATMENTS:

All combinations of (1) and (2)

(1) 3 levels of F.Y.M.: \( F_1 = 92.2 \), \( F_2 = 184.4 \) and \( F_3 = 276.6 \) Q/ha.

(2) 3 levels of Dalweed: \( D_1 = 92.2 \), \( D_2 = 184.4 \) and \( D_3 = 276.6 \) Q/ha.

### DESIGN:

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 3 (iv) (a) N.A. (b) 3.05m. x 1.34m. (v) N.A. (vi) Yes.

### GENERAL:

(i) Normal (ii) N.A. (iii) Yield of roots. (iv) (a) 1963—only (b) — (c) Nil. (v) to (vii) Nil.

### RESULTS:

(i) 236.2 Q/ha. (ii) 40.09 Q/ha, (iii) None of the effects is significant, (iv) Av. yield of turnip in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>( D_1 )</th>
<th>( D_2 )</th>
<th>( D_3 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>203.5</td>
<td>207.2</td>
<td>212.1</td>
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<td>( F_2 )</td>
<td>216.9</td>
<td>225.8</td>
<td>225.8</td>
<td>220.7</td>
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<tr>
<td>( F_3 )</td>
<td>236.8</td>
<td>244.2</td>
<td>292.3</td>
<td>257.7</td>
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<tr>
<td>Mean</td>
<td>224.4</td>
<td>224.4</td>
<td>241.7</td>
<td>230.2</td>
</tr>
</tbody>
</table>

C.D. for D marginal means\(-24.5\) Kg/ha.

C.D. for C marginal means\(-17.3\) Kg/ha.

C.D. for the body of CxD table\(-34.7\) Kg/ha.

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**Crop:** Turnip. *(Rabi)*

**Site:** Kashmir Provincial Agric. Expt. Farm, Shalimar.

**Object:** To study the effect of different levels of F.Y.M. and Dalweed on the yield of Turnip.

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Ref: J.&K. 63(221).

Type: 'M'.

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<table>
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<td>( C_1 )</td>
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<td>52.6</td>
<td>52.3</td>
<td>87.1</td>
<td>122.0</td>
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Crop: Turnip. *(Rabi)*

Site: Kashmir Provincial Agric. Expt. Farm, Shalimar.

Object: To study the effect of different levels of F.Y.M. and Dalweed on the yield of Turnip.
Crop : Turnip (Rabi).  
Site :- Kashmir Provincial Agri. Exptl. Farm, Shalimar.  
Object :- To study the effect of different levels of N, P on the yield of Turnip.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 39.63.  (iv) (a) N.A.  (b) Transplanting.  (c) to (e) N.A.  (v) N.A.  (vi) Purple top.  (vii) to (ix) N.A.  (x) 28.12.63.

2. TREATMENTS:
   All combinations of (1) and (2).
   (1) 3 levels of N :- N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.
   (2) 3 levels of P<sub>2</sub>O<sub>5</sub> :- P<sub>0</sub>=0, P<sub>1</sub>=44.8 and P<sub>2</sub>=89.2 Kg/ha.

3. RESULTS:
   (i) 41.1 Q/ha.  (ii) 10.32 Q/ha.  (iii) None of the effects is significant.  (iv) Av. yield of roots in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N&lt;sub&gt;0&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
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<td>38.1</td>
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<td>40.6</td>
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<tr>
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<td>43.4</td>
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<tr>
<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
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<td>37.4</td>
<td>42.6</td>
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<tr>
<td>Mean</td>
<td>38.5</td>
<td>39.6</td>
<td>45.2</td>
<td>41.1</td>
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</table>

Crop : Knol-Khol, (Rabi).  
Ref :- J.&K. 63(159).  
Site :- Kashmir Provincial Agri. Exptl. Farm, Shalimar.  
Type :- 'CM'.  
Object :- To study the effect of different levels of manures and spacings on Knol-Khol varieties.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 11.9.61.  (iv) (a) N.A.  (b) Transplanting.  (c) to (e) N.A.  (vi) As per treatments.  (v) N.A.  (vii) N.A.  (viii) N.A.  (ix) 9.3cm.  (x) 15.1.62.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4).
   (1) 3 levels of P<sub>2</sub>O<sub>5</sub> :- P<sub>0</sub>=0, P<sub>1</sub>=44.1 Kg/ha, and P<sub>2</sub>=168.2 Kg/ha.
   (2) 3 levels of N :- N<sub>0</sub>=0, N<sub>1</sub>=44.1 and N<sub>2</sub>=168.2 Kg/ha.
   (3) 3 levels of spacing :- S<sub>1</sub>=30cm. x 22cm.  S<sub>2</sub>=30cm. x 20cm. and S<sub>3</sub>=30cm. x 30cm.
   (4) 2 varieties : V<sub>1</sub>=King of market and V<sub>2</sub>=White vienna.

3. DESIGN:
   (i) Fact. in R.B.D.  (ii) (a) and (b) N.A.  (iii) 3.  (iv) (a) 3.05m. x 2.44m.  (b) 1.83m. x 1.83m.  (v) 61em. x 30cm.  (vi) Yes.
4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of knobs. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 321.0 Q/ha. (ii) 93.67 Q/ha. (iii) Main effects of N and S are highly significant and Interaction N x V is highly significant. (iv) Av. yield of Knol-Khol in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>S0</th>
<th>S1</th>
<th>S2</th>
<th>V1</th>
<th>V2</th>
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<td>311.5</td>
<td>364.5</td>
<td>371.9</td>
<td>324.0</td>
<td>225.5</td>
<td>290.9</td>
<td>323.3</td>
<td>307.3</td>
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<tr>
<td>P1</td>
<td>287.8</td>
<td>347.1</td>
<td>393.1</td>
<td>387.8</td>
<td>336.4</td>
<td>303.8</td>
<td>293.0</td>
<td>333.8</td>
<td>342.6</td>
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<tr>
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<td>283.0</td>
<td>300.0</td>
<td>357.2</td>
<td>335.3</td>
<td>311.3</td>
<td>253.7</td>
<td>293.0</td>
<td>333.8</td>
<td>313.4</td>
</tr>
</tbody>
</table>

Mean: 272.0; 319.5; 371.6

V1: 283.0; 311.5; 330.8
V2: 359.4; 237.5; 412.4
S1: 312.5; 366.6; 435.9
S2: 274.6; 345.2; 371.9
S3: 229.1; 246.8; 307.0

C.D. for N or S marginal means—35.69Q/ha.
C.D. for the body of N X V table—50.48Q/ha.

Crop: Knol-Khol (Rabi)
Site: Kashmir Provincial Agri
Exptl. Farm, Shalimar.
Object: To study the effect of different spacings and levels of N on Knol-Khol crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Clay loam. (iii) 2.9.62; 10.9.63. (iv) (a) N.A. (b) Transplanting. (c) N.A.
(d) As per treatments. (e) N.A. (v) N.A. (vi) King of market (vii) and (viii) N.A. (ix) 19.8cm; 25.3cm. (x) 11.2.63; 15.1.64.

2. TREATMENTS:
Main-plot treatments:
4 levels of nitrogen: \( N_0 = 0, N_1 = 112, N_2 = 168 \) and \( N_3 = 224 \) kg/ha.

Sub-plot treatments:
2 spacings: \( S_1 = 30 \text{cm.} \times 10 \text{cm.} \) and \( S_2 = 23 \text{cm.} \times 10 \text{cm.} \)

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/repliation; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A.
(b) 1/1683.3 ha.; 1/1538.8 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal (ii) N.A. (iii) Yield of knobs. (iv) (a) 1962-63. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Sub-plot error variances are heterogeneous, results of individual years are given below.
5. RESULTS:

62(237)

(i) 212.1 Q/ha. (ii) (a) 48.28 Q/ha. (b) 42.31 Q/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of Knot-Khol in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
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<tbody>
<tr>
<td>S₁</td>
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<td>233.1</td>
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<tr>
<td>S₂</td>
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<td>238.7</td>
<td>209.1</td>
<td>284.9</td>
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<tr>
<td>Mean</td>
<td>159.1</td>
<td>221.1</td>
<td>209.1</td>
<td>259.0</td>
<td>212.1</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=54.61 Q/ha.

63(216)

(i) 144.9 Q/ha. (ii) (a) 19.22 Q/ha. (b) 18.18 Q/ha. (iii) Main effect of N alone is significant, (iv) Av. yield of Knot-Khol in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
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<td>146.9</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=21.73 Q/ha

---

Crop := Knot-Khol.  
Ref := J.&K. 60(33).  
Type := 'GMV'.

Object := To study the effect of different spacings and manures on the yield of different varieties of Knot-Khol.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A.  (ii) N.A.  (iii) 6.9.60.  (iv) (a) to (c) N.A.  (d) As per treatments.  (e) 1.  (v) N.A.  
(vi) As per treatments.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 21.1.61.

2. TREATMENTS:

Main-plot treatments:

2 varieties: V₁=White vienna and V₂=King of market.

Sub-plot treatments:

All combinations of (1), (2) and (3)

(1) 3 levels of P₂O₅ as Super: −P₄=0, P₂=84 and P₅=168 Kg/ha.

(2) 3 levels of N as A/S: −N₄=0, N₂=84 and N₃=168 Kg/ha.

(3) 3 spacings: −S₁=30cm. × 10cm.; S₂=30cm. × 30cm. and S₃= 30cm. × 30cm.

3. DESIGN:

(i) Split-plot confd. (Interaction P N² S² confd.).  (ii) (a) 2 main-plots/replication ; 3 blocks/main-plot and 9 sub-plots/block.  (b) N.A.  (iii) 2.  (iv) (a) 2’44m. × 2’44m.  (b) 1’83m. × 1’83m.  (v) 30cm. × 30cm.  
(vi) Yes.
4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of knob-khol and beans. (iv) (a) and (b) Nil. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 300.4 Q/ha. (ii) (a) 241.4 Q/ha. (b) 61.11 Q/ha. (iii) Main effect of N is highly significant while that of S is significant. (iv) Av. yield of knob-khol in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>S1</th>
<th>S2</th>
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<td>291.7</td>
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<td>V2</td>
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</tr>
<tr>
<td>N2</td>
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<td>306.9</td>
<td>309.7</td>
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C.D. for N or S marginal means=28.8 Q/ha.

Crop :- Onion
Site :- Kashmir Provincial Agri
Exptl. Farm, Shalimar.

Ref :- J.d.K. 64(216), 65(109).

Object :- To study the effect of dates of sowing and ages of seedling on the yield of Onion.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clayey loam. (iii) As per treatments. (iv) (a) N.A. (b) Transplanting. (c) —
(d) N.A. (e) As per treatments (v) 276.7 Q/ha. of F.Y.M. (vi) Red globe. (vii) Irrigated. (viii) 4 weedings.
(ix) N.A. (x) N/A; 5:7:66.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 4 dates of transplanting :- D1=16th Aug., D2=1st Sept., D3=16th Sept. and D4=1st Oct.
(2) 4 ages of seedlings :- A1=45, A2=60, A3=75 and A4=90 days.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 2-44m x 1-83m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of bulbs. (iv) (a) 1964—contd. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As the experiment is continued beyond 1965, the results of individual years are presented under 2. Results.
5. RESULTS

64(216)

(i) 136.9 Q/ha. (ii) 23.57 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of onion Q/ha.

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>Mean</th>
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<td>140.3</td>
<td>164.4</td>
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<td>D2</td>
<td>138.7</td>
<td>138.3</td>
<td>138.8</td>
<td>168.2</td>
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<td>D3</td>
<td>108.4</td>
<td>97.2</td>
<td>117.4</td>
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<td>D4</td>
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</table>

Mean: 123.3, 131.7, 135.8, 156.8, 136.9

63(100)

(i) 135.5 Q/ha. (ii) 30.14 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of onion in Q/ha.

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>Mean</th>
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<tr>
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<td>148.0</td>
<td>145.0</td>
<td>155.3</td>
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<td>D2</td>
<td>123.3</td>
<td>118.1</td>
<td>133.1</td>
<td>141.3</td>
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<tr>
<td>D3</td>
<td>133.6</td>
<td>97.2</td>
<td>121.1</td>
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<td>D4</td>
<td>138.3</td>
<td>131.6</td>
<td>127.8</td>
<td>143.5</td>
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Mean: 138.0, 123.7, 132.5, 147.8, 135.5

Crop: Onion
Site: Kashmir Provincial Agri. Exptl. Farm, Shalimar

Object: To study the effect of dates of sowing on the yield of Onion.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam (iii) As per treatments (iv) (a) N.A. (b) Transplanting (c) to (e) N.A. (v) 276.7 Q/ha. (vi) Red globe. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) Aug., 61

2. TREATMENTS:
7 dates of sowing:—D1=1st Sept., transplanted in Dec., D2=1st Sept., transplanted in March, D3=16th Sept., transplanted in March, D4=16th Sept., transplanted in March, D5=1st Oct., transplanted in Dec., D6=1st Oct., transplanted in March, and D7=16th Oct., transplanted in March.

3. DESIGN:
(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 3 ; 4. (iv) (a) N.A. (b) 4.57m x 1.60m. : 3.56m x 1.56m. (v) N.A. (vi) Yes

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of bulbs (iv) (a) 1960-61. (b) N.A. (c) Results of combined analysis are given under 5. Results (v) and (vi) NIL. (vii) Error variances are homogeneous and Treatments x Years interaction is present.

5. RESULTS:
Pooled results
(i) 357.5 Q/ha. (ii) 221.4 Q/ha. (based on 6 d. f. made up of Treatments x Years interaction.) (iii) Treatment differences are not significant. (iv) Av. yield of bulb in Q/ha.

Ref: J. & K. 60(171), 61(157).

Type: 'C'.
<table>
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<th>Treatment</th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>D₄</th>
<th>D₅</th>
<th>D₆</th>
<th>D₇</th>
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</thead>
<tbody>
<tr>
<td>Av. yield.</td>
<td>477'9</td>
<td>328'6</td>
<td>472'5</td>
<td>348'6</td>
<td>346'4</td>
<td>295'5</td>
<td>235'1</td>
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</table>

**Individual results:**

<table>
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<th>Year</th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>D₄</th>
<th>D₅</th>
<th>D₆</th>
<th>D₇</th>
<th>Sig.</th>
<th>S.E./plot</th>
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<tr>
<td>1960</td>
<td>508'1</td>
<td>481'3</td>
<td>491'6</td>
<td>526'7</td>
<td>254'1</td>
<td>433'</td>
<td>254'1</td>
<td>**</td>
<td>421'4</td>
</tr>
<tr>
<td></td>
<td>458'3</td>
<td>214'1</td>
<td>455'2</td>
<td>215'0</td>
<td>415'6</td>
<td>191'8</td>
<td>220'9</td>
<td>**</td>
<td>310'1</td>
</tr>
<tr>
<td>Pooled</td>
<td>477'9</td>
<td>328'6</td>
<td>472'5</td>
<td>348'6</td>
<td>346'4</td>
<td>295'5</td>
<td>235'1</td>
<td>N.S.</td>
<td>337'8</td>
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</table>

**Crop:** Onion, (Rabi)  
**Site:** Kashmir Provincial Agric. Exptl. Farm, Shalimar.  
**Type:** ‘CM’.  
**Ref:** J & K, 61(158), 62(236)

**Object:** To study the effect of different levels of N and spacings on the yield of Onion.

1. **BASAL CONDITIONS:**
   (i) (a) to (c) N.A.  
   (ii) Sandy loam.  
   (iii) December.  
   (iv) (a) N.A.  
   (b) Transplanting.  
   (c) — (d) As per treatments.  
   (e) Nil.  
   (v) 276'7 Q/ha. of F.Y.M.  
   (vi) Red globe.  
   (vii) Irrigated.  
   (viii) 4-5 weedings  
   (ix) 36'4cm; 30 3cm.  
   (x) July, 62; Aug., 63.

2. **TREATMENTS:**
   All combinations of (1) and (2)
   (1) 3 levels of N :—N₀=0, N₁=56 and N₂=112 Kg/ha.
   (2) 3 levels of spacings S₁=22'5cm. x 7'5cm., S₂=22'5cm. x 22'5cm. and S₃=22'5cm. x 22'5cm.

3. **DESIGN:**
   (i) Fact. in R.B.D.  
   (ii) (a) 9.  
   (b) N.A.  
   (iii) 4.  
   (iv) (a) and (b) N.A.  
   (v) N.A.  
   (vi) Yes.

4. **GENERAL:**
   (i) Normal.  
   (ii) Nil.  
   (iii) Yield of bulbs.  
   (iv) (a) 1961-62.  
   (b) No.  
   (c) Results of combined analysis are given under 5 Results.  
   (v) and (vi) Nil.  
   (vii) Error variances are homogeneous and Treatments X Years interaction is absent.

5. **RESULTS:**
   **Pooled Results**
   (i) 298'2 Q/ha.  
   (ii) 72'8Q/ha. (based on 56 d.f. made up of Pooled error and Treatments X Years interaction)
   (iii) Main effect of S is highly significant, and that of N is significant, (iv) Av. yield of bulbs in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
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<td>399'0</td>
<td>368'2</td>
<td>372'7</td>
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<td>S₂</td>
<td>283'0</td>
<td>262'2</td>
<td>294'6</td>
<td>280'1</td>
</tr>
<tr>
<td>S₃</td>
<td>199'4</td>
<td>301'0</td>
<td>225'2</td>
<td>241'9</td>
</tr>
<tr>
<td>Mean</td>
<td>268'0</td>
<td>320'7</td>
<td>306'9</td>
<td>298'2</td>
</tr>
</tbody>
</table>

C.D. for N or S marginal means = 47'1 Q/ha.
Object: To study the effect of different levels of N and spacings on the yield of Onion.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) Feb., 63. (iv) (a) N.A. (b) Transplanting (c) — (d) As per treatments. (e) Nil. (v) 276.7 Q/ha. of F.Y.M. (vi) Red globe. (vii) Irrigated. (viii) 4-5 weedings (ix) 33.8cm. (x) 28.7.63.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 4 levels of N: N₀ = 0, N₁ = 56, N₂ = 112 and N₃ = 168 Kg/ha.
   (2) 2 spacings: S₁ = 22.5cm × 7.5cm. and S₂ = 15cm. × 10cm.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 8, (b) N.A. (iii) 5. (iv) (a) N.A. (b) 3'96m. × 2'13m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of bulbs. (iv) (a) 1961—contd. (modified) (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 151.9 Q/ha. (ii) 26.2 Q/ha. (iii) Main effect of N alone is highly significant (iv) Avg. yield of bulbs in Q/ha.

<table>
<thead>
<tr>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>Mean</th>
</tr>
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<td>158.8</td>
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<tr>
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<td>170.3</td>
<td>193.4</td>
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</table>

C.D. for N marginal means = 33.9 Q/ha.
Crop: Onion.  
Ref: J.&K. 64(217)

Site: Kashmir Provincial Agr. 
Exptl. Farm, Shalimar.  
Type: 'CM'.

Object: To study the effect of different levels of N and spacings on the yield of Onion.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  (ii) Sandy loam. (iii) 10.3.64.  (iv) (a) N.A.  (b) Transplanting. (c) — (d) As per treatments. (e) Nil.  (v) N.A.  (vi) Red globe. (vii) Irrigated. (viii) 4-5 weedings. (ix) 47-5cm. (x) 20.7.64.

2. TREATMENTS:
All combinations of (1) and (2)

(1) 4 levels of N : \( N_1 = 56, N_2 = 112, N_3 = 168 \) and \( N_4 = 224 \) Kg/ha.

(2) 2 spacings : \( S_1 = 22.5 \text{cm} \times 10 \text{cm} \) and \( S_2 = 15 \text{cm} \times 10 \text{cm} \).

3. DESIGN:
(i) Factor in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3.96m. x 2.13m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of bulbs. (iv) (a) 1961—contd. (modified) (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 214.0 Q/ha.  (ii) 24.0 Q/ha.  (iii) Main effect of N alone is highly significant.  (iv) Av. yield of bulbs in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( N_3 )</th>
<th>( N_4 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>( S_2 )</td>
<td>183.3</td>
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<td>Mean</td>
<td>181.1</td>
<td>217.3</td>
<td>222.5</td>
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<td>214.0</td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 25.0 Q/ha.

Crop: Onion.  
Ref: J. & K. 65(18).

Site: Kashmir Provincial Agr.
Exptl. Farm, Shalimar  
Type: 'CM'.

Object: To study the effect of different levels of N and spacings on the yield of Onion.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A.  (ii) Clay loam. (iii) 5.11.65.  (iv) (a) N.A.  (b) Transplanting. (c) As per treatments. (d) 1. (v) N.A. (vi) Red globe. (vii) Unirrigated. (viii) and (ix) N.A. (x) 27.7.66.

2. TREATMENTS:
Main-plot treatments:
4 levels of N: \( N_1 = 56, N_2 = 112, N_3 = 168 \) and \( N_4 = 224 \) Kg/ha.

Sub-plot treatments:
2 spacings: \( S_1 = 23 \text{cm} \times 8 \text{cm} \) and \( S_2 = 15 \text{cm} \times 10 \text{cm} \).
3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 213m. x 122m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of bulbs. (iv) (a) 1961-66. (modified) (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 199'9 Q/ha. (ii) (a) 49'9 Q/ha. (b) 31'7 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of bulbs in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>182'7</td>
<td>216'1</td>
<td>206'7</td>
<td>184'6</td>
<td>200'0</td>
</tr>
<tr>
<td>S₂</td>
<td>197'1</td>
<td>226'0</td>
<td>192'3</td>
<td>183'6</td>
<td>199'7</td>
</tr>
<tr>
<td>Mean</td>
<td>189'9</td>
<td>226'0</td>
<td>190'5</td>
<td>184'1</td>
<td>199'9</td>
</tr>
</tbody>
</table>

Crop: Apple  
Site: Kashmir Provincial Agril.  
Exptl. Farm, Shalimar  
Ref: J.&K. 63(244)  
Type: 'CM'.

Object: To see the comparative study of different fungicides in controlling the scale on Apples.

1. BASAL CONDITIONS:
   (i) N.A.  (ii) Clay loam. (iii) - (v) Ambari. (v) 5'10m. x 6'10m. (vi) 3-4 years. (vii) and (viii) N.A. (ix) Nil. (x) Irrigated. (xi) and (xii) N.A.

2. TREATMENTS
   7 fungicidal treatments: T₀ = Coatrol, T₁ = Coptan at 2gm./litre per plant, T₂ = Terzil at 1'5gm./litre per plant, T₃ = Melprex at 1'20gm./litre per plant, T₄ = Cunran at 1'8gm./litre per plant, T₅ = Diathene (z-78) 2gm./litre per plant, T₆ = Diathene (M₂₂) at 2'5gm./litre per plant.
   4 spacings with the interval of 20 days. 1st spray was done on 3rd April, 1963.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) 2194'56m. (iii) 4. (iv) (a) N.A. (b) 28. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) N.A. (iii) Infestation measurements (iv) 1963—only. (v) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 6'9 degree. (ii) 0'57 degree (iii) Treatment differences are highly significant. (iv) Mean infestation in degree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
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<tbody>
<tr>
<td>Mean angle</td>
<td>10'0</td>
<td>5'8</td>
<td>6'3</td>
<td>6'7</td>
<td>7'0</td>
<td>6'2</td>
<td>6'2</td>
</tr>
<tr>
<td>C.D. = 0'64 degree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Saffron.  
Site: Kashmir Provincial Agr. 
Expul. Farm, Shalimar.  

Objekt: To find the best combination of N, P and F.Y.M. for the maximum yield of Saffron.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  
   (ii) N.A.  
   (iii) Dibbling (transplantation).  
   (iv) Local.  
   (v) 9.58.  
   (vi) N.A.  
   (vii) Nil.  
   (viii) 4 hoeings.  
   (ix) N.A.  
   (x) Unirrigated.  
   (xi) N.A.  
   (xii) Oct. and Nov. every year.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of F.Y.M.: F0=0, F1=138 and F2=277 Kg/ha.
   (2) 3 levels of N as A/S: N0=0, N1=138 and N2=277 Kg/ha.
   (3) 3 levels of P as Super-P: P0=0, P1=138 and P2=277 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D.  
   (ii) 27.  
   (iii) 2.  
   (iv) N.A.  
   (v) Bedsize=1/2152² ha.  
   (vi) Nil.  
   (vii) Yes.

4. GENERAL:
   (i) Normal.  
   (ii) N.A.  
   (iii) No. of flowers  
   (iv) 1958-contd.  
   (v) N.A.  
   (vi) N.A.  
   (vii) Nil.  
   (viii) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>14334</td>
<td>14535</td>
<td>18660</td>
<td>15066</td>
<td>15066</td>
<td>17218</td>
<td>15783</td>
</tr>
<tr>
<td>18738</td>
<td>19736</td>
<td>18254</td>
<td>15066</td>
<td>23675</td>
<td>24751</td>
<td>2003</td>
</tr>
<tr>
<td>15066</td>
<td>23675</td>
<td>24751</td>
<td>15066</td>
<td>19370</td>
<td>24751</td>
<td>19729</td>
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<tr>
<td>Mean</td>
<td>19722</td>
<td>18057</td>
<td>19736</td>
<td>15905</td>
<td>19370</td>
<td>22240</td>
</tr>
</tbody>
</table>

C.D. for P or F marginal means=3776.9 flowers/ha.
C.D. for the body of F×N table=6539.1 flowers/ha.

62 (11)

<table>
<thead>
<tr>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>10761</td>
<td>15432</td>
<td>32284</td>
<td>19370</td>
<td>19370</td>
<td>19736</td>
<td>19492</td>
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<tr>
<td>49136</td>
<td>18660</td>
<td>22964</td>
<td>26903</td>
<td>30131</td>
<td>33726</td>
<td>30253</td>
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<tr>
<td>11837</td>
<td>24751</td>
<td>34436</td>
<td>26143</td>
<td>15264</td>
<td>27247</td>
<td>23675</td>
</tr>
<tr>
<td>Mean</td>
<td>23911</td>
<td>19614</td>
<td>29895</td>
<td>24139</td>
<td>22362</td>
<td>26903</td>
</tr>
</tbody>
</table>

C.D. for N or F marginal means=5044.6 flowers/ha.
C.D. for the body of N×F table=8737.3 flowers/ha.
63 (13)

(i) 21922 flowers/ha. (ii) 5187 flowers/ha. (iii) Main effects of N, F are highly significant and that of P is significant. Interaction F x P is highly significant and that of N x P is significant. (iv) Av. no. of saffron flowers/ha.

<table>
<thead>
<tr>
<th></th>
<th>N_0</th>
<th>N_1</th>
<th>N_2</th>
<th>P_0</th>
<th>P_1</th>
<th>P_2</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>F</td>
<td>9319</td>
<td>15060</td>
<td>46639</td>
<td>17928</td>
<td>16508</td>
<td>36588</td>
<td>23675</td>
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<tr>
<td>P</td>
<td>45411</td>
<td>19370</td>
<td>17218</td>
<td>29765</td>
<td>29055</td>
<td>21178</td>
<td>26666</td>
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<tr>
<td>Mean</td>
<td>22720</td>
<td>15668</td>
<td>27377</td>
<td>23309</td>
<td>19133</td>
<td>23323</td>
<td>21922</td>
</tr>
</tbody>
</table>

C.D. for any marginal mean=3556 flowers/ha.
C.D. for the body of F x P or N x P table=6158 flowers/ha.

Crop : Saffron.

Ref :- J.K. 60(5), 61(6), 62(12), 63(14)

Site :- Kashmir Provincial Agric.

Exptl. Farm, Shalimar

Type :- 'C'.

Object :- To find out the effect of different spacings on the yield of Saffron.

1. BASAL CONDITIONS :

(i) and (ii) N.A. (iii) Dibbling (Transplanting) (iv) Local (v) 1.9.58. (vi) N.A. (vii) Nil. (viii) 4 hoeings. (ix) Nil. (a) Unirrigated. (x) N.A. (xii) October and November every year.

2. TREATMENTS :

9 spacings: S_1=8cm. x 8cm., S_2=8cm. x 15cm., S_3=8cm. x 23cm., S_4=8cm. x 30cm., S_5=15cm. x 15cm., S_6=15cm. x 23cm., S_7=15cm. x 30cm., S_8=23cm. x 23cm., and S_9=23cm. x 30cm.

3. DESIGN:

(i) R.B.D. (ii) 9. (iii) 2. (iv) (a) and (b) Bed size=1/2152.3ha. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) No. of flowers. (iv) (a) 1958—contd. (64, 65 N.A.) (b) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

60 (5)

(i) 3946 flowers/ha. (ii) 2019 flowers/ha. (iii) Treatment differences are not significant, (iv) Av. no. of saffron flowers/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
<th>S_5</th>
<th>S_6</th>
<th>S_7</th>
<th>S_8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>4104</td>
<td>2152</td>
<td>5381</td>
<td>4304</td>
<td>6457</td>
<td>1076</td>
<td>1076</td>
<td>3228</td>
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<tr>
<td>7533</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 (6)

(i) 10761 flowers/ha. (ii) 3444 flowers/ha. (iii) Treatment differences are significant, (iv) Av. no. of saffron flowers/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
<th>S_5</th>
<th>S_6</th>
<th>S_7</th>
<th>S_8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>12914</td>
<td>9685</td>
<td>21522</td>
<td>8608</td>
<td>12914</td>
<td>7233</td>
<td>5381</td>
<td>9685</td>
</tr>
</tbody>
</table>

C.D.=7941 flowers/ha.
63 (12)

(i) 32571 flowers/ha.  (ii) 8587 flowers/ha.  (iii) Treatment differences are highly significant.  (iv) Av. no of saffron flowers/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
<th>S9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>37664</td>
<td>16142</td>
<td>39187</td>
<td>20570</td>
<td>43045</td>
<td>23675</td>
<td>14420</td>
<td>21522</td>
<td>26903</td>
</tr>
</tbody>
</table>

C.D. = 19802 flowers/ha.

63 (14)

(i) 34795 flowers/ha.  (ii) 9039 flowers/ha.  (iii) Treatment differences are significant.  (iv) Av. no. of saffron flowers/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
<th>S9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>53806</td>
<td>53806</td>
<td>25055</td>
<td>51654</td>
<td>21522</td>
<td>33360</td>
<td>22599</td>
<td>29055</td>
<td>18294</td>
</tr>
</tbody>
</table>

C.D. = 20845 flowers/ha.
PUNJAB
Crop: Paddy, (Kharif)  
Site: Uppal Farm, Amritsar  
Ref: Pb. 60(128)  
Type: ‘M’.

Object: To study the effect of different sources of N on the yield of Paddy.

1. BASIC CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 10.7.60.  (iv) to (vi) N.A.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 7.10.60.

2. TREATMENTS:
   8 manual treatments:  
   - T1 = Control (No manure),  
   - T2 = 44.8 Kg/ha. of Neem cake,  
   - T3 = 44.8 Kg/ha. of N as Cotton cake,  
   - T4 = 44.8 Kg/ha. of N as G.N.C.,  
   - T5 = 44.8 Kg/ha. of N as Bone meal,  
   - T6 = 44.8 Kg/ha. of N as Compost,  
   - T7 = 22.4 Kg/ha. of N as C/A/N.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 8.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/99 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) N.A.  (b) No.  (c) Nil.  (v) N.A.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 1871 Kg/ha.  (ii) 1278 Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1415</td>
<td>2409</td>
<td>1834</td>
<td>2165</td>
<td>1837</td>
<td>1963</td>
<td>16603</td>
</tr>
</tbody>
</table>

C.D. = 187.7 Kg/ha.

Object: To study the effect of spraying micronutrients on the yield of Paddy.

1. BASIC CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 18.7.62.  (iv) (a) 6 ploughings.  (b) to (g) N.A.  (v) 67.2 Kg/ha.  
   of N+33.6 Kg/ha. of P2O5+33 Kg/ha. of K2O applied at sowing.  (vi) N.A.  (vii) Irrigated.  (viii) 2 weedings.  (ix) N.A.  (x) 16.10.62.

2. TREATMENTS:
   8 applications of micronutrients:  
   - M1 = Control (no micronutrient applied),  
   - M1 = 2.24 Kg/ha. of Borax in 454 litre of water,  
   - M2 = 4.48 Kg/ha. of Copper sul.+2.24 Kg/ha. of hydrated lime in 454 litre of water,  
   - M3 = 4.48 Kg/ha. of Ferrous-Sul.+2.24 Kg/ha. of hydrated lime in 454 litre of water,  
   - M4 = 6.72 Kg/ha. of Manganese Sul.+4.48 Kg/ha. of hydrated lime in 454 litre of water,  
   - M5 = 6.72 Kg/ha. of Zinc Sul.+4.48 Kg/ha. of hydrated lime in 454 litre of water,  
   - M6 = 11.2 Kg/ha. of Magnesium in 454 litre. of water and M7 = 1.12 Kg/ha. of Ammon. Molybdate in 454 litre of water.

Micronutrient applied as foliar spray when crop was 1 and 2 months old of water.
3. DESIGN:
(i) R.B.D. (ii) (a) R. (b) N.A. (iii) 4. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) As per treatments. (iii) Yield of grain. (iv) (a) N.A. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 1766 Kg/ha. (ii) 2230 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain
in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
<th>M₇</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1945</td>
<td>1787</td>
<td>1680</td>
<td>1957</td>
<td>1631</td>
<td>1713</td>
<td>1932</td>
<td>1483</td>
</tr>
</tbody>
</table>

Crop : Paddy. (Kharif)


Ref : Pb. 62(189), 63(88).

Type : 'M'.

Object : To study the effect of different levels of silica on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Wheat; N.A. (c) N.A. (ii) Heavy loam; loam sand. (iii) 5.7.62; 13.7.63. (iv) (a) 4 ploughings; N.A. (b) to (e) N.A. (v) C-27; N.A. (vi) Irrigated. (vii) N.A. (x) 15.10.62; 7.10.63.

2. TREATMENTS:
Main-plot treatments:
2 manurial treatments: M₁=56 Kg/ha. of N as C/A/N and M₂=56 Kg/ha. of N+28 Kg/ha. of P₂O₅
as Super+28 Kg/ha. of K₂O as Mur. pot.
Sub-plot treatments:
5 levels of silica: S₀=Control (no silica), S₁=224, S₂=448, S₃=672 and S₄=896 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication, 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/123.6 ha; 1/148.3 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-63. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Both the error variances are homogeneous. Main-plot treatments x Years interaction is absent while Sub-plot treatments x Years interaction is present.

5. RESULTS:
(i) 2057 Kg/ha. (ii) (a) 744.7 Kg/ha. (based on 7 d.f. made up of Pooled error and Treatments x Years interaction). (b) 413.1 Kg/ha. (based on 8 d.f. made up of Treatments x Years interaction). (iii) None of the above effects is significant. (iv) Av. yield of grain in Kg/ha.

Pooled results

<table>
<thead>
<tr>
<th></th>
<th>S₀</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2038</td>
<td>1906</td>
<td>2170</td>
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<tr>
<td>M₄</td>
<td>1975</td>
<td>2014</td>
<td>2232</td>
<td>2176</td>
<td>2078</td>
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</tr>
<tr>
<td>Mean</td>
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<td>2026</td>
<td>2069</td>
<td>2173</td>
<td>2061</td>
<td>2057</td>
</tr>
</tbody>
</table>
Crop :- Paddy (Kharij).
Site :- Agri. Res. Stn., Gurdaspur.

Object :- To find the optimum time of application of C/A/N on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 13.7.64;  (iv) (a) to (e) N.A.  (v) 22.4 Kg/ha. of P₂O₅+22.4 Kg/ha. of K₂O at planting.  (vi) N.A.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 7.10.64.

2. TREATMENTS:
   6 times of application of 44.8 Kg/ha. of N as C/A/N:  T₀=Control (No nitrogen).  T₁=At transplanting,  T₂=10 days after transplanting,  T₃=20 days after transplanting,  T₄=30 days after transplanting, and  T₅=40 days after transplanting.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 6.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/123 6 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1964—contd. (Treatments modified in 65).  (b) No.  (c) Nil.  (d) Nil.  (e) and (vi) N.A.

5. RESULTS:
   (i) 1475 Kg/ha.  (ii) 152.0 Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of grain in Kg/ha.

   Treatment  T₀  T₁  T₂  T₃  T₄  T₅
   Av. yield 1041 1486 1433 1785 1640 1467
   C.D. = 229.0 Kg/ha.

---

Crop :- Paddy (Kharij).
Site :- Agri. Res. Stn., Gurdaspur.

Object :- To study the effect of N on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) N.A.  (b) Sugarcane.  (c) N.A.  (ii) Sandy loam.  (iii) 15.7.65.  (iv) (a) to (e) N.A.  (v) 50 Kg/ha. of P₂O₅+50 Kg/ha. of K₂O.  (vi) Ghana.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 11.10.65.
2. TREATMENTS:

7 manural treatments: T₀=Control, T₁=100 Kg/ha. of N at sowing, T₂=100 Kg/ha. of N after 10 days of sowing, T₃=100 Kg/ha. of N after 20 days of sowing, T₄=100 Kg/ha. of N after 30 days of sowing, T₅=100 Kg/ha. of N after 40 days of sowing and T₆=T₇+T₈

3. DESIGN:

(i) R.B.D. (ii) (a) 7.  (b) N.A.  (iii) 4.  (iv) (a) 18’90m. x 2’74m,  (b) 18’44m. x 2’74m.  (v) 22 cm. at the ends.  (vi) Yes.

4. GENERAL:

(i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1964-contd (Treatments modified. in 65)  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:

(i) 831 Kg/ha.  (ii) 625 Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>650</td>
<td>771</td>
<td>948</td>
<td>1031</td>
<td>843</td>
<td>706</td>
<td>865</td>
</tr>
<tr>
<td>C.D.</td>
<td>95.2 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Crop :- Paddy (Kharif)**  
**Site :- Agri. Res. Sta., Gurdaspur**  
**Ref. :- Pb. 65(69)**  
**Type :- ‘M’**

Object :- To study the effect of spraying the micronutrients on the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) N.A.  (b) Sugarcane.  (c) N.A.  (d) Sandy loam.  (ii) 14.7.65.  (iii) 125 Kg/ha. of N + 62.5 Kg/ha. of P₂O₅ + 62.5 Kg/ha. of K₂O.  (iv) Ghana.  (v) Irrigated.  (vi) to (x) N.A.

2. TREATMENTS:

8 micronutrient treatments: T₀=Control, T₁=4.5 Kg/ha. of N, P and K each + 4.5 Kg/ha. of Lime, T₂=2.2 Kg/ha. of Borax + 4.5 Kg/ha. of Lime, T₃=4.5 Kg/ha. of Fe + 4.5 Kg/ha. of Lime, T₄=6.7 Kg/ha. of Zn + 4.5 Kg/ha. of Lime, T₅=6.7 Kg/ha. of Mn + 4.5 Kg/ha. of Lime, T₆=11.2 Kg/ha. of Mg + 4.5 Kg/ha. of Lime and T₇=1.1 Kg/ha. of Molybdenum + 2.1 Kg/ha. of Lime.

3. DESIGN:

(i) R.B.D.  (ii) (a) 8.  (b) N.A.  (iii) 4.  (iv) (a) 18’90m. x 2’74m.  (b) 18’44m. x 2’13m.  (v) 28cm. x 30cm.  (vi) Yes.

4. GENERAL:

(i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1965-only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:

(i) 923 Kg/ha.  (ii) 70.9 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>933</td>
<td>978</td>
<td>894</td>
<td>939</td>
<td>914</td>
<td>904</td>
<td>908</td>
<td>912</td>
</tr>
</tbody>
</table>
**Crop:** Paddy (Kharif)

**Site:** Reg. Rice Res. Sta., Kapurthala

**Object:** To study the effect of different sources of N on the yield of Paddy.

### 1. BASAL CONDITIONS:

- (a) to (c) N.A.
- (ii) Clay loam.
- (iii) Seed sown 5 weeks earlier to transplanting and transplanting done on last week of July.
- (iv) (a) Ploughing, 2 puddlings.
- (b) Transplanting.
- (c) 18 Kg/ha.
- (d) 23 cm x 23 cm.
- (e) 1.
- (v) Nil.
- (vi) Jhona - 349.
- (vii) Irrigated.
- (viii) 2 weeding.
- (ix) N.A.
- (x) 28.11.62; 1.10.63; 29.10.64

### 2. TREATMENTS:

7 sources of N at 22.4 Kg/ha. 
- $S_0$ = (No manure), $S_1$ = F.Y.M., $S_2$ = C/A/N, $S_3$ = G.M. (Dhaincha) $S_4$ = A/S, $S_5$ = Rice husk and $S_6$ = Urea.

In Expt. No 62 (4) treatment $S_4$ has not been tried.

### 3. DESIGN:

- (i) R.B.D.
- (ii) (a) 6 for '62' and 7 for others.
- (b) N.A.
- (iii) 64 for 63 and 64
- (iv) 1/1977 ha; 1/247 ha; 1/741 ha.
- (v) Nil.
- (vi) Yes.

### 4. GENERAL:

(i) Normal.
- (ii) N.A.
- (iii) Yield of grain.
- (iv) (a) 1962 - 64; (b) N.A.
- (c) Nil, (v) and (vi) Nil.
- (vii) Error variance are heterogeneous and Treatments x Years interaction is absent for 63 and 64, therefore results of individual years are given below.

### 5. RESULTS:

#### 1. 62 (4)

- (i) 1515 Kg/ha.
- (ii) 1000 Kg/ha.
- (iii) Treatment differences are not significant.
- (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$S_0$</th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>$S_3$</th>
<th>$S_4$</th>
<th>$S_5$</th>
<th>$S_6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1483</td>
<td>1813</td>
<td>1714</td>
<td>757</td>
<td>1674</td>
<td>1647</td>
<td></td>
</tr>
</tbody>
</table>

#### 2. 63 (2)

- (i) 1811 Kg/ha.
- (ii) 622.7 Kg/ha.
- (iii) Treatment differences are not significant.
- (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$S_0$</th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>$S_3$</th>
<th>$S_4$</th>
<th>$S_5$</th>
<th>$S_6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1186</td>
<td>2199</td>
<td>2002</td>
<td>1754</td>
<td>1952</td>
<td>1829</td>
<td>1754</td>
</tr>
</tbody>
</table>

#### 3. 64 (1)

- (i) 1319 Kg/ha.
- (ii) 378.1 Kg/ha.
- (iii) Treatment differences are not significant.
- (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$S_0$</th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>$S_3$</th>
<th>$S_4$</th>
<th>$S_5$</th>
<th>$S_6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>779</td>
<td>1557</td>
<td>1542</td>
<td>1460</td>
<td>1371</td>
<td>1320</td>
<td>1201</td>
</tr>
</tbody>
</table>
2. TREATMENTS:
4 factorial treatments: $T_1 =$ Control (no manure). $T_2 = 28 \text{ Kg/ha. of } N$ as $\text{A/S}$. $T_3 = 28 \text{ Kg/ha. of } N$ as $\text{Dhaincha}$. $T_4 = 28 \text{ Kg/ha. of } N$ as $\text{Dhaincha}$.

3. DESIGN:
   (i) R.B.O. (ii) A. (iii) N.A. (iv) 1/123.6 ha.; 1/74 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—Conlt. (b) No. (c) Results of combined analysis are presented under 5 Results. (v) and (vi) N.A. (vii) Error variances are homogeneous and $\text{Treatments} \times \text{Years}$ interaction is present.

5. RESULTS:
Pooled results:
(i) 1874 Kg/ha. (ii) 621.4 Kg/ha. (based on 3 d.f. made up of $\text{Treatments} \times \text{Years}$ interaction) (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$T_0$</th>
<th>$T_1$</th>
<th>$T_2$</th>
<th>$T_3$</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td>1689</td>
<td>2264</td>
<td>1837</td>
<td>1936</td>
<td>**</td>
<td>1992</td>
<td>193.2</td>
</tr>
<tr>
<td>1964</td>
<td>1090</td>
<td>2098</td>
<td>2061</td>
<td>2016</td>
<td>**</td>
<td>1816</td>
<td>385.2</td>
</tr>
<tr>
<td>Pooled</td>
<td>1389</td>
<td>2181</td>
<td>1949</td>
<td>1976</td>
<td>N.S.</td>
<td>1874</td>
<td>624.4</td>
</tr>
</tbody>
</table>

Crop :- Paddy(Kharif)
Site :- Govt. Agri. College; Ludhiana.
Object :- To study the effect of fertilizers on the yield of Paddy.

Ref :-Pb. 62(170)
Type :- ‘M’.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) sandy loam. (iii) 18.7.62. (iv) (a) 4-5 ploughings. (b) to (c) N.A. (v) Nil. (vi) China-4. (vii) Irrigated. (viii) 2 weeding. (b) N.A. (x) 16.10.62.

2. TREATMENTS:
   All combinations of (1) (2), and (3).  
   (1) 2 levels of $N$ as $\text{C/A/N}$: $N_0 = 0$ and $N_1 = 48$ Kg/ha. 
   (2) 2 levels of $\text{P}_2\text{O}_5$ as Super : $P_0 = 0$ and $P_1 = 22.4$ Kg/ha. 
   (3) 2 levels of $\text{K}_2\text{O}$ as Mur. pot: $K_0 = 0$ $K_1 = 22.4$ Kg/ha. $\text{P}_2\text{O}_5$ and $\text{K}_2\text{O}$ was applied on 17.7.62 while $N$ on 8.8.62 and 24.9.62.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) A. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/791 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Av. yield of grain and straw. (iv) (a) 1962-only (b) No. (c) Nil. (e) to (vii) N.A.

5. RESULTS:
   (i) 2450 Kg/ha. (ii) 3400 Kg/ha. (iii) Main effect of $N$ alone is highly significant. (iv) Av. yield fo grain in Kg/ha.
Crop : Paddy (Kharif).

Site : Govt. Agri. College, Ludhiana

Type : 'M'.

Object : To study the effect of different combinations of N, P and K on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A., (ii) Sandy loam, (iii) 20.76%.Z. (iv) (a) to 6 ploughings. (b) Transplanting. (c) and (d) N.A. (e) 1. (v) and (vi) N.A. (vii) Irrigated. (viii) 3 weeding. (ix) N.A. (x) 29.10.62.

2. TREATMENTS:
   12 manurial treatments: T0 = Control (no manure), T1 = 44.8 Kcri/ha. of N, T2 = T1+22.4 Kg/ha. of P2O5, T3 = T1+44.8 Kg/ha. of P2O5, T4 = T1+89.6 Kg/ha. of P2O5, T5 = T1+22.4 Kg/ha. of K2O, T6 = T1+44.8 Kg/ha. of K2O, T7 = T1+89.6 Kg/ha. of K2O as Mur. Pot., T8 = T1+67.2 Kg/ha. of K2O, T9 = T1+22.4 Kg/ha. of K2O, T10 = T1+44.8 Kg/ha. of K2O and T11 = T1+67.2 Kg/ha. of K2O.

N applied as C/A/N, P2O5 as Super and K2O as Mur.Pot.

3. DESIGN:
   (i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/3/ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) and (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 3463 Kg/ha. (ii) 695.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

   Treatment T0  T1  T2  T3  T4  T5  T6  T7  T8  T9  T10  T11
   Av. yield 1690 2979 3689 3776 3936 4527 3153 3557 3266

   C.D. = 1001.8 Kg/ha.
Crop : Paddy(Kharif) Ref : Pb. 62(269).

Site : Govt. Agri. Collage. Ludhiana Type := 'M'.

Object :—To study the effect of micronutrients on the yield of Paddy.

1. BASAL CONDITIONS :
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 19.7.62. (iv) (a) 5 ploughings. (b) to (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) 19.10.62.

2. TREATMENTS :
9 manural and trace-elements : T₆=Control (No manure), T₁=44'8 Kg/ha. of N+22'4 Kg/ha. of P₂O₅+ 
22'4 Kg/ha. of K₂O. T₃=T₁+Copper sul. 0'4%+Lime 0'2%. T₄=T₁+Manganese sul. 0'6%+Lime 0'4%, 
T₅=T₁+Zine sul. 0'6%+Lime 0'4%, T₆=T₁+Perrous sul. 0'4% +Lime 0'2%. T₇=T₁+Ammon.

molybate 0'1%, T₈=T₁+Borax 0'2% and T₉=T₁+All micronutrients as lime and lime 0'1%. P₂O₅ 
and K₂O applied on 17.7 62 while N applied on 10.8.62 and 24.9.62.

3. DESIGN :
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 1/64 ha. (v) N.A. (vi) Yes.

4. GENERAL :
(i) Normal. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :
(i) 2670 Kg/ha. (ii) 321'8 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain 
in Kg/ha.

Treatment T₆ T₁ T₂ T₃ T₄ T₅ T₆ T₇ T₈

Av. yield 2002 2263 2883 2496 2823 2858 3158 2554 2997

C.D.=414'8 Kg/ha.

Crop : Paddy. (Kharif). Ref : Pb. 60(M.A.E.)

Site := M.A.E. Centre, Nasipur. Type := 'M'.

Object :—To study the effect of different times of N on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 30.5.60/3.8.60. (iv) (a) 6 ploughings with cultivation. (b) 
Transplanting. (c) 18'4 Kg/ha. (d) 23cm. x 23cm. (e) 22'4 Kg/ha. of P₂O₅ as Super drilled on 7.7.60. 
(vi) Jhona-349 (95 days duration) (vii) Irrigated. (viii) One weeding. (ix) N.A. (x) 28.10.60.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 levels of 22'4 Kg/ha. of N : S₁=C/A/N and S₂=A/S.

(2) 7 times of application of N :—T₁=Full dose before planting. T₂=Full dose at planting, T₃=Full dose 
at tillering, T₄=½ before planting+½ at tillering, T₅=½ at planting+½ at tillering, T₆=½ before planting+½ at tillering+½ at flowering and T₇=½ at planting+½ at tillering+½ at flowering.
3. **DESIGN:**
   (i) R.B.D.  
   (ii) (a) 15.  
   (b) N.A.  
   (iii) 3.  
   (iv) (a) 17.41m. x 2.90m.  
   (b) 16.64m. x 2.44m.  
   (v) 38cm. x 23cm.  
   (vi) Yes.

4. **GENERAL:**
   (i) Yes.  
   (ii) Nil.  
   (iii) Yields of grain and straw.  
   (iv) (a) and (b) No.  
   (v) to (vii) Nil.

5. **RESULTS:**
   (i) 2830 Kg/ha.  
   (ii) 356.9 Kg/ha.  
   (iii) Main effect of S and control vs. others are highly significant (iv) Av. yield of grain in Kg/ha.

   Control=2204 Kg/ha

   \[
   \begin{array}{ccccccccc}
   & T_1 & T_2 & T_3 & T_4 & T_5 & T_6 & T_7 & \text{Mean} \\
   S_1 & 2802 & 3120 & 3325 & 2989 & 3130 & 3400 & 2840 & 3088 \\
   S_2 & 2652 & 2599 & 2690 & 2690 & 2784 & 2746 & 2685 & 2663 \\
   \text{Mean} & 2727 & 2858 & 3007 & 2839 & 2961 & 3073 & 2662 & 2875 \\
   \end{array}
   \]

   C.D. for S marginal means=225.6 Kg/ha.
   C.D. for Control vs. others=436.8 Kg/ha.

---

**Crop:** Paddy (Khurij).

**Site:** M.A.E. Centre; Nasipur.

**Ref:** Pb. 62(M.A.E.)

**Type:** 'M'.

**Object:** To study the effect of methods of application of N on Paddy.

1. **BASAL CONDITIONS:**
   (i) (a) to (c) N.A.  
   (ii) N.A.  
   (iii) 1st week of July, 62.  
   (iv) to (ix) S.A.  
   (x) 2nd week of Sept., 62.

2. **TREATMENTS:**
   All combinations of (1) and (2)+Control.
   (1) 3 levels of N: N_1=33.6, N_2=50.4 and N_3=67.2 Kg/ha.
   (2) 4 methods of application: M_1=Broadcasted just before last puddling and incorporated in the soil (sub surface application), M_2=Broadcasted at planting, M_3=Broadcasted half at planting and half about a month after planting and M_4=Application in the form of pellets about three weeks after planting.

3. **DESIGN**
   (i) R.B.D.  
   (ii) (a) 15.  
   (b) N.A.  
   (iii) 3.  
   (iv) 1/185.25 ha.  
   (v) Nil.  
   (vi) Yes.

4. **GENERAL**
   (i) and (ii) N.A.  
   (iii) Yield of grain.  
   (iv) (a) 1962—only (b) No (c) Nil.  
   (v) and (vi) N.A.  
   (vii) Since the no. of replication is not available, hence critical difference is not calculated.

5. **RESULTS**:
   (i) 1479 Kg/ha.  
   (ii) 277.7 Kg/ha.  
   (iii) Main effect of M is highly significant and Control vs. others is significant.  
   (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Rabi)
Site: M.A.E. Centre; Nasirpur.

Ref: Ph. 64, 65 (M.A.E.)
Type: M.

Object: To determine the effect of micronutrient application and to study the relative merits of two methods of application.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.
   (ii) Indus alluvium.
   (iii) to (x) N.A.

2. TREATMENTS:
   Same as in expt. conducted at Khudwani (J. & K.) for the year 63 and 65 and presented on page no. 344.

3. DESIGN:
   (i) R.B.D.
   (ii) (a) 15.
   (b) N.A.
   (iii) N.A.
   (iv) (a) and (b) N.A.
   (v) N.A.
   (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A.
   (iii) Yield of grain.
   (iv) (a) 1964-66
   (b) No.
   (c) Nil.
   (v) Nil.
   (vi) N.A.
   (vii) Nil.

5. RESULTS:

64 (M.A.E.)
   (i) 2695 Kg/ha.
   (ii) and (iii) N.A.
   (iv) Av. yield of grain in Kg/ha.

| Treatment | T₆ | T₇ | T₈ | T₉ | T₁₀ | T₁₁ | T₁₂ | T₁₃ | T₁₄ | Average
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1700</td>
<td>2750</td>
<td>2830</td>
<td>2790</td>
<td>2760</td>
<td>2840</td>
<td>2710</td>
<td>2790</td>
<td>2770</td>
<td>2740</td>
</tr>
</tbody>
</table>

65 (M.A.E.)
   (i) 3346 Kg/ha.
   (ii) and (iii) N.A.
   (iv) Av. yield of grain in Kg/ha.

| Treatment | T₆ | T₇ | T₈ | T₉ | T₁₀ | T₁₁ | T₁₂ | T₁₃ | T₁₄ | Average
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2393</td>
<td>3312</td>
<td>4119</td>
<td>3374</td>
<td>3256</td>
<td>3362</td>
<td>3549</td>
<td>3200</td>
<td>3339</td>
<td>3418</td>
</tr>
<tr>
<td></td>
<td>3345</td>
<td>3305</td>
<td>3156</td>
<td>3424</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Paddy (Kharif).
District: Patiala, Hoshiarpur and Ferozepur.

Object: Type A: To study the response of different levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:
   8 manural treatments:
   O = Control (no manure)
   N = 22.4 Kg/ha. of N
   P = 22.4 Kg/ha. of P2O5
   K = 22.4 Kg/ha. of K2O
   NP = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P2O5
   NK = 22.4 Kg/ha. of N + 22.4 Kg/ha. of K2O
   PK = 22.4 Kg/ha. of P2O5 + 22.4 Kg/ha. of K2O
   NPK = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P2O5 + 22.4 Kg/ha. of K2O

3. DESIGN:
   (i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on Cash crop, 4 on an Oilseed crop and 3 on a legume crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on Type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain (iv) to (vii) N.A.

5. RESULTS:
   Avg. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 (S.F.T.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patiala</td>
<td>5</td>
<td>1890</td>
<td>310</td>
<td>240</td>
<td>230</td>
<td>440</td>
<td>50</td>
<td>10</td>
<td>--10</td>
<td>10</td>
<td>330</td>
</tr>
<tr>
<td>61 (S.F.T.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoshiarpur</td>
<td>4</td>
<td>1160</td>
<td>290</td>
<td>50</td>
<td>0</td>
<td>370</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>--10</td>
<td>320</td>
</tr>
<tr>
<td>Ferozepur</td>
<td>10</td>
<td>1670</td>
<td>460</td>
<td>40</td>
<td>250</td>
<td>490</td>
<td>130</td>
<td>70</td>
<td>--140</td>
<td>130</td>
<td>640</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).
District: Hoshiarpur and Ferozepur.

Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) to (c) N.A. (ii) Tarai and sub-mountain for Hoshiarpur and Alluvial for Ferozepur. (iii) to (x) N.A.
2. TREATMENTS:

7 manurial treatments:
- Control (no manure)
- $N_1 = 22.4$ Kg/ha. of $N$ as A/S
- $N_2 = 44.8$ Kg/ha. of $N$ as A/S
- $N_3 = 22.4$ Kg/ha. of $N$ as Urea
- $N_4 = 44.8$ Kg/ha. of $N$ as A/S/N
- $N_5 = 22.4$ Kg/ha. of $N$ as A/S/N
- $N_6 = 44.8$ Kg/ha. of $N$ as A/S/N

3. DESIGN:

Same as in type A conducted on Paddy crop on page. No. 417.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain (iv) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No of trials</th>
<th>Control yield in Kg/ha.</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$N_3$</th>
<th>$N_4$</th>
<th>$N_5$</th>
<th>$N_6$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferozepur</td>
<td>4</td>
<td>1790</td>
<td>60</td>
<td>130</td>
<td>70</td>
<td>140</td>
<td>50</td>
<td>100</td>
<td>14-0</td>
</tr>
<tr>
<td>Hoshiarpur</td>
<td>7</td>
<td>1100</td>
<td>270</td>
<td>510</td>
<td>200</td>
<td>370</td>
<td>260</td>
<td>510</td>
<td>39-0</td>
</tr>
<tr>
<td>Ferozepur</td>
<td>11</td>
<td>1700</td>
<td>480</td>
<td>720</td>
<td>210</td>
<td>540</td>
<td>220</td>
<td>580</td>
<td>112-0</td>
</tr>
</tbody>
</table>

Crop: Paddy ('Kharif')

Ref: Pb. 62(S.F.T.) for Hoshiarpur

District: Hoshiarpur

Type: 'M'.

Object — Type A: To study the response curves of important cereal, cash, and oil seed crops to $N$ applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:

(i) to (vii) N.A. (viii) Unirrigated, (viii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments,
- Control (no manure)
- $N_7 = 35$ Kg/ha. of $N$
- $N_8 = 70$ Kg/ha. of $N$
- $P_1 = 35$ Kg/ha. of $P_2O_5$
- $P_2 = 35$ Kg/ha. of $P_2O_5$ (at 45 days after planting)
- $P_3 = 70$ Kg/ha. of $P_2O_5$
- $P_4 = 70$ Kg/ha. of $P_2O_5$ (at 70 days after planting)
- $P_5 = 70$ Kg/ha. of $P_2O_5$

$N$ applied as A/S, $P_2O_5$ as Super and $K_2O$ as Mur. pot.
3. DESIGN:
(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A, 11 of type A, and 3 are of type C. The eleven experiments under type A, A, and A, are distributed as 3 on a Kharif cereal, 3 on Rabi cereal, 3 on Cash crop and 2 on Oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A, A, and A experiments 31 villages are randomly selected in each block and in each village 3 experiments one each of type A, A, and A, are laid out. For conducting these experiments the three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (iv) to (vii) N.A.

5. RESULTS:
62 (S.F.T.)

Hoshiarpur

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N</th>
<th>P</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>457</td>
<td>1012</td>
<td>84</td>
<td>526</td>
<td>1000</td>
<td>114</td>
<td>1124</td>
</tr>
</tbody>
</table>

Control yield=1395 Kg/ha., No. of trials=5

Crop: Potato (Kharif)  Ref - Ph. 62 to 65 (S.F.T.) for Ferozepur 62 to 65 (S.F.T.) for Gurdaspur and 63 (S.F.T.) for Hoshiarpur.

District: Ferozepur, Gurdaspur and Hoshiarpur Type: 'M'.

Object: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS: 3. DESIGN:

Some as in type A, conducted on Paddy crop under unirrigated conditions and presented above.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) 1962 to 66 for Ferozepur, 1962 to 66 for Gurdaspur and 63 for Hoshiarpur. (v) to (vii) N.A.

5. RESULTS:
62 (S.F.T.)

Ferozepur

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N</th>
<th>P</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>234</td>
<td>481</td>
<td>230</td>
<td>244</td>
<td>593</td>
<td>760</td>
<td>841</td>
<td>76.1</td>
</tr>
</tbody>
</table>

Control yield=1564 Kg/ha.; No. of trials=8
<table>
<thead>
<tr>
<th>Location</th>
<th>Treatment</th>
<th>Av. response of grain in Kg/ha.</th>
<th>Control yield</th>
<th>No. of trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gurdaspur</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;, N&lt;sub&gt;3&lt;/sub&gt;, P&lt;sub&gt;1&lt;/sub&gt;, N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;, N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;, N&lt;sub&gt;6&lt;/sub&gt;PsK&lt;sub&gt;1&lt;/sub&gt;</td>
<td>420</td>
<td>2475 Kg/ha</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoshiarpur</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;, N&lt;sub&gt;3&lt;/sub&gt;, P&lt;sub&gt;1&lt;/sub&gt;, N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;, N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;, N&lt;sub&gt;6&lt;/sub&gt;PsK&lt;sub&gt;1&lt;/sub&gt;</td>
<td>460</td>
<td>2065 Kg/ha</td>
<td>2</td>
</tr>
</tbody>
</table>
Crop: Paddy (Kharif)  

Ref: Ph. 63(S.F.T) for Hoshiarpur, 63 to 65(S.F.T) for Ferozepur and 62 to 65(S.F.T) for Gurdaspur.

District: Hoshiarpur, Ferozepur and Gurdaspur.  
Type - "M".

Object: Type A3: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASEL CONDITIONS:
(i) to (vi) N.A.  
(vii) Irrigated  
(viii) to (x) N.A.

2. TREATMENTS
8 manurial treatments:
O—Control (no measure)
N1=35 Kg/ha. of N
P1=35 Kg/ha. of P2O5
P2=70 Kg/ha. of P2O5
N2P1=35 Kg/ha. of N + 35 Kg/ha. of P2O5
N2P2=35 Kg/ha. of N + 70 Kg/ha. of P2O5
N2P2K1=70 Kg/ha. of N + 70 Kg/ha. of P2O5 + 70 Kg/ha. of K2O.
N applied as A.S, P2O5 as Super and K2O as Muri. pot.

3. DESIGN:
Same as in type A1, conducted under irrigated conditions on Paddy crop on page No. 419.

4. GENERAL
(i) and (ii) N.A.  
(iii) Yield of grain.  
(iv) (a) 1963 for Hoshiarpur; 1962 to 66 for Ferozepur and 1962 to 66 for Gurdaspur.  
(b) and (c) Nil.  
(v) to (vii) N.A.

5. RESULTS:
Hoshiarpur
63 (S.F.T.)
Treatment  
N1  P1  P2  N1P2  N1P3  N1P2K2  S.E.
Av. response of grain in Kg/ha.  
686  74  —14  667  986  1141  1200  1204
Control yield=1616 Kg/ha.; No. of trials=2

Ferozepur
62 (S.F.T.)
Treatment  
N2  P1  P2  N2P2  N2P3  N2P2K2  S.E.
Av. response of grain in Kg/ha.  
305  176  313  574  604  774  885  673
Control yield=1800 Kg/ha.; No. of trials=9

63 (S.F.T.)
Treatment  
N1  P1  P2  N1P2  N1P3  N1P2K2  S.E.
Av. response of grain in Kg/ha.  
647  231  351  729  993  1288  1361  14B9
Control yield=2198 Kg/ha.; No. of trials=8

64 (S.F.T.)
Treatment  
N2  P1  P2  N2P2  N2P3  N2P2K2  S.E.
Av. response of grain in Kg/ha.  
606  237  434  994  1278  1910  2148  929
Control yield=1599 Kg/ha.; No. of trials=3
Crop : Paddy (Kharif).

Ref : Ph. 62 (S.F.T.) for Hoshiarpur

District : Hoshiarpur.

Type : 'M'.

Object : Type A2 : To study the response curves of cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:

(i) to (vi) N.A. (vii) Un-irrigated. (viii) to (x) N.A.

2. TREATMENTS

Same as in type A2 conducted on Paddy crop under irrigated conditions on page No. 421.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) 1962—only (b) to (c) Nil. (v) to (vii) N.A.

5. RESULTS ;

Hoshiarpur

62 (S.F.T.)

Treatment

\[ N_1 \quad P_1 \quad P_2 \quad N_1P_1 \quad N_2P_2 \quad N_1P_2 \quad N_1P_3 K_4 \quad S.E. \]

Av. response of grain in Kg/ha.

471 53 431 629 912 1010 109'2

Control yield=1422 Kg/ha.; No. of trials=5

---

Gurdaspur

62 (S.F.T.)

Treatment

\[ N_1 \quad P_1 \quad P_2 \quad N_1P_1 \quad N_2P_2 \quad N_2P_3 \quad N_1P_2 \quad N_1P_3 K_4 \quad S.E. \]

Av. response of grain in Kg/ha.

425 165 208 576 642 818 861 81'3

Control yield=1690 Kg/ha., No. of trials=9

63 (S.F.T.)

Treatment

\[ N_1 \quad P_1 \quad P_2 \quad N_1P_1 \quad N_2P_2 \quad N_2P_3 \quad N_1P_2 \quad N_1P_3 K_4 \quad S.E. \]

Av. response of grain in Kg/ha.

410 72 135 541 575 975 963 60'3

Control yield=1760 Kg/ha., No. of trials=13

64 (S.F.T.)

Treatment

\[ N_1 \quad P_1 \quad P_2 \quad N_1P_1 \quad N_2P_2 \quad N_2P_3 \quad N_1P_2 \quad N_1P_3 K_4 \quad S.E. \]

Av. response of grain in Kg/ha.

325 135 211 541 511 717 708 96'6

Control yield=1615 Kg/ha., No. of trials=11

65 (S.F.T.)

Treatment

\[ N_1 \quad P_1 \quad P_2 \quad N_1P_1 \quad N_2P_2 \quad N_2P_3 \quad N_1P_2 \quad N_1P_3 K_4 \quad S.E. \]

Av. response of grain in Kg/ha.

385 73 195 835 693 991 1031 143'9

Control yield=1556 Kg/ha., No. of trials=8

---
Crop: Paddy (Kharif)
Ref.: Pb. 62 to 65(S.F.T.) for Ferozepur and 62 to 65(S.F.T.) for Gurdaspur.
District: Ferozepur and Gurdaspur.

Object: Type A: To study the response curves of important cereal, cash and oilseed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
Same as in type A conducted on Paddy crop under un-irrigated condition on page No. 424.

3. DESIGN:
Same as in type A conducted on Paddy crop under irrigated condition on page No. 419.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 62(S.F.T.) to 66(S.F.T.), for Ferozepur, 62(S.F.T.) to 66(S.F.T.) for Gurdaspur. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

Ferozepur
62 (S.F.T.)
Treatment | N1 K1 K2 N1K2 N2K2 N3K2 N1P1K2 | S.E.
---|---|---|---|---|---|---|---|
Av. response of grain in Kg/ha.
Control yield=1959 Kg/ha.; No. of trials=8

63 (S.F.T.)
Treatment | N1 K1 K2 | N1K2 | N2K2 | N3K2 | N1P1K2 | S.E.
---|---|---|---|---|---|---|
Av. response of grain in Kg/ha.
Control yield =2549 Kg/ha.; No. of trials=7

64 (S.F.T.)
Treatment | N1 K1 K2 | N1K2 | N2K2 | N3K2 | N1P1K2 | S.E.
---|---|---|---|---|---|---|
Av. response of grain in Kg/ha.
Control yield=1449 Kg/ha.; No. of trials=3

65 (S.F.T.)
Treatment | N1 K1 K2 | N1K2 | N2K2 | N3K2 | N1P1K2 | S.E.
---|---|---|---|---|---|---|
Av. response of grain in Kg/ha.
Control yield=2037 Kg/ha.; No. of trials=8

Gurdaspur
62 (S. F. T.)
Treatment | N1 K1 K2 | N1K2 | N2K2 | N3K2 | N1P1K2 | S.E.
---|---|---|---|---|---|---|
Av. response of grain in Kg/ha.
Control yield=1728 Kg/ha.; No. of trials=9
Crop: Paddy (Kharif)  
District: Hoshiarpur.

Ref: Ph. 62(S.F.T), Type: 'M'.

Object: Type A1: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS:**
   (i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. **TREATMENTS:**
   8 manurial treatments:
   - O=Control (no manure).
   - N1=35 Kg/ha. of N
   - K1=35 Kg/ha. of K2O
   - K2=70 Kg/ha. of K2O
   - N1K1=35 Kg/ha. of N+35 Kg/ha. of K2O
   - N1K2=70 Kg/ha. of N+70 Kg/ha. of K2O
   - N1P1K1=35 Kg/ha. of N+35 Kg/ha. of P2O5+35 Kg/ha. of K2O
   - N applied as A/S, P2O5 as Super and K2O as Mur. Pot.

3. **DESIGN:**
   Same as in type A3 conducted on Paddy crop under irrigated condition on page No. 419.

4. **GENERAL:**
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) and (c) Nil. (v) to (vii) N.A.

5. **RESULTS:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N, K,</th>
<th>Av. response of grain in Kg/ha.</th>
<th>Control yield=1733 Kg/ha.</th>
<th>No. of trials=8</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1K1K2N1P1K1</td>
<td>S.E.</td>
<td>322 -75 26 413 337 648 490</td>
<td>58.9</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N, K,</th>
<th>Av. response of grain in Kg/ha.</th>
<th>Control yield=1460 Kg/ha.</th>
<th>No. of trials=12</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1K1K2N1P1K1</td>
<td>S.E.</td>
<td>374 77 144 444 516 837 682</td>
<td>35.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Treatment</th>
<th>N, K,</th>
<th>Av. response of grain in Kg/ha.</th>
<th>Control yield=1460 Kg/ha.</th>
<th>No. of trials=2</th>
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<td>N1K1K2N1P1K1</td>
<td>S.E.</td>
<td>390 20 80 440 600 780</td>
<td>110.6</td>
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62(S.F.T.)
Hoshiarpur

<table>
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<tr>
<th>Treatment</th>
<th>N, K,</th>
<th>Av. response of grain in Kg/ha.</th>
<th>Control yield=1395 Kg/ha.</th>
<th>No. of trials=3</th>
</tr>
</thead>
<tbody>
<tr>
<td>N, K,</td>
<td>Av. response of grain in Kg/ha.</td>
<td>Control yield=1395 Kg/ha.</td>
<td>No. of trials=3</td>
<td></td>
</tr>
<tr>
<td>N1K1K2N1P1K1</td>
<td>S.E.</td>
<td>524 -22 48 541 521 1137 652</td>
<td>55.5</td>
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Crop: Paddy (Kharif)  
Site: Reg. Rice Res. Sta., Kharapunam

Object: To study the effect of N on different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 1st week of July.  (iv) (a) 2 ploughings and 2 puddlings.  (b) Transplanting.  (c) 18 Kg/ha.  (d) 23cm x 23cm.  (e) 1.  (v) N.A.  (vi) As per treatments.  (vii) Irrigated.  (viii) 2 weeding.  (x) N.A.  (ix) 10.10.64.

2. TREATMENTS:
   Main-plot treatments:
   2 varieties: V₁=Jhansa 349 and V₂=Bazmati 370.

   Sub-plot treatments:
   5 levels of N as A/S : N₀=0, N₁=22.4, N₂=44.8, N₃=67.2 and N₄=89.7 Kg/ha.

3. DESIGN:
   (i) Split-plot  (ii) (a) 2 main-plot/replication, 5 sub-plot/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) and (b) N.A.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1964 only.  (b) N.A.  (c) Nil.  (v) to (vii) N.A.

5. RESULTS:
   (i) 2931 Kg/ha.  (ii) (a) 960.7 Kg/ha.  (b) 521.9 Kg/ha.  (iii) Main effect of N alone is highly significant.
   (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
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<td>2662</td>
<td>3104</td>
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<td>3535</td>
<td>2931</td>
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</table>

C.D. for N marginal means=338.5 Kg/ha.

---

Crop: Paddy (Kharif)  
Site: Agri Res. Sta., Gurdaspur

Object: To study the effect of puddling on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Loamy sand.  (iii) 13.7.63.  (iv) (a) As per treatments.  (b) to (e) N.A.  (v) and (vi) N.A.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 7.10.63.

2. TREATMENTS:
   2 cultural practices: T₀=No puddling and T₁=2 ploughings and planting in water.
3. DESIGN:
   (i) R.B.D. (ii) (a) 2 (b) N.A. (iii) 10. (iv) (a) N.A. (b) 1/59.3 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) N.A. (b) No. (c) Nil. (v) N.A. (vi) N.A. (vii) N.A.

5. RESULTS:
   (i) 1912 Kg/ha. (ii) 174.5 Kg/ha. (iii) Treatment difference is highly significant. (iv) Av. yield of grain in Kg/ha.

   Treatment | T₁   | T₂   |
   Av. yield | 1550 | 2273 |
   C.D. = 176.6 Kg/ha.

   Crop : Paddy (Kharif)  
   Site : Reg. Rice Res. Sta., Kapurthala.

   Ref. Pb. 62(6), Type : 'C'.

Object :—To study the effect of different depths of transplanting on the yield of Paddy.

1. BASAL CONDITIONS
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 24.7.62 planting (c) 18 Kg/ha. (d) 23 cm x 23 cm. (e) 1. (f) N.A. (g) Jhana-349. (h) Irrigated. (i) Weeding. (ix) N.A. (x) 2nd week of Nov., 62

2. TREATMENTS:
   4 depths of transplanting :—D₁ = 1.3, D₂ = 3.8, D₃ = 6.4 and D₄ = 8.9 cm.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4 (b) N.A. (iii) 6. (iv) (a) 8 (b) N.A. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 1770 Kg/ha. (ii) 387.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

   Treatment | D₁ | D₂ | D₃ | D₄ |
   Av. yield | 1774 | 1618 | 1774 | 1914

   Crop : Paddy (Kharif)  
   Site : Reg. Rice Res. Sta., Kapurthala.

   Ref. Pb. 62(7).63(5)  
   Type : 'C'.

Object :—To study the effect of taking on the yield of Paddy.
1. BASEL CONDITIONS:
   (i) (a) to (c) N.A.  (iv) Clay loam.  (iii) Seeds planted 4 weeks earlier transplanting on 24.7.62, 1st week of July.
   (v) (a) 2 ploughings, 2 puddlings.  (b) Transplanting.  (c) 18 Kg/ha.  (d) 23cm x 23cm.  (e) I.  (v) N.A.

2. TREATMENTS
   
   T0 = Control (No earthing up), T1 = Earthing up 15 days after transplanting, T2 = 30 days after transplanting.
   
3. DESIGN:
   (i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 6, 4.  (iv) (a) and (b) 1/988 ha.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) 1962-63.  (b) No.  (c) Nil.  (v) and (vi) N.A.  (vii) Error variances are heterogeneous and Treatments x Years interaction is absent, therefore individual years results are presented under 5. Results.

5. RESULTS:

5.1
   (i) 2595 Kg/ha.  (ii) 1561.7 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.
   
   Treatment | T0 | T1 | T2 | T3
   Av. yield  | 2422 | 2155 | 2965 | 2837

5.2
   (i) 657 Kg/ha.  (ii) 102.8 Kg/ha.  (iii) Treatment differences are highly significant  (iv) Av. yield of grain in Kg/ha.
   
   Treatment | T0 | T1 | T2 | T3
   Av. yield  | 514 | 682 | 603 | 830
   C.D. = 164.6 Kg/ha.

---

Crop — Paddy (Kharif).
Ref — Ph. 62(8), 63(6)
Type — ‘C’.
Object — To study the effect of earthing up on the yield of Paddy.

1. BASEL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) N.A./24.7.62 ; 1st week of July.  (iv) (a) 2 ploughings and puddlings.
   (b) Transplanting.  (c) 18 Kg/ha.  (d) 23cm x 23cm.  (e) I.  (f) N.A.; Nil.  (v) Jhona — 349.  (vi) Irrigated.
   (vii) 2 weedicings.  (ix) N.A.  (x) 2nd week of Nov.; 1st week of Oct.

2. TREATMENTS:

Earthing up treatments : T0= Control (no earthing up).  T1= 15 days after transplanting, T2= 30 days after transplanting.
   T3 = 45 days after transplanting.  T4 = 15 days after transplanting and again 30 days after transplanting.  T5 = 15 days and again 45 days after transplanting.
3. DESIGN:
   (i) R.B.D.  (ii) (a) 7.  (b) N.A.  (iii) 4.  (iv) (a) and (b) 1/88 ha.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1962-63  (b) No.  (v) N.A.  (vi) Nil.  (vii) Error variances are heterogeneous and Treatments X Years interaction is present.

5. RESULTS:
   Pooled results
   (i) 2522 Kg/ha.  (ii) 530.4 Kg/ha. (based on 6 d.f. made up of Treatments X Years interaction).  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Year</th>
<th>T5</th>
<th>T4</th>
<th>T3</th>
<th>T2</th>
<th>T1</th>
<th>T0</th>
<th>Sign.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<td>2522</td>
<td>530.4</td>
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</table>

Crop : Paddy (Kharif).
Site : Reg. Rice Res. Sta., Kapurthala.
Object: -To study the effect of different dates of transplanting on the yield of different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) NA  (ii) Clay loam  (iii) As per treatments (iv) (a) 2 ploughings, 2 puddlings  (b) Transplanting  (c) 18 Kg/ha.  (d) 23cm.X23cm.  (e) I.  (v) N.A.  (vi) As per treatments  (vii) Irrigated  (viii) 2 weedications  (ix) N.A.  (x) 30.9.62 to 28.10.62

2. TREATMENTS:
   Main-plot treatments :

   Sub-plot treatments : - 4 varieties : V1=Jhona-349, V2=Basmati-370, V3=Jhona-20 and V4=Hybrid-27

3. DESIGN:
   (i) Split-plot  (ii) (a) 8 main-plots/replication, 4 sub-plots/main-plot.  (b) N.A.  (iii) 4  (iv) (a) and (b) N.A.  (v) Nil  (vi) Yes.

4. GENERAL:
   (i) Normal  (ii) N.A.  (iii) Yield of grain  (iv) (a) 1962 to 1963 (Treatments modified every year)  (b) No  (c) Nil  (v) to (vii) N.A.

5. RESULTS:
   (i) 1814 kg/ha.  (ii) (a) 628.6 Kg/ha. (b) 593.4 Kg/ha.  (iii) All the effects are significant  (iv) Av. yield of grain in Kg/ha.
Crop :- Paddy(Kharif)

Site :- Reg. Rice, Res. Stn., Kapurthala

Object :- To study the effect of different dates of transplanting on the yield of different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) As per treatments. (iv) (a) 2 ploughings and 2 puddings. (b) Transplanting. (c) 18 Kg/ha. (d) 23 cm. x 23 cm. (e) 1 (v) N.A. (vi) As per treatments (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 30.9.63 to 23.10.63.

2. TREATMENTS:
Main-plot treatments :- 7 dates of transplanting:-- D₁=10.5.63, D₂=25.5.63, D₃=10.6.63, D₄=25.6.63, D₅=10.7.63, D₆=25.7.63, and D₇=10.8.63.
Sub-plot treatments :- 4 varieties:-- V₁=Jhora-20 V₂=Basmati-370, V₃=Hybrid-27, and V₄=Jhora-349.

3. DESIGN:
(i) Split-plot. (ii) (a) 7 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) N.A. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 to 64 (Treatments modified for each year). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 852 Kg/ha. (ii) (a) 854.0 Kg/ha. (b) 332.1 Kg/ha. (iii) Main effect of V and interaction VxD are highly significant, (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V₁</th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>D₄</th>
<th>D₅</th>
<th>D₆</th>
<th>D₇</th>
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<td>949</td>
<td>593</td>
<td>1542</td>
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</tbody>
</table>

Mean 1616 1853 2283 3010 2741 1542 949 519 1814

C.D. for D marginal means=462.2 Kg/ha.
C.D. for V marginal means=281.2 Kg/ha.
C.D. for D means at the same level of V=829.2 Kg/ha.
C.D. for V means at the same level of D=793.1 Kg/ha.

Ref. :- Ph. 63(3).

Type :- 'CV'.

Crop :- Paddy

Site :- Reg. Rice, Res. Stn., Kapurthala

Object :- To study the effect of different dates of transplanting on the yield of different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) As per treatments. (iv) (a) 2 ploughings and 2 puddings. (b) Transplanting. (c) 18 Kg/ha. (d) 23 cm. x 23 cm. (e) 1 (v) N.A. (vi) As per treatments (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 30.9.63 to 23.10.63.

2. TREATMENTS:
Main-plot treatments :- 7 dates of transplanting:-- D₁=10.5.63, D₂=25.5.63, D₃=10.6.63, D₄=25.6.63, D₅=10.7.63, D₆=25.7.63, and D₇=10.8.63.
Sub-plot treatments :- 4 varieties:-- V₁=Jhora-20 V₂=Basmati-370, V₃=Hybrid-27, and V₄=Jhora-349.

3. DESIGN:
(i) Split-plot. (ii) (a) 7 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) N.A. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 to 64 (Treatments modified for each year). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 852 Kg/ha. (ii) (a) 854.0 Kg/ha. (b) 332.1 Kg/ha. (iii) Main effect of V and interaction VxD are highly significant, (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Kharif)
Site: Reg. Rice Res. Sta., Kaparthala
Object: To study the effect of different dates of transplanting on the yield of different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) 2 ploughings and 2 puddlings. (b) Transplanting. (c) 18 Kg/ha. (d) 23 cm. x 23 cm. (e) 1. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedicides. (ix) N.A. (x) 30th Sept. to last week of Oct.

2. TREATMENTS:
   Main-plot treatments:
   6 transplanting dates: D, D,-25.5, D,-64, D,-10.6.64, D,-25.7.64 and D,-10.8.64.
   Sub-plot treatments:

3. DESIGN:
   (i) Split-plot. (ii) (a) 6 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) N.A. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-64 (Treatments are modified every year). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 1616 Kg/ha. (ii) (a) 474·4 Kg/ha. (b) 400·3 Kg/ha. (iii) All the effects are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>D,</th>
<th>D,</th>
<th>D,</th>
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<td>1399</td>
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</table>

C.D. for D marginal means=357·4 Kg/ha.
C.D. for V marginal means=233·0 Kg/ha.
C.D. for D means at the same level of V=607·1 Kg/ha.
C.D. for V means at the same level of D=567·2 Kg/ha.

Crop: Paddy (Kharif)
Site: Reg. Rice Res. Sta., Kaparthala
Object: To study the effect of different dates of transplanting, varieties & spacings on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) N.A. (b) Transplanting. (c) N.A. (d) As per treatments. (e) N.A. (f) N.A. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) 4·10.64 for 5·11.64.
2. TREATMENTS:

Main-plot treatments:
3 dates of transplanting: $D_1=20.6.64$, $D_2=5.7.64$ and $D_3=20.7.64$.

Sub-plot treatments:
All combinations of (1) and (2)
3 varieties: $V_1=Jhona-349$, $V_2=Jhona-20$, and $V_3=Basmati-370$.
3 spacings: $S_1=15$ cm. x 15 cm., $S_2=23$ cm. x 15 cm., and $S_3=23$ cm. x 23 cm.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) N.A. (v) Nil. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 2624 Kg/ha. (ii) (a) 1178.7 Kg/ha. (b) 563.5 Kg/ha. (iii) Main effect of Salone is significant.
(iv) Av. yield of grain in Kg/ha.

<table>
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<th>$S_2$</th>
<th>$S_3$</th>
<th>$D_1$</th>
<th>$D_2$</th>
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C.D. for 5 marginal means—2656 Kg/ha.

Crop: Paddy (Kharij).
Object: To study the effect of deep cultivation and fertilizer placement on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Maize (fodder). (c) N.A. (ii) Heavy loam. (iii) 29.7.62. (iv) (a) 5 ploughings (b) to (c) N.A. (v) N.A. (vi) Jhona-349. (vii) Irrigated. (viii) 4 weeding. (ix) N.A. (x) 29.10.62.

2. TREATMENTS:
Main-plot treatments:
3 deep cultivations: $D_1=15$ cm. deep, $D_2=30$ cm. deep and $D_3=46$ cm. deep.

Sub-plot treatments:
5 fertilizer placements: $P_0=Control$ (no fertilizer), $P_1=$Surface application of 56 Kg/ha. of N as C/A/N+28 kg/ha. of P,O, as Super, $P_2=$Surface application of F.Y.M.+28 Kg/ha. of K,O as Mur. pot., $P_3=Deep$ application of 56 Kg/ha. of N as C/A/N+28 Kg/ha. of P,O, as Super, $P_4=Deep$ application of F.Y.M.+28 Kg/ha. of K,O as Mur. pot.
3. DESIGN:
(i) Split-plot. (ii) 3 main-plots/replication, 5 sub-plots/main-plot. (a) N.A. (b) 1.37 m x 0.3 m. (c) N.A. (v) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) No. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1376 Kg/ha. (ii) (a) 235·6 Kg/ha., (b) 149·4 Kg/ha., (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>P3</th>
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C.D. for P marginal means=136·9 Kg/ha.

Crop: Paddy (Kharij).

Ref: Ph. 62(191)


Type: 'CM'.

Object: To find out the manurial requirements of Paddy.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Heavy loam. (iii) 10,7,62. (iv) (a) 5 ploughings. (b) to (e) N.A. (v) 56 Kg/ha. of N+28 Kg/ha. of P2O5. (vi) Zona-349. (vii) Irrigated. (viii) and (ix) N.A. (x) 23,10,62.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1) and (2)
(1) 2 cultural treatments:— T0=Untreated seed and T1=Seed treated with Agrosan O. N.
(2) 2 types of seeds:— H1=Healthy and H2=Diseased.
Sub-plot treatments:
4 levels of fertilizer: S1=Control, S2=56 Kg/ha. of K2O as Mur. pot. at transplanting, S3=K2Mo4 5% spray, and S4=56 Kg/ha. of K2O as Mur. pot. at disease appearance.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/30 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 2489 Kg/ha. (ii) (a) 444·2 Kg/ha. (b) 193·7 Kg/ha. (iii) Main effect of H alone is significant.
(iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Kharif).

Object: To study the effect of different levels of N and different spacings on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.
   (ii) Clay loam.
   (iii) Last week of July, 64.
   (iv) (a) 2 ploughings and 2 puddlings.
   (b) Transplanting. (c) 18 Kg/ha.
   (d) As per treatments. (e) 1.
   (f) N.A.  (g) Hybrid-27.
   (h) Irrigated.
   (i) 2 weedings. (j) N.A.  (k) 23, 4w, 64.

2. TREATMENTS:
   Main-plot treatments:
   4 levels of N as A/S: - N₁ = 0, N₂ = 44.8, N₃ = 67.2, N₄ = 89.6 Kg/ha.

   Sub-plot treatments:
   3 spacings: - S₁ = 15 cm. x 15 cm., S₂ = 23 cm. x 15 cm. and S₃ = 23 cm. x 23 cm.

3. DESIGN:
   (i) Split-plot.
   (ii) (a) 4 main-plots/replication. 3 sub-plots/main-plot. (b) N.A.  (iii) 4.
   (iv) (a) and (b) 1/494 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal
   (ii) N.A.
   (iii) Yield of grain. (iv) (a) 1964-only. (b) No. (c) Nil. (v) N.A.
   (vi) and (vii) N.A.

5. RESULTS:
   (i) 2020 Kg/ha. (ii) (a) 691-9 Kg/ha. (b) 365-7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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Crop: Wheat. (Rabi)  
Ref: Pb. 60(129).

Site: Bassi Jana. (Hoshiarpur)  
Type: 'M'.

Object: To study the effect of N, P and K applied individually and in combination on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (a) (i) N.A. (b) Fallow. (c) Nil. (ii) Sandy. (iii) N.A. (iv) C-561. (v) (a) N.A. (b) Kera. (c) to (e) N.A. (vi) 19.11.60. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) 20.4.61.

2. TREATMENTS:
   All combinations of (1), (2) and (3).
   (1) 2 levels of N as C/A/N: \( \text{N}_4 = 0 \) and \( \text{N}_5 = 44'8 \text{ Kg/ha} \).
   (2) 2 levels of \( \text{P}_2 \)O as Super: \( \text{P}_4 = 0 \) and \( \text{P}_5 = 22'4 \text{ Kg/ha} \).
   (3) 2 levels of \( \text{K}_2 \)O as Mop. Pot.: \( \text{K}_4 = 0 \) and \( \text{K}_5 = 22'4 \text{ Kg/ha} \).
   All fertilizers drilled below the seed.

3. DESIGN:
   (i) 
   (ii) Fert. in R. B. D.; 8; 4. (iii) (a) N.A. (b) 1/198 ha. (iv) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-only. (b) No. (c) Nil. (v) Stage Khurd and Phullanwal. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2291 Kgl/ha. (ii) 58'8 Kgl/ha. (iii) Main effects of N and P are highly significant (iv) Av. yield of grain in Kgl/ha.

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C.D. for N or P marginal means = 427'7 Kgl/ha.

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Crop: Wheat. (Rabi)  
Ref: Pb. 60(96).

Site: Govt. Agri. Res. Stn., Gurdaspur  
Type: 'M'.

Object: To study the residual effect of N and \( \text{P}_2 \)O on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Maize. (c) As per treatments. (ii) Sandy loam. (iii) 29.11.60. (iv) and (v) N.A. (vi) C-273. (vii) Irrigated. (viii) and (ix) N.A. (x) 2.5.61.

2. TREATMENTS:
   All combinations of (1) and (2):—
(1) 3 levels of N as C/A/N: \( N_1 = 0 \), \( N_2 = 67.2 \) and \( N_3 = 134.4 \) Kg/ha.
(2) 3 levels of \( P_2O_5 \) as Super: \( P_0 = 0 \), \( P_1 = 3P_6 \), \( P_2 = 67.2 \) Kg/ha.
Only residual effects are studied. No fertilizer is given to Wheat.

3. DESIGN:
(i) R. B. D. (ii) 3. (b) N.A. (iii) 4. (b) (a) 1/198 ha. (b) 1/207 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-only. (b) No. (c) Nil. (v) N.A.
(vi) and (vii) Nil.

5. RESULTS:
(i) 1996 Kg/ha. (ii) 211.0 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<td>1678</td>
<td>1955</td>
<td>2527</td>
<td>1996</td>
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</table>

C.D. for N marginal means = 178.1 Kg/ha.

Crop = Wheat (Rabi)
Site = Govt. Agri. Sta., Gurdaspur

Ref: Pb. 60(24), 61(63).
Type: 'M'.

Object: --To study the effect of different sources of N on the yield of Wheat Crop.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Paddy–Jowar (fodder). (c) N.A. (ii) Sandy loam. (iii) 15.11.60; 28.11.61. (iv) (a) and (b) N.A. (c) N.A.; 85 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) C-271; C-286. (vii) Irrigated. (viii) and (ix) N.A. (x) 27.4.61; 27.4.62.

2. TREATMENTS:
10 sources of N at 45 Kg/ha.: \( S_0 \)=Control (no manure), \( S_1 = A/S \), \( S_2 = A/S/N \), \( S_3 = A/C \), \( S_4 = A/N \), \( S_5 = Urea \), \( S_6 = D/N \), \( S_7 = C/A/N \), \( S_8 = Ammon. Phos. \) and \( S_9 = \) Liquid Ammonia.

3. DESIGN:
(i) R. B. D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/173 ha; 1/148 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960–61. (b) N.A. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x Years interaction is present.

5. RESULTS:
Pooled results: --
(i) 1285 Kg/ha. (ii) 257 Kg/ha. (based on 9 d.f. made up of Treatments x Years Interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.
Treatment S₁ S₂ S₃ S₄ S₅ S₆ S₇ S₈ S₉ Av. yield 624 1368 1386 1422 1054 1179 1626 1483 1623 1086

C.D. = 299.9 Kg/ha.

Individual results

Treatment S₁ S₂ S₃ S₄ S₅ S₆ S₇ S₈ S₉ Sig. G.M. S.E./Plot

Year 1960 928 1846 1742 1111 1555 2025 1866 2245 1535 ** 1712 88.6
1961 319 390 1034 552 845 1227 1101 1001 63 864 196.5
Pooled 624 1368 1386 1422 1054 1179 1626 1483 1623 1086 ** 1283 265.3

Crop: Wheat (Robi).

Ref: Ph. 60(122), 61(94), 63(211), 64(206).

Sit: Agri. Res. Stn., Gurdaspur

Type: "M".

Object: To study the effect of N, P and K on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) (a) N.A. for 60; Wheat—Fallow—Wheat for others. (b) Nil. (iii) 10.11.60; 10.11.61; 17.11.63; 21.11.64. (iv) (a) and (b) N.A. (c) 85 Kg/ha. (d) and (e) N.A. (vi) C-285; C-286; C-273; C-273. (vii) Unirrigated (viii) and (ix) N.A.

2. TREATMENTS
   7 manurai treatments: M₃=Control (no fertilizer), M₁=33.6 Kg/ha. N+33.6 Kg/ha. P₂₀₀, M₂=44.8 Kg/ha. N+33.6 Kg/ha. P₂₀₀, M₄=67.1 Kg/ha. N+33.6 Kg/ha. P₂₀₀, M₅=M₃+22.4 Kg/ha. K₂₀₀, M₆=M₄+22.4 Kg/ha. K₂₀₀, M₇=M₅+K₂₀₀ as Muri, pot. N applied as CAN, P₂₀₀ as Super and K₂₀₀ as Muri, pot.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 3 for 63; 4 for others. (iv) (a) 1/198 ha. for 61; N.A. for others (b) 1/207 ha. for 60, 1/198 ha. for 61, 62; N.A. for 63 (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—64 (1962 N.A.) (b) No. (c) Results of combined analysis are presented under 5. Results, (v) and (vi) Nil. (vii) Error variances are heterogeneous and Tests X Years interaction is present.

5. RESULTS:
   Pooled results
   (i) 1331Kg/ha. (ii) 366.3 Kg/ha. (based on 18 d.f. made up of Treatments X Years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.
   Treatment M₁ M₂ M₃ M₄ M₅ M₆ M₇ M₈ M₉ Av. yield 767 1336 1394 1541 1321 1388 1502

   Individual results

   Treatment M₁ M₂ M₃ M₄ M₅ M₆ M₇ M₈ M₉ Sig. G.M. S.E./Plot

   Years 1960 843 1584 1679 1724 1533 1648 1822 ** 1548 131.7
1961 687 870 840 756 741 771 677 N.S. 7652 302.5
1963 637 1211 1318 1451 1232 1314 1438 ** 1272 262.6
1964 870 1464 1720 2210 1740 1799 2056 ** 1720 205.6
Pooled 767 1336 1394 1541 1321 1388 1502 ** 1321 369.3
Crop: Wheat (Rabi).
Ref: Ph. 61(85).
Type: ‘M’.

Object:—To study the effect of different times of application of C/A/N on the yield of Wheat crop.

1. BASAL CONDITIONS
   (i) (a) to (c) N.A. (ii) Sandy Loam. (iii) 28.11.61. (iv) (a) N.A. (b) Kurn. (c) 92Kg/ha. (d) and (e) N.A. (v) N.A. (vi) C-281. (vii) Irrigated. (viii) and (ix) N.A. (x) 25 4.62.

2. TREATMENTS:
   4 times and methods of application of C/A/N:—T1=At sowing by drilling, T2=At sowing by broadcasting, T3=One month after sowing and T4=one month after sowing+1 at sowing by drilling.

3. DESIGN:
   (i) R B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/99 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2727Kg/ha. (ii) 4571Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.
   Treatment
   T1  T2  T3  T4
   Av. yield 3209 2551 2379 2752
   C.D. = 562.7Kg/ha.

Crop: Wheat (Rabi).
Ref: Ph. 60(110).
Site:—Govt. Agri. Sta., Gurdaspur.
Type: ‘M’.

Object:—To study the effect of N, P and K. applied individually and in combination on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Fallow. (c) N.A. (ii) Loamy. (iii) 9.12.60. (iv) (a) to (e) N.A. (v) N.A. (vi) 286 (vii) Irrigated (viii) and (ix) N.A. (x) 25 4.61.

2. TREATMENTS:
   All combinations of (1), (2) and (3).
   (1) 3 levels of N as C/A/N ➔ No control (no manure). N1=44.8 and N4=89.6Kg/ha.
   (2) 3 levels of P2O5 as Super ➔—Control (no manure), P1=44.8 and P4=89.6Kg/ha.
   (3) 2 levels of K2O as Mur. pot.: K1=22.4 and K4=44.8Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/299 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.
5. RESULTS:

(i) 2601 Kg/ha. (ii) 3017 Kg/ha. (iii) Main effects of N and P are highly significant and that of K is significant while interaction P × K is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N or P marginal means = 175.9 Kg/ha.
C.D. for K marginal means = 142.1 Kg/ha.
C.D. for the body of P × K table = 246.8 Kg/ha.

Crop: Wheat (Rabi).
Site : Reg. Wheat Res. Sub-Stn., Gurdaspur.
Object:—To study the effect of N, P and K. applied individually and in combination on the yield of Wheat.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 2.12, 61. (iv) (a) 6-8 ploughings, 6-8 plankings. (b) Behind the plough. (c) to (e) N.A. (v) N.A. (vi) C-273. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 30.4, 62.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N. as C/A/N := N_1 = 0, N_2 = 28 and N_3 = 56 Kg/ha.
(2) 3 levels of P_2O_5 as Super := P_1 = 0, P_2 = 28 and P_3 = 56 Kg/ha.
(3) 3 levels of K_2O as Mur. Pot. := K_1 = 0, K_2 = 28 and K_3 = 56 Kg/ha.
All fertilizers applied before sowing.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/444ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-64 (Design modified in 62) (b) No. (c) Nil, (v) to (vii) N.A.

5. RESULTS
(i) 887 Kg/ha. (ii) 3619 Kg/ha. (iii) Main effects of N and P are significant. (iv) Av. yield of grain in Kg/ha.
Crop : Wheat (Rabi).
Site : Govt. Agri. Stn.; Gurdaspur.

Object: To study the effect of fertilizers on the yield of Wheat.

1. BASAL CONDITIONS
   (i) (a) N.A. (b) Fallow. (c) N.A. (ii) Sandy loam. (iii) 6.12.62. (iv) (a) 5 ploughings and 3 subagas.
   (b) to (e) N.A. (v) 33.6Kg/ha. of P₂O₅. (vi) C-286. (vii) Unirrigated. (viii) 2 ploughings and 2 weedings.
   (ix) N.A. (x) 20.4.63.

2. TREATMENTS:
   All Combinations of (1) and (2) + one control (no manure).
   (1) 3 levels of N as C/A/N: N₁=33.6, N₂=44.8 and N₃=67.2 Kg/ha.
   (2) 2 levels of K₂O as Mur. Pot := K₀=0, and K₁=22.4Kg/ha.
   Fertilizers were applied before sowing.

3 DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/198ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain & straw. (iv) (a) 1962-only (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 1089Kg/ha. (ii) 83.0Kg/ha. (iii) Main effect of N and extra Vs. others are highly significant. (iv) Av. yield of grain in Kg/ha.

   Control = 455Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
<th>Mean</th>
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<tr>
<td>Mean</td>
<td>1075</td>
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</table>

C.D. for N marginal means = 80.1Kg/ha.
C.D. for extra vs. others = 322.6Kg/ha.
Crop: Wheat. (Rabi.)

Site: Govt. Agri. Stn., Gurdaspur.

Object: To study the effect of sprayings of micronutrients on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 6.12.62.  (iv) (a) 5 ploughings. (b) to (e) N.A.  (v) 67.2 Kg/ha. of N+31.6 Kg/ha. of P₂O₅+35.6 Kg/ha. of K₂O at the time of sowing.  (vi) C-286  (vii) Irrigated.  (viii) 2 ploughings and 2 weedings.  (ix) N.A.  (x) 20.4.63.

2. TREATMENTS:
   8 micronutrients:
   (i) T₁=Control, T₁=2.24 Kg/ha. of Borax in 454.6 litre of water. T₁=4.48 Kg/ha. of Copper Sul. + 2.24 Kg/ha. of hydrated lime in 454.6 litre of water. T₁=6.72 Kg/ha. of Ferrous Sul. 2.24 Kg/ha. of hydrated lime in 454.6 litre of water. T₁=4.48 Kg/ha. of hydrated lime in 454.6 litre of water. T₁=6.72 Kg/ha. of Magnesium in 454.6 litre of water. T₁=6.72 Kg/ha. of ZnSul.+4.48 Kg/ha. of hydrated lime in 454.6 litre of water. T₁=6.72 Kg/ha. of hydrated lime in 454.6 litre of water. T₁=6.72 Kg/ha.

3. DESIGN:
   (i) R. B. D.  (ii) (a) 8. (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/99 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Good.  (ii) As per treatments.  (iii) Yield of grain and straw.  (iv) (a) 1962-only.  (b) No.  (c) Nil.  (v) (vi) (vii) N.A.

5. RESULTS:
   (i) 1471 Kg/ha.  (ii) 159.4 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
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<td>1467</td>
<td>1467</td>
<td>1465</td>
<td>1453</td>
<td>1444</td>
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</table>

Crop: Wheat (Rabi.)


Object: To study the comparative manuring value of different cakes, F. Y. M. and doses of C/A/N.

1. BASAL CONDITIONS:
   (i) (a) N.A.  (b) Fallow.  (c) N.A.  (d) Sandy loam.  (iii) 5.12.62.  (iv) (a) 5 ploughings. (b) to (e) N.A.  (v) and (vi) N.A.  (vii) Irrigated.  (vii) 3 weedings.  (ix) N.A.  (x) 23.4.63.

2. TREATMENTS:
   9 types of fertilizers: T₀=Control (No manure), T₁=Neem cake, T₂=G. N. C., T₃=Cotton seeds, T₄=F. Y. M. T₅=22.4 kg/ha. of N as C/A/N. T₆=Bone fluff, T₇=44.8 kg/ha. of C/A/N, and T₈=Blood meal.

3. DESIGN:
   (i) R. B. D.  (ii) (a) 9.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/148 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) Nil.  (iii) Yield of grain and straw.  (iv) (a) 1962-only.  (b) No.  (c) Nil.  (v) to (vii) Nil.
5. RESULTS:
   (i) 818 Kg/ha.  (ii) 108.5 Kg/ha.  (iii) Treatment differences are significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
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<td>Av. yield</td>
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<td>893</td>
<td>854</td>
<td>806</td>
<td>669</td>
<td>882</td>
<td>865</td>
<td>927</td>
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</tbody>
</table>

C.D. = 158.5 Kg/ha.

Crop : Wheat (Rabi).  Ref : Pb. 62(89),

Site : Reg. Wheat Res. Stn., Gurdaspur.  Type : 'N'.

Object : To study the effect of placement of N as C/A/N on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 31. 10.52.  (iv) (a) 6-8 ploughings. 6-8 ploughings and (b) Behind the plough.  (c) to (e) N.A.  (v) N.A.  (vi) C-286.  (vii) Unirrigated.  (viii) 2 weedings.  (ix) & (x) N.A.

2. TREATMENTS:
   Main-plot treatments :
   4 levels of N as C/A/N : N_0 = 0, N_1 = 22.4, N_2 = 44.8 and N_3 = 66.2 Kg/ha.
   Sub-plot treatments :
   3 methods of placement of C/A/N : M_1 = Kera, M_2 = Para and M_3 = Broadcasting.

3. DESIGN :
   (i) Split-plot.  (ii) 4 main-plots/replication, 3 sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/98 ha.  (v) N.A.  (vi) Yes.

4. GENERAL :
   (i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) 1962-64 (Treatments are modified in 63)  (b) No.  (c) Nil.  (v) to (vii) N.A.

5. RESULTS:
   (i) 1597 Kg/ha.  (ii) 250.5 Kg/ha.  (b) 139.5 g/ha.  (iii) Only interaction M×N is highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>M_1</th>
<th>M_2</th>
<th>M_3</th>
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<td>1557</td>
<td>1685</td>
<td>1636</td>
<td>1626</td>
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</table>

Mean : 1597

C.D. for N means at the same level of M = 284.6 Kg/ha.
C.D. for M means at the same level of N = 203.6 Kg/ha.
Crop: Wheat. (Rabi)

Site: Reg. Wheat Res. Sta., Gurdaspur

Object: To study the effect of different placement methods of fertilizer under rain fed conditions for Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 1st week of Nov. (iv) (a) 6 to 8 ploughings, 6 to 8 plankings. (b) Behind the plough. (c) to (e) N.A. (v) N.A. (vi) C-286. (vii) Un-irrigated, (viii) 2 weedinings (ix) and (x) N.A.

2. TREATMENTS:
   Main-plot treatments: -
   4 manurial treatments: -
   M₁ = 44.8 Kg/ha. of N as Ca(NO₃)₂, M₂ = M₁ + 44.8 Kg/ha. of P as Super. M₃ = M₁ + 44.8 Kg/ha. of K as Mur. pot. and M₄ = M₂ + 44.8 Kg/ha. of K as Mur. pot.

   Sub-plot treatments: -
   3 methods of application: - A₁ = Ker, A₂ = Pora and A₃ = Broadcasting.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/247 ha. (c) N.A. (d) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 - 64 (Treatments modified in 63). (b) No. (c) Nil. (v) and (vi) Nil. (vii) Both the error variances are heterogeneous, therefore individual years results are given under Results.

5. RESULTS:

63 (111)
   (i) 1208 Kg/ha. (ii) (a) 156.5 Kg/ha. (b) 135.4 Kg/ha. (iii) Main effect of M is significant, (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>A₁</th>
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<th>A₃</th>
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<tr>
<td>M₄</td>
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</table>

   Mean 1266 1192 1168 1208

   C.D. for M marginal means=111.2 Kg/ha.

64 (100)
   (i) 2742 Kg/ha. (ii) (a) 332.2 Kg/ha. (b) 323.2 Kg/ha. (iii) None of the effect is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>A₁</th>
<th>A₂</th>
<th>A₃</th>
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<tr>
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   Mean 2713 2788 2725 2742
Crop: Wheat (Rabi)

Ref: Pb. 62(91), 63(107), 64(99).

Site: Reg. Wheat Res. Sta., Gurdaspur

Type: 'M'.

Object: To study the effect of N and P on the yield of Wheat.

1. **BASAL CONDITIONS**:
   - (i) to (c) N.A.
   - (ii) Sandy loam.
   - (iii) Last week of October.
   - (iv) (a) 6 - 8 ploughings and 6 - 8 plowings
     - (b) Behind the plough.
   - (c) to (d) N.A.
   - (v) N.A.
   - (vi) C-286 for 62 and 64, C-303 for 63.
   - (vii) Un-irrigated.
   - (viii) 2 weedings.
   - (i) and (c) N.A.

2. **TREATMENTS**:
   - **Main-plot treatments**:
     - 3 levels of N: N<sub>0</sub>=0, N<sub>1</sub>=33·6 and N<sub>2</sub>=67·2 Kg/ha.
   - **Sub-plot treatments**:
     - 3 levels of P<sub>2</sub>O<sub>5</sub>: P<sub>0</sub>=0, P<sub>1</sub>=33·6 and P<sub>2</sub>=67·2 Kg/ha.

3. **DESIGN**:
   - (i) Split-plot.
   - (ii) 3 main-plots/replication, 3 sub-plots/main-plot.
   - (iii) N.A.
   - (iv) 6.
   - (v) N.A.
   - (vi) 1/198ha. for 62; 1/247ha. for others.
   - (vii) N.A.
   - (viii) Yes.

4. **GENERAL**:
   - (i) Normal.
   - (ii) N.A.
   - (iii) Yield of grain.
   - (iv) (a) 1962 - 64.
   - (v) No.
   - (vi) Results of combined analysis are presented under 5. Results.
   - (vii) N.A.
   - (viii) Both the error variances are homogeneous and Treatments X Years interaction is absent.

5. **RESULTS**:
   - **Pooled results**:
     - (i) 1574 Kg/ha.
     - (ii) 214·0 Kg/ha. (based on 30 d.f. made up of pooled error and Treatments X Years Interaction)
     - (iii) 149·5 Kg/ha. (based on 90 d.f. made up of pooled error and Treatments X Years Interaction).
     - (iv) Main effect of P alone is significant.
     - (iv) Av. yield of grain in Kg/ha.

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<th></th>
<th>P&lt;sub&gt;0&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
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</table>

Mean 1397 1616 1704 1574

C.D. for P marginal means=55·3 Kg/ha.

**Individual results**:

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<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>Sig.</th>
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<td>1574</td>
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</table>
Crop: Wheat (Rob) Ref: Pb. 62(92), 63(104) 64(105).
Site: Reg. Wheat Res. Stn., Gurdaspur Type: ‘M’

Object: To study the effect of \( N \), \( P \) and \( K \) applied individually and in combination on the yield of wheat.

1. BASAL CONDITIONS:
   (i) to (c) N.A. (ii) Sandy loam. (iii) 21.11 64; N.A. for 63 and 64. (iv) (a) 6—8 ploughings and 6—8 ploughings. (b) Behind the plough. (c) to (e) N.A. (v) N.A. (vi) C-273—for 62 and 63; N.A. (vii) Irrigated, (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS:
   Main-plot treatments: 3 levels of \( N \): \( N_1=0 \), \( N_2=28 \) and \( N_3=56\)Kg/ha.
   Sub-plot treatments:
   All combinations of (1) and (2)
   (i) 3 levels of \( P_0=0 \), \( P_1=28 \) and \( P_2=56\)Kg/ha.
   (2) 3 levels of \( K_0=0 \), \( K_1=28 \) and \( K_2=56\)Kg/ha.
   Fertilizers were applied before sowing.

3. DESIGN:
   (I) Split-plot. (II) 3 main-plots/replication, 9 sub-plots/main-plot. (b) N.A. (iii) 4. (vi) (a) N.A. (b) N.A. 1/370 ha., 1/494 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil.; N.A. for 62 & 64. (iii) Yield of grain. (iv) (a) 1961 – 64 (Design modified in 62) (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As both the error variances are heterogeneous, the results of individual years are given under 5. Results.

5. RESULTS:

62(92)
   (i) 2024Kg/ha. (ii) (a) 535·5Kg/ha. (b) 173·3Kg/ha. (iii) Main effects of \( N \) and \( P \) are significant. (iv) Av. yield of grain in Kg/ha.

\[
\begin{array}{ccc|ccc|c}
 & P_0 & P_1 & P_2 & & K_0 & K_1 & K_2 & \text{Mean} \\
N_0 & 1543 & 1748 & 1866 & & 1717 & 1715 & 1725 & 1719 \\
N_1 & 2079 & 2114 & 2145 & & 2129 & 2167 & 2043 & 2113 \\
N_2 & 2024 & 2377 & 2325 & & 2247 & 2331 & 2148 & 2242 \\
\text{Mean} & 1882 & 2030 & 2112 & & 2031 & 2071 & 1972 & 2024 \\
K_0 & 1876 & 2060 & 2157 & & 2031 & 2071 & 1972 & 2024 \\
K_1 & 1919 & 2110 & 2184 & & 2031 & 2071 & 1972 & 2024 \\
\end{array}
\]

C.D. for \( N \) marginal means=30·8Kg/ha.
C.D. for \( P \) marginal means=81·4Kg/ha.

63(104)
   (i) 2560Kg/ha. (ii) (a) 198·8Kg/ha. (b) 303·3Kg/ha. (iii) Main effects of \( N \) and \( P \) are significant. (iv) Av. yield of grain in Kg/ha.
Crop: Wheat (Rabi)

Ref: Ph. 63(105), 64(97).


Type: ‘M’.

Object: To study the effect of different times of application of N on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) (a) to (e) N.A. (ii) Sandy loam. (iii) Last week of Nov. (iv) (n) 6 to 8 ploughings. (b) Behind the plough. (c) to (e) N.A. (v) N.A. (vi) C-273. (vii) Irrigated. (viii) 4 weedings. (ix) & (x) N.A.

2. TREATMENTS:
   6 times of application of 67.5 Kg/ha. of N: -- T₆ = 1/2 at sowing + 1/2 at flowering, T₅ = 1/3 at sowing + 1/3 at first irrigation, T₄ = Full at sowing, T₃ = 1/2 at first irrigation + 1/2 at flowering, T₂ = 1/2 at first irrigation + 1/2 at sowing and T₁ = Full at first irrigation.

<table>
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<tr>
<th></th>
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<th>P₂</th>
<th>P₃</th>
<th>P₄</th>
<th>K₁</th>
<th>K₂</th>
<th>K₃</th>
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<tr>
<td>N₀</td>
<td>1915</td>
<td>2076</td>
<td>2237</td>
<td>1915</td>
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<td>1265</td>
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<tr>
<td>N₁</td>
<td>2026</td>
<td>2495</td>
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<td>N₂</td>
<td>2125</td>
<td>25+5</td>
<td>2674</td>
<td>2348</td>
<td>2537</td>
<td>2456</td>
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<tr>
<td>Mean</td>
<td>2202</td>
<td>2372</td>
<td>2403</td>
<td>2154</td>
<td>2338</td>
<td>2286</td>
<td>2266</td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N marginal means=114·8 Kg/ha.
C.D. for P marginal means=142·7Kg/ha.

(i) 2551Kg/ha.  (ii) (a) 248·5 Kg/ha.  (b) 813·0Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
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<td>2234</td>
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<td>N₁</td>
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<td>2473</td>
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<td>N₂</td>
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<td>3074</td>
<td>3006</td>
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<tr>
<td>Mean</td>
<td>2325</td>
<td>2662</td>
<td>2667</td>
<td>2538</td>
<td>2554</td>
<td>2562</td>
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</tbody>
</table>

C.D. for N marginal means=143·1Kg/ha.
3. DESIGN:
(i) R. B. D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963 64. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As the error variances are heterogeneous and Treatments X Years interaction is absent, the results of individual years are given under 5. Results.

5. RESULTS:

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
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<tr>
<td>1963</td>
<td>Av. yield</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>2611 Kg/ha.</td>
<td>2612</td>
<td>2613</td>
<td>2614</td>
<td>2615</td>
<td>2616</td>
<td>2617</td>
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<tr>
<td></td>
<td>C.D. = 122.4 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1964</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>3361 Kg/ha.</td>
<td>3362</td>
<td>3363</td>
<td>3364</td>
<td>3365</td>
<td>3366</td>
<td>3367</td>
</tr>
<tr>
<td></td>
<td>C.D. = 116.7 Kg/ha.</td>
<td></td>
<td></td>
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</tbody>
</table>

Crop: Wheat (Kohi)
Site: Reg. Wheat Res. Sta., Gurdaspur
Object: To study the effect of G.M., when G.M. was planted on different dates, on the yield of Wheat.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 24.11.63. (iv) (a) 6-8 ploughings, 6-8 plantings. (b) Behind the plough. (c) to (e) N.A. (v) C-303. (vi) Irrigated. (vii) 2 weedings. (viii) and (ix) N.A.

2. TREATMENTS:
Main-plot treatments:
3 dates of sowing of G.M. as Dhalna-D1 = 6th June, D2 = 19th June and D3 = 3rd July, 63.
Sub-plot treatments:
4 doses of manural treatments: - M0 = 0 (No G.M.), M1 = G.M., M2 = G.M + 50.4Kg/ha. of P2O5 to G.M. and M3 = G.M + 50.4Kg/ha. of P2O5 to Wheat.

3. DESIGN:
(i) Split-plot. (ii) 3 main-plots/split-plot. 4 Sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/247ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963 to 64. (Treatments modified in 64). (b) No. (c) Nil. (v) to (vi) N.A.

5. RESULTS:
(i) 1972Kg/ha. (ii) (a) 158.8Kg/ha. (b) 303.8Kg/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of grain Kg/ha.
Crop :- Wheat. (Rabi)

Site :- Reg. Wheat Res. Sta., Gurdaspur

Object :- To study the effect of G.M. and P on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) 6-8 ploughings and 6-8 ploughings. (b) Behind the plough. (c) to (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) 2 weeding. (ix) and (x) N.A.

2. TREATMENTS
   Main-plot treatments:
   4 dates of burying Dhaincha as G.M. : D0 = 0 (Fallow), D1 = 30 days, D2 = 40 days and D3 = 50 days.
   Sub-plot treatments:
   4 levels of P2O5 : P0 = 0, P1 = 22.4, P2 = 44.8 and P3 = 67.2 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (b) 4 main-plots/replication, 4 sub-plots/main plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/247ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963–64. (Treatments modified in 64). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 2297Kg/ha. (ii) (a) 228.6Kg/ha. (b) 142.6Kg/ha. (iii) Main effects of D and P are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>D</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>Mean</th>
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<td>D0</td>
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<td>1396</td>
<td>1520</td>
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<tr>
<td>D1</td>
<td>2291</td>
<td>2419</td>
<td>2664</td>
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<td>2444</td>
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<tr>
<td>D2</td>
<td>2315</td>
<td>2582</td>
<td>2607</td>
<td>2516</td>
<td>2505</td>
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<tr>
<td>D3</td>
<td>2624</td>
<td>2713</td>
<td>2807</td>
<td>2686</td>
<td>2708</td>
</tr>
<tr>
<td>Mean</td>
<td>2163</td>
<td>2278</td>
<td>2350</td>
<td>2197</td>
<td>2297</td>
</tr>
</tbody>
</table>

C.D. for D marginal means = 182.8Kg/ha.
C.D. for P marginal means = 162.3Kg/ha.
Crop : Wheat, (Rabi)  
Ref : Ph. 65(163).
Type : 'M'.

Object: — To study the effect of application of different sources of Nitrogen and different times of its application on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) (a) Fallow-Wheat. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 20th Nov., 65. (iv) (a) 3-4 ploughings. (b) Kera. (c) 43Kg/ha. (d) 20 cm. (e) — (v) 40Kg/ha. of N+25Kg/ha. of P2O5. (vi) C-273. (vii) Irrigated. (viii) One hoeing. (ix) 59 Jun. (x) 2nd week of April, 66.

2. TREATMENTS

   Main-plot treatments:
   3 sources of N : S1 = Urea, S2 = A/S and S3 = C/A/N.

   Full dose of N = 60Kg/ha.

   Sub-plot treatments:
   6 times of application: T1 = Full dose at sowing, T2 = Full dose at 1st irrigation, T3 = at sowing + at 1st irrigation, T4 = at sowing + at flowering, T5 = at 1st irrigation + at flowering + at sowing + at flowering + at 1st irrigation.

3. DESIGN:

   (i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/250ha. (v) N.A. (vi) Yes.

4. GENERAL:

   (i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965-only. (b) No. (c) Nil. (v) Ludiana. (vi) and (vii) Nil.

5. RESULTS:

   (i) 2025Kg/ha. (ii) (a) N.A. (b) 2422Kg/ha. (iii) Main effect of T and interaction S x T are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>T1</td>
<td>2150</td>
<td>2150</td>
<td>2250</td>
<td>2300</td>
</tr>
<tr>
<td>T2</td>
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<td>T3</td>
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<td>T4</td>
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<td>T5</td>
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</tr>
<tr>
<td>T6</td>
<td>2100</td>
<td>2100</td>
<td>2100</td>
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</tr>
</tbody>
</table>

Mean 2058 2000 2067 2025

C.D. for T marginal means = 220-3Kg/ha.
C.D. for T means at the same level of S = 345-3Kg/ha.
1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) N.A. (iii) 8/9.11.60. (iv) (a) to (c) N.A. (v) 6'7·3Kg/ha. of N as C/A/N+33·6Kg/ha. of P₂O₅ as Super+30·5Kg/ha. of K₂O as muri. pot. (vi) C-273. (vii) Irrigated. (viii) and (ix) N.A. (x) 30.4.61.

2. TREATMENTS:
All Combinations of (1), (2), (3), (4) and (5).
(1) 2 levels of Borax: -A₀-Control and A₁=Borax 0·2%
(2) 2 levels of CuSO₄ := B₂=Control and B₁=CuSO₄ 0·4%
(3) 2 levels of FeSO₄ := C₀=Control and C₁=FeSO₄ 0·4%
(4) 2 levels of MnSO₄ := D₀=Control and D₁=MnSO₄ 0·6%
(5) 2 levels of ZnSO₄ := E₀=Control and E₁=ZnSO₄ 0·6%

3. DESIGN:
(i) 2' fact. Conf'd. (ii) (a) 4 blocks/replication, 8 plots/block. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/290·4ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 1398 Kg/ha. (ii) 303·7 Kg/ha. (iii) Interaction D × E is significant. (iv) Mean and differential responses in Kg/ha.

\[
\begin{array}{c|cccc|cccc|cccc}
\text{Mean Response} & A & B & C & D & E & A & B & C & D & E \\
\hline
A & -13·89 & - & - & 0·00 & -27·78 & -90·76 & 62·98 & -6·48 & -21·30 & -13·89 & -13·9 \\
B & 17·60 & 31·49 & 3·71 & - & - & - & 20·38 & 14·82 & 23·16 & 12·04 & -8·33 & 43·53 \\
C & 10·19 & -66·68 & 87·06 & 12·97 & 7·41 & - & - & - & 21·30 & -0·92 & -25·00 & 45·38 \\
D & 77·80 & 85·21 & 70·39 & 83·36 & 72·24 & 88·91 & 66·69 & - & - & - & 50·93 & 206·53 \\
E & 33·34 & 33·34 & 33·34 & 7·41 & 59·27 & -1·85 & 68·53 & -95·39 & 162·07 & - & - & -
\end{array}
\]

C.D. for differential response=151'1Kg/ha.

Crop := Wheat(Rabi).
Ref := Ph. 60(97).
Site := Govt. Agri. Stn., Jullundur.
Type := 'M'.

Object := To study the effect of different sources of N on the yield of Wheat.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 24.11.60. (iv) (a) and (b) N.A. (c) 79·6Kg/ha. (d) and (e) N.A. (v) N.A. (vi) C-273. (vii) Irrigated. (viii) and (ix) N.A. (x) April, 61.

2. TREATMENTS:
8 manurial treatments:
T₁=Control. T₂=44·8Kg/ha. of N as Neem Cake., T₃=44·8Kg/ha. of N as G. Nut.
Crop: Wheat (Rabi).
Site: Govt. Agri. Sta., Jullundur
Type: 'M'.

Object: To study the effect of different levels of N on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Maize. (c) N.A. (ii) Sandy loam. (iii) 21.11.60. (iv) (a) and (b) N.A. (c) 65 Kg/ha. (d) and (e) N.A. (v) Nil. (vi) C-265. (vii) Irrigated. (viii) and (ix) N.A. (x) 21.4.61.

2. TREATMENTS:
   6 levels of N as C/A/N: N₀ = Control (no manure), N₁ = 56, N₂ = 112, N₃ = 186, N₄ = 224 and N₅ = 336 Kg/ha.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/266.5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-only. (b) No. (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:
   (i) 1960 Kg/ha. (ii) 2290 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>969</td>
<td>1537</td>
<td>932</td>
<td>1080</td>
<td>1772</td>
<td>776</td>
<td>988</td>
<td>2469</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).
Site: Govt. Agri. Sta., Jullundur
Type: 'M'.

Object: To study the effect of different levels of N on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Maize. (c) N.A. (ii) Sandy loam. (iii) 21.11.60. (iv) (a) and (b) N.A. (c) 65 Kg/ha. (d) and (e) N.A. (v) Nil. (vi) C-265. (vii) Irrigated. (viii) and (ix) N.A. (x) 21.4.61.

2. TREATMENTS:
   6 levels of N as C/A/N: N₀ = Control (no manure), N₁ = 56, N₂ = 112, N₃ = 186, N₄ = 224 and N₅ = 336 Kg/ha.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/266.5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-only. (b) No. (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:
   (i) 1901 Kg/ha. (ii) 2290 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
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<td>Av. yield</td>
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<td>2543</td>
<td>3284</td>
<td>3299</td>
<td>3610</td>
<td>2572</td>
<td></td>
</tr>
</tbody>
</table>

C.D. = 696.2 Kg/ha.
Crop: Wheat (Roohi).

Site: Govt. Agri. Stn., Jullundur.

Object: To study the residual effect of different levels of N applied to Maize on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Maize. (c) As per treatments. (ii) Sandy loam. (iii) 21.11.60; 3.12.62. (iv) (a) and (b) N.A. (c) 85 Kg/ha.; N.A. (d) and (e) N.A. (v) Nil. (vi) C-273. (vii) Irrigated. (viii) N.A.; 4 hoings. (ix) N.A. (x) May, 61; N.A.

2. TREATMENTS:
   6 levels of N as C/A/N: N<sub>0</sub>=0, N<sub>1</sub>=56, N<sub>2</sub>=112, N<sub>3</sub>=168, N<sub>4</sub>=224 and N<sub>5</sub>=336 Kg/ha.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/296.5 ha.; 1/259.5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-62. (Experiment for 61 N.A.) (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatment x Years interaction is present.

5. RESULTS:
   Pooled results
   (i) 2083 Kg/ha. (ii) 792.4 Kg/ha. (based on d.f. made up of Treatments x Years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;0&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<td></td>
<td>2952</td>
<td>572.3</td>
</tr>
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<td>1962</td>
<td>909</td>
<td>699</td>
<td>763</td>
<td>1561</td>
<td>1210</td>
<td>2152</td>
<td>**</td>
<td>1216</td>
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<td>1550</td>
<td>1942</td>
<td>2726</td>
<td>2113</td>
<td>2740</td>
<td>N.S.</td>
<td>2083</td>
<td>792.4</td>
</tr>
</tbody>
</table>

Crop: Wheat (Roohi).

as Super and $T_0 = T_4 + 112\text{Kg/ha.}$ of $K_2O$ as Mur. Pot.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) N.A. (b) $1/247\text{ha.}$; $1/208\text{ha.}$ (v) $N.A.$ (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 62. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatments $\times$ Years interaction is present.

5. RESULTS:
   Pooled results:
   (i) 1921Kg/ha. (ii) 509·3Kg/ha. (based on 12d.f made up of Treatment $\times$ Years interaction) (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

   Treatment
   \[ T_0 \quad T_1 \quad T_2 \quad T_3 \quad T_4 \quad T_5 \quad T_6 \]
   Av. yield.
   1458 1865 2108 1735 2005 2938 2195

   Individual results:

   Treatment
   \[ T_0 \quad T_1 \quad T_2 \quad T_3 \quad T_4 \quad T_5 \quad T_6 \]
   Sig.  G.M.  S.E./plot
   Year
   1960 2181 2823 2099 2656 3101 2502 3262 ** 2783 348·4
   1961 1564 2130 2541 1882 2188 2729 2162 ** 2171 187·0
   1962 629 701 823 667 726 943 1162 N.S. 807 271·3
   Pooled 1458 1865 2108 1735 2005 2938 2195 N.S. 1921 509·3

Crop: Wheat. \textit{(Rabi)}

Site: Govt. Agrl. Stn., Jallundur.

Object: To study the best dose of Nitrogen on the yield of Wheat in the presence and absence of F.Y.M. application.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) N.A. (iii) 17, 11, 61. (iv) (a) to (c) N.A. (v) Two experiments were conducted and F.Y.M was applied, to one experiment (vi) C-273. (vii) Irrigated (viii) 4 hoeings, 4 waterings. (ix) N.A. (x) 24/25.4.62.

2. TREATMENTS:
   6 levels of N as C/A/N: $N_0 = 0, N_1 = 56, N_2 = 112, N_3 = 168, N_4 = 224$ and $N_5 = 336\text{Kg/ha.}$

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 158·5m. $\times$ 2·44m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-only. (b) No. (c) Nil. (v) No. (vi) Nil. (vii) Two separate experiments, with and without F.Y.M. were conducted.
5. RESULTS:

(With the application of F.Y.M.)

(i) 1903 Kg/ha. (ii) 319.1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment:
N0  N1  N2  N3  N4  N5
Av. yield:  2412  2403  1557  1646  2153  1292

C.D. = 441.8 Kg/ha.

(Without the application of F.Y.M.)

(i) 1774 Kg/ha. (ii) 322.1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment:
N0  N1  N2  N3  N4  N5
Av. yield:  1880  2039  1483  1652  2185  1403

C.D. = 500.3 Kg/ha.

Crop: Wheat (Rabi)
Site: Govt. Agri. Sta., Jullundur
Object: To study the effect of various micronutrients on the yield of wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) N.A. (iii) 24.11.61. (iv) (a) to (e) N.A. (v) 91 Kg/ha. of C/A/N+57 Kg/ha. of P2O5+19 Kg/ha. of K2O on 24.11.61 and 50Kg/ha. of C/A/N applied on 7.2.62. (vi) C-273. (vii) Irrigated. (viii) and (ix) N.A. (v) 30.4 62.

2. TREATMENTS:

8 micro nutrient treatments: T0 = Control, T1 = Borax 2%, T2 = Copper 4%, T3 = Iron 4%, T4 = Manganese 6%, T5 = Zinc 6%, T6 = Magnesium 10% and T7 = Molybdate 1%.

Micronutrients sprayed on 30.1.62 and on 21.2.62.

3. DESIGN:

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) and (b) 1/123.6ha. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) N.A. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:

(i) 1618 Kg/ha. (ii) 303.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment:
T1  T2  T3  T4  T5  T6  T7  T8
Av. yield:  1597  1799  1709  1667  1611  1456  1625  1477
Crop: Wheat (Rabi)

Site: Govt. Agri. Sta., Jullundur

Ref: Pb 61, (102).

Type: ‘M’.

Object: To study the residual effect of \( N \), applied to Maize, on Wheat.

1. BASAL CONDITIONS:
   
   (i) (a) N.A.  
   (b) Hybrid-Maize.  
   (c) As per treatments.  
   (ii) (a) and (b) N.A.  
   (c) 85 kg/ha.  
   (d) and (e) N.A.  
   (vi) C-23.  
   (vii) Irrigated.  
   (viii) and (ix) N.A.  
   (x) 24.2.6.62.

2 TREATMENTS:

   All combinations of (I) and (2)

   (1) 2 manural treatments: \( F_0 = \) No. F.Y.M. and \( F_1 = \) F.Y.M. applied. 
   (2) 6 levels of \( N \) as C/A/N: \( N_0 = 0, N_1 = 56, N_2 = 112, N_3 = 168, N_4 = 224 \) and \( N_5 = 336 \) kg/ha. 
   56 kg/ha. of \( N \) applied at the time of sowing and rest aside dressing.

3. DESIGN:

   (i) Fact. in R.B.D.  
   (ii) (a) N.A.  
   (iii) 4.  
   (iv) (a) N.A.  
   (b) 1/259.5 ha.  
   (v) N.A.  
   (vi) Yes.

4. GENERAL:

   (i) Normal.  
   (ii) N.A.  
   (iii) Yield of grain.  
   (iv) (a) N.A.  
   (b) No.  
   (c) N.A.  
   (v) to (vii) Nil.

5. RESULTS:

   (i) 1840 kg/ha.  
   (ii) 311.9 kg/ha.  
   (iii) Main effect of \( N \) alone is highly significant.  
   (vi) Av. yield of grain in kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( N_0 )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( N_3 )</th>
<th>( N_4 )</th>
<th>( N_5 )</th>
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</tr>
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<td>1483</td>
<td>1652</td>
<td>2039</td>
<td>2185</td>
<td>1880</td>
<td></td>
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<tr>
<td>( F_1 )</td>
<td>1292</td>
<td>1557</td>
<td>1616</td>
<td>2403</td>
<td>2133</td>
<td>2412</td>
<td></td>
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<tr>
<td>Mean</td>
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<td>1520</td>
<td>1634</td>
<td>2221</td>
<td>2169</td>
<td>2146</td>
<td>1840</td>
</tr>
</tbody>
</table>

C.D. for \( N \) marginal mean=337.5 kg/ha.

Crop: Wheat (Rabi).

Site: Govt. Agri. Sta., Jullundur.

Ref: Pb 62(18).

Type: ‘M’.

Object: To study the residual effect on Wheat, of \( N \) applied to the previous Hybrid Maize.

1. BASAL CONDITIONS:

   (i) (a) No.  
   (b) Hybrid-Maize.  
   (c) As per treatments.  
   (ii) (a) and (b) N.A.  
   (iii) 3.12.62.  
   (iv) (a) to (e) N.A. 
   (v) 24.7 Q/ha. of F.Y.M.  
   (vi) C-273.  
   (vii) Irrigated.  
   (viii) 4 waterings.  
   (ix) and (x) N.A.

2 TREATMENTS:

   6 doses of \( N \) as C/A/N: \( N_0 = 0, N_1 = 56, N_2 = 112, N_3 = 168, N_4 = 224 \), and \( N_5 = 336 \) kg/ha. of \( N \). 
   Manures applied to the previous crop Maize.
3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/259'5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) N.A. (iii) Yield of grain. (iv) (a) and (b) N.A. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS:
   (i) 1341 Kg/ha. (ii) 379 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
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<tr>
<td>Av. yield</td>
<td>1273</td>
<td>1325</td>
<td>1384</td>
<td>1354</td>
<td>1210</td>
<td>1409</td>
</tr>
</tbody>
</table>

C.O. = 1153 ± 11

Crop : Wheat (Rabi).
Site : Govt. Agri. Stn., Jullundur.
Object : To study the effect of N, P and K applied individually and in combination on the yield of Wheat.
1. BASAL CONDITIONS:
(a) N.A. (b) Wheat (c) Sandy loam. (iii) N.A. (iv) C-286. (v) N.A. (b) Kera. (c) to (e) N.A. (vi) 13.11.60. (iii) Irrigated. (viii) and (ix) N.A. (x) 19.4.61.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 2 levels of N as C/A/N: N₀ = 0, N₁ = 44.8Kg/ha.
(2) 2 levels of P₂O₅ as Super: P₀ = 0 and P₁ = 22.4Kg/ha.
(3) 2 levels of K₂O as Muri. Pot.: K₀ = 0 and K₁ = 22.4 Kg/ha.
P₂O₅ drilled before seed while N and K broadcasted at sowing.

3. DESIGN:
(i) Fact. in R.B.D. ; 8 ; 4. (ii) — (iii) (a) N.A. (b) 1/297 ha. (iv) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 2041Kg/ha. (ii) 181.0Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>K₀</th>
<th>K₁</th>
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<td>1476</td>
<td>1523</td>
<td>1379</td>
<td>1451</td>
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<tr>
<td>N₁</td>
<td>2576</td>
<td>2684</td>
<td>2617</td>
<td>2643</td>
<td>2630</td>
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<tr>
<td>Mean</td>
<td>2001</td>
<td>2080</td>
<td>2070</td>
<td>2011</td>
<td>2041</td>
</tr>
</tbody>
</table>

C.D. for N marginal means—133*0Kg/ha.

Crop: Wheat. (Rabi)
Site: Govt. Agri. College, Ludhiana.

Object: To study the effect of different levels of N with and without P and K on the yield of Wheat crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 25.11.61. (iv) (a) 4 to 5 ploughings. (b) Kara. (c) to (e) N.A. (v) N.A. (vi) C-286. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 20.4.62.

2. TREATMENTS:
Main-plot treatments:
2 levels of P and K:—T₁ = Without P and K and T₂ = With P and K (doses, N.A.).

Sub-plot treatments:
6 levels of nitrogen: N₀ = 0, N₁ = 45, N₂ = 67, N₃ = 90, N₄ = 112 and N₅ = 134Kg/ha.
P and K applied at the time of sowing by drilling and N applied at the time of sowing by broadcasting.
3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/197'69 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 2183Kg/ha. (ii) (a) 437'7 Kg/ha. (b) 241'5Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>N</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>N5</th>
<th>Mean</th>
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<tbody>
<tr>
<td>T1</td>
<td>1030</td>
<td>2195</td>
<td>2421</td>
<td>2486</td>
<td>2504</td>
<td>2489</td>
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<tr>
<td>T2</td>
<td>956</td>
<td>2197</td>
<td>2233</td>
<td>2592</td>
<td>2426</td>
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<tr>
<td>Mean</td>
<td>993</td>
<td>2196</td>
<td>2327</td>
<td>2539</td>
<td>2465</td>
<td>2589</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=246'6 Kg/ha.

Crop :- Wheat. (Rabi)
Site :- Govt. Agri. College, Ludhiana.
Object :- To study the effect of micronutrients as spray on the yield of Wheat.

1. BASAL CONDITIONS
(i) (a) to (c) N A. (ii) Sandy loam. (iii) 25.11.62. (iv) (a) 5 - 6 ploughings. (b) to (e) N.A. (v) 67'2 Kg/ha. of N+33'6Kg/ha. of P,0 5 +33'6Kg/ha. of K2O at sowing. (vi) C-273. (vii) Irrigated. (viii) 2 weedings. (a) N.A. (a) 3.5. 63.

2. TREATMENTS:
7 micronutrient treatments + one control :- T0=Control, T1=Borax. 2 29Kg/ha. in 1122'9 litre of water per ha. T2=4'5Kg/ha. of Copper. Sul +2'2Kg/ha. of hydrated lime in 1122'9 litre of water, T3=4'5Kg/ha. of Ferrous Sul.+2'2 Kg/ha. of hydrated lime in 1122'9 litre of water, T4=6'7 Kg/ha. of Manganese, Sul.+4'5 Kg/ha of hydrated lime in 1122'9 litre of water, T5=6'7 Kg/ha. of Zinc. Sul.+4'5 Kg/ha. of hydrated lime in 1122'9 litre of water, T6=11'2 Kg/ha. of Magnesium. in 1122'9 litre of Water and T7=1'1 Kg/ha. of Ammon. molybdate in 1122'9 litre of water.

3. DESIGN:
(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/195 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) As per treatments. (iii) Yield of grain and straw. (iv) (a) 1962-only. (b) No. (c) Nil. (v) to (vii) N.A.
5. RESULTS:
(i) 2779Kg/ha. (ii) 34Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
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<tr>
<td>Av. yield</td>
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<td>2762</td>
<td>2728</td>
<td>2860</td>
<td>2771</td>
<td>2893</td>
<td>2753</td>
<td>2791</td>
</tr>
</tbody>
</table>

Crop: Wheat. (Rabi)
Site: Govt. Agri. College, Ludhiana

Object: To study the effect of different doses of K on the yield of Wheat.

1. BASAL CONDITIONS
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 16.11.63. (iv) (a) 2 to 3 ploughings. (b) N.A. (c) 91Kg/ha. (d) and (e) N.A. (v) N.A. (vi) C-273. (vii) Irrigated. (viii) and (ix) N.A. (x) April, 64.

2. TREATMENTS:
5 levels of K₂O as Muri. Pot.: K₀=0, K₁=28, K₂=56, K₃=84, K₄=112Kg/ha.

3. DESIGN:
(i) R.B.D. (ii) 5. (b) N.A. (iii) 6. (v) and (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) No. (b) Nil. (v) N.A. (vi) and (vii) Nil

5. RESULTS:
(i) 2381Kg/ha. (ii) 2115Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>K₃</th>
<th>K₄</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>2320</td>
<td>2322</td>
<td>2416</td>
<td>2570</td>
<td>2374</td>
</tr>
</tbody>
</table>

Crop: Wheat. (Rabi)
Site: Govt. Agri. College, Ludhiana

Object: To study the effect of different levels of P on the yield of Wheat crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 16.11.63. (iv) (a) 2 to 3 ploughings. (b) N.A. (c) 91Kg/ha. (d) and (e) N.A. (v) N.A. (vi) C-273. (vii) Irrigated. (viii) and (ix) N.A. (x) April, 64.

2. TREATMENTS:
5 levels of P₂O₅ as Super: P₀=0, P₁=28, P₂=56, P₃=84 and P₄=112Kg/ha.
3. DESIGN:
   (i) R.B.D. (ii) (a) 5, (b) N.A. (iii) 6. (iv) 36 and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2027 Kg/ha. (ii) 305.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

   Treatment:  
<table>
<thead>
<tr>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>P₄</th>
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<td>1688</td>
<td>2079</td>
<td>1969</td>
<td>2194</td>
<td>2203</td>
</tr>
</tbody>
</table>
   
   C.D. = 367.3 Kg/ha.

Crop: Wheat, (Rabi).  
Type: 'M'.

Object: To find out the requirements of N, P, and K in various combinations of the doses on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) Maize-Wheat (b) Maize. (c) N.A. (d) Loamy sand. (e) Up to 20th Nov. 64. (f) (a) 3-4 ploughings. (b) Kera. (c) 80 Kg/ha. (d) 20 cm. (e) (v) N.A. (vi) C=306.  
   (vii) Irrigated. (viii) 2 hoeings. (ix) 11 cm. (x) 2nd week of April 65.

2. TREATMENTS:
   Main-plot treatments:  
   4 levels of N: N₀=0, N₁=44.8, N₂=89.7 and N₃=134.5 Kg/ha.
   Sub-plot treatments:  
   All combinations of (1) and (2)  
   (1) 2 levels of P₀P₁: P₀=0 and P₁=67.3 Kg/ha.  
   (2) 2 levels of K₀K₁: K₀=0 and K₁=44.9 Kg/ha.
   The required doses of fertilizers were applied at the time of sowing by the method of broadcasting.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/replication, 4 sub-plots/main-plot. (b) N.A (iii) 4. (iv) (a) N.A. (b) 1/32-2 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964 only. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 4365 Kg/ha. (ii) (a) 720.3 Kg/ha. (b) N.A. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.
Crop - Wheat, (Rabi)

Site : Punjab Agri. University, Ludhiana.

Object : To find out the effect of spartin on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) (a) Maize - Wheat. (b) Maize. (c) 375 Kg/ha. of Super + 125 Kg/ha. of K_{2}O + 1020 Kg/ha. of A/S.
   (ii) 25.11.61. (iv) (a) 3 ploughing. (b) Kera. (c) 90 Kg/ha. (d) 23 cm. (e) - (vi) Nil. (vii) Irrigated. (viii) One hoeing. (ix) 91 cm. (x) 2nd April, 66.

2. TREATMENTS:
   All combinations of (1) and (2).
   (1) 3 levels of Spartin : - S_0 = 0, S_1 = 100 and S_2 = 200 Kg/ha.
   (2) 2 levels of Nitrogen : - N_0 = 0 and N_1 = 61 Kg/ha.

3. DESIGN:
   (i) Fact, in R.B.D. (ii) (a) 6. (b) N.A. (ii) 4. (iv) (a) N.A. (b) 1/500 ha. (v) N.A. (vi) Ycs

4. GENERAL:
   (i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1965 - only (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 3281 Kg/ha. (ii) 328.5 Kg/ha. (iii) Main effect of S is significant while that of N is highly significant.
   (iv) Av. yield of grain in Kg/ha.

<table>
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<th>S_0</th>
<th>S_1</th>
<th>S_2</th>
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<tr>
<td>N_1</td>
<td>3425</td>
<td>3380</td>
<td>3640</td>
</tr>
</tbody>
</table>

Mean 3303 3010 3530 3281

C.D. for S marginal means - 359.9 Kg/ha.

C.D. for N marginal means - 285.8 Kg/ha.
Crop = Wheat (Rabi)
Ref: Ph. 65(162).
Type = "M".

Object: To study the effect of different times of application of Nitrogen on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) (a) Fallow-Wheat. (b) Fallow. (c) Nil. (ii) Loamy sand. (iii) Up to 20 Nov., 65. (iv) (a) 3-4 ploughing. (b) Red. (c) 65 Kg/ha. (d) Decem. (e) — (v) 40 Kg/ha. of N+25 Kg/ha. of P₂O₅. (vi) S-306. (vii) Irrigated. (viii) One hoing. (ix) Nil. (x) Second week of April, 66.

2. TREATMENTS:
   Main-plot treatments:
   Sub-plot treatments:
   6 timing of application: T₁—Full at sowing, T₂—Full at 1st irrigation, T₃—1/2 at sowing+1/2 at first irrigation, T₄—1/2 at sowing+1/2 at flowering, T₅—1/2 at 1st irrigation+1/2 at flowering, and T₆—1/3 at sowing+1/3 at flowering+1/3 at flowering.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) 1/250ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Germination counts, yield of grain. (iv) (a) and (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 3132 Kg/ha. (ii) (a) 3019 Kg/ha. (b) 251.5 Kg/ha. (iii) Main effect of S alone is significant. (vi) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th></th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
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<td>3132</td>
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</table>

C.D. for S marginal means = 214.0 Kg/ha.

Crop = Wheat (Rabi).
Site = Sadhar, Ludhiana. (c.f.)
Ref.: Ph. 60(101)
Type: = "M".

Object: —To study the effect of organic manures on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Fine sand. (iii) N.A. (iv) C-273. (v) (a) and (b) N.A. (c) 40 Kg/ha. (d) and (e) N.A. (vi) 20.11.60. (vii) Irrigated. (viii) and (ix) N.A. (x) 20.4.61.
2. TREATMENTS:
8 manural treatments: T<sub>1</sub> = Control (no measure). T<sub>2</sub> = 44.8 Kg/ha of N as Neem Cake, T<sub>3</sub> = 44.8 Kg/ha. of N as G.N.C., T<sub>1</sub> = 44.8 Kg/ha. of N as Cotton seed cake, T<sub>4</sub> = 45.8 Kg/ha. of N as Bone meal, T<sub>1</sub> = 44.8 Kg/ha. of N as F.Y.M. T<sub>6</sub> = 22.4 Kg/ha. of N as C/A/N, and T<sub>7</sub> = 44.8 Kg/ha. of N as C/A/N.

3. DESIGN:
(i) R.B.D. : 8 ; 3. (ii) R. (iii) (a) N.A. (b) 1/99 ha. (iv) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) No. (b) and (c) N.A. (v) to (vii) Nil.

5. RESULTS:
(i) 2448 Kg/ha. (ii) 153.0 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T&lt;sub&gt;1&lt;/sub&gt;</th>
<th>T&lt;sub&gt;2&lt;/sub&gt;</th>
<th>T&lt;sub&gt;3&lt;/sub&gt;</th>
<th>T&lt;sub&gt;4&lt;/sub&gt;</th>
<th>T&lt;sub&gt;5&lt;/sub&gt;</th>
<th>T&lt;sub&gt;6&lt;/sub&gt;</th>
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<td>C.D.</td>
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Crop: Wheat (Rabi).
Ref: Pb.60(103),60(102),60(131),60(130).
Site: Jawadhi, Ghungabri, Khurd, phulanchib and Ludhiana
Type: 'M'.

Object: To study the effect of N, P and K on the yield of Wheat crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) C-273 for 60(103) and 60(102); C-518 for 60(131) and Mixed variety for 60(130). (v) 3-4 ploughings. (b) Kera. (c) to (e) N.A. (vi) 28.10.60; 9.11.60; 15.11.60; 19.11.60. (vii) Irrigated. (viii) and (ix) N.A. (x) 3rd week of April.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 2 levels of N as C/A/N: N<sub>0</sub> = 0 and N<sub>1</sub> = 44.8 Kg/ha.
(2) 2 levels of P as Super: P<sub>0</sub> = 0 and P<sub>1</sub> = 22.4 Kg/ha.
(3) 2 levels of K as Mur. Pot: K<sub>0</sub> = 0 and K<sub>1</sub> = 22.4 Kg/ha.
All fertilizers drilled below the seed.

3. DESIGN:
(i) Fact. in R.B.D. ; 8; 4. (ii) — (iii) (a) N.A. (b) 1/74 ha. for 60(102) and 149.4 ha. for others. (iv) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) and (b) No. (c) Nil. (v) No. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x Places interaction is present

5. RESULTS:
Pooled results:
(i) 1883Kg/ha. (ii) 725.9 Kg/ha. (based on 21 d.f. made up of Treatments x Places interaction). (iv) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.
I N, i N, ·· ··

\begin{tabular}{|l|c|c|}
\hline
Treatments & P\textsubscript{0} & P\textsubscript{1} \\
\hline
N\textsubscript{0} & 1352 & 1473 \\
N\textsubscript{1} & 2276 & 2472 \\
\hline
Mean & 1794 & 1972 \\
\hline
K\textsubscript{0} & 1790 & 1953 \\
K\textsubscript{1} & 1798 & 1992 \\
\hline
\end{tabular}

C.D. for N marginal means = 270 Kg/ha.

\begin{tabular}{|l|c|c|c|c|c|c|c|}
\hline
Treatments & Year & N\textsubscript{0} & N\textsubscript{1} & P\textsubscript{0} & P\textsubscript{1} & K\textsubscript{0} & K\textsubscript{1} & Sig. & G.M. & S.E./plot \\
\hline
1960 (103) & 1760 & 2682 & 2184 & 2558 & 2225 & 2217 & N.S. & 2221 & 92.4 \\
1960 (102) & 1475 & 3276 & 2262 & 2489 & 2349 & 2402 & N.S. & 2375 & 216.0 \\
1960 (131) & 1248 & 1648 & 1272 & 1624 & 1420 & 1476 & N.S. & 1448 & 50.3 \\
1960 (130) & 1168 & 1809 & 1458 & 152 & N.S. & 1492 & 1486 & N.S. & 1489 & 126.5 \\
\hline
\hline
\end{tabular}

Crop: Wheat (Rabi).
Site: Jawadhi, Ghungrali Bagge Khurd, Ludhiana, (c.f.)

Object:—To study the effect of different mixtures of N, P and K on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Fellow; N.A.; Fellow. (c) Nil. (d) Sandy loam; Loamy sand; Sandy loam. (e) N.A.; Nil.; N.A. (f) C-273; C-271; C-518. (g) to 6 ploughings; 3-4 ploughings. (h) Kera. (i) to (e) N.A.
   (ii) 5.11.60; 10.11.60; 16.11.60. (iii) Irrigated. (iv) Hoe and weedings; 2 weedings.
   (v) C-273; C-271; C-518. (vi) to 6 ploughings; 3-4 ploughings. (vii) to (e) N.A.

2. TREATMENTS:
   45 Kg/ha. of N from each mixture
   \( T_0 = \) Control
   \( T_1 = \) Mixture of N, P and K in the ratio 10:5:5
   \( T_2 = \) Mixture of N, P and K in the ratio 12:5:5
   \( T_3 = \) Mixture of N, P and K in the ratio 14:5:5

3. DESIGN:
   (i) R.B.D.; 4; 4. (ii) — (iii) (a) N.A. (b) 1/49.4 ha. (iv) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) and (b) No. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x Places interaction is present.

5. RESULTS:
   Pooled results
   (i) 2462 Kg/ha. (ii) 453.5 Kg/ha. (based on 6 d.f. made up of Treatments x Places interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

\begin{tabular}{|l|l|l|l|l|}
\hline
Treatment & \( T_0 \) & \( T_1 \) & \( T_2 \) & \( T_3 \) \\
\hline
Av. yield & 2474 & 2746 & 2717 \\
\hline
\end{tabular}

C.D. = 453.0 Kg/ha.
Individual Results

<table>
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<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<td>1960(135)</td>
<td>2199</td>
<td>2684</td>
<td>3099</td>
<td>3101</td>
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<td>2771</td>
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<td>1960(134)</td>
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<td>1496</td>
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<td>1649</td>
<td>**</td>
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<td>2727</td>
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<td>2462</td>
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Crop: Wheat  
Site: M. A. E. Centre, Nasirpur.  
Ref: Pb. 60(M.A.E).  
Type: 'M'.

Object Type VI: To study the effect of different times of application of N on the yield of block.

1. BASAL CONDITIONS
   (i) (a) to (c) N.A.  (ii) Alluvial. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   All combinations of (1), (2) and (3)+a control plot in each Block.
   2 levels of N: N1=22.4 and N2=44.1 Kg/ha.
   (2) 3 sources of N: S1=A/N, S2=A/S/N and S3=Urea.
   (3) 3 times of application: T1=At sowing, T2=At first irrigation and T3=at sowing+at first irrigation.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 7 plots/block, 3 blocks/replication. (b) N.A. (iii) 4. (vi) (a) and (b) N.A. (v)
   to (vii) Nil. (vi) Yes.

4. GENERAL:
   (i) and (iii) N.A. (ii) Yield of grain. (iv) (a) 1960-only. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) N.A. (ii) N.A. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.
   Control=3071 Kg/ha.

<table>
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<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
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<tr>
<td>Treatment</td>
<td>N1</td>
<td>N2</td>
<td></td>
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<tr>
<td>Av. yield</td>
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<td>3486</td>
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<tr>
<td>C.D.</td>
<td>316Kg/ha.</td>
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</table>
Object Type II: To study the effect of different levels of N, P and K on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) Maize-Wheat-Cotton-Serji, for 60; N.A. for others. (b) Maize for 60; N.A. for others. (c) N.A.
   (ii) Sandy loam; Alluvial; N.A.: Indian alluvium for 63 and 64. (iii) 26.10.60; 30.10.66; N.A.; N.A.; 12.11.64. (iv) (a) 5 ploughings; 3 ploughings; N.A. for others. (b) Pora method for 60 and 61; N.A. for others. (c) 80Kgf/ha; 76.5Kg/ha.; N.A. for others. (d) 23cm between rows; N.A. for others. (v) Nil. (vi) Irrigated. (vii) One hoeing for 60 and 61; N.A. for others. (ix) N.A. (x) 18.6.61; last week of April; N.A.; 19.6.64; N.A.

2. TREATMENTS:
   All combinations of (1),(2),(3) and (4).
   (1) 3 levels of F.Y.M.: F₀=0, F₁=5000 and F₂=11200Kg/ha.
   (2) 3 levels of N as C/A/N: N₀=0, N₁=22.4 and N₂=44.8Kg/ha.
   (3) 3 levels of P₂O₅ as Super; P₀=0, P₁=22.4 and P₂=44.8Kg/ha.
   (4) 3 levels of K₂O as Mor. Pot.; K₀=0, K₁=22.4 and K₂=44.8 Kg/ha.

3. DESIGN:
   (i) 3° Fct. confd. (ii) (a) 9 plots/block, 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 10.06m. × 50.04m.; 1/197.6 ha.; N.A. for others. (b) 8.86m. × 45.8m.; 1/247 ha.; N.A. for others. (v) 61cm. × 26cm; N.A. for others. (vi) Ye1. (vii) N.A.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-64. (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   40(M.A.E.)
   (i) 1434Kg/ha. (ii) 275 Kg/ha. (iii) Main effect of N is highly significant and that of F is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>K₀</th>
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</tbody>
</table>

C.D. for N or F marginal means=151.7 Kg/ha.
Phase I
(i) 1466 Kg/ha. (ii) 341.2 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>P₀</th>
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</tbody>
</table>

C.D. for N marginal means = 187.7 Kg/ha.

Phase II (Direct effect)
(i) 1377 Kg/ha. (ii) 193.7 Kg/ha. (iii) Main effect of N is highly significant. Main effect of P, K and interaction N x P, N x F are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
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C.D. for N, P or K marginal means = 106.5 Kg/ha.

C.D. for the body of N x P or N x F table = 184.5 Kg/ha.
Phase III (Residual effect)

(i) 923 Kg/ha. (ii) 209.4 Kg/ha (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

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C.D for N marginal means=115.2 Kg/ha.

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\[978 \ 1018 \ 895 \ 974 \ 899 \]

\[892 \ 1018 \ 858 \]

\[923 \]

\[61 (M.A.E.)\]

Cumulative Phase

(i) 1837 Kg/ha. (ii) 286.8 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant. (vii) Av. yield of grain in Kg/ha.

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C.D for N or P marginal means=157.7 Kg/ha.
Residual Phase

(i) 1681 Kg/ha.  (ii) 284.2 Kg/ha.  (iii) Main effect of N alone is highly significant.  (vi) Av. yield of grain in Kg/ha.

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C.D. for N marginal means=150.3 Kg/ha.

Direct Phase

(i) 1362 Kg/ha.  (ii) 354.4 Kg/ha.  (iii) Main effect of N alone is highly significant.  (vi) Av. yield of grain in Kg/ha.

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C.D. for N marginal means=194.9 Kg/ha.
63 (M.A.E.)

Direct effect

(i) 288 Kg/ha. (ii) 391'0 Kg/ha. (iii) Main effects of N and P are highly significant. Main effect of F and interaction F x N are significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N or P marginal means = 215'0 Kg/ha.

C.D. for the body of N x F table = 372'4 Kg/ha.

Cumulative Effect

(i) 2546 Kg/ha. (ii) 454'6 Kg/ha. (iii) Main effects of F and N are highly significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N or F marginal means = 250'0 Kg/ha.
Residual effect

(i) 2257 Kg/ha. (ii) 540·6 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
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| K<sub>4</sub> | 1812        | 2381        | 2786        | 2374        | 2326        | 2278        | 1997        | 2223        | 2155  |       |
| K<sub>1</sub> | 2109        | 2168        | 2690        | 2107        | 2779        | 2072        |           |             |       |       |
| K<sub>5</sub> | 1784        | 2018        | 2574        | 1997        | 2223        | 2155        |           |             |       |       |

| P<sub>4</sub> | 1715        | 2072        | 2690        |           |             |       |       |             |       |
| P<sub>1</sub> | 2258        | 2478        | 2594        |           |             |       |       |             |       |
| P<sub>5</sub> | 1722        | 2017        | 2765        |           |             |       |       |             |       |

C.D. for N or P marginal means—297·3 Kg/ha.

64(M.A.E.)

Cumulative Phase

(i) 2214 Kg/ha. (ii) 465·3 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

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| K<sub>4</sub> | 1567        | 2309        | 2901        | 2103        | 2488        | 2185        |           |             |       |       |
| K<sub>1</sub> | 1690        | 2233        | 2363        | 2282        | 2240        | 2144        |           |             |       |       |
| K<sub>5</sub> | 1649        | 2309        | 2529        | 2102        | 2138        | 2226        |           |             |       |       |

| P<sub>4</sub> | 1539        | 2296        | 2722        |           |             |       |       |             |       |
| P<sub>1</sub> | 1649        | 2447        | 2790        |           |             |       |       |             |       |
| P<sub>5</sub> | 1718        | 2138        | 2680        |           |             |       |       |             |       |

C.D. for N marginal means—255·9 Kg/ha.
Residual effect

(i) 1689 Kg/ha.  (ii) 381.4 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of grain in Kg/ha.

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| K₀  | 1402| 1786| 1704| 1553| 1690| 1649| 1924| 2020| 1525|       |
| K₁  | 1758| 1649| 2061| 1443| 1650| 1745|       |       |       |       |
| K₂  | 1677| 1580| 1581|       |       |       |       |       |       |       |

| P₀  | 1594| 1608| 1718| 1622| 1686| 1759| 1883| 1993| 1759| 1878 |
| P₁  | 1718| 1745| 1897| 1883| 1993| 1759| 2130| 2282| 1952| 2121 |
| P₂  | 1525| 1663| 1731| 2240| 1993| 2312| 2440| 1993| 2312| 2182 |

Direct Phase

(i) 2060 Kg/ha.  (ii) 415.8 Kg/ha.  (iii) Main effect of N is highly significant and that of F is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th></th>
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<th>N₂</th>
<th>P₀</th>
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| K₀  | 1525| 2295| 2433| 1952| 2226| 2075|       |       |       |       |
| K₁  | 1622| 2158| 2488| 2075| 2158| 2034|       |       |       |       |
| K₂  | 1708| 2089| 2226| 1924| 1844| 2554|       |       |       |       |
| P₀  | 1594| 2034| 2323|       |       |       |       |       |       |       |
| P₁  | 1693| 2199| 2336|       |       |       |       |       |       |       |
| P₂  | 1567| 2309| 2487|       |       |       |       |       |       |       |

C.D. for N or F marginal means—228.7 Kg/ha.
Crop: Wheat (Rabi).

Site: M.A.E. Centre, Nasirpur

Ref: Ph. 60, 61 (M.A.E.)

Type: 'M'.

Objec.:—Type IX: To study the relative efficacy of different types of phosphates along with different methods of application on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 4.11.60; 8.11.61. (iv) (a) 4—5 ploughings. (b) Kera method. (c) 80 Kg/ha. (d) 23cm between rows. (e) — (v) Nil. (vi) C-273. (vii) Irrigated. (viii) one hoeing. (ix) N.A. (x) 15.4.61; 1st week of April, 62.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4)+extra treatments in each block.
   (1) 3 types of phosphates : P₁ =Super, P₂=ODDA (20-20-0) and P₃=PEC (16-14-0)
   (2) 3 levels of fertilizers : L₁=12 Kg/ha. of N + 10.5 Kg/ha. of P₂O₅. L₂=2L₁ and L₃=2L₂
   (3) 3 methods of application of fertilizers : M₁—broadcasted before sowing, M₄=placement 6·3cm. below seed and M₅=Band placement.
   (4) 2 levels of F.Y.M : F₀=0 and F₁=5604 Kg/ha.
   Extra treatments: N₀=0, N₁=12, N₂=24 and N₃=48Kg/ha. of N.

3. DESIGN:
   (i) (3³x2)+4, confd. (ii) (a) 13 plots/block; 6 blocks/replication (3 blocks received F₀ treatment and other 3 blocks received F₁ treatment.) (b) N.A. (iii) 1. (iv) (a) 3·28m. x 7·64m. (b) 2·82m. x 7·18m. (v) 23cm. x 23cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-61. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Only marginal means and S.E.'s are available and are presented under 5. Results.

5. RESULTS:

60(M.A.E.)
   (i) 3477Kg/ha. (ii) 464·8 Kg/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of grain in Kg/ha. (Marginal means)

<table>
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<tr>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
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Extra Treatment
   N₀ | N₁ | N₂ | N₃
   3456 | 3445 |
Av. yield.
   3528 | 3547 | 3864 | 3477

61(M.A.E.)
   (i) 2315 Kg/ha. (ii) 367·1 Kg/ha. (iii) Interaction (F×L) alone is highly significant. (vi) Av. yield of grain in Kg/ha. (Marginal means)

<table>
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<tr>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>L₁</th>
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Extra treatment
   N₀ | N₁ | N₂ | N₃
   2401 |
Av. yield.
   2278 | 2043 | 2209 | 2347

---

Site: M.A.E. Centre, Nasirpur.

Object Type V (a): To study the effect of different methods of placement of Nitrogenous manures on the yield of Wheat.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Alluvial. (iii) and (iv) N.A. (v) 33.6 Kg/ha. of P₂O₅ as Super. (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
All combinations of (1) and (2) + one control (without nitrogen)
(1) 3 methods of placement: M₁ = Broadcasted at sowing, M₂ = Drilled 7 cm below the Seed and M₃ = side band placement at about 5 to 8 cm. on either side.
(2) 3 levels of nitrogen in the form of A/S: N₁ = 31.6, N₂ = 50.4 and N₃ = 67.2 Kg/ha. of N.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-66. (b) N.A. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS:
62(M.A.E.)
(i) 2499 Kg/ha. (ii) N.A. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha. Control = 1630.
Treatment | M₁ | M₂ | M₃ | N₁ | N₂ | N₃
---|---|---|---|---|---|---
Av. yield | 2896 | 2682 | 2787 | 2565 | 2835 | 2965
C.D. = 267 Kg/ha.

63(M.A.E.)
(i) 2211 Kg/ha. (ii) N.A. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha. Control = 1968 Kg/ha.
Treatment | M₁ | M₂ | M₃ | N₁ | N₂ | N₃
---|---|---|---|---|---|---
Av. yield | 2366 | 2314 | 2438 | 2360 | 2516 | 2242

64(M.A.E.)
(i) 2502 Kg/ha. (ii) N.A. (iii) Main effects of M and N are significant. (iv) Av. yield of grain in Kg/ha. Control = 1873 Kg/ha.
Treatment | M₁ | M₂ | M₃ | N₁ | N₂ | N₃
---|---|---|---|---|---|---
Av. yield | 2715 | 2601 | 2819 | 2497 | 2778 | 2661
C.D. = 178 Kg/ha.

65(M.A.E.)
(i) 2791 Kg/ha. (ii) N.A. (iii) Main effects of M and N are significant. (iv) Av. yield of grain in Kg/ha. Control = 1654 Kg/ha.
Treatment | M₁ | M₂ | M₃ | N₁ | N₂ | N₃
---|---|---|---|---|---|---
Av. yield | 3104 | 3083 | 3322 | 2874 | 3239 | 3395
C.D. = 193 Kg/ha.
Crop: Wheat.

Site: M.A.E. Centre, Nasirpur.

Object: Type X: To compare the effect of green manure raised and ploughed both in-situ on succeeding cereal crop.

1. BASAL CONDITIONS:
   (i) to (c) N.A. (ii) Alluvial. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   All combinations of (1), (2) and (3)+(Extra treatment (T) in each block.
   (1) 3 green manuring treatments: \( G_0 \) = No green manure, \( G_1 \) = Green manure crop raised and ploughed back in-situ before cereal crop sown in-situ, and \( G_2 = G_1 + 35\text{Kg/ha.} \) of \( P_2 O_5 \) applied to G.M. crop.
   (2) 3 levels of Nitrogen: \( N_0 = 0 \), \( N_1 = 17.5 \) and \( N_2 = 35 \) Kg/ha. of N as A/S.
   (3) 3 levels of Phosphate: \( P_0 = 0 \), \( P_1 = 35 \) and \( P_2 = 70 \) Kg/ha. of \( P_2 O_5 \) as Super.
   (T) Extra treatment: N, P, K nutrients through artificial fertilizers equivalent to those obtained from G.M.

3. DESIGN:
   (i) 3 rep. (ii) (a) 10 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 1/100 ha. (b) 1/125 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-66. (65 N.A.) (b) N.A. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS:

\[ T = 1861 \text{ Kg/ha.} \]

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C.D. for G or N or P marginal means = 148 Kg/ha.

C.D. for Extra Vs. others = 256 Kg/ha.
(i) 2043 Kg/ha. (ii) 257.5 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

\[ T = 1853 \text{ Kg/ha.} \]

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<td>2080</td>
<td>2488</td>
<td>2064</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=175 Kg/ha.

(64(M.A.E.)

(i) 2030 Kg/ha. (ii) 355.7 Kg/ha. (iii) Main effects of G, N and Ext. Vs. "others" are highly significant. (iv) Av. yield of grain in Kg/ha.

\[ T = 3225 \text{ Kg/ha.} \]

<table>
<thead>
<tr>
<th></th>
<th>( G_0 )</th>
<th>( G_1 )</th>
<th>( G_2 )</th>
<th>( N_0 )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( P_0 )</td>
<td>1623</td>
<td>3163</td>
<td>3017</td>
<td>2289</td>
<td>2455</td>
<td>3039</td>
<td>2601</td>
</tr>
<tr>
<td>( P_1 )</td>
<td>1727</td>
<td>2955</td>
<td>2851</td>
<td>2226</td>
<td>2622</td>
<td>2684</td>
<td>2511</td>
</tr>
<tr>
<td>( P_2 )</td>
<td>1956</td>
<td>2997</td>
<td>2790</td>
<td>2102</td>
<td>2764</td>
<td>2872</td>
<td>2581</td>
</tr>
<tr>
<td>Mean</td>
<td>1769</td>
<td>3038</td>
<td>2886</td>
<td>2206</td>
<td>2615</td>
<td>2872</td>
<td>2564</td>
</tr>
</tbody>
</table>

C.D. for G or N marginal means=242 Kg/ha.

C.D. for Ext. Vs. others =419 Kg/ha.

Crop :- Wheat (Rabi).

Site :- Jawadhi Ludhiana (c.f.)

Ref :- Pb. 60(147).

Type :- 'M'.

Object :- To study the effect of different ratios of N, P and K on the yield of Wheat.

1.BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) Nil. (iv) C-273. (v) (a) 4.5 ploughings. (b) Kerai. (c) to (e) N.A. (vi) 29.10.60. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 19.4.61
2. TREATMENTS:

(Actual dose - N.A.)

3. DESIGN:
(i) R.B.D.; 4; 4. (ii) (iii) N.A. (b) 494 ha. (iv) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only (b) No. (c) Nil. (v) Phoolarwal, Ghungrali and Sadhar. (vi) and (vii) Nil.

5. RESULTS:
(i) 2738 Kg/ha. (ii) 279.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2147</td>
<td>2764</td>
<td>2923</td>
<td>3116</td>
</tr>
<tr>
<td>C.D.</td>
<td>447.8 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Crop: Wheat (Rabi). Ref: Pb. 60 and 61 (S.F.T.).
Site: Sangrur, Patiala, Ludhiana, Hoshiarpur, Jullundur and Ferozepur

Object:—Type A: To study the response of N, P and K applied individually and in combination on the yield of Wheat.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O=Control (no manure)
N=22.4 Kg/ha. of N
P=22.4 Kg/ha. of P2O5
K=22.4 Kg/ha. of K2O
NP=22.4 Kg/ha. of N+22.4 Kg/ha. of P2O5
NK=22.4 Kg/ha. of N+22.4 Kg/ha. of K2O
PK=22.4 Kg/ha. of P2O5+22.4 Kg/ha. of K2O.
NPK=22.4 Kg/ha. of N+22.4 Kg/ha. of P2O5+22.4 Kg/ha. of K2O.

3. DESIGN:
(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years with in the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on Cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. Three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rates of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.
4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960–61. (b) and (c) N.A. (v) to (vii) N.A.

Av. response in Kg/ha.

5. RESULTS:

60 (S.F.T.)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of Control trials</th>
<th>Yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangpur</td>
<td>14</td>
<td>2060 280 180</td>
<td>110</td>
<td>59'0</td>
<td>460</td>
<td>60</td>
<td>60</td>
<td>110</td>
<td>47'0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patiala</td>
<td>9</td>
<td>2080 590 260</td>
<td>130</td>
<td>55'0</td>
<td>40</td>
<td>40</td>
<td>0</td>
<td>80</td>
<td>60'0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ludhiana</td>
<td>10</td>
<td>1860 460 200</td>
<td>10</td>
<td>55'0</td>
<td>20</td>
<td>60</td>
<td>160</td>
<td>70</td>
<td>40'0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoshiarpur</td>
<td>2</td>
<td>1200 1180 440</td>
<td>310</td>
<td>144'0</td>
<td>290</td>
<td>20</td>
<td>10</td>
<td>40</td>
<td>61'0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jullundur</td>
<td>15</td>
<td>1890 450 130</td>
<td>130</td>
<td>33'0</td>
<td>20</td>
<td>10</td>
<td>20</td>
<td>90</td>
<td>28'0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferozepur</td>
<td>17</td>
<td>1490 290 90</td>
<td>80</td>
<td>30'0</td>
<td>20</td>
<td>10</td>
<td>50</td>
<td>10</td>
<td>18'0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 (S.F.T.)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of Control trials</th>
<th>Yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangpur</td>
<td>15</td>
<td>1700 460 250</td>
<td>130</td>
<td>61'0</td>
<td>30</td>
<td>60</td>
<td>70</td>
<td>120</td>
<td>35'0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patiala</td>
<td>8</td>
<td>2330 490 250</td>
<td>80</td>
<td>73'0</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>80</td>
<td>47'0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ludhiana</td>
<td>19</td>
<td>1850 640 280</td>
<td>100</td>
<td>85'0</td>
<td>180</td>
<td>0</td>
<td>60</td>
<td>50</td>
<td>69'0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoshiarpur</td>
<td>8</td>
<td>1550 1060 280</td>
<td>250</td>
<td>34'0</td>
<td>70</td>
<td>20</td>
<td>40</td>
<td>10</td>
<td>20'0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jullundur</td>
<td>15</td>
<td>1130 640 250</td>
<td>120</td>
<td>53'0</td>
<td>10</td>
<td>20</td>
<td>60</td>
<td>20</td>
<td>22'0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferozepur</td>
<td>19</td>
<td>1470 310 100</td>
<td>130</td>
<td>27'0</td>
<td>20</td>
<td>10</td>
<td>30</td>
<td>10</td>
<td>20'0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop = Wheat (Rabi).

Site = Patiala and Hoshiarpur

Ref = Pb. 60 and 61 (S.F.T.)

Type = 'M'.

Object = - Type A : To study the response of N, P and K applied individually and in combination on the yield of Wheat.

1. BASAL CONDITIONS

(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN:

Same as in type A conducted on Wheat crop under irrigated condition on page No. 476.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 61. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

Av. response in Kg/ha.
Crop: Wheat (Rabi).
Site: Patiala and Hoshiarpur

Object: - Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
7 manurial treatments:
   O = Control (no manure)
   N1 = 22.4 Kg/ha. of N as A/S,
   N2 = 44.8 Kg/ha. of N as A/S,
   N1' = 22.4 Kg/ha. of N as Urea,
   N2' = 44.8 Kg/ha. of N as Urea,
   N1'' = 22.4 Kg/ha. of N as C/A/N, and
   N2'' = 44.8 Kg/ha. of N as C/A/N.

3. DESIGN:
Same as in type A conducted under irrigated condition on Wheat crop on page No. 476.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 - 61. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   61 (S.F.T.)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N1</th>
<th>N1'</th>
<th>N2</th>
<th>N2'</th>
<th>N1''</th>
<th>N2''</th>
<th>S.B.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patiala</td>
<td>2</td>
<td>1870</td>
<td>70</td>
<td>740</td>
<td>160</td>
<td>570</td>
<td>410</td>
<td>1030</td>
<td>135'0</td>
</tr>
<tr>
<td>Hoshiarpur</td>
<td>7</td>
<td>1000</td>
<td>250</td>
<td>790</td>
<td>310</td>
<td>720</td>
<td>390</td>
<td>1010</td>
<td>60'0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N1</th>
<th>N1'</th>
<th>N2</th>
<th>N2'</th>
<th>N1''</th>
<th>N2''</th>
<th>S.B.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patiala</td>
<td>4</td>
<td>1770</td>
<td>360</td>
<td>760</td>
<td>290</td>
<td>540</td>
<td>440</td>
<td>800</td>
<td>67'0</td>
</tr>
<tr>
<td>Hoshiarpur</td>
<td>3</td>
<td>640</td>
<td>350</td>
<td>770</td>
<td>370</td>
<td>740</td>
<td>640</td>
<td>800</td>
<td>138'0</td>
</tr>
</tbody>
</table>

478
Crop: Wheat (Rabi).

Ref: Ph. 60(S.F.T) for Patiala and Sangrur and 61(S.F.T) for Sangrur and Hoshiarpur

Site: Patiala, Sangrur and Hoshiarpur. Type: ‘M’.

Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. **BASAL CONDITIONS**:
   (i) (a) to (c) N.A. (ii) Alluvial. (iii) to (vi) N.A. (vii) Irrigated. (vii) to (x) N.A.

2. **TREATMENTS**:
   7 manurial treatments:
   - O=Control (no manure)
   - N₁=22.4 Kg/ha. of N as A/S.
   - N₂=44.8 Kg/ha. of N as A/S.
   - N₃=22.4 Kg/ha. of N as urea.
   - N₄=44.8 Kg/ha. of N as urea.
   - N₅=22.4 Kg/ha. of N as C/A/N.
   - N₆=44.8 Kg/ha. of N as C/A/N.

3. **DESIGN**:
   Same as in type A conducted under irrigated condition on Wheat crop on page No. 476.

4. **GENERAL**:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) N.A. (v) to (vii) N.A.

5. **RESULTS**:
   Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No of Control</th>
<th>Yield N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
<th>N₆</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patiala</td>
<td>9</td>
<td>2080</td>
<td>610</td>
<td>950</td>
<td>450</td>
<td>1010</td>
<td>760</td>
<td>1130</td>
</tr>
<tr>
<td>Sangrur</td>
<td>16</td>
<td>1910</td>
<td>350</td>
<td>720</td>
<td>340</td>
<td>450</td>
<td>510</td>
<td>780</td>
</tr>
<tr>
<td>Hoshiarpur</td>
<td>7</td>
<td>2050</td>
<td>360</td>
<td>400</td>
<td>470</td>
<td>540</td>
<td>280</td>
<td>1970</td>
</tr>
<tr>
<td>Sangrur</td>
<td>8</td>
<td>1140</td>
<td>480</td>
<td>1130</td>
<td>320</td>
<td>850</td>
<td>480</td>
<td>1140</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).

Ref: Ph. 60(S.F.T) for Ferozepur and 61(S.F.T) for Sangrur, Ferozepur and Patiala

District: Sangrur, Ferozepur and Patiala. Type: ‘M’.

Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. **BASAL CONDITIONS**:
   (i) to (vi) N.A. (vii) Irrigated. (vii) to (x) N.A.

2. **TREATMENTS**:
   7 manurial treatments:
**O—Control (no manure)**

$N_1 = 22.4 \text{ Kg/ha. of N as A/S}$,

$N_2 = 44.8 \text{ Kg/ha. of N as A/S}$,

$N_3 = 22.4 \text{ Kg/ha. of N as Urea}$,

$N_4 = 44.8 \text{ Kg/ha. of N as Urea}$,

$N_5 = 22.4 \text{ Kg/ha. of N as A/S/N}$

$N_6 = 44.8 \text{ Kg/ha. of N as A/S/N}$

3. **DESIGN**:

Same as in type A conducted under irrigated condition on Wheat crop on page No. 476.

4. **GENERAL**:

(i) and (ii) N.A. (iii) Yield of grain. (iv) to (vii) N.A.

5. **RESULTS**:

Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$N_1'$</th>
<th>$N_2'$</th>
<th>$N_1''$</th>
<th>$N_2''$</th>
<th>S E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferozepur</td>
<td>15</td>
<td>1490</td>
<td>290</td>
<td>440</td>
<td>270</td>
<td>410</td>
<td>220</td>
<td>430</td>
<td>55.0</td>
</tr>
<tr>
<td>Sangrur</td>
<td>8</td>
<td>1730</td>
<td>340</td>
<td>470</td>
<td>270</td>
<td>520</td>
<td>580</td>
<td>760</td>
<td>103.0</td>
</tr>
<tr>
<td>Ferozepur</td>
<td>12</td>
<td>1320</td>
<td>170</td>
<td>320</td>
<td>160</td>
<td>360</td>
<td>170</td>
<td>330</td>
<td>39.0</td>
</tr>
<tr>
<td>Patiala</td>
<td>8</td>
<td>2490</td>
<td>50</td>
<td>950</td>
<td>470</td>
<td>1070</td>
<td>590</td>
<td>1190</td>
<td>105.3</td>
</tr>
</tbody>
</table>

**Crop**: Wheat (Rabi).

Ref: Ph. 62 to 65 (S.F.T.) for Ferozepur, Gurdaspur, Ludhiana, Patiala and Sangrur; 62, 65 (S.F.T.) for Hoshiarpur and 62, 63, and 65 (S.F.T.) for Jullundur.

**District**: Ferozepur, Gurdaspur, Ludhiana, Patiala, Sangrur, Type ‘M’ Hoshiarpur and Jullundur.

Object: —Type A1: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS**:

(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. **TREATMENTS**:

8 manurial treatments:

O—Control (no manure)

$N_1 = 35 \text{ Kg/ha. of N}$,

$N_2 = 70 \text{ Kg/ha.}$,

$P_1 = 35 \text{ Kg/ha. of P}_2O_5$,

$N_1P_1 = 35 \text{ Kg/ha. of N}+35 \text{ Kg/ha. of P}_2O_5$
N<sub>2</sub>P<sub>1</sub> = 70 Kg/ha. of N<sub>1</sub> P<sub>1</sub> 35 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
N<sub>2</sub>P<sub>1</sub> = 70 Kg/ha. of N<sub>1</sub> P<sub>1</sub> 35 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
N<sub>2</sub>P<sub>1</sub>K<sub>1</sub> = 70 Kg/ha. of N<sub>1</sub> P<sub>1</sub> 35 Kg/ha. of K<sub>2</sub>O

3. DESIGN:
(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A<sub>1</sub>, 11 of type A<sub>2</sub>, 11 of type A<sub>3</sub> and 3 are type C. The eleven experiments each under type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are distributed as 3 on a Kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oilseed. All the three type C experiments are conducted on legume crop. For the purpose of conducting the A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are laid out. For conducting these experiments, three villages are randomly selected in each block.
(iii) (a) 1/1000ha. (b) 1/2000ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N A. (iii) Yield of grain. (iv) (a) 1962 to 66 for Ferozepur, Gurdaspur, Ludhiana, Patiala and Sangrur. 1962 to 66 for Hoshiarpur. (63,64, N.A.) and 1962 to 65 for Jullundur (64 N.A.) (iv) to (vii) N.A.

5. RESULTS:
Patiala
62 (S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;n&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;n&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;n&lt;/sub&gt;</th>
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<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>642</td>
<td>820</td>
<td>327</td>
<td>778</td>
<td>931</td>
<td>1188</td>
<td>1153</td>
<td>114.1</td>
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Control yield = 1799 Kg/ha.; No. of trials = 7

63(S.F.T.)
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<th>N&lt;sub&gt;n&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;n&lt;/sub&gt;</th>
<th>N&lt;sub&gt;n&lt;/sub&gt;P&lt;sub&gt;n&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>536</td>
<td>625</td>
<td>214</td>
<td>577</td>
<td>1017</td>
<td>1037</td>
<td>1034</td>
<td>181.3</td>
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Control yield = 2464 Kg/ha.; No. of trials = 7

64(S.F.T.)
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<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>553</td>
<td>939</td>
<td>102</td>
<td>674</td>
<td>1150</td>
<td>1344</td>
<td>1348</td>
<td>80.5</td>
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Control yield = 1781 Kg/ha.; No. of trials = 11

65(S.F.T.)
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<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;n&lt;/sub&gt;</th>
<th>N&lt;sub&gt;n&lt;/sub&gt;P&lt;sub&gt;n&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>503</td>
<td>956</td>
<td>-20</td>
<td>636</td>
<td>1238</td>
<td>1222</td>
<td>1417</td>
<td>159.1</td>
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</table>
Control yield = 1679 Kg/ha.; No. of trials = 8

Hoshiarpur
62(S.F.T.)
<table>
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<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;n&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;n&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;n&lt;/sub&gt;</th>
<th>N&lt;sub&gt;n&lt;/sub&gt;P&lt;sub&gt;n&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>222</td>
<td>170</td>
<td>-85</td>
<td>227</td>
<td>333</td>
<td>459</td>
<td>511</td>
<td>185.2</td>
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Control yield = 980 Kg/ha.; No. of trials = 2
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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
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<td>Julundur</td>
<td>579</td>
<td>996</td>
<td>45</td>
<td>722</td>
<td>1108</td>
<td>1359</td>
<td>1369</td>
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<td>Control yield = 1245 Kg/ha.; No. of trials = 15</td>
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<tr>
<td>63 (S.F.T.)</td>
<td>391</td>
<td>580</td>
<td>179</td>
<td>555</td>
<td>778</td>
<td>985</td>
<td>1085</td>
<td>69.5</td>
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<tr>
<td>65 (S.F.T.)</td>
<td>380</td>
<td>664</td>
<td>186</td>
<td>486</td>
<td>674</td>
<td>912</td>
<td>1043</td>
<td>71.1</td>
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<td>Control yield = 1808 Kg/ha.; No. of trials = 16</td>
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<tr>
<td>66 (S.F. T.)</td>
<td>590</td>
<td>1052</td>
<td>218</td>
<td>825</td>
<td>946</td>
<td>1396</td>
<td>1678</td>
<td>117.3</td>
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<td>Control yield = 1096 Kg/ha.; No. of trials = 10</td>
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<tr>
<td>Ferozepur</td>
<td>448</td>
<td>622</td>
<td>213</td>
<td>542</td>
<td>605</td>
<td>904</td>
<td>624</td>
<td>96.5</td>
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<td>Control yield = 1467 Kg/ha.; No. of trials = 9</td>
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<tr>
<td>67 (S.F.T.)</td>
<td>376</td>
<td>589</td>
<td>99</td>
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<td>764</td>
<td>965</td>
<td>1027</td>
<td>59.8</td>
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<td>Control yield = 1149 Kg/ha.; No. of trials = 10</td>
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<tr>
<td>69 (S.F.T.)</td>
<td>458</td>
<td>755</td>
<td>202</td>
<td>682</td>
<td>940</td>
<td>1125</td>
<td>1238</td>
<td>72.8</td>
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<td>Control yield = 1395 Kg/ha.; No. of trials = 7</td>
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<tr>
<td>65 (S.F.T.)</td>
<td>210</td>
<td>411</td>
<td>89</td>
<td>368</td>
<td>610</td>
<td>737</td>
<td>856</td>
<td>35.2</td>
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<td>Control yield = 1779 Kg/ha.; No. of trials = 17</td>
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Gurdaupur
62(S.F.T.)
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>347</td>
<td>673</td>
<td>70</td>
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<tr>
<td>Control yield=1205 Kg/ha.; No. of trials=7</td>
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63(S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>448</td>
<td>602</td>
<td>21</td>
<td>606</td>
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<tr>
<td>Control yield=1375 Kg/ha.; No. of trials=8</td>
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64(S.E.T)
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<th>NaPtKt</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>441</td>
<td>773</td>
<td>93</td>
<td>648</td>
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<tr>
<td>Control yield=1301 Kg/ha.; No. of trials=11</td>
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Ludhiana
62(S.F.T.)
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<th>NaPtKt</th>
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<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>289</td>
<td>417</td>
<td>9</td>
<td>435</td>
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<tr>
<td>Control yield=1293 Kg/ha.; No. of trials=10</td>
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63(S.F.T.)
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<th>NaPtKt</th>
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<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>339</td>
<td>965</td>
<td>58</td>
<td>745</td>
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<tr>
<td>Control yield=1819 Kg/ha.; No. of trials=7</td>
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64(S.F.T.)
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<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>339</td>
<td>563</td>
<td>207</td>
<td>699</td>
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<tr>
<td>Control yield=2142 Kg/ha.; No. of trials=11</td>
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65(S.F.T.)
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<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>454</td>
<td>708</td>
<td>405</td>
<td>843</td>
</tr>
<tr>
<td>Control yield=2033 Kg/ha.; No. of trials=14</td>
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</table>
Crop: Wheat (Rabi)
District: Gurdaspur, Hoshiarpur, Ludhiana and Patiala.

Object Type A₁: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A.  (vii) Unirrigated.  (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN: are same as in Type A₁ conducted on Wheat crop under irrigated condition on page No. 480.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of Wheat.  (vi) (a) 1962 to 66 (64 and 65 N.A.) for Gurdaspur, 1962 to 66.  (65 N.A.) for Hoshiarpur, 1962 for Ludhiana and 1963 only for Patiala.  (iv) to (vii) N.A.
5. RESULTS:

**Gurdaspur**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>355</td>
<td>635</td>
<td>102</td>
<td>431</td>
<td>817</td>
<td>929</td>
<td>1011</td>
<td>62.5</td>
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Control yield = 448 Kg/ha.; No. of trials = 3

**63 (S.F.T.)**

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<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>444</td>
<td>743</td>
<td>224</td>
<td>889</td>
<td>1284</td>
<td>1415</td>
<td>1524</td>
<td>94.8</td>
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Control yield = 872 Kg/ha.; No. of trials = 4

**Hoshiarpur**

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<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>513</td>
<td>855</td>
<td>113</td>
<td>555</td>
<td>918</td>
<td>1019</td>
<td>1037</td>
<td>89.7</td>
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Control yield = 1030 Kg/ha.; No. of trials = 10

**64 (S.F.T.)**

<table>
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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>S.E.</th>
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<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>423</td>
<td>740</td>
<td>88</td>
<td>498</td>
<td>952</td>
<td>890</td>
<td>1141</td>
<td>108.2</td>
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Control yield = 1078 Kg/ha.; No. of trials = 17

**64 (S.F.T.)**

<table>
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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>433</td>
<td>853</td>
<td>105</td>
<td>566</td>
<td>993</td>
<td>1213</td>
<td>1261</td>
<td>60.9</td>
</tr>
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</table>

Control yield = 1250 Kg/ha.; No. of trials = 18

**Ludhiana**

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<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>263</td>
<td>505</td>
<td>186</td>
<td>507</td>
<td>639</td>
<td>836</td>
<td>965</td>
<td>110.9</td>
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Control yield = 1054 Kg/ha.; No. of trials = 3

**Patiala**

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<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>333</td>
<td>528</td>
<td>56</td>
<td>464</td>
<td>593</td>
<td>672</td>
<td>785</td>
<td>70.6</td>
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</table>

Control yield = 630 Kg/ha.; No. of trials = 4
Crp : Wheat (Rabi)  
Ref :- Pb. 62, 63(S.F.T.) for Jullundur  
District :- Jullundur, Ludhiana, Patiala, Sangur and Hoshiarpur.  
62 to 65(S.F.T.) for Ludhiana, Patiala, Sangur and 62,65(S.F.T.) for Hoshiarpur.  
Type :- ‘M’.  

Object :- Type A₂ : To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :  
(i) to (vii) N.A.  
(viii) to (x) Irrigated.  
(vi) to (c) N.A.

2. TREATMENTS :  
8 manurial treatments :  
O=Control (No manure)  
N₁=35 Kg/ha. of N,  
P₁=15Kg/ha. of P₂O₅,  
P₂=70 Kg/ha. of P₂O₅,  
N₁P₁=35 Kg/ha. of N+35 Kg/ha. of P₂O₅,  
N₁P₂=35 Kg/ha. of N+70 Kg/ha. of P₂O₅,  
N₁P₁K₂=70 Kg/ha. of N+70 Kg/ha. of P₂O₅ and  
N₁,P₂K₂=70 Kg/ha. of N+70 Kg/ha. of P₂O₅+70Kg/ha. of K₂O.

3. DESIGN :  
Same as in type A₁ Conducted under irrigated condition on Wheat crop on page No. 480.

4. GENERAL :  
(i) and (ii) N.A.  
(iii) Yield of wheat.  
(iv) (a) 1962 to 63 for Jullundur, 1962 to 66 for Ludhiana, Patiala, Sangrur and 1962 to 66 for Hoshiarpur (63 and 64 N.A.)  
(b) and (c) Nil.  
(v) to (vii) N.A.

5. RESULTS  
Jullundur  
62 (S.F.T.)  
Treatment  
N₁  P₁  P₂  N₁P₁  N₁P₂  N₁P₁K₂  S.E.  
Av. response of grain in Kg/ha.  
408 116 231 482 599 719 812 59.8  
Control yield=1244 Kg/ha.  
No. of trials=12.

63(S. F.T.)  
Treatment  
N₁  P₁  P₂  N₁P₁  N₁P₂  N₁P₁K₂  S.E.  
Av. response of grain in Kg/ha.  
613 159 307 706 807 1044 1110 55.5  
Control yield=1519 Kg/ha.  
No. of trials=16.

Ludhiana  
62(S.F.T.)  
Treatment  
N₁  P₁  P₂  N₁P₁  N₁P₂  N₁P₁K₂  S.E.  
Av. response of grain in Kg/ha.  
652 295 356 652 894 1178 985 369.2  
Control yield=1712 Kg/ha.  
No. of trials=7.
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<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;5&lt;/sub&gt;</th>
<th>S.E.</th>
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<tr>
<td><strong>Av. response of grain in Kg/ha.</strong></td>
<td>582</td>
<td>250</td>
<td>426</td>
<td>807</td>
<td>1013</td>
<td>1153</td>
<td>1374</td>
<td>389.0</td>
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<tr>
<td><strong>Control yield—1889 Kg/ha; No. of trials—7</strong></td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Treatment</strong></td>
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<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;3&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</td>
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<td>N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;5&lt;/sub&gt;</td>
<td>S.E.</td>
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<tr>
<td><strong>Av. response of grain in Kg/ha.</strong></td>
<td>771</td>
<td>287</td>
<td>433</td>
<td>880</td>
<td>1226</td>
<td>1592</td>
<td>1717</td>
<td>1042.2</td>
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<tr>
<td><strong>Control yield—1719 Kg/ha; No. of trials—16</strong></td>
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<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;3&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</td>
<td>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</td>
<td>N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;5&lt;/sub&gt;</td>
<td>S.E.</td>
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<tr>
<td><strong>Av. response of grain in Kg/ha.</strong></td>
<td>559</td>
<td>260</td>
<td>548</td>
<td>665</td>
<td>979</td>
<td>1258</td>
<td>1376</td>
<td>104.4</td>
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<td><strong>Control yield—2000 Kg/ha; No. of trials—15</strong></td>
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**Patiala**

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<th>N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;5&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td><strong>Av. response of grain in Kg/ha.</strong></td>
<td>485</td>
<td>95</td>
<td>459</td>
<td>732</td>
<td>936</td>
<td>1015</td>
<td>1174</td>
<td>97.8</td>
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<tr>
<td><strong>Control yield—1623 Kg/ha; No. of trials—7</strong></td>
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<td><strong>Treatment</strong></td>
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<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;3&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</td>
<td>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</td>
<td>N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;5&lt;/sub&gt;</td>
<td>S.E.</td>
</tr>
<tr>
<td><strong>Av. response of grain in Kg/ha.</strong></td>
<td>499</td>
<td>232</td>
<td>336</td>
<td>741</td>
<td>1095</td>
<td>1047</td>
<td>1371</td>
<td>176.3</td>
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<tr>
<td><strong>Control yield—2357Kg/ha; No. of trials—8</strong></td>
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<tr>
<td><strong>Treatment</strong></td>
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<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
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<td>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</td>
<td>N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;5&lt;/sub&gt;</td>
<td>S.E.</td>
</tr>
<tr>
<td><strong>Av. response of grain in Kg/ha.</strong></td>
<td>459</td>
<td>-3</td>
<td>131</td>
<td>504</td>
<td>654</td>
<td>1132</td>
<td>1110</td>
<td>117.7</td>
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<td><strong>Control yield—1859 Kg/ha; No. of trials—12</strong></td>
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<td><strong>Treatment</strong></td>
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<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;5&lt;/sub&gt;</td>
<td>S.E.</td>
</tr>
<tr>
<td><strong>Av. response of grain in Kg/ha.</strong></td>
<td>491</td>
<td>246</td>
<td>270</td>
<td>723</td>
<td>1001</td>
<td>1532</td>
<td>1447</td>
<td>132.6</td>
<td></td>
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<tr>
<td><strong>Control yield—1621 Kg/ha; No. of trials—9</strong></td>
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**Sangrur**

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<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;P&lt;sub&gt;5&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td><strong>Av. response of grain in Kg/ha.</strong></td>
<td>555</td>
<td>162</td>
<td>321</td>
<td>512</td>
<td>747</td>
<td>786</td>
<td>943</td>
<td>90.4</td>
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<tr>
<td><strong>Control yield—1708 Kg/ha; No. of trials—15</strong></td>
<td></td>
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</table>
Crop: Wheat (Rabi).

Ref: Pb. 63(S.F.T) for Patiala, 63,64(S.F.T) for Hoshiarpur, 62,63(S.F.T) for Gurdaspur and 62,63(S.F.T) for Ludhiana.

Type 'M'.

Object: Type A2: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A.  (vii) Irrigated  (viii) to (x) N.A.

2. TREATMENTS:
   Same as in type A4 conducted on Wheat crop under irrigated condition on page No. 486.
3. DESIGN:

Same as in type A conducted under irrigated condition on Wheat crop on page No. 480.

4. GENERAL

(i) and (ii) N.A. (iii) Yield of wheat. (iv) 1963 for Patiala, 1962 to 66 Hoshiarpur (62, 65 N.A.). (b) 1962 to 66 for Gurdaspur (64 N.A.) and 1962, 63 for Ludhiana. (v) to (vii) N.A.

5. RESULTS:

Patiala

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<th>S.E.</th>
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<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>258</td>
<td>49</td>
<td>143</td>
<td>429</td>
<td>444</td>
<td>605</td>
<td>840</td>
<td>85·7</td>
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Control yield=659 Kg/ha. ; No. of trials=4

Hoshiarpur

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<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>463</td>
<td>137</td>
<td>198</td>
<td>645</td>
<td>708</td>
<td>970</td>
<td>1012</td>
<td>72·5</td>
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Control yield=901 Kg/ha. ; No. of trials=17

Gurdaspur

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<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;K&lt;sub&gt;3&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>615</td>
<td>141</td>
<td>328</td>
<td>748</td>
<td>707</td>
<td>1120</td>
<td>1283</td>
<td>87·6</td>
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Control yield=1357 Kg/ha. ; No. of trials=18

Gurdaspur

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<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>318</td>
<td>88</td>
<td>237</td>
<td>496</td>
<td>607</td>
<td>854</td>
<td>716</td>
<td>159·1</td>
</tr>
</tbody>
</table>

Control yield=321 Kg/ha. ; No. of trials=4

63(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;K&lt;sub&gt;3&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>467</td>
<td>160</td>
<td>345</td>
<td>1072</td>
<td>1010</td>
<td>1111</td>
<td>1494</td>
<td>138·5</td>
</tr>
</tbody>
</table>

Control yield=825 Kg/ha. ; No. of trials=4

65(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;K&lt;sub&gt;3&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>270</td>
<td>44</td>
<td>110</td>
<td>391</td>
<td>517</td>
<td>831</td>
<td>824</td>
<td>76·7</td>
</tr>
</tbody>
</table>

Control yield=990 Kg/ha. ; No. of trials=10
Ludhiana

62 (S.F.T.)

Treatment | $N_1$ | $P_1$ | $P_2$ | $N_1P_1$ | $N_1P_2$ | $N_0P_0$ | $N_0P_0K_0$ | S.E.
--- | --- | --- | --- | --- | --- | --- | --- | ---
Av. response of grain in Kg/ha. | 343 | 264 | 674 | 683 | 856 | 1090 | 1245 | 101

Control yield = 1179 Kg/ha.; No of trials = 3

63 (S.F.T.)

Treatment | $N_1$ | $P_1$ | $P_2$ | $N_1P_1$ | $N_1P_2$ | $N_0P_0$ | $N_0P_0K_0$ | S.E.
--- | --- | --- | --- | --- | --- | --- | --- | ---
Av. response of grain in Kg/ha. | 125 | 204 | 349 | 487 | 606 | 810 | 1041 | 66

Control yield = 1001 Kg/ha.; No of trials = 3

Crop: Wheat (Rabi)

District: Ferozepur, Ludhiana, Patiala, Ludhiana, Patiala and Sangrur; Jullundur, Hoshiarpur and Gurdaspur

Ref.: Pb 62 to 65 (S.F.T.) for Ferozepur, 62,63 (S.F.T.) for Jullundur; 62,65 (S.F.T.) for Hoshiarpur and 62,63 and 65 (S.F.T.) for Gurdaspur.

Type: ‘CM’.

Object: A: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O = Control (no manure), $N_1 = 35$ Kg/ha. of $N$, $K_1 = 35$ Kg/ha. of $K_2O$, $K_0 = 70$ Kg/ha. of $K_2O$, $N_1K_1 = 35$ Kg/ha. of $N+35$ Kg/ha. of $K_2O$, $N_1K_0 = 35$ Kg/ha. of $N+70$ Kg/ha. of $K_2O$, $N_2K_0 = 70$ Kg/ha. of $N+70$ Kg/ha. of $K_2O$ and $N_1P_1K_1 = 35$ Kg/ha. of $N+35$ Kg/ha. of $P_2O_5+35$ Kg/ha. of $K_2O$.

3. DESIGN:
   Same as in type $A_1$. Conducted under irrigated condition on Wheat crop on page No. 480.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) 1962 to 65 (S.F.T.) for Ferozepur, Ludhiana, Patiala and Sangrur; 62, 65 (S.F.T.) for Jullundur; 62, 65 (S.F.T.) for Hoshiarpur and 62, 63 and 65 (S.F.T.) for Gurdaspur (v) to (vii) N.A.
5. RESULTS:

Ferozepur
62(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>361</td>
<td>44</td>
<td>340</td>
<td>365</td>
<td>503</td>
<td>702</td>
<td>682</td>
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</table>

Control yield = 1472 Kg/ha.; No. of trials = 5

63 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>573</td>
<td>174</td>
<td>298</td>
<td>695</td>
<td>797</td>
<td>1004</td>
<td>901</td>
</tr>
</tbody>
</table>

Control yield = 1123 Kg/ha.; No. of trials = 8

64(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>454</td>
<td>89</td>
<td>182</td>
<td>626</td>
<td>649</td>
<td>871</td>
<td>1180</td>
</tr>
</tbody>
</table>

Control yield = 1301 Kg/ha.; No. of trials = 8

65(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>278</td>
<td>81</td>
<td>184</td>
<td>416</td>
<td>504</td>
<td>630</td>
<td>720</td>
</tr>
</tbody>
</table>

Control yield = 1516 Kg/ha.; No. of trials = 15

Ludhiana

62(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>810</td>
<td>95</td>
<td>69</td>
<td>445</td>
<td>477</td>
<td>924</td>
<td>734</td>
</tr>
</tbody>
</table>

Control yield = 1517 Kg/ha.; No. of trials = 7

63(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>472</td>
<td>49</td>
<td>192</td>
<td>507</td>
<td>608</td>
<td>908</td>
<td>934</td>
</tr>
</tbody>
</table>

Control yield = 1983 Kg/ha.; No. of trials = 7

64(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>686</td>
<td>196</td>
<td>403</td>
<td>681</td>
<td>804</td>
<td>1160</td>
<td>1177</td>
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</tbody>
</table>

Control yield = 1796 Kg/ha.; No. of trials = 14

65(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>515</td>
<td>213</td>
<td>440</td>
<td>539</td>
<td>693</td>
<td>1008</td>
<td>1094</td>
</tr>
</tbody>
</table>

Control yield = 1888 Kg/ha.; No. of trials = 16
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>62(S.F.T.)</td>
<td>51</td>
<td>522</td>
<td>833</td>
<td>1030</td>
<td>1123</td>
<td>761</td>
<td>2361</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>1651 Kgs</td>
<td>No. of trials = 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>63(S.F.T.)</td>
<td>509</td>
<td>98</td>
<td>212</td>
<td>523</td>
<td>679</td>
<td>820</td>
<td>939</td>
</tr>
<tr>
<td>Control</td>
<td>2033 Kgs</td>
<td>No. of trials = 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>64(S.F.T.)</td>
<td>501</td>
<td>197</td>
<td>225</td>
<td>577</td>
<td>681</td>
<td>1186</td>
<td>1136</td>
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<tr>
<td>Control</td>
<td>1820 Kgs</td>
<td>No. of trials = 12</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>65(S.F.T.)</td>
<td>610</td>
<td>90</td>
<td>211</td>
<td>756</td>
<td>831</td>
<td>1074</td>
<td>1262</td>
</tr>
<tr>
<td>Control</td>
<td>1688 Kgs</td>
<td>No. of trials = 10</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>Sangrur</td>
<td>62(S.F.T.)</td>
<td>558</td>
<td>85</td>
<td>132</td>
<td>482</td>
<td>669</td>
<td>915</td>
</tr>
<tr>
<td>Control</td>
<td>1570 Kgs</td>
<td>No. of trials = 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>63(S.F.T.)</td>
<td>290</td>
<td>57</td>
<td>262</td>
<td>520</td>
<td>598</td>
<td>735</td>
<td>767</td>
</tr>
<tr>
<td>Control</td>
<td>1195 Kgs</td>
<td>No. of trials = 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>64(S.F.T.)</td>
<td>381</td>
<td>520</td>
<td>307</td>
<td>787</td>
<td>879</td>
<td>1010</td>
<td>608</td>
</tr>
<tr>
<td>Control</td>
<td>1603 Kgs</td>
<td>No. of trials = 9</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>65(S.F.T.)</td>
<td>328</td>
<td>84</td>
<td>74</td>
<td>210</td>
<td>178</td>
<td>536</td>
<td>405</td>
</tr>
<tr>
<td>Control</td>
<td>1623 Kgs</td>
<td>No. of trials = 11</td>
<td></td>
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<tr>
<td>Av. response of grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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### 5. RESULTS:

#### Jullundur

<table>
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<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>443</td>
<td>123</td>
<td>232</td>
<td>540</td>
<td>638</td>
<td>794</td>
<td>780</td>
</tr>
</tbody>
</table>

Control yield = 1303 Kg/ha.; No. of trials = 12

#### Hoshiarpur

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>729</td>
<td>258</td>
<td>349</td>
<td>691</td>
<td>774</td>
<td>1107</td>
<td>1088</td>
</tr>
</tbody>
</table>

Control yield = 1464 Kg/ha.; No. of trials = 14

#### Gurdaspur

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>543</td>
<td>8</td>
<td>106</td>
<td>671</td>
<td>692</td>
<td>1106</td>
<td>1103</td>
</tr>
</tbody>
</table>

Control yield = 1131 Kg/ha.; No. of trials = 13

---

S.E. values are provided for comparison. No. of trials for each treatment is also indicated.
Object: —Type A. To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS
Same as in type A, conducted under irrigated condition on Wheat crop on page No. 490.

3. DESIGN:
Same as in type A, conducted under irrigated condition on Wheat crop on page No. 480.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of wheat. (iv) (a) 1962 for Ferozepur, Patiala, 1962 to 66 for Hoshiarpur (65 N.A.), 1962 to 63 for Ludhiana and 1963 to 66 for Gurdaspur (65 N.A.). (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
Ferozepur
62(S.F.T.)

<table>
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<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>192</td>
<td>93</td>
<td>256</td>
<td>143</td>
<td>326</td>
<td>385</td>
<td>118</td>
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Control yield=1126 Kg/ha.; No. of trials=2

Patiala
62(S.F.T.)

<table>
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<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>224</td>
<td>22</td>
<td>76</td>
<td>244</td>
<td>328</td>
<td>696</td>
<td>541</td>
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</table>

Control yield=669 Kg/ha.; No. of trials=4

Hoshiarpur
62 (S.F.T.)

<table>
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<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>414</td>
<td>60</td>
<td>105</td>
<td>461</td>
<td>453</td>
<td>769</td>
<td>778</td>
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Control yield=729 Kg/ha.; No. of trials=9

63(S.F.T.)

<table>
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<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
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<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>422</td>
<td>96</td>
<td>142</td>
<td>468</td>
<td>522</td>
<td>903</td>
<td>825</td>
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</table>

Control yield=1067 Kg/ha.; No. of trials=17
Object: —To study the response of different varieties of Wheat to different doses of fertilizer.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Nil. (c) N.A. (ii) Heavy loam. (iii) 13.11.62. (iv) (a) 5-6 ploughings. (b) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) 18.4.63.

2. TREATMENTS:

Main-plot treatments:

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<tr>
<th>Crop</th>
<th>Site</th>
<th>Type</th>
<th>Ref.</th>
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<tr>
<td>Wheat</td>
<td>Agri. Res. Sta; Gurdaspur</td>
<td>'MV'</td>
<td>Pb. 62 (195).</td>
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<table>
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<th>Treatment</th>
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<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
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<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</td>
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<tr>
<td>Av. response</td>
<td>422</td>
<td>63</td>
<td>177</td>
<td>610</td>
<td>626</td>
<td>1019</td>
<td>818</td>
<td>81 5</td>
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<tr>
<td></td>
<td>Control</td>
<td>yield=1164 Kg/ha.;</td>
<td>No. of trials=17</td>
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<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
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<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</td>
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<tr>
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<td>235</td>
<td>400</td>
<td>552</td>
<td>644</td>
<td>802</td>
<td>888</td>
<td>113 4</td>
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<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
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<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</td>
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<td>Av. response</td>
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<td>85</td>
<td>164</td>
<td>467</td>
<td>540</td>
<td>632</td>
<td>830</td>
<td>42 8</td>
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<th>Treatment</th>
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<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
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<tr>
<td>Treatment</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</td>
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<tr>
<td>Av. response</td>
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<td>217</td>
<td>300</td>
<td>672</td>
<td>765</td>
<td>1087</td>
<td>931</td>
<td>128 7</td>
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<tr>
<td></td>
<td>Control</td>
<td>yield=937 Kg/ha.;</td>
<td>No. of trials=5</td>
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<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
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<th>S.E.</th>
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<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</td>
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<tr>
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<td>262</td>
<td>-29</td>
<td>11</td>
<td>314</td>
<td>375</td>
<td>648</td>
<td>585</td>
<td>60 0</td>
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<tr>
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<td>Control</td>
<td>yield=1164 Kg/ha.;</td>
<td>No. of trials=9</td>
<td></td>
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</table>

Activity: To study the response of different varieties of Wheat to different doses of fertilizer.

Main-plot treatments:

7 fertilizers: M<sub>0</sub>=Control (No manure), M<sub>1</sub>=44·8 Kg/ha. of N, M<sub>2</sub>=89·6 Kg/ha. of N, M<sub>3</sub>=M<sub>1</sub>+22·4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, M<sub>4</sub>=M<sub>3</sub>+44·8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22·4 Kg/ha. of K<sub>2</sub>O, M<sub>5</sub>=M<sub>4</sub>+22·4 Kg/ha. of K<sub>2</sub>O and M<sub>6</sub>=M<sub>5</sub>+44·8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+44·8 Kg/ha. of K<sub>2</sub>O.
Sub-plot treatments:

2 varieties: \( V_1 = \text{C-286} \) and \( V_2 = \text{C-273} \).

3. DESIGN:

(i) Split-plot. (ii) (a) 7 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/197.7 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 1743 Kg/ha. (ii) (a) 219.4 Kg/ha. (b) 109.9 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha,

<table>
<thead>
<tr>
<th></th>
<th>( M_0 )</th>
<th>( M_1 )</th>
<th>( M_2 )</th>
<th>( M_3 )</th>
<th>( M_4 )</th>
<th>( M_5 )</th>
<th>Mean</th>
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<tbody>
<tr>
<td>( V_1 )</td>
<td>519</td>
<td>1661</td>
<td>2034</td>
<td>1532</td>
<td>2397</td>
<td>1774</td>
<td>2466</td>
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<tr>
<td>( V_2 )</td>
<td>499</td>
<td>1557</td>
<td>1942</td>
<td>1641</td>
<td>2392</td>
<td>1715</td>
<td>2273</td>
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<tr>
<td>Mean</td>
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<td>1609</td>
<td>1988</td>
<td>1586</td>
<td>2394</td>
<td>1744</td>
<td>2370</td>
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</table>

C.D. for M marginal means=230.3 Kg/ha.

---

Crop: Wheat \((Rabi)\)  
Ref: Pb. 61(62).  
Type: \( 'MV' \).

Object—To study the effect of different doses of N on different varieties of Wheat crop.

1. BASAL CONDITIONS:

(i) to (c) N.A. (ii) Sandy loam. (iii) 29.11.61 (iv) (a) 6-8 ploughings, 6-8 plankings. (b) Behind the plough. (c) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) N.A.  
(x) 26.4.62.

2. TREATMENTS:

All combinations of (1) and (2):

(1) 6 levels of N as Ca(N)\(_2\)O\(_4\): \( N_0 = 0 \), \( N_1 = 22.4 \), \( N_2 = 33.6 \), \( N_3 = 44.8 \), \( N_4 = 56.0 \), and \( N_5 = 67.2 \) Kg/ha.  
(2) 2 varieties: \( V_1 = \text{C-286} \) and \( V_2 = \text{C-273} \).

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/346 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961 (Design and treatments modified in 62). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 1316 Kg/ha. (ii) 132.8 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.
Crop :- Wheat (Rabi).

Site :- Reg. Wheat Res. Stn., Gurdaspur.

Object :- To study the effect of different doses of N on the different varieties of Wheat crop.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) 6-8 ploughings, 6-8 plankings. (b) Behind the plough. (c) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 seedings. (ix) and (x) N.A.

2. TREATMENTS :
   Main-plot treatments :-
   4 levels of N as C/A/N : N₁=0, N₂=22.4, N₃=44.8 and, N₄=67.2 Kg/ha.
   Sub-plot treatments:
   3 varieties : V₁=C-273, V₂=C-306 and V₃=C-286.

3. DESIGN :
   (i) Split-plot. (ii) (a) 4 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) N.A. (iv) and (v) N.A. (vi) Yes.

4 GENERAL :
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-63. (Treatments modified in 61) (b) N.A. (c) Nil. (v) to (vii) N.A.

5 RESULT:
   (i) 1043 Kg/ha. (ii) (a) 424.9 Kg/ha. (b) 1437 Kg/ha (iii) Main effect of N alone is significant (iv) Av. yield of grain in Kg/ha.

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<tr>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
<th>Mean</th>
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<td>973</td>
<td>1248</td>
<td>1440</td>
<td>1043</td>
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</table>

C.D. for N marginal means=301.7 Kg/ha.
Crop :- Wheat (Rabi).

Site :- Reg. Wheat Res. Sta., Gurdaspur.

Object :- To study the effect of different doses of N on different varieties of Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 25.11.63. (iv) (a) 6-8 ploughings. (b) Behind the plough. (c) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS:

Main-plot treatments:
3 varieties: \( V_1 = 303, V_2 = 273 \) and \( V_3 = 306 \).

Sub-plot treatments:
5 levels of N as \( C/A/N=N_1=0, N_2=22.4, N_3=44.8, N_4=67.2 \) and \( N_5=89.6 \) Kg/ha.

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/replication, 5 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-63. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 1868 Kg/ha. (ii) (a) 313.6 Kg/ha. (b) 151.3 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>( N_0 )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( N_3 )</th>
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<tr>
<td>( V_1 )</td>
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<td>1400</td>
<td>1614</td>
<td>1960</td>
<td>2109</td>
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C.D. for N marginal means=101.8 Kg/ha.
2. TREATMENTS:

Main-plot treatments:
5 doses of fertilizers: F₀ = 0 (Control), F₁ = 67.2 Kg/ha. of P₂O₅ + 44.8 Kg/ha. of K₂O, F₂ = 44.8 Kg/ha. of N + 57.2 Kg/ha. of P₂O₅ + 44.8 Kg/ha., of K₂O, F₃ = 89.6 Kg/ha. of N + 67.2 Kg/ha. of P₂O₅ + 44.8 Kg/ha. of K₂O and F₄ = 154.4 Kg/ha. of N + 89.6 Kg/ha. of P₂O₅ + 44.8 Kg/ha. of K₂O.

Sub-plot treatments:

3. DESIGN:
(i) Split-plot. (ii) (a) 5 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/2/7 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) and (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 3140 Kg/ha. (ii) N.A. (b) 482.4 Kg/ha. (iii) Main effect of V alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>F₀</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
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<td>2928</td>
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<td>2817</td>
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<td>V₆</td>
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<td>2869</td>
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<td>3226</td>
<td>3269</td>
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<td>3140</td>
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C.D. for V marginal means = 304 3 Kg/ha.

Crop: Wheat (Robi).
Site: Govt. Agrl. Stn., Gurdaspur.

Object: To study the effect of N,P and K on the yield of different varieties of Wheat.

1. BASAL CONDITIONS:
(i) N.A. (ii) Sandy loam. (iii) 17.11. 64. (iv) and (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) 24.4.65.

2. TREATMENTS

Main-plot treatments:
2 varieties: V₁ = C-273, V₆ = C-286.

Sub-plot treatments:
13 doses of fertilizers - F₀ = Control (No manure), F₁ = 44.8 Kg/ha. of N as C/A/N, F₂ = 89.6 Kg/ha. of N
as C/A/N: \( F_1 = F_2 + P_1, F_2 = F_3 + P_2, F_3 = F_4 + P_3, F_4 = F_5 + P_4, F_5 = F_6 + P_5, F_6 = F_7 + P_6, F_7 = F_8 + P_7, F_8 = F_9 + P_8, F_9 = F_{10} + P_9, F_{10} = F_{11} + P_{10}, F_{11} = F_{12} + P_{11}, F_{12} = F_{13} + P_{12}, F_{13} = F_{14} + P_{13}, F_{14} = F_{15} + P_{14} \)

3. DESIGN:

(i) Split-plot. (ii) (a) 2 main-plots/replication, 13 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 1/48.3 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964-only. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) N.A.

5. RESULTS:

(i) 2131 Kg/ha. (ii) (a) 286.0 Kg/ha. (a) 205.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( F_1 )</th>
<th>( F_2 )</th>
<th>( F_3 )</th>
<th>( F_4 )</th>
<th>( F_5 )</th>
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<td>( V_2 )</td>
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<td>1942</td>
<td>2231</td>
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<td>2268</td>
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<tr>
<td>Mean</td>
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<td>2198</td>
<td>1931</td>
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Crop: Wheat. (Rabi).
Site: Punjab Agri. University. (Ludhiana Campus) Ludhiana
Ref: Pb 65(121).
Type: MV.

Object: To study the effect of different levels of N on the yield of tall and dwarf varieties of wheat.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 16.11.65. (iv) (a) 3 ploughings. (b) By Kera. (c) 90 Kg/ha. (d) 23 cm. row to row. (e) Nil. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) 24.4.66.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 5 levels of N: \( N_0 = 0, N_1 = 45, N_2 = 90, N_3 = 135 \) and \( N_4 = 180 \) Kg/ha.

(2) 2 varieties: \( V_1 = C-306 \) and \( V_2 = PV-18 \).

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/250 ha. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) to (viii) Nil.

5. RESULTS:

(i) 4033 Kg/ha. (ii) 258.3 Kg/ha. (iii) Main effects of N, V and interaction N×V are highly significant. (iv) Av. yield of grain in Kg/ha.
Crop: Wheat (Rabi).

Site: Cotton Res. Stn., Abohar.

Object: To study the effect of deep ploughing and inter culturing on the yield of Wheat crop.

1. BASAL CONDITIONS:
(i) (a) Cotton-Wheat. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) Nov., 65. (iv) (a) 4-5 ploughings. (b) to (e) N.A. (v) C-273. (vi) Irrigated. (vii) 2 hoeings and 2 weedings. (ix) N.A. (x) 1st week of April, 66.

2. TREATMENTS:
Main-plot treatments:
3 ploughings: P1 = Normal ploughing, P2 = 22cm. deep ploughing every year after Cotton-Wheat and P3 = 22cm. deep ploughing once or two years after Wheat harvesting.

Sub-plot treatments:
3 inter-culturing treatments: C1 = One inter-culture, C2 = Two inter cultures and C3 = Three inter cultures.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4 (iv) (a) N.A. (b) 1/299 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain (iv) (a) 1965-only. (b) No. (c) Nil. (v) Jullundur and Gurdaspur. (vi) and (vii) Nil.

5. RESULTS:
(i) 3425 Kg/ha. (ii) (a) 1790 Kg/ha. (b) 2430Kg/ha. (iii) Main effect of 'P' alone is highly significant (iv) Av. yield of grain in Kg/ha.
Crop: Wheat (Rabi).


Ref: Ph. 65(66).

Type: 'C'.

Objec:—To study the effect of deep ploughing and inter culturing on the yield of Wheat crop.

1. BASAL CONDITIONS:
   (i) (a) Cotton-Wheat. (b) Cottton. (c) N.A. (ii) Heavy loam. (iii) Mid of Nov., 65. (iv) (a) 5-6 ploughings. (b) to (c) N.A. (v) N.A. (vi) C-286. (vii) Irrigated. (viii) 2 hoeings. (ix)—(a) Mid of April, 66.

2. TREATMENTS:
   Same as in expt. no. 65(59) and presented on page No. 301.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/291 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal (ii) N.A. (iii) Yield of grain. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) Abohar and Jullundur. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1019 Kg/ha. (ii) (a) 422·0 Kg/ha. (b) 173·0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
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<td>P2</td>
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<td>P3</td>
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</table>

Mean 3485 3442 3347 3425

C.D. for P marginal means = 178·8 Kg/ha.

Crop: Wheat (Rabi).


Ref: Ph. 65(33).

Type: 'C'.

Objec:—To study the effect of deep ploughing and inter culturing on the yield of Wheat crop.
1. BASAL CONDITIONS:
   (i) (a) Cotton-Wheat. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 3.11.65. (iv) (a) 5 ploughings. (b) to (e) N.A. (v) N.A. (vi) C-273. (vii) Irrigated. (viii) 2 hoeings, 2 weedings. (ix) N.A. (x) Mid of April, 66.

2. TREATMENTS:
   Same as in exp, no. 65(59) and presented on page No. 501.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/161 ha. (v) No. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1965 – contd. (b) No. (c) Nil. (v) Abha (vi) and (vii) N.A.

5. RESULTS:
   (i) 2321 Kg/ha. (ii) (a) 246'0 Kg/ha. (b) 314'0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>P2</th>
<th>P3</th>
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Crop :- Wheat. (Rabi).
Ref :- Pb. 61(110), 62(174).
Site :- Govt. Agric. College, Ludhiana.
Type :- 'C'.

Object :- To study the effect of deep cultivation on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam ; Loamy sand. (iii) 27.11. 61; 29. 11. 62. (iv) (a) 5-6 ploughings. (b) to (e) N.A (vi) 44 '8 Kg/ha. of N + 22 '8 Kg/ha. of P2O5. (vii) C-273. (vii) Irrigated. (viii) N.A.; (ix) N.A. (x) 16.4. 62.; 4 5.63.

2. TREATMENTS:
   3 depths of ploughing : D1= Shallow ploughing 10cm. to 15cm. deep. , D2= Deep ploughing 20cm. to 25 cm. deep and D3= Ripping up to 46cm. deep.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. ; 8. (iv) (a) N.A. (b) 1/59ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961 to 62. (b) No. (c) Nil. (v) N.A. (vi) Nil (vii) As the error variances are heterogeneous and Treatments x Years interaction is absent hence the results of individual years are given under 5. Results.
5. RESULTS:

(1) 1809 Kg/ha. (ii) 2280 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
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<th>D3</th>
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<tr>
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<td>1636</td>
<td>1894</td>
<td>1897</td>
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</tbody>
</table>

(2) 1036 Kg/ha. (ii) 928 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>D2</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>934</td>
<td>1025</td>
<td>1150</td>
</tr>
</tbody>
</table>

Crop: Wheat (Rabi).
Site: Reg. Wheat Res. Sta., Gurdaspur.

Object: To study the effect of different spacings on the yield of different varieties of Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 2.12.61. (iv) (a) 6-8 ploughings; 6-8 plankings. (b) Behind the plough. (c) N.A. (d) As per treatments. (e) N.A. (f) N.A. (g) As per treatments. (h) Irrigated. (i) 2 weedings. (ii) N.A. (iii) 30.4.62.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 3 varieties: V1=C-303, V2=C-273 and V3=C-286.
(2) 3 spacings (between rows): S1=15, S2=23 and S3=30 cm.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/49 ha. (c) N.A. (d) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) No. (c) Nil. (d) to (vii) N.A.

5. RESULTS:

(i) 6510 Kg/ha. (ii) 300 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
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<th>V3</th>
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<td>S2</td>
<td>662</td>
<td>633</td>
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<td>646</td>
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<td>S3</td>
<td>642</td>
<td>558</td>
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<tr>
<td>Mean</td>
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<td>644</td>
<td>585</td>
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Crop: Wheat (Rabi).
Site: Reg. Wheat Res. Stn., Gurdaspur
Ref: Pb. 61(59).
Type: CV.

Object: To study the effect of different seed rates on the different varieties of Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam. (iii) 24.11.61.  (iv) (a) 6-8 ploughings and 6-8 plankings. (b) Behind the plough.  (c) As per treatments.  (d) and (e) N.A.  (v) G.M. with Dhiantcha 22·4 Kg/ha. of N as C/A/N and 17·9 Kg/ha. of P2O5 as Super.  (vi) As per treatments  (vii) Irrigated.  (viii) 2 weedicings.  (ix) N.A.  (a) 27.4.62.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 5 seed rates: S1=49·4, S2=59·3, S3=69·2, S4=79·1, S5=89·0 and S6=98·8 Kg/ha.
   (2) 2 varieties: V1=273 and V4=286.

3. DESIGN:
   (i) Fact. in R B.D.  (ii) (a) 12. (b) N.A.  (iii) 6.  (iv) (a) N.A.  (b) l/136ha.  (c) N.A.  (v) Yes.

4. GENERAL:
   (i) Normal  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1961-64. (modified for 62 to 64 treatments and Design.)  (b) No.  (c) N0.  (v) to (vii) N.A.

5. RESULTS:
   (i) 1216 Kg/ha.  (ii) 448·8 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>S2</th>
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<th>S4</th>
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<td>1344</td>
<td>1301</td>
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Crop: Wheat (Rabi).
Ref: Pb. 62(90).
Type: CV.

Object: To study the effect of different seed rates on the yield of different varieties of Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) N.A. (iv) (a) 6-8 ploughings, 6-8 plankings. (b) Behind the plough.  (c) As per treatments.  (d) and (e) N.A.  (v) N.A.  (vi) As per treatments.  (vii) Irrigated.  (viii) 2 weedicings.  (ix) N.A.  (a) 27.4.62.

2. TREATMENTS:
   Main-plot treatments:
   3 varieties: V1=C-306, V2=C-273 and V1=C 286.
   Sub-plot treatments:
   4 seed rates: S1=49·4, S2=74·1, S3=98·8 and S4=123·6 Kg/ha.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/136ha.  (v) N.A.  (vi) Yes.
4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-64 (Treatments modified every year). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 1474 Kg/ha. (ii) (a) 118.0 Kg/ha. (b) 164.6 Kg/ha. (iii) Main effect of V alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>V₃</th>
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C.D. for V marginal means = 102.0 Kg/ha.

Crop :: Wheat. (Rabi).
Ref :: Ph. 63(108).
Type :: 'CV'.

Object :: To study the effect of different seed rates on the yield of different varieties of Wheat.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) 6-8 ploughings, and 6-8 plankings. (b) Behind the plough. (c) As per treatments. (d) and (e) N.A. (v) 44.8 Kg/ha. of N + 28 Kg/ha. of P₂O₅. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS:
Main-plot treatments:
3 varieties: V₁ = C-303, V₂ = C-273 and V₃ = C-305.
Sub-plot treatments:
4 seed-rates: S₁ = 49.4, S₂ = 74.1, S₃ = 98.8 and S₄ = 123.6 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961 to 64 (Treatments modified every year). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 2166 Kg/ha. (ii) (a) 222.8 Kg/ha. (b) 151.3 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of grain in Kg/ha.
Object: To study the effect of different seed rates on different varieties of Wheat.

1. BASAL CONDITIONS:
   (i) to (c) N.A.  (ii) Sandy loam.  (iii) N.A.  (iv) 6-8 ploughings, 6-8 plankings.  (b) Behind the plough.  (c) As per treatments.  (d) and (e) N.A.  (v) 44·8 Kg/ha. of N and 44·8 Kg/ha. of P₂O₅ at the time of sowing.  (vi) As per treatments.  (viii) 1 irrigation.  (ix) and (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   4 seed rates: S₁=49·6, S₂=54·1, S₃=78·8 and S₄=123·6 Kg/ha.
   Sub-plot treatments:
   3 varieties: V₁=C-273, V₂=C-306 and V₃=C-286.

3. DESIGN:
   (i) Split-plot.  (ii) 4 main-plots/replication; 3 sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (v) 1/247ha.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) 1961-64. (Treatments modified every year) (b) No.  (c) Nil.  (v) to (vii) N.A.

5. RESULTS:
   (i) 314 Kg/ha.  (ii) (a) 294 Kg/ha.  (b) 335·2 Kg/ha.  (iii) Main effect of V alone is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
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</table>

C.D. for S marginal means = 101·7 Kg/ha.

---

**Crop:** Wheat. **(Rabi)**  
**Site:** Reg. Wheat. Res. Stn., Gurdaspur.  
**Ref:** Pb. 64(102).  
**Type:** ‘CV’.
Crop: Wheat (Rabi).


Ref: Pb. 62(88).

Type: 'CV'.

Object: To study the effect of different dates of sowing on the yield of different varieties of Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) 6-8 ploughings, 6-8 plankings. (b) Behind the plough. (c) to (e) N.A.: (v) 33.6 Kg/ha. of N. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   4 dates of sowing: D1 = 30th Nov., D2 = 14th Nov., D3 = 30th Nov. and D4 = 14th Dec. 62.

   Sub-plot treatments:
   3 varieties: V1 = C-286, V2 = C-306 and V3 = C-273.

3. DESIGN:
   (i) Split-plot (ii) 4 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A (b) 1.197 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-64. (Treatments modified every year). (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 1409 Kg/ha. (ii) (a) 1991 Kg/ha. (b) 1463 Kg/ha. (iii) Main effects of D and V are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
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<td>D4</td>
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<td>519</td>
<td>577</td>
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</tbody>
</table>

Mean 1359 1525 1342 1409

C.D for D marginal means = 183.9 Kg/ha.
C.D for V marginal means = 106.7 Kg/ha.

---
2. TREATMENTS:

Main-plot treatments:

Sub-plot treatments:
3 varieties: V₁ = C-303, V₂ = C-306, and V₃ = C-273.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 to 64 (Treatments modified every year). (b) N.A. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 2362 Kg/ha. (ii) (a) 111'3 Kg/ha. (b) 445'5 Kg/ha. (iii) Main effects of D and V are significant. (iv) As yield of grain in Kg/ha.

<table>
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<td>D₄</td>
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</table>

C.D. for D marginal means = 102'8 Kg/ha.
C.D. for V marginal means = 325'1 Kg/ha.

Crop: Wheat (Rahi).

Ref: Ph. 64(275).

Site: Ag. Res. Sta., Gurdaspur.

Type: 'CV'.

Object: To study the effect of different dates of sowing on different varieties of Wheat.

1. BASAL CONDITIONS:
(i) (a) Cotton-Weat. (b) Cotton. (c) N.A. (ii) Heavy loam. (iii) As per treatments. (iv) (a) 4 ploughings. (b) Ker. (c) 70 Kg/ha. (d) and (e) 22 cm. (v) 45 Kg/ha. of N + 28 Kg/ha. of P₂O₅. (vi) As per treatments. (vii) Irrigated. (vii) One hoeing and one weeding. (ix) 93 cm. (x) 2nd first night of April.

2. TREATMENTS:

Main-plot treatments:

Sub-plot treatments:
3 varieties: V₁ = C-273, V₂ = C-306, and V₃ = C-286.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.
4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Germination Counts and yield of grain. (iv) (a) 1962-64 (Treatments modified every year) (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:

(i) 2470 Kg/ha. (ii) (a) 216.7 Kg/ha. (b) 250.5 Kg/ha. (iii) Main effects of D, V and interaction D x V are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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</table>

C.D. for D marginal means = 200.2 Kg/ha.
C.D. for V marginal means = 185.9 Kg/ha.
C.D. for D means at the same level of V = 212.4 Kg/ha.
C.D. for V means at the same level of D = 255.7 Kg/ha.

Crop : Wheat. (Rabi).

Ref : Pb. 64(272).

Site : Punjab Agri. University (Ludhiana, Campus); Ludhiana.

Type : ‘CV’.

Object—To study the effect of seed rates and dates of sowing on the yield of different varieties of Wheat.

1. BASAL CONDITIONS:

(i) (a) Maize—Fallow-Wheat. (b) Fallow. (c) Nil. (ii) Loamy Sand. (iii) As per treatments. (iv) (a) 3 ploughings. (b) Kern. (c) As per treatments. (d) 22 cm. (e) — (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) One hoeing. (ix) 11 cm. (x) Second week of April, 65.

1. TREATMENTS:

Main-plot treatments:

3 dates of sowing : D₁ = Ist Nov., D₂ = 21st Nov., and D₃ = 15th Dec.

Sub-plot treatments:

All combinations of (1) and (2)

(1) 2 varieties : V₁ = C-306, and V₂ = C-273,

(2) 4 seed rates : S₁ = 74, S₂ = 99, S₃ = 124, and S₄ = 148 Kg/ha.

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/replication, 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/286.7 ha. (v) N.A. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) Nil. (iii) Germination count and yield of grain. (iv) (a) 1964—only (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 3418 Kg/ha. (ii) (a) 331·3 Kg/ha. (b) 321·1 Kg/ha. (iii) Main effects of D, V, S and interactions D x V, D x S and S x V are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
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Mean
3463 3185 3456 3569
3244 3592 3418

C.D. for D marginal means=202·7 Kg/ha.
C.D. for S marginal means=185·5 Kg/ha.
C.D. for V marginal means=131·0 Kg/ha.
C.D. for the body of S x V table =262·2 Kg/ha.
C.D. for D means at the same level of V=25·7 Kg/ha.
C.D. for V means at the same level of D=227·0 Kg/ha.
C.D. for D means at the same level of S=342·8 Kg/ha.
C.D. for S means at the same level of D=321·0 Kg/ha.

Crop: Wheat (Rabi).

Object:—To study the residual effect of mixed cropping and manuring on the yield of succeeding Wheat crop.

1. BASAL CONDITIONS:
(i) (a) Cotton-Wheat. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 4·11·65. (iv) (a) to (c) N.A. (v) At per treatments (vi) N.A. (vii) Irrigate. (viii) Sugarcane. (ix) Ant N.A. (x) 1546.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 8 mixed crop treatments:—T_1=Cotton (m) 60cm. x 45cm., T_2=Cotton (w) 90cm. x 30cm., T_3=Cotton + Bhendi (one row), T_4=Cotton + Bhendi (2 rows), T_5=Cotton + Cowpeas (one row), T_6=Cotton + Cowpeas (two rows), T_7=Cotton + Gaura fodder and T_8=Cotton + Gaura (green manure).
(2) 2 levels of N: N_1=60 and N_2=120 Kg/ha.
25 Kg/ha. of N at sowing, rest at flowering 40 Kg/ha. of P_2O_5 applied to Cowpeas and Gaura.

3. DESIGN:
(i) Fact. in R.B.D (ii) (a) 16. (b) N.A. (iii) 4 (iv) (a) N.A. (b) 1/440'3 ha. (v) N.A. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) 2 sprayings of Endrine 0.02% solu. (iii) Yield of grain. (iv) (a) 1965—only (b) Nil. (c) N.A. (v) and (vi) Nil.

5. RESULTS:
(i) 601 Kg/ha. (ii) 106.6 Kg/ha. (iii) Main effects of T and N are highly significant and interaction T x N is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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Mean 390 403 356 1173 661 557 697 601

C.D. for T marginal means = 107.4 Kg/ha.
C.D. for N marginal means = 53.7 Kg/ha.
C.D. for body of T x N table = 154.9 Kg/ha.

Crop: Wheat (Rabi).
Site: Reg. Wheat Res. Sta., Gurdaspur.
Type: ‘CM’
Ref.: Pb. 62(86), 63(109), 64(98).

Object: To study the effect of different spacings and levels of N on the yield of Wheat.

1. BASAL CONDITIONS
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) Mid of Nov. (iv) (a) 6 to 8 ploughings, 6 to 8 planking. (b) Behind the plough. (c) 50.8 Kg/ha. (d) As per treatments. (e) N.A. (f) N.A. (g) 3-273. (h) Irigated. (viii) 2 weedings. (x) and (x) N.A.

3. DESIGN:
Main-plot treatments:
3 levels of N as C/A/N: N4=0, N1=28 and N2=56 Kg/ha.
Sub-plot treatments:
3 spacings between rows: S1=15, S2=23 and S3=30cm.
N applied at the time of sowing.

2. TREATMENTS:
(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (vi) (a) 1962 to 64. (b) No. (c) Nil. (v) N.A. (vii) Since the sub-plot error variances are heterogeneous, therefore results of individual years are presented under 5. Results.

5. RESULTS:
62 (86)
(i) 970 Kg/ha. (ii) (a) 136.4 Kg/ha. (b) 94.4 Kg/ha. (iii) Main effect of N is highly significant, and that of ‘S’ is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<td>S3</td>
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<td>978</td>
<td>1416</td>
<td>940</td>
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</tbody>
</table>

Mean 434 1026 1450 970
C.D. for N marginal means = 101.4 Kg/ha.
C.D. for S marginal means = 64.3 Kg/ha.
Crop: Wheat (Rahi).
Site: Agri Res. Stn., Gurdaspur.
Object: To find out the best row to row spacing for Wheat at different levels of Nitrogen.

1. BASAL CONDITIONS:
   (i) (a) Fallow-Wheat, (b) Fallow, (c) Nil, (ii) Sandy loam, (iii) Up to 20th Nov., 64. (iv) (a) 4 ploughings by tractor, (b) Kera, (c) 98-9 Kg/ha, (d) 20 cm, (e) — (v) C/A/N applied, quantify N.A. (vi) C-273, (vii) Irrigated, (viii) 2 weedings. (ix) 11 cm, (x) Second week of April, 65.

2. TREATMENTS:
   Main-plot treatments:
   3 levels of Nitrogen: \( N_0 = 0 \), \( N_1 = 28 \) Kg/ha, and \( N_2 = 56 \) Kg/ha.
   Sub-plot treatments:
   3 spacings: \( S_1 = 15'2 \) cm, \( S_2 = 22'9 \) cm, and \( S_3 = 30'5 \) cm.

3 DESIGN:
   (i) Split-plot, (ii) (a) 3 main-plots/replication and 3 sub-plots/main-plot, (b) N.A. (iii) 6, (iv) (a) 1/2472ha, (v) No, (vi) Yes.

4. GENERAL:
   (i) Satis factory, (ii) Nil, (iii) Germination, no. of plants and yield of grain. (iv) (a) 1965-cond. (b) No. (c) Nil, (v) No, (vi) and (vii) Nil.

5. RESULTS:
   (i) \( 2621 \) Kg/ha, (ii) \( 273.5 \) Kg/ha, (b) \( 377.4 \) Kg/ha, (iii) Main effects of N and S are highly significant. (iv) Av. yield of grain in Kg/ha.

\[
\begin{array}{cccc}
 & N_0 & N_1 & N_2 & \text{Mean} \\
S_1 & 2452 & 2689 & 2855 & 2665 \\
S_2 & 2511 & 2659 & 2768 & 2646 \\
S_3 & 2355 & 2637 & 2664 & 2552 \\
\text{Mean} & 2439 & 2662 & 2763 & 2621 \\
\end{array}
\]

C.D. for N marginal means = 158'5 Kg/ha.
C.D. for S marginal means = 256'9 Kg/ha.
2. TREATMENTS:

Main-plot treatments:
All combinations of (1) and (2)
(1) 2 levels of $P_0$: $P_0=0$ and $P_0=40$ kg/ha.
(2) 2 levels of $K_0$: $K_0=0$ and $K_0=40$ kg/ha.

Sub-plot treatments:
3 methods of sowing: $T_s$=Kera, $T_s$=Pora and $T_s$=Broadcast.

3. DESIGN:

(i) Split-plot. (ii) 4 main-plots/replication; 3 sub-plots/main-plot. (iii) 6. (iv) 1/27 ha. (v) No. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Germination Counting and yield of grain. (iv) (a) 1964-Contd. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:

(i) 2735 kg/ha. (ii) 2154 kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in kg/ha.

<table>
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<tr>
<th></th>
<th>$T_1$</th>
<th>$T_2$</th>
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_Crop_: Wheat. (Rabi).

Object:—To study the requirements of N for Wheat in different rotations.

1. BASAL CONDITIONS:

(i) (a) and (b) As per treatments. (c) N.A. (ii) Sandy loam. (iii) Up to 20th Nov., 64. (iv) 6-8 ploughings, 6-8 plankings. (b) Behind the plough. (c) 75 kg/ha. (d) 22 cm. (e) — (f) N.A. (vii) C-273. (viii) Irrigated. (x) 59-3 cm. (x) 1st week of April, 65.

2. TREATMENTS:

Main-plot treatments:
5 different rotations:
$R_1$=Fallow-Wheat, $R_2$=Dhaincha-Wheat (G.M.), $R_3$=Maize-Wheat, $R_4$=Rice-Wheat and $R_5$=Chari-Wheat.

Sub-plot treatments:
4 levels of N: $N_0=0$, $N_1=33.6$, $N_2=67.3$ and $N_3=100.2$ kg/ha.

3. DESIGN:

(i) Split-plot. (ii) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.
4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) No. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 2620 Kg/ha. (ii) (a) 429-4 Kg/ha. (b) 442-5 Kg/ha. (iii) Main effects of R and N are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
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<td>Mean</td>
<td>1962</td>
<td>2292</td>
<td>2930</td>
<td>2996</td>
</tr>
</tbody>
</table>

C.D. for R marginal means=331-2 Kg/ha.
C.D. for N marginal means=322-0 Kg/ha.

Crop : Wheat. (Rabi).
Site : Punjab Agri. University (Ludhiana Campus) Ludhiana.

Object : To study the effect of different dates of sowing and the application of Nitrogen and Phosphorus on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) Fallow or maize -Wheat. (b) Fallow. (c) Nil. (ii) Loamy sand. (iii) As per treatments. (iv) (a) 1-ploughings. (b) Kera. (c) 85 Kg/ha. (d) 20 cm. (e) - (v) 80 Kg/ha. of N=25 Kg/ha. of P₂O₅. (vi) C-306. (vii) Irrigated. (viii) One hoeing. (ix) 1/0 cm. (x) Second week of April, 65.

2. TREATMENTS:

Main-plot treatments :
All combinations of (1) and (2).
(1) 3 levels of Nitrogen : N₀=0, N₁=44-5 Kg/ha. and N₂=89-0 Kg/ha.
(2) 2 levels of P₂O₅ : P₀=0 and P₁=67-3 Kg/ha.

Sub-plot treatments :

3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication. 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) 1/286-7 ha. (v) No. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Germination and yield of grain. (iv) (a) 1964-contd. (design changed in 65). (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS :

(i) 2333 Kg/ha. (ii) (a) 587-6 Kg/ha. (b) 246-4 Kg/ha. (iii) Main effects of N and D are highly significant. Interaction D x N is significant and D x P is highly significant. (iv) Av. yield of grain in Kg/ha.
Object:—To study the effect of different dates of sowing and the application of Nitrogen and Phosphorus on the yield of Wheat.

1. BASAL CONDITIONS:
(i) (a) Fallow-Wheat. (b) Fallow. (c) Nil. (ii) Loamy sand. (iii) Upto 20th Nov., 65. (iv) 3 ploughings. (b) Kern. (c) 85 Kg/ha. (d) 20cm. (e) — (v) N.A. (vi) C-273. (vii) Irrigated. (viii) One hoeing. (ix) 9.1cm. (x) Second week of April, 66.

2. TREATMENTS:
Main-plot treatments:
4 dates of sowing :-D1=1st Nov., D2=15th Nov., D3=1st Dec. and D4=15 th Dec.

Sub-plot treatments
All combinations of (1) and (2)
(1) 3 levels of nitrogen: N0=0, N1=45 and N2=90 Kg/ha.
(2) 2 levels of P2O5=P1=0 and P2=60 Kg/ha.

3. DESIGN:
(i) Split-plot (ii) 4 main-plots/replication, 6 sub-plots/main-plot- (iii) 4. (iv) 1/250 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964-contin. (design changed in 65) (b) No. (c) Nil. (v) No. (vi) Nil.

5. RESULTS:
(i) 752 Kg/ha. (ii) (a) 415:1 Kg/ha. (b) 523:3Kg/ha. (iii) Main effects of D, N and P are highly significant and interaction D x P is significant (iv) Av. yield of grain in Kg/ha.
Crop: Wheat.  
Site: M.A.E. Centre, Nasirpur. 

Object: Type VIII—To study the optimum requirements of seed rate, time of sowing and different combinations with fertilizer doses for Wheat.

1. BASAL CONDITIONS:
   (i) N.A.  (ii) Indus alluvium. (iii) to (x) N.A.

2. TREATMENTS:
   Main-plot treatments.
   All combinations of (1) and (2)
   (1) 3 seed rates: $S_1 = 59.0$, $S_2 = 78.4$ and $S_3 = 100.8$ Kg/ha.
   (2) 3 dates of sowing: $D_1 = 21.10.60$, $D_2 = 31.10.60$ and $D_3 = 10.11.60$.

   Sub-plot treatments:
   All combinations of (1) and (2)
   (1) 3 levels of N as A/S: $N_1 = 0$, $N_2 = 22.4$ and $N_3 = 44.8$ Kg/ha.
   (2) 3 levels of P as Super: $P_1 = 0$, $P_2 = 22.4$ and $P_3 = 44.8$ Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 9 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1957-61. (b) N.A. (c) Nil (v) Sira. (vi) N.A. (vii) Nil.

5. RESULTS:
   60 (M.A.E.)
   (i) 2676 Kg/ha. (ii) (a) and (b) N.A. (iii) Main effects of D and N are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>S</th>
<th>S</th>
<th>S</th>
<th>D</th>
<th>D</th>
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C.D. for D marginal means=271.0 Kg/ha.
C.D. for N marginal means=261.2 Kg/ha.
C.D. for P marginal means=213.6 Kg/ha.
C.D. for D means at the same level of P=404.9 Kg/ha.
C.D. for P means at the same level of D=427.3 Kg/ha.
Crop :- Wheat. (Rabi).
Ref. :- Pb.60, 61(M.A.E.).
Site :- M.A.E. Centre Nasirpur.
Type :- 'CMF'.

Object :- Type IV : To study the effect of Phosphatic manures on legumes and their residual effect on succeeding Wheat manured with N.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Guara; N.A. (c) As per treatments; N.A. (II) Sandy loam, Alluvial soil. (iii) 6/11/60 1st week of Oct., 61. (iv) (a) 3 ploughings. (b) Pora method. (c) 59.7 Kg/ha. (d) 23cm. between rows. (e) Nil. (v) C-273. (vi) Irrigated. (vii) One hoeing. (ix) N.A. (x) 17.4; 1st week of April, 62.

2. TREATMENTS:
Main plot treatments
All combinations of (1) and (2) + a control (Lo Po)
(1) 2 previous legumes: L1=Guara ahd L2=Mosh.
(2) 3 levels of P2 O1 ; Po=0;P1=44.8 and P2=89.6 Kg/ha.

Sub-plot treatments
3 levels of N as A/S applied to wheat: N0=0, N1=16.8 and N2=33.6 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 7 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1957-61. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
60 M.A.E.
(i) 2716 Kg/ha. (ii) (a) 172.2 Kg/ha. (b) 286.0 Kg/ha. (iii) Main effects of L1, N and control vs. others are highly significant and interaction L x P is significant. (vi) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>N2</th>
<th>P0</th>
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<tr>
<td>60(M.A.E.)</td>
<td>(i) 828 Kg/ha. (ii) (a) and (b) N.A. (iii) Main effects of S and N are significant. (iv) Av. yield of grain in Kg/ha.</td>
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<tr>
<td>Treatment</td>
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<td>S2</td>
<td>S3</td>
<td>D1</td>
<td>D2</td>
<td>D3</td>
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<tr>
<td>Av. yield</td>
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<td>727</td>
<td>667</td>
<td>931</td>
<td>673</td>
<td>881</td>
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<td>C.D. = 307 Kg/ha.</td>
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<tr>
<td>Treatment</td>
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<td>N1</td>
<td>N2</td>
<td>P0</td>
<td>P1</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>Av. yield</td>
<td>615</td>
<td>876</td>
<td>994</td>
<td>808</td>
<td>879</td>
<td>798</td>
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<td>C.D. = 85 Kg/ha.</td>
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Site : M.A.E. Centre Nasirpur.
Type :- 'CMF'.

Object :- Type IV : To study the effect of Phosphatic manures on legumes and their residual effect on succeeding Wheat manured with N.
(D) 2402 Kg/ha. (ii) (a) 553.3 Kg/ha. (b) 395.6 Kg/ha. (iii) Main effect of N alone is highly significant.
(iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>L₁P₃</th>
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**Crop : Wheat (Rabi).**  
**Site : Reg. Wheat Res. Stn., Gurdaspur.**  
**Ref. :- Pb. 62(87).**  
**Type :-P.**

Object:---To study the effect of different depths of irrigation and intervals of irrigation on the yield of Wheat crop.

1. **BASAL CONDITIONS:**
   (i) to (v) N.A. (vi) C-281. (vii) As per treatments. (viii) 2 weedings. (ix) and (x) N.A.

2. **TREATMENTS:**
   **Main-plot treatments:**
   3 irrigation intervals week :-і₁=2, і₂=3, and і₃=4.
   **Sub-plot treatments :**
   3 depths of irrigation :-D₁=6, D₂=3.7 and D₃=7.5cm.

3. **DESIGN :**
   (i) Split-plot, (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (c) 6. (iv) (a) N.A. (b) 1/423ha. (v) N.A. (vi) Yes.

4. **GENERAL :**
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) and (b) No. (c) Nil. (v) to (vii) N.A.

5. **RESULTS:**
   (i) 2453 Kg/ha. (ii) (a) 775.2 Kg/ha. (b) 250-5 Kg/ha. (iii) Main effect of D alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>D₂</th>
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<td>L₃</td>
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<tr>
<td>Mean</td>
<td>2180</td>
<td>2444</td>
<td>2736</td>
<td>2519</td>
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</table>

C.D. for D marginal means=170.5 Kg/ha.
Crop :- Wheat (Rabi).

Object :- To determine the irrigational requirement of Wheat with manuring treatments.

1. BASAL CONDITIONS:
   (i) (a) Cotton-kenaf- (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) Mid. of Nov., 65. 
   (iv) (a) 4-5 ploughings. (b) to (e) N.A. (v) N.A. (vi) C-273. (vii) Irrigated. (viii) 2 hoeings, 2 weedings. (ix) N.A.
   (x) 3rd week of April, 66.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 levels of N : N1=60 and N2=120 Kg/ha.
   (2) 8 irrigational treatments of intensity and time of application. First irrigation was given before flowering and second irrigation was given after flowering. T1=1t1, T2=1t1, T3=1t1, T4=1t1, T5=1t1, T6=1t1, T7=1t1 and T8=local method.
   Note (1) t1 = Irrigation when 25% of the available soil moisture on the 30 cm. of the soil consumed. t2 = Irrigation when 50% of the available soil moisture is consumed. t3 = Irrigation when 75% of the available soil moisture is consumed.
   (2) on T1 to T4 indicates first irrigation as T1 and second irrigation as T2 Similarly T5 to T8 indicates first as irrigation as t1 and second irrigation as t2 and so on.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) 1/400 ba. (v) N.A. (vi) Yrs.

4. GENERAL
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 1181 Kg/ha. (ii) 139.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.
   \[
   \begin{array}{cccccccccc}
   & T_1 & T_2 & T_3 & T_4 & T_5 & T_6 & T_7 & T_8 & \text{Mean} \\
   N_1 & 1190 & 1130 & 1050 & 1080 & 1130 & 1250 & 1130 & 1230 & 1149 \\
   N_2 & 1050 & 1200 & 1150 & 1250 & 1170 & 1110 & 1180 & 1260 & 1212 \\
   \text{Mean} & 1120 & 1165 & 1120 & 1200 & 1120 & 1280 & 1155 & 1255 & 1181 \\
   \end{array}
   \]

Crop :- Wheat (Rabi).
Site :- M.A.E. Centre, Nasirpur.

Object :- Type I: To study the effect of different intensities and frequencies of irrigation along with different levels of N and P on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Fallow for 60 and 61; N.A. (c) Nil for 60 and 61; N.A. (iii) Sandy loam; Alluvial soil; N.A.
   (iv) 27.10.60; 22.10.61; N.A. (iv) (a) 6 ploughings; 4 ploughings; N.A. (b) Pod method for 60 and 61; N.A.
   (c) 80.7 Kg/ha.; 78.1 Kg/ha; N.A. (d) 2 cm. between rows; N.A. for 61 and 62. (v) 5600 Kg/ha. of F.Y.M. for 60 and 61; N.A. for 62. (vi) C-273 for 60 and 61; N.A. for 62. (vii) Irrigated for 60 and 61; N.A. for 62. (viii) One hoeing for 60 and 61; N.A. for 62 (a) N.A. (x) 13.4.61; 1st week of April; N.A.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4)
   (1) 3 frequencies of irrigation: F1=2, F2=3 and F3=4 irrigations.
Object:- To test the effect of irrigation on different varieties of Wheat in the presence of different levels of Nitrigen.

1. BASAL CONDITIONS:

(i) (a) Fallow-Wheat. (b) Fallow. (c) Nil. (ii) Loamy sand. (iii) 20.11.65 (iv) (a) 3 ploughings. (b) Kera. (c) 85 Kg/ha. (d) 20 cm. (e) (v) 40 Kg/ha. of N+25 Kg/ha. of P04 (vi) and (vii) As per treatments. (viii) One hoeing. (ix) P10cm. (x) 2nd week of April, 66
2. TREATMENTS:

Main-plot treatments:
3 intervals of irrigation: \( I_1 = 15 \) days, \( I_2 = 30 \) days and \( I_3 = 45 \) days.

Sub-plot treatments:
All combinations of (1) and (2)

(1) 3 levels of \( N_1 = 50, N_2 = 100 \) and \( N_3 = 150 \) Kg/ha.
(2) 2 varieties: \( V_1 = C-306 \) and \( V_2 = P.V. 18 \)

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. 4 (iv) (a) N.A. (b) 1/250 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Germination and yield of grain. (iv) (a) 1965-continued. (b) Nil. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:

(i) 2397 Kg/ha. (ii) (a) 601.7 Kg/ha. (b) 690.8 Kg/ha. (iii) Main effect of \( I \) alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( N_3 )</th>
<th>( V_1 )</th>
<th>( V_2 )</th>
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<td>( I_3 )</td>
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<td>1950</td>
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<td>2397</td>
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</table>

C.D. for I marginal means = 425.0 Kg/ha.

Crop :- Wheat (Rahini)
Site :- Govt. Agri. Stn., Jullundur.
Object :-To study the results of spraying with sodium salt for weed control on Wheat.

1. BASAL CONDITIONS:

(i) and (ii) N.A. (iii) 28.11.61. (iv) (a) to (e) N.A. (v) Nil. (vi) C-273. (vii) Irrigated. (viii) One hoeing in treatments \( T_1 \) and \( T_2 \). (ix) N.A. (x) 26.4.62.

2. TREATMENTS:

4 weedical treatments: \( T_0 = \) Control (no weeding and weedicide) \( T_1 = \) Local method of weeding, \( T_2 = \) Spraying with weedicide once and \( T_3 = \) Spraying with weedicide once + one weeding.

3. DESIGN:

(iii) B.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) and (b) 1/198 ha. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Av. yield of grain. (iv) (a) N.A. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.
5. RESULTS

(i) 594 Kg/ha. (ii) 320.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>583</td>
<td>567</td>
<td>567</td>
<td>659</td>
</tr>
</tbody>
</table>

Crop :- Maize (Kharif)
Ref :- Pb. 60(111).
Site :- Govt. Agri. Sta., Gurdaspur.
Type :- 'M'.

Object :-To study the comparison of different doses of N on the yield Maize crop.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 9.6-6.0. (iv) N.A. (v) 50 Kg/ha. of P₂O₅ as Super-56 Kg/ha. of K₂O and 251 Q/ha. of F.Y.M. (vi) Hybrid. (vii) Irrigated. (viii) and (ix) N.A. (x) 20.9-60.

2. TREATMENTS :

6 levels of N as C/A/N : N₀=control (no manure), N₁=67·2 Kg/ha. or N as F.Y.M, N₂=134·4 Kg/ha. of N as F.Y.M, N₃=190·6 Kg/ha. of N as F.Y.M.

3. DESIGN :

(i) R.B.D. (ii) 6. (b) N.A. (iii) 4. (iv) (a) 1/133·4/ha. (b) 1/149·5 ha. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1761 Kg/ha. (ii) 284·6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
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<td>1784</td>
<td>1712</td>
<td>1995</td>
<td>1756</td>
<td>2136</td>
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</table>
| C. D.—428·8 Kg/ha.

Crop :- Maize (Kharif)
Ref :- Pb. 60(112).
Site :- Govt. Agri. Sta., Gurdaspur.
Type :- 'M'.

Object :-To study the comparative efficiency of C/A/N and F.Y.M. on the yield of Maize crop.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 13.6.60 (iv) and (v) N.A. (vi) Local. (vii) Irrigated. (viii) and (ix) N.A. (x) 15.9.60.

2. TREATMENTS :

6 manural doses : M₀=control (no manure), M₁=67.2 Kg/ha. of N as C/A/N, M₂=67.2 Kg/ha. of N as F.Y.M, M₃=134.4 Kg/ha. of N as F.Y.M, M₄=M₁+M₂ and M₅=201.6 Kg/ha. of N as F.Y.M.
3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 1/165·5 Kg/ha. (b) 1/186·5 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) N/A. (v) N.A. (vi) and
(vii) Nil.

5. RESULTS:

(i) 1946 Kg/ha. (ii) 230·3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain
in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M_0</th>
<th>M_1</th>
<th>M_2</th>
<th>M_3</th>
<th>M_4</th>
<th>M_5</th>
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<tr>
<td>Av. yield</td>
<td>1737</td>
<td>1846</td>
<td>1971</td>
<td>1941</td>
<td>2074</td>
<td>2104</td>
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</tbody>
</table>

Crop :- Maize. (Kharij).

Site :- Govt. Agri. Stn., Gurdaspur.

Object :- To study the effect of various sources of N on the yield of Maize crop.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Wheat. (c) N.A. (iii) Sandy loam. (iii) 14.6.60, (iv) and (v) N.A. (vii) Irrigated.
(viii) and (ix) N.A. (x) 15.9.60.

2. TREATMENTS:

7 sources of N at 67·2 Kg/ha. :- T_0 = Control (No manure), T_1 = A/S, T_2 = C/A/N, T_3 = Urea, T_4 = Ammon.
Chloride, T_5 = Ammon. liquor and T_6 = A/N.

3. DESIGN:

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 1/165·49 ha. (b) 1/186·48 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) N.A. (vi) and
(vii) Nil.

5. RESULTS:

(i) 1960 Kg/ha. (ii) 353·2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain
in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_0</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
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<td>Av. yield</td>
<td>1889</td>
<td>2153</td>
<td>2245</td>
<td>1903</td>
<td>1873</td>
<td>1794</td>
<td>1865</td>
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</table>
Crop: Maize. (Kharif).
Site: Govt. Agri. Stn., Gurdaspur.

Object: To study the effect of different combinations of N and P on the yield of Maize crop.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 21.6.60. (iv) and (v) N.A. (vi) Local. (vii) Irrigated. (viii) and (ix) N.A. (x) 21.9.60.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of N: N₁=0, N₂=67.2 and N₃=134.4 Kg/ha.
   (2) 3 levels of P₂O₅ as Super: P₁=0, P₂=33.6, P₃=67.2 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 1/168 ha. (b) 1/198 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1496 Kg/ha. (ii) 189.3 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>Mean</th>
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<tr>
<td>Mean</td>
<td>1092</td>
<td>1526</td>
<td>1869</td>
<td>1496</td>
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</table>

C.D. for N marginal means=159.5 Kg/ha.

Crop: Maize (Kharif).

Object: To study the effect of different levels of N, P and K on the yield of Maize crop.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 23.6.60. (iv) and (v) N.A. (vi) Hybrid. (vii) Irrigated. (viii) and (ix) N.A. (x) 26.6.60.

2. TREATMENTS:
   All combinations of (1), (2) and (3)+One control (No fertilizer).
   (1) 3 levels of N: N₁=56, N₂=112 and N₃=168 Kg/ha.
   (2) 3 levels of P₂O₅ as Super: P₁=28, P₂=56 and P₃=112 Kg/ha.
   (3) 3 levels of K₂O as Mur. pot.: K₁=56, K₂=112 and K₃=224 Kg/ha.
3. DESIGN:
(i) Fact. in R.B.D.  (ii) 28,  (b) N.A.  (iii) 2.  (iv) 1/170 ha.  (b) 1/222 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) N.A.  (b) No.  (c) N.E.  (v) N.A.  (vi) and (vii) Nil.

5. RESULTS:
(i) 1369 Kg/ha.  (ii) 509'1 Kg/ha.  (iii) Main effect of N is highly significant and control Vs. others is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>P_1</th>
<th>P_2</th>
<th>P_3</th>
<th>K_1</th>
<th>K_2</th>
<th>K_3</th>
<th>K_4</th>
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<td>1218</td>
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<td>931</td>
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<td>1879</td>
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<td>1830</td>
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<tr>
<td>Mean</td>
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<td>1577</td>
<td>1454</td>
<td>1367</td>
<td>1372</td>
<td>1398</td>
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</tbody>
</table>

C.D. for N marginal means=348.2 Kg/ha.
C.D. for control vs. others =752.2 Kg/ha.

Crop :- Maize, (Kharif).
Ref :- Ph. 60(120), 61(92).
Site :- Agri. Govt. Stn., Gurdaspur
Type :- 'M'.
Object :- To study the effect of different levels of N, P and K on the yield of Maize crop.

1. BASAL CONDITIONS
(i) (a) N.A.  (b) Fallow; Wheat.  (c) Nil; N.A.  (ii) Sandy loam  (iii) 26.5.60; 28.7.61  (iv) (a) and (b) N.A.  (c) 13 Kg/ha.  (d) and (e) N.A.  (v) N.A.; Illinois 1658 Kg/ha.  (vi) Irrigated.  (vii) and (ix) N.A.  (x) 15/16.

2. TREATMENTS:
All combinations of (1) and (2)+one control (no manure)
(1) 2 levels of N as C/A/N : N_1=112 and N_2=224 Kg/ha.
(2) 3 manurial treatments:=M_0=manure, M_1=112 Kg/ha. of P_2O_5 as Super and M_2=M_1+112 Kg/ha. of K_2O as Mur. Pot.
Half N and full P and K applied at sowing and half N at 30cm. plant height.

3. DESIGN:
(i) Fact. in R.B.D.  (ii) (a) 7.  (b) N.A.  (iii) 4.  (iv) (a) 1/84'0 ha. ; N.A.  (b) 1/98'8 ha. ; 1/207'6 ha.  (v) N.A.  (vi)Yes.

4. GENERAL:
(i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) 1960-61.  (b) No.  (c) Results of combined analysis are presented under 5. Results.  (v) N.A.  (vi) Nil. (vii) Error variances are homogeneous and TreatmentXYears interaction is absent.
5. RESULTS:

(i) 2172 Kg/ha. (ii) 2714 Kg/ha. (based on 41 d.f. made up of pooled error and Treatments X Years interaction). (iii) Control Vs. others' alone is highly significant. (iv) Av. yield of grain in Kg/ha.

Control=1968 Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>Mean</th>
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<tr>
<td>Mean</td>
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<td>2293</td>
<td>2187</td>
<td>2206</td>
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</tbody>
</table>

C.D. for 'Control Vs. others' = 280.2 Kg/ha.

Individual results

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<th>Treatment</th>
<th>Year</th>
<th>N1</th>
<th>N2</th>
<th>Sig.</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>Sig.</th>
<th>Control</th>
<th>Sig.</th>
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<th>S.E./ plot</th>
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<td>2187</td>
<td>N.S.</td>
<td>1968</td>
<td>**</td>
<td>2206</td>
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</tbody>
</table>

Crop :- Maize (Kharif).

Ref:- Pb. 61(108): 64(163).

Site :- Agri. Res. Stn., Gurdaspur.

Type :- 'M'.

Object :- To study the effect of different levels of N, P and K on the yield of Maize crop.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 8.7.61 ; 7.7.64. (iv) (a) to (e) N.A. (v) N.A. (vi) N.A.; Local. (vii) Irrigated. (viii) and (ix) N.A. (x) 5.10.61 ; 8.10.64.

2. TREATMENTS:

All combinations of (1), (2) and (3)+ One control.

(1) 3 levels of N :- N1=56, N2=112 and N3=224 Kg/ha.
(2) 3 levels of P2O5 as Super :- P1=28, P2=56 and P3=112 Kg/ha.
(3) 3 levels of K2O as Mur. of Pot. :- K1=56, K2=112 and K3=224 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 28. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 1/197.7 ha.; 1/177.9 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961 to 64 (Expt. for 62 and 63 N.A.) (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments X Years interaction for (P X K) table is absent and for others is present.

5. RESULTS:

Pooled results

(i) 2066 Kg/ha. (ii) 817.9 Kg/ha. (based on 14 d.f. made up of Treatments X Years interaction). (iii) Main
effect of N and "Control Vs. others are highly significant. (iv) Av. yield of grain in Kg/ha.

Control—879 Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P_1</th>
<th>P_2</th>
<th>P_3</th>
<th>K_1</th>
<th>K_2</th>
<th>K_3</th>
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<td>2796</td>
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<td>2130</td>
<td>2138</td>
<td>2110</td>
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</tbody>
</table>

C.D. for N marginal means= 413.5 Kg/ha.
C.D. for Control Vs. others= 845.1 Kg/ha.

Individual results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>N_4</th>
<th>N_3</th>
<th>Sig.</th>
<th>P_1</th>
<th>P_2</th>
<th>P_3</th>
<th>Sig.</th>
<th>K_1</th>
<th>K_2</th>
<th>K_3</th>
<th>Sig.</th>
<th>Control</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<tbody>
<tr>
<td>Year</td>
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<td></td>
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</tr>
<tr>
<td>1961</td>
<td>755</td>
<td>1048</td>
<td>1315</td>
<td>**</td>
<td>1065</td>
<td>1058</td>
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<td>1082</td>
<td>N.S.</td>
<td>754</td>
<td>N.S.</td>
<td>3188</td>
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<td>2982</td>
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<td>**</td>
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<td>**</td>
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<td>1442</td>
<td>2203</td>
<td>2685</td>
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<td>1993</td>
<td>2145</td>
<td>2192</td>
<td>N.S.</td>
<td>2061</td>
<td>2130</td>
<td>2138</td>
<td>N.S.</td>
<td>879</td>
<td>**</td>
<td>2110</td>
<td>817.9</td>
</tr>
</tbody>
</table>

Crop: Maize (Kharif).
Site: Govt. Agri. Stn., Gurdaspur.

Object: To study the effect of P and K on the yield of Maize crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.
   (ii) Sandy loam.
   (iii) 7.7.63.
   (iv) (v) N.A.
   (vi) Local.
   (vii) Irrigated.
   (viii) and (ix) N.A.
   (x) 8.10.63.

2. TREATMENTS:
   All combinations of (1) and (2) + a control (No manure)
   (1) 2 levels of P_2O_5 as Super: P_1 = 28 and P_3 = 56 Kg/ha.
   (2) 3 levels of K_2O as Mur. Pot.: K_1 = 56, K_2 = 112 Kg/ha, and K_3 = 224 Kg/ha.
   56 Kg/ha. of N as Ca/Na applied to all plots except control plot.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 1/1966 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal.
   (ii) N.A. (iii) Yield of grain. (iv) (a) 1963 only. (b) No. (c) Nil.
   (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 328.9 Kg/ha.
   (ii) 472.3 Kg/ha.
   (iii) Main effects of K and control vs. others treatments are highly significant.
   (iv) Av. yield of grain in Kg/ha.

Control—1700 Kg/ha.
Crop : - Mazie (Kharif).
Site : - Agri. Res. Sta., Gurdaspur.
Type : - 'M'.

Object : - To study the effect of different times of application of C/A/N.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 9.6.63; 27.6.64. (iv) (a) to (e) N.A. (v) N.A.; 36 Kg/ha. of P₂O₅ + 56 Kg/ha. of K₂O at the time of sowing. (vi) Hybrid. (vii) Irrigated. (viii) and (ix) N.A. (x) 20.9.63; 1.10.64.

2. TREATMENTS:
   7 methods of application of 112 Kg/ha. of N as C/A/N : T₀=Control (No fertilizer), T₁=Drilled at sowing, T₂=Kera at sowing, T₃=Broad cast at sowing, T₄=Band application at sowing, T₅=Band application at 30 cm. plant height and T₆=Broad cast at 30 cm. plant height.

3. DESIGN:
   (i) R.B.D. (ii) 7. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/163 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-64. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As error variances are heterogeneous and Treatment X Years interaction is absent, results of individual years are presented under 5. Results.

5. RESULTS:

   63(213) (i) 3610 Kg/ha. (ii) 586 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

   Treatment  | T₀ | T₁ | T₂ | T₃ | T₄ | T₅ | T₆
   Av. yield  | 2088| 4144| 3576| 3855| 3951| 3667| 3989
   C.D. : - 870.6 Kg/ha.

   64(221) (i) 4376 Kg/ha. (ii) 1870 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

   Treatment  | T₀ | T₁ | T₂ | T₃ | T₄ | T₅ | T₆
   Av. yield  | 3099| 4785| 4558| 4819| 4456| 4489| 4424
   C.D. : - 277.8 Kg/ha.
Crop: Maize (Kharif).
Refer: Pb. 60(109), 61(8), 62(16).
Type: ‘M’.

Object: To study the effect of different combinations of N, P and K on the yield of Maize crop.

1. Basal Conditions:
(i) (a) to (e) N.A. (ii) Sandy loam. (iii) 26.7.60; 29.7.61; 27.7.62. (iv) (a) and (b) N.A. (c) 13‘5 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) Illinois 1656; Hybrid Maize; Ganga No. 101. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) 1st week of Nov.

2. Treatments:
7 manurial: 
- Control, T1=112 Kg/ha. of N as C/A/N, T2=224 Kg/ha. of N as C/A/N, T3=112 Kg/ha. of P2O5 as Super, T4=T3+112 Kg/ha. of P2O5 as Super, T5=T3+112 Kg/ha. of K as Mur. of Pot, and T6=T3+112 Kg/ha. of K as Mur. of Pot.
Whole of P and K applied at sowing. 1/4 of N at sowing + 1/2 of N at 30 cm. crop height.

3. Design:
(i) R.B.D. (ii) 7. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1:297:6 ha. (v) N.A. (vi) Yes.

4. General:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) 1950-52. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As the error variances are heterogeneous and Treatments x Years interaction is absent, results of individual years are presented under 5. Results.

5. Results:
60 (109)
(i) 320 Kg/ha. (ii) 493 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1847</td>
<td>3125</td>
<td>3021</td>
<td>2938</td>
<td>4000</td>
<td>3140</td>
</tr>
<tr>
<td>C.D. = 732.4 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

61 (8)
(i) 2070 Kg/ha. (ii) 1027 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1541</td>
<td>2065</td>
<td>1980</td>
<td>2239</td>
<td>2431</td>
<td>2055</td>
</tr>
</tbody>
</table>

62(16)
(i) 2597 Kg/ha. (ii) 5478 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1779</td>
<td>1925</td>
<td>3277</td>
<td>2100</td>
<td>3159</td>
<td>2357</td>
</tr>
<tr>
<td>C.D. = 813.7 Kg/ha.</td>
<td></td>
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</tbody>
</table>

Crop: Maize (Kharif).
Site: Govt. Agri. Sta., Jullundur.
Refer: Pb. 61(101).
Type: ‘M’.

Object: To study the effect of different combinations of N, P and K with F.Y.M.on the yield of Maize crop.
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 27.6.61 (iv) (a) and (b) N.A. (c) 12.7 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) Illinois 1656. (vii) Irrigated. (viii) and (ix) N.A. (x) Nov., 61.

2. TREATMENTS:
   All combinations of (1), and (2).
   (1) 6 levels of N as C/A/N: \(-N_1=0\), \(N_2=56\), \(N_3=112\), \(N_4=168\), \(N_5=224\) and \(N_6=336\) Kg/ha.
   (2) 2 levels of F.Y.M. \(-F_1=No. F.Y.M.\) and \(F_2=With F.Y.M.\)

3. DESIGN:
   (i) Fact. in R. B. D. (ii)(a) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/257 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) N.A. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1587 Kg/ha. (ii) 353·6 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

- - - - -

\[
\begin{array}{cccccc}
N_1 & N_2 & N_3 & N_4 & N_5 & N_6 \\
F_1 & 1298 & 1124 & 1336 & 1677 & 2101 \\
F_2 & 1240 & 1381 & 1311 & 1683 & 1769 \\
\text{Mean} & 1269 & 1252 & 1324 & 1675 & 1935 & 2067
\end{array}
\]

C.D. for N marginal means=360·0 Kg/ha.

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Crop :- Maize (Kharif).
Ref :- Pb. 60(46), 61(7), 62(19).
Site :- Govt. Agri. Sta., Jullundur.
Type :- 'M'.

Object :- To study the effect of different doses of N in the presence of F. Y. M. on the yield of Maize.
4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—62. (b) N.O. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogenous and Treatments X Years interaction is present.

5. RESULTS:

Pooled results
(i) 2391 Kg/ha. (ii) 1011.5 Kg/ha. (based on 10 d.f. made up of Treatments X Years Interaction) (iii) Treatment differences are not significant (iv) Av. yield of grain in Kg/ha.

| Treatment Year | N₁ | N₂ | N₃ | N₄ | N₅ | N₆ | Sig | G.M. | S.E./pol | Yield/
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>2266</td>
<td>2562</td>
<td>3016</td>
<td>2549</td>
<td>2951</td>
<td>2696</td>
<td>N.S.</td>
<td>2677</td>
<td>370.0</td>
<td>2997</td>
</tr>
<tr>
<td>1961</td>
<td>2033</td>
<td>1699</td>
<td>1388</td>
<td>1323</td>
<td>1784</td>
<td>1249</td>
<td>N.S.</td>
<td>1579</td>
<td>394.4</td>
<td>2917</td>
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<tr>
<td>1962</td>
<td>2027</td>
<td>2081</td>
<td>3004</td>
<td>3268</td>
<td>3223</td>
<td>3847</td>
<td>**</td>
<td>2977</td>
<td>421.6</td>
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<td>2141</td>
<td>2469</td>
<td>2380</td>
<td>2653</td>
<td>2597</td>
<td>N.S.</td>
<td>2391</td>
<td>1011.5</td>
<td></td>
</tr>
</tbody>
</table>

Crop: Maize (Kharif).
Site: Govt. Agri. Sta., Jullundur.
Object: To find out the best dose of N in the absence of F.Y.M. on the yield of Maize.

Ref: Pb 60(37), 61(7A), 62(15).
Type: ‘M’.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Loam. (iii) 29.7.60; 29.7.61; 27.7.62. (iv) N.A. (v) 56 Kg/ha of P₂O₅ + 56 Kg/ha of K₂O. (vi) N.A. for 60 and 61; Ganga No.101. (vii) Irrigated. (viii) 3 hoeings. (ix) N.A. (x) 9.11.60; 4.11.61; N.A.

2. TREATMENTS:
Same as in Expt. no. 60(46), 61(7), 62(19) and presented on page 531.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/259.3 ha.; 15 x 3 m. x 6 m.; 1/259 Sh.a. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—62. (b) N.O. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogenous and Treatments X Years interaction is present.

5. RESULTS:

Pooled results:
(i) 2351 Kg/ha. (ii) 1205.8 Kg/ha. (based on 10 d.f. made up of Treatments X Years interaction) (iii) Treatment differences are significant (iv) Av. yield of grain in Kg/ha.
Crop: Maize. (Kharif).

Ref: Pb. 60, 61, 62, 63, 64 (M.A.E).

Site: M.A.E. Center, Nasirpur.

Type: 'M'.

Object: To study the effect of different levels of N, P, K and F. Y. M on the yield of Maize.

1. BASAL CONDITIONS:
   (i) Maize-Wheat-cotton-Sesaji for 60 and 61; N.A. for others. (b) Sesaji for 60 and 61; N.A. for others. (c) N.A. (ii) Sandy loam; Aluvial; N.A.; Indus Alluvium for 63 and 64. (iii) 6.7.60, 31.7.61, N.A.; 30.6, 62; 22.7.64. (iv) (a) 8 ploughings, 7 ploughings; N.A. for 62 to 64. (b) Pora method; Drilling; N.A. for 62 to 64. (c) 179 Kg/ha., 23 to 35 Kg/ha., N.A. for 62 to 64. (d) N.A.; 30cm. x 30cm, N.A. for 62 to 64. (e) Nil. (v) Nil. (vi) Local. (vii) Irrigated. (viii) 2 weedings; 2 weedings and hoeings; N.A. for others. (ix) N.A. (x) 30.9.60; 21.9.61 to 23.9.61; N.A; 28.9.63; 10.10.64.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4)
   (1) 3 levels of P_2O_5 as Super: P_1 = 0, P_2 = 22.4 and P_3 = 44.8 Kg/ha.
   (2) 3 levels of N as C/A/N: N_0 = 0, N_1 = 22.4 and N_2 = 44.8 Kg/ha.
   (3) 3 levels of K_2O as Mur. Pot: K_0 = 0, K_1 = 22.4 and K_2 = 44.8 Kg/ha.
   (4) 3 levels of F. Y. M.: F_1 = 0, F_2 = 5500 and F_3 = 11200 Kg/ha.

N applied by broadcasting. P and K drilled into the soil before sowing.

3. DESIGN:
   (i) 3^6 fact confd. (ii) (a) 9 plots/block, 9 blocks/replication. (b) N.A. (iii) 1 for 60 and 61; N.A. for others. (iv) (a) 10.08m. x 5.04m. for 60 and 61; N.A. for others. (b) 47m. x 47m. for 60 and 61; N.A. for others. (v) 30cm. x 83cm. for 60 and 61; N.A. for others (v) Yes.

4. GENERAL:
   (i) Normal for 60 and 61; N.A. for others. (ii) Nil; Maize borer attack; N.A. for others. (iii) Yield of grain. (iv) (a) 1960—64. (b) N.A. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   60 (M.A.E.)
   (i) 963 Kg/ha. (ii) 282 Kg/ha. (iii) Main effect of N is highly significant and interaction P x K is significant. (iv) Av. yield of grain in Kg/ha.
<table>
<thead>
<tr>
<th></th>
<th>$N_0$</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_0$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$K_0$</th>
<th>$K_1$</th>
<th>$K_2$</th>
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<td>1030</td>
<td>906</td>
<td>887</td>
<td>964</td>
<td>919</td>
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<tr>
<td>$F_1$</td>
<td>703</td>
<td>878</td>
<td>1175</td>
<td>979</td>
<td>940</td>
<td>838</td>
<td>831</td>
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<td>1243</td>
<td>971</td>
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<td>1000</td>
<td>917</td>
<td>992</td>
<td>979</td>
<td>963</td>
</tr>
</tbody>
</table>

C. D. for $N$ marginal means = 194.6 Kg/ha.
C. D. for the body of $P \times K$ table = 337.1 Kg/ha.

61 (M.A.E.)

Phase I (cumulative effect)

(i) 1004 Kg/ha. (ii) 326.5 Kg/ha. (iii) Main effects of $F$ and $N$ are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$N_0$</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_0$</th>
<th>$P_1$</th>
<th>$P_2$</th>
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<td>1217</td>
<td>812</td>
<td>784</td>
<td>885</td>
<td>867</td>
<td>738</td>
<td>876</td>
<td>827</td>
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<tr>
<td>$F_1$</td>
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<td>1356</td>
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<td>1012</td>
<td>1042</td>
<td>972</td>
<td>999</td>
<td>1004</td>
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</tbody>
</table>

C.D. for $N$ marginal means = 225.3 Kg/ha.
C.D. for $F$ marginal means = 184.0 Kg/ha.
Phase (ii) Residual effect

1. 592 Kg/ha.  
2. 254.5 Kg/ha.  
3. None of the effects is significant.  
4. Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
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<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
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<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
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<td>535</td>
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Phase (iii) Direct

1. 903 Kg/ha.  
2. 350.5 Kg/ha.  
3. Main effect of N alone is highly significant.  
4. Av. yield of grain in Kg/ha.

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C.D. for N marginal means=241.8 Kg/ha.
Cumulative Phase

(i) 1309 Kg/ha.
(ii) 2301 Kg/ha.
(iii) Main effects of F and N are highly significant.
(iv) Av. yield of grain in Kg/ha.

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| K₁ | 1216 | 1397 | 1368 | 1298 | 1294 | 1388 | 1498 | 1294 | 1388 |
| Mean | 1180 | 1377 | 1371 | 1300 | 1308 | 1319 | 1235 | 1366 | 1327 | 1309 |

P₀ | 1238 | 1333 | 1329 | 1319 | 1327 | 1309 |
| P₁ | 1108 | 1423 | 1394 | 1365 | 1365 | 1365 |
| P₂ | 1194 | 1374 | 1389 | 1365 | 1365 | 1365 |

C.D. for F marginal means = 129*6 Kg/ha.
C.D. for N marginal means = 158*8 Kg/ha.

Residual Phase

(i) 1095 Kg/ha.
(ii) 293 Kg/ha.
(iii) Main effect of F and interaction F×N are significant.
(iv) Av. yield of grain in Kg/ha.

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| K₁ | 1012 | 940 | 1120 | 893 | 1096 | 1084 | 1112 | 1024 | 1148 | 1095 |
| K₂ | 1145 | 1141 | 1158 | 1197 | 1094 | 1153 | 1112 | 1024 | 1148 | 1095 |

P₀ | 1063 | 1052 | 1210 | 1063 | 1052 | 1210 | 1063 | 1052 | 1210 |
| P₁ | 1186 | 1025 | 1072 | 1186 | 1025 | 1072 | 1186 | 1025 | 1072 |
| P₂ | 1096 | 1078 | 1072 | 1096 | 1078 | 1072 | 1096 | 1078 | 1072 |

C.D. for F marginal means = 165 0 Kg/ha.
C.D. for the body of F×N table = 285 3 Kg/ha.
### Direct Phase

(i) 1656 Kg/ha  
(ii) 297.5 Kg/ha  
(iii) None of the effects is significant.  
(iv) Av. yield of grain in Kg/ha.

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63(M.A.F.)

### Direct Effect

(i) 1202 Kg/ha.  
(ii) 284.5 Kg/ha.  
(iii) Main effects of F and N are significant, and interaction F × P is highly significant.  
(iv) Av. yield of grain in Kg/ha.

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C.D. for N marginal means = 196.3 Kg/ha.
C.D. for F marginal means = 160.8 Kg/ha.
C.D. for the body of F×P table = 277.6 Kg/ha.
Cumulative effect
(i) 1395 Kg/ha. (ii) 347.3 Kg/ha. (iii) Main effects of F and N are highly significant. (iv) Av. yield of grain in Kg/ha.

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C.D for N marginal means = 239.6 Kg/ha.  
C.D. for F marginal means = 195.6 Kg/ha.

Residual effect
(i) 1117 Kg/ha. (ii) 254.8 Kg/ha. (iii) Main effect of F alone is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for F marginal means = 143.1 Kg/ha.
Cumulative Phase

(i) 397 Kg/ha.  (ii) 279.1 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of grain in Kg/ha.

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Direct Phase

(i) 730 Kg/ha.  (ii) 247.3 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of grain in Kg/ha.

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Residual phase

(i) 533 Kg/ha. (ii) 1870 Kg/ha. (iii) None of the effects is significant (iv) Av yield of grain in Kg/ha.

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**Crop :- Maize.**

**Site :- M.A.E. Centre, Nasirpur.**

Object—Type XII: To study the effect of different fertilizer treatments and their methods of application on the yield of Maize.

1. **BASAL CONDITIONS :**

   (i) (a) to (c) N.A. (ii) Arid, brown. (iii) to (vi) N.A. (viii) Irrigated. (viii) to (x) N.A.

2. **TREATMENTS :**

   **Main-plot treatments :**

   4 fertilizer treatments: F₁=112·0 Kg/ha. of N as A/S. F₂=67·2 Kg/ha. of P₂O₅ as Super, F₃=112·0 Kg/ha. of N+67·2 Kg/ha. of P₂O₅ and F₄=112·0 Kg/ha. of N+67·2 Kg/ha. of P₂O₅+67·2 Kg/ha. of K₂O.

   **Sub-plot treatments :**

   All combinations of (1) and (2)+2 extra treatments

   (1) 3 methods of application : M₃=Soil application, M₄= Foliar application and M₅= Soil application and foliar application.

   (2) 2 levels of application : L₁=½ dose and L₂=Full dose

   C₀=Water spray and C₁=Absolute control.

3. **DESIGN :**

   (i) Split-plot. (ii) 4 main-plots/replication, 8 sub-plots/main-plot. (b) N.A. (iv) (a) and (b) N.A. (v) N.A. (v) Yes.

4. **GENERAL :**

   (i) and (ii) N.A. (iii) Yield of grain (iv) (a) 1963-64. (b) N.A. (c) Nil. (v) Nil (vi) N.A. (vii) Nil.

5. **RESULTS :**

63(M.A.E.)

(i) 2344 Kg/ha. (ii) (a) and (b) N.A. (iii) N.A. (iv) Av. yield of grain in Kg/ha.

C₀=2368 and C₁=2096 Kg/ha.
Crop:- Maize (Kharif)
Ref :- Ph. 64, 65 (M.A.E.)

Site:-- M.A.E. Center, Nasirpur.
Type :- 'M'.

Object :- Type XI :- To determine the effect of micro nutrients application and to study the merits of two methods of application.

1. BASAL CONDITIONS
(i) (a) to (c) N.A. (ii) Indus alluvium (iii) 5.8.64; N.A. (iv) (a) to (e) N.A. (v) N.A. (vi) GNG-101; N.A. (vii) I-irrigated. (viii) and (ix) N.A. (x) 7.11.64; N.A.

2. TREATMENTS:
15 micro nutrient treatments: T₀ = Control (no fertilizer), T₁ = NPK applied to soil only, T₂ = T₁ + Spartin at 395 Kg/ha, by Soil application, T₃ = T₁ + Manganese as Manganese Sul at 60 Kg/ha, T₄ = T₁ + Zn as Zinc Sul at 30 Kg/ha, T₅ = T₁ + Cu as Copper Sul. at 30 Kg/ha, T₆ = T₁ + Boron as Borax at 17.5 Kg/ha, T₇ = T₁ + Molybdenum as Sodium Molybdate at 12.5 Kg/ha, T₈ = T₁ + Mn + Zn + Cu + Be + Mo, T₉ = T₁ + Manganese as Manganese Sul at 17.5 Kg/ha, T₁₀ = T₁ + Zn as Zinc Sul at 12.5 Kg/ha, T₁₁ = T₁ + Cu as Copper Sul at 12.5 Kg/ha, T₁₂ = T₁ + Boron as Borax at 6.2 Kg/ha, T₁₃ = T₁ + Molybdenum as Sodium Molybdate at 0.62 Kg/ha, and T₁₄ = T₁ + Mn + Zn + Cu + Be + Mo.

Treatments T₀ to T₉ by soil application and T₁₀ to T₁₄ by foliar spray. T₁₅ = 67.2 Kg/ha of N + 44.8 Kg/ha of P₂O₅ + 44.8 Kg/ha of K₂O for 63 and 64 and 70 Kg/ha of N + 50 Kg/ha of P₂O₅ + 50 Kg/ha of K₂O for 1965.

3. DESIGN
(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) N.A. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.
4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1964–66. (b) N.A. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS:

64 (M.A.E.)

(i) 1484 Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of grain in Kg/ha.

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<th>T_2</th>
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65 (M.A.E.)

(i) 1546 Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of grain in Kg/ha.

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<th>T_3</th>
<th>T_4</th>
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Crop: Maize. (Kharg)

Site: Khanara Hoshiarpur (c.f.)

Ref: Pb. 60(107)

Object: To study the effect of different levels of N, P and K on the yield of Maize.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Wheat. (c) N.A. (ii) Silty loam. (iii) N.A. (iv) Local. (v) (a) to (e) N.A. (vi) 11.7.60. (vii) Irrigated. (viii) and (ix) N.A. (x) 6.10.60.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 2 levels of N: N_0 = 0 and N_1 = 22.4 Kg/ha.
(2) 2 levels of P_0 : P_0 = 0 and P_1 = 22.4 Kg/ha.
(3) 2 levels of K_0 : K_0 = 0 and K_1 = 22.4 Kg/ha.

3. DESIGN:
(i) Fact. in R.B.D, 8,4. (ii) N.A. (iii) (a) N.A. (b) 1/98 8 ha. (iv) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) N.A. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 976 Kg/ha. (ii) 157.0 Kg/ha. (iii) Main effects of N and K are highly significant. (iv) Av. yield of grain in Kg/ha.
Crop: Maize (Kharif).
Ref: Pb. 60(132), 60(133).
Site: Phulanwal and Salandi—Ludhiana (c.f.).
Type: 'M'.

Object: To study the effect of balanced doses of N, P and K on the yield of Maize.

1. BASAL CONDITIONS:
(i) to (e) N.A.
(ii) Sandy loam.
(iii) Nil.
(iv) Local (a) 4 to 5 ploughings.
(v) to (e) N.A.
(vi) Irrigated (vii) 2 hoeings (viii) N.A.
(ix) to (e) N.A.
(x) 6.10.60.

2. TREATMENTS:
All combinations of (i), (2) and (3).
(i) 2 levels of N as C/A/N: N₀=0 and N₁=56 Kg/ha.
(2) 2 levels of P₀ as Super: P₀=0 and P₁=28 Kg/ha.
(3) 2 levels of K₀ as Mur. pot.: K₀=0 and K₁=28 Kg/ha.

3. DESIGN:
(i) Fact. in R.B.D., 8, 4.
(ii) and (b) N.A.
(iii) Yes.

4. GENERAL:
(i) Normal.
(ii) Nil.
(iii) Yield of grain.
(iv) (a) 1960—only.
(v) No.
(vi) Results of combined analysis are presented under 5. Results.
(vii) (a) Results are highly significant

5. RESULTS:
Pooled results:
(i) 792 Kg/ha.
(ii) 59.5 Kg/ha.
(iii) Main effects of N, P and interaction P×K are highly significant
(iv) Av. yield of grain in Kg/ha.

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C.D. for N or K marginal means=115.6 Kg/ha.
Individual results.

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<th>K&lt;sub&gt;5&lt;/sub&gt;</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<td>Phulavat</td>
<td>1485</td>
<td>1707</td>
<td>**</td>
<td>1564</td>
<td>1628</td>
<td>**</td>
<td>1583</td>
<td>1609</td>
<td>**</td>
<td>1596</td>
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<td>1821</td>
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<td>**</td>
<td>1942</td>
<td>2034</td>
<td>**</td>
<td>1977</td>
<td>1999</td>
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<td>1931</td>
<td>**</td>
<td>1753</td>
<td>1831</td>
<td>**</td>
<td>1780</td>
<td>1864</td>
<td>**</td>
<td>1792</td>
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Crop: Maize (Kharif).

District: Ferozepur, Jullundur, Hoshiarpur and Ludhiana, Patiala and Sangrur.

Ref: Pb. 60 (S.F.T.) for Ferozepur, Jullundur, Hoshiarpur, Ludhiana, Patiala and Sangrur and 61 (S.F.T.) for Ferozepur, Jullundur, Hoshiarpur and Ludhiana.

Type: ‘M’.

Object: Type A: To study the response of Maize to levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Tarai and submountain for Hoshiarpur and Alluvial for others. (iii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O = Control (no manure),
   N = 22.4 Kg/ha. of N,
   P = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
   K = 22.4 Kg/ha. of K<sub>2</sub>O,
   NP = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
   NK = 22.4 Kg/ha. of N + 22.4 Kg/ha. of K<sub>2</sub>O,
   PK = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 22.4 Kg/ha. of K<sub>2</sub>O and
   NPK = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 22.4 Kg/ha. of K<sub>2</sub>O.

3. DESIGN:
   (i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on Cash crop, 4 on an Oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on Type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain (iv) to (vii) N.A.

5. RESULTS:
   60 (S.F.T.)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
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<td>1620</td>
<td>50</td>
<td>50</td>
<td>60</td>
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<td>-20</td>
<td>20</td>
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<td>150</td>
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<tr>
<td>Ludhiana</td>
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<td>20</td>
<td>20</td>
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<td>18.0</td>
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<td>65.0</td>
<td>120</td>
<td>110</td>
<td>90</td>
<td>190</td>
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</table>

Av. response in Kg/ha.
Crop: Maize (Kharif).  
Ref: Pb. 60(S.F.T.) for Jallundur, Ferozepur, Patiala and Ludhiana and 61(S.F.T.) for Ferozepur, Jallundur and Hoshiarpur.

District: Ferozepur, Jallundur, Hoshiarpur, Patiala and Ludhiana. Type: 'M'.

Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:

(i) to (x) N.A.

2. TREATMENTS:
7 manurial treatments:
O-Control (no manure)
N1=22.4 Kg/ha. of N as A/S.,
N2=44.8 Kg/ha. of N as A/S.,
N3=22.4 Kg/ha. of N as Urea,
N4=44.8 Kg/ha. of N as Urea,
N5=22.4 Kg/ha. of N as A/S/N, and
N6=44.8 Kg/ha. of N as A/S/N.

3. DESIGN:
Same as in type A conducted on Maize crop on page No. 544.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>N5</th>
<th>N6</th>
<th>Av. response in Kg/ha.</th>
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<td>Ferozepur</td>
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<td>2150</td>
<td>310</td>
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<td>70</td>
<td>68</td>
<td>50</td>
<td>0</td>
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</tr>
<tr>
<td>Jallundur</td>
<td>18</td>
<td>1910</td>
<td>430</td>
<td>180</td>
<td>20</td>
<td>26</td>
<td>10</td>
<td>0</td>
<td>40.0</td>
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<td>Hoshiarpur</td>
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<td>560</td>
<td>180</td>
<td>60</td>
<td>71</td>
<td>20</td>
<td>50</td>
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<td>140</td>
<td>34</td>
<td>0</td>
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<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>N5</th>
<th>N6</th>
<th>Av. response in Kg/ha.</th>
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<td>1630</td>
<td>150</td>
<td>260</td>
<td>120</td>
<td>240</td>
<td>270</td>
<td>270</td>
<td>97.0</td>
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<tr>
<td>Jallundur</td>
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<td>2290</td>
<td>400</td>
<td>540</td>
<td>210</td>
<td>740</td>
<td>440</td>
<td>83.0</td>
<td>77.0</td>
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<tr>
<td>Hoshiarpur</td>
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<td>340</td>
<td>510</td>
<td>610</td>
<td>240</td>
<td>480</td>
<td>290</td>
<td>610</td>
<td>-</td>
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Crop: Maize (Kharif).

Ref: Pb. 60(S.F.T.) for Patiala, Hoshiarpur and Sangrur and 61(S.F.T.) for Jullundur, Ludhiana and Hoshiarpur.

Type: ·M'.

Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS
7 manurial treatments:
- O—Control (no manure)
- N1=22·4 Kg/ha. of N as A/S
- N2=44·8 Kg/ha. of N as A/S
- N1'=22·4 Kg/ha. of N as Urea
- N2'=44·8 Kg/ha. of N as Urea
- N1''=22·4 Kg/ha. of N as C/A/N and
- N2''=44·8 Kg/ha. of N as C/A/N

3. DESIGN:
   Same as in type A conducted on Maize crop on page 544.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield  (iv) to (vii) N.A.

5. RESULTS:
   Av. response in Kg/ha.

60 (S.F.T.)

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield</th>
<th>N1</th>
<th>N2</th>
<th>N1'</th>
<th>N2'</th>
<th>N1''</th>
<th>N2''</th>
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<td>230</td>
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<td>190</td>
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<td>100</td>
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<tr>
<td>Sangrur</td>
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<td>1070</td>
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<td>100</td>
<td>350</td>
<td>500</td>
<td>420</td>
<td>770</td>
<td>142</td>
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<tr>
<td>Hoshiarpur</td>
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<td>220</td>
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61 (S.F.T.)

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<th>N2</th>
<th>N1'</th>
<th>N2'</th>
<th>N1''</th>
<th>N2''</th>
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<td>2020</td>
<td>400</td>
<td>700</td>
<td>440</td>
<td>770</td>
<td>420</td>
<td>790</td>
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<td>Ludhiana</td>
<td>11</td>
<td>2080</td>
<td>480</td>
<td>770</td>
<td>650</td>
<td>960</td>
<td>580</td>
<td>960</td>
<td>71</td>
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<tr>
<td>Hoshiarpur</td>
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<td>1060</td>
<td>270</td>
<td>870</td>
<td>580</td>
<td>960</td>
<td>71</td>
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</table>

Crop: Maize (Kharif)

Ref: Pb. 62, 63 and 65(S.F.T.) for Sangrur; 62, 63 (S.F.T.) for Jullundur, 62, 63, 65(S.F.T.) for Patiala, 62 to 65(S.F.T.) for Ludhiana and 65(S.F.T.) for Ferozepur.

District: Sangrur, Jullundur, Patiala, Ludhiana and Ferozepur. Type: ·M'.

Object: Type A: To study the response curves of important cereal, cash, and oil seed crops to N applied singly and in combination with other nutrients.
1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments.
   O = Control (no manure)
   N₀ = 60 Kg/ha. of N
   N₁ = 120 Kg/ha. of N
   P₀ = 35 Kg/ha. of P₂O₅
   N₀P₀ = 60 Kg/ha. of N + 35 Kg/ha. of P₂O₅
   N₁P₀ = 120 Kg/ha. of N + 35 Kg/ha. of P₂O₅
   N₀P₁ = 120 Kg/ha. of N + 70 Kg/ha. of P₂O₅
   N₁P₁ = 120 Kg/ha. of N + 70 Kg/ha. of P₂O₅ + 35 Kg/ha. of K₂O

3. DESIGN:
   (i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A₁, 11 of type A₂, 11 of type A₃ and 3 are of type C. The eleven experiments under type A₁, A₂ and A₃ are distributed as 3 on Kharif cereal, 3 on Rabi cereal, 3 on Cash crop and 2 on Oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A₁, A₂ and A₃ experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A₁, A₂ and A₃ are laid out. For conducting these experiments the three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of Maize. (iv) (a) 1962 to 66 for Sangrur (64 N.A.), 1962,63 for Jullundur, 1962 to 66 for Patiala (64 N.A.) 1962 to 66 for Ludhiana and 1965 to 66 for Ferozepur. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   Sangrur
   62 (S.F.T.)
   Treatment
   N₁ N₂ P₁ N₁P₁ N₂P₁ N₀P₁ N₀P₁K₁ S.E.
   Av. response of grain in Kg/ha.
   185 273 152 356 303 349 596 73-6
   Control yield=1365 Kg/ha.; No. of trials=10

   63 (S.F.T.)
   Treatment
   N₁ N₂ P₁ N₁P₁ N₂P₁ N₀P₁ N₀P₁K₁ S.E.
   Av. response of grain in Kg/ha.
   235 592 123 519 883 1042 141-0
   Control yield=2030 Kg/ha.; No. of trials=7

   65 (S.F.T.)
   Treatment
   N₁ N₂ P₁ N₁P₁ N₂P₁ N₀P₁ N₀P₁K₁ S.E.
   Av. response of grain in Kg/ha.
   380 369 -35 198 208 569 815 179-0
   Control yield=2138 Kg/ha.; No. of trials=7

   Jullundur
   62 (S.F.T.)
   Treatment
   N₁ N₂ P₁ N₁P₁ N₂P₁ N₀P₁ N₀P₁K₁ S.E.
   Av. response of grain in Kg/ha.
   547 617 140 420 573 813 931 98-0
   Control yield=1386 Kg/ha.; No. of trials=13
<table>
<thead>
<tr>
<th>District</th>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
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<tr>
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<td>Av. response of grain in Kg/ha.</td>
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<td>1197</td>
<td>876</td>
<td>704</td>
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<td>1110</td>
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<tr>
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<td>Av. response of grain in Kg/ha.</td>
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<td>328</td>
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<td>830</td>
<td>917</td>
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<td>Av. response of grain in Kg/ha.</td>
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Crop: Maize (Kharij).

Ref.- Pb. 65(S.F.T) for Gurdaspur. 62 to 65 (S.F.T.) for Hoshiarpur. 63, 64 (S.F.T.) for Patiala. and 64 (S.F.T.) for Sangrur

District:- Gurdaspur. Hoshiarpur, Patiala and Sangrur Type :- 'M'.

Object : Type A : To study the response curve of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients,

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated (viii) to (x) N.A.

2. Treatments 3 Design:
Same as in type A, conducted under irrigated condition on Maize crop on page No. 547.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1965 to 66 for Gurdaspur, 1962 to 66 for Hoshiarpur, 1963 to 66 for Patiala and 1964 only for Sangrur.  (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:

Gurdaspur
65 (S.F.T.)

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<td>Av. response of grain in Kg/ha.</td>
<td>396</td>
<td>646</td>
<td>126</td>
<td>526</td>
<td>813</td>
<td>953</td>
<td>1013</td>
<td>1190</td>
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Control yield = 969 Kg/ha., No. of trials = 3

Hoshiarpur
62 (S.F.T.)

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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
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<td>Av. response of grain in Kg/ha.</td>
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<td>1529</td>
<td>270</td>
<td>1756</td>
<td>1568</td>
<td>1768</td>
<td>1998</td>
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Control yield = 1390 Kg/ha., No. of trials = 9

63 (S.F.T.)

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<td>Av. response of grain in Kg/ha.</td>
<td>560</td>
<td>933</td>
<td>33</td>
<td>529</td>
<td>921</td>
<td>1097</td>
<td>1219</td>
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Control yield = 1525 Kg/ha., No. of trials = 15

64 (S.F.T.)

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<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
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<td>Av. response of grain in Kg/ha.</td>
<td>566</td>
<td>779</td>
<td>34</td>
<td>684</td>
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<td>1010</td>
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Control yield = 1222 Kg/ha., No. of trials = 14

65 (S.F.T.)

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<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
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<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>465</td>
<td>837</td>
<td>84</td>
<td>550</td>
<td>935</td>
<td>1085</td>
<td>1095</td>
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Control yield = 1074 Kg/ha., No. of trials = 13

Patiala
63 (S.F.T.)

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<td>Av. response of grain in Kg/ha.</td>
<td>509</td>
<td>926</td>
<td>200</td>
<td>753</td>
<td>1198</td>
<td>1247</td>
<td>1344</td>
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Control yield = 1359 Kg/ha., No. of trials = 4
Crop: Maize (Kharif).  Ref: Pb. 65(S.F.T) for Gurdaspur, 63 to 65(S.F.T) for Hoshiarpur and 63, 64(S.F.T) for Patiala.

Districts: Gurdaspur, Hoshiarpur and Patiala. Type: 'M'.

Object:—Type A1: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   Same as in type A1 conducted under irrigated conditions on Maize crop on page No. 551.

3. DESIGN:
   Same as in type A1 conducted under irrigated condition on Maize crop on page No. 547.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of Maize. (iv) 1965 to 66 for Gurdaspur; 1962 to 66 for Hoshiarpur (62 N.A.) and 1963, 64 for Patiala. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

   **Gurdaspur**

   65(S.F.T.)

   Treatment: \[ N_1 \quad N_2 \quad P_1 \quad N_1P_1 \quad N_1P_2 \quad N_1P_4 \quad N_1P_5K_2 \quad \text{S.E.} \]

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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>65</td>
<td>362</td>
<td>97</td>
<td>307</td>
<td>623</td>
<td>625</td>
<td>608</td>
<td>170</td>
</tr>
</tbody>
</table>

   Control yield = 1096 Kg/ha.; No. of trials = 4

   **Hoshiarpur**

   63(S.F.T.)

   Treatment: \[ N_1 \quad P_1 \quad P_2 \quad N_1P_1 \quad N_1P_2 \quad N_1P_3 \quad N_1P_4 \quad N_1P_5K_2 \quad \text{S.E.} \]

<table>
<thead>
<tr>
<th>Treatment</th>
<th>542</th>
<th>71</th>
<th>113</th>
<th>596</th>
<th>674</th>
<th>1081</th>
<th>1238</th>
<th>790</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>542</td>
<td>71</td>
<td>113</td>
<td>596</td>
<td>674</td>
<td>1081</td>
<td>1238</td>
<td>790</td>
</tr>
</tbody>
</table>

   Control yield = 1133 Kg/ha; No. of trials = 15
Crop: Maize (Kharif). Ref:- Pb. 65 (S.F.T.) for Ferozepur, 62 to 65 (S.F.T.) for Ludhiana, 62,63, 65 (S.F.T.) for Patiala, 62, 63, 65 (S.F.T.) for Sangrur and 62, 63(S.F.T.) for Jullundur.

District :- Ferozepur, Ludhiana, Patiala, Sangrur, Type ‘M’ and Jullundur.

Object—Type A 2 To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O=Control (no manure)
   N 60 Kg/ha. of N,
   P 35 Kg/ha. of P 2 O 5,
   P 70 Kg/ha. of P 2 O 5,
   N 60 Kg/ha. of N + 35 Kg/ha. of P 2 O 5,
   N 60 Kg/ha. of N + 70 Kg/ha. of P 2 O 5,
   N 120 Kg/ha. of N + 70 Kg/ha. of P 2 O 5, and
   N 120 Kg/ha. of N + 70 Kg/ha. of P 2 O 5 + 70 Kg/ha. of K 2 O

3. DESIGN
   Same as in type A 1 conducted under irrigated condition on Maize crop on page No. 647.
4. GENERAL:

(i) and (ii) N.A.  (iii) Yield of Maize. (iv) 1965 for Ferozepur, 1962 to 66 for Ludhiana, 1962 to 66 for Patiala, Sangrur (64 N.A.) and 1962, 03 for Jullundur; (v) to (vii) N.A.

5. RESULTS:

Ferozepur

65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P4K4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>62</td>
<td>150</td>
<td>87</td>
<td>201</td>
<td>287</td>
<td>362</td>
<td>450</td>
<td>18.7</td>
</tr>
</tbody>
</table>

Control yield = 1412 Kg/ha.; No. of trials = 4

Ludhiana

62 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P4K4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>253</td>
<td>-56</td>
<td>261</td>
<td>553</td>
<td>485</td>
<td>658</td>
<td>756</td>
<td>289.3</td>
</tr>
</tbody>
</table>

Control yield = 1644 Kg/ha.; No. of trials = 7

63 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P4K4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>245</td>
<td>56</td>
<td>384</td>
<td>700</td>
<td>663</td>
<td>858</td>
<td>1045</td>
<td>137.0</td>
</tr>
</tbody>
</table>

Control yield = 1765 Kg/ha.; No. of trials = 9

64 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P4K4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>758</td>
<td>415</td>
<td>546</td>
<td>801</td>
<td>956</td>
<td>1382</td>
<td>1609</td>
<td>126.5</td>
</tr>
</tbody>
</table>

Control yield = 2577 Kg/ha.; No. of trials = 7

65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P4K4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>535</td>
<td>549</td>
<td>641</td>
<td>685</td>
<td>778</td>
<td>1168</td>
<td>1326</td>
<td>115.5</td>
</tr>
</tbody>
</table>

Control yield = 2008 Kg/ha.; No. of trials = 7

Patiala

62 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P4K4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>277</td>
<td>205</td>
<td>240</td>
<td>578</td>
<td>564</td>
<td>726</td>
<td>674</td>
<td>123.8</td>
</tr>
</tbody>
</table>

Control yield = 2296 Kg/ha.; No. of trials = 9

63 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P4K4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>543</td>
<td>231</td>
<td>133</td>
<td>495</td>
<td>575</td>
<td>783</td>
<td>1011</td>
<td>241.0</td>
</tr>
</tbody>
</table>

Control yield = 2665 Kg/ha.; No. of trials = 6
Crop: Maize (Kharif).

Ref: Pb.62 and 63(S.F.T) for Jullundur,
62 to 65(S.F.T.) for Ludhiana and Patiala
62, 63 and 65(S.F.T.) for Sangrur and 65 (S.F.T.) for Ferozepur.

Type: 'M'

Object Type A: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.
1. **Basal Conditions:**

(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. **Treatments:**

8 manuriial treatments:

- O = Control (no manure),
- N1 = 60 Kg/ha. of N,
- K1 = 35 Kg/ha. of K2O,
- K2 = 70 Kg/ha. of K2O,
- N1K1 = 60 Kg/ha. of N + 35 Kg/ha. of K2O,
- N1K2 = 60 Kg/ha. of N + 70 Kg/ha. of K2O,
- N1K1K2 = 120 Kg/ha. of N + 70 Kg/ha. of K2O and
- N1P1K1 = 80 Kg/ha. of P2O5 + 35 Kg/ha. of K2O.

3. **Design:**

Same as in Type A, conducted under irrigated condition on Maize crop on page No. 547.

4. **General:**

(i) and (ii) N.A. (iii) Yield of grain. (vi) (a) 62 to 63 (S.F.T.) for Jullundur; 62 to 65 (S.F.T.) for Ludhiana and Patiala; 62, 63 and 65 (S.F.T.) for Sangrur and 65 (S.F.T.) for Feroepur (b) and (c) N.A.

**Jullundur 62 (S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K1K2</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>462</td>
<td>104</td>
<td>125</td>
<td>378</td>
<td>532</td>
<td>500</td>
<td>722</td>
<td>110.7</td>
</tr>
</tbody>
</table>

Control yield = 1473 Kg/ha.; No of trials = 10

**Ludhiana 62 (S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K1K2</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>521</td>
<td>179</td>
<td>233</td>
<td>355</td>
<td>551</td>
<td>866</td>
<td>864</td>
<td>640</td>
</tr>
</tbody>
</table>

Control yield = 1045 Kg/ha.; No. of trials = 15

**Jullundur 63 (S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K1K2</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>362</td>
<td>-79</td>
<td>-63</td>
<td>397</td>
<td>373</td>
<td>507</td>
<td>451</td>
<td>139.2</td>
</tr>
</tbody>
</table>

Control yield = 1377 Kg/ha.; No. of trials = 8

**Ludhiana 63 (S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K1K2</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>275</td>
<td>64</td>
<td>106</td>
<td>378</td>
<td>368</td>
<td>647</td>
<td>702</td>
<td>129.0</td>
</tr>
</tbody>
</table>

Control yield = 1763 Kg/ha.; No. of trials = 5
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
<th>Av. response of grain in Kg/ha.</th>
<th>Control yield</th>
<th>No. of trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 (S.F.T.)</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>283</td>
<td>421</td>
<td>648</td>
<td>933</td>
<td>1055</td>
<td>1022</td>
<td>107-1</td>
<td>1245 Kg/ha</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>62 (S.F.T.)</td>
<td>635</td>
<td>30</td>
<td>475</td>
<td>687</td>
<td>576</td>
<td>832</td>
<td>821</td>
<td>232-1</td>
<td>1402 Kg/ha</td>
</tr>
<tr>
<td></td>
<td>63 (S.F.T.)</td>
<td>452</td>
<td>262</td>
<td>30</td>
<td>171</td>
<td>356</td>
<td>504</td>
<td>555</td>
<td>212-0</td>
<td>2467 Kg/ha</td>
</tr>
<tr>
<td></td>
<td>64 (S.F.T.)</td>
<td>112</td>
<td>-138</td>
<td>-32</td>
<td>289</td>
<td>375</td>
<td>790</td>
<td>724</td>
<td>249-8</td>
<td>1290 Kg/ha</td>
</tr>
<tr>
<td></td>
<td>65 (S.F.T.)</td>
<td>23</td>
<td>-163</td>
<td>-84</td>
<td>132</td>
<td>95</td>
<td>199</td>
<td>551</td>
<td>230-3</td>
<td>2375 Kg/ha</td>
</tr>
<tr>
<td></td>
<td>62 (S.F.T.)</td>
<td>471</td>
<td>440</td>
<td>423</td>
<td>569</td>
<td>520</td>
<td>650</td>
<td>740</td>
<td>98-4</td>
<td>1213 Kg/ha</td>
</tr>
<tr>
<td></td>
<td>63 (S.F.T.)</td>
<td>354</td>
<td>92</td>
<td>93</td>
<td>497</td>
<td>529</td>
<td>937</td>
<td>871</td>
<td>151-0</td>
<td>2029 Kg/ha</td>
</tr>
<tr>
<td></td>
<td>65 (S.F.T.)</td>
<td>432</td>
<td>180</td>
<td>226</td>
<td>605</td>
<td>385</td>
<td>960</td>
<td>877</td>
<td>51-8</td>
<td>1452 Kg/ha</td>
</tr>
</tbody>
</table>
### Ferozepur

**65(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_4$</th>
<th>$N_1K_1$</th>
<th>$N_1K_4$</th>
<th>$N_2K_4$</th>
<th>$N_1P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>75</td>
<td>112</td>
<td>275</td>
<td>350</td>
<td>412</td>
<td>525</td>
<td>450</td>
<td>49.4</td>
</tr>
</tbody>
</table>

Control yield = 1650 Kg/ha.; No. of trials = 4

---

### Crop: Maize (Kharif).

Ref. - Pb 62 to 65(S.F.T.) for Hoshiarpur, 63(S.F.T.) for Patiala, and 65(S.F.T.) for Gurdaspur.

**District: Hoshiarpur, Patiala and Gurdaspur.**

Type: - 'M'.

Object - Type A: To study the response curves of important cereal, cash and oil-seed crops to K applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS:**
   - (i) to (vi) N.A.
   - (vii) Unirrigated.
   - (viii) to (a) N.A.

2. **TREATMENTS**
   - Same as in type A conducted under irrigated condition on Maize crop on page No. 554.

3. **DESIGN**
   - Same as in type A conducted under irrigated condition on Maize crop on page No. 547.

4. **GENERAL**
   - (i) and (ii) N.A.
   - (iii) Yield of maize.
   - (iv) (a) 1962 to 66 for Hoshiarpur, 1963 only for Patiala, and 65 for Gurdaspur.
   - (v) to (vii) N.A.

5. **RESULTS**

**Hoshiarpur 62(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_4$</th>
<th>$N_1K_1$</th>
<th>$N_1K_4$</th>
<th>$N_2K_4$</th>
<th>$N_1P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>755</td>
<td>119</td>
<td>254</td>
<td>368</td>
<td>1049</td>
<td>1583</td>
<td>1240</td>
<td>83.4</td>
</tr>
</tbody>
</table>

Control yield = 1523 Kg/ha.; No. of trials = 9

**63(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_4$</th>
<th>$N_1K_1$</th>
<th>$N_1K_4$</th>
<th>$N_2K_4$</th>
<th>$N_1P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>471</td>
<td>-19</td>
<td>78</td>
<td>493</td>
<td>497</td>
<td>952</td>
<td>605</td>
<td>84.9</td>
</tr>
</tbody>
</table>

Control yield = 1380 Kg/ha.; No. of trials = 13

**64(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_4$</th>
<th>$N_1K_1$</th>
<th>$N_1K_4$</th>
<th>$N_2K_4$</th>
<th>$N_1P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>711</td>
<td>111</td>
<td>176</td>
<td>484</td>
<td>601</td>
<td>1037</td>
<td>797</td>
<td>202.3</td>
</tr>
</tbody>
</table>

Control yield = 1091 Kg/ha.; No. of trials = 13
Crop: Barley (Rabi).


Object: To see the effect of different levels of N and P on the yield of Barley crop.

1. BASAL CONDITIONS:
   (i) (a) Maize-Barley. (b) Maize. (c) N.A. (ii) Sandy loam. (iii) 15 to 30.11.64. (iv) (a) 2 ploughings. (b) Ker. (c) 35 Kg/ha. (d) N.A. (e) — (v) N.A. (vi) C-164 (vii) Irrigated. (viii) one hoeing. (ix) 11cm. (x) 11th week of April, 65.

2. TREATMENTS
   Main-plot treatments:
   3 levels of N: N₀=0, N₁=28 and N₂=56Kg/ha.
   Sub-plot treatments:
   3 levels of P₀₀₂₅₆: P₀=0, P₁=28 and P₂=56Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 10·12 sq metre. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Germination, no. of ears, yield of grain. (iv) (a) 1964—only. (b) b-o (c) Nil. (v) to (vii) No.

5. RESULTS:
   (i) 2524 Kg/ha. (ii) (a) 595·7 Kg/ha. (b) 323·2 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av yield of grain in Kg/ha.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ref: Pb. 65(164).</td>
<td>Type: 'M'.</td>
</tr>
</tbody>
</table>

Object: To study the effect of different spacings and seed-rates on the yield of Barley.

1. BASAL CONDITIONS:
   (i) (a) Maize-Barley. (b) Maize. (c) N.A. 
   (ii) Loamy sand. 
   (iii) 15 and 30.11.65. 
   (iv) (a) 2 ploughings, (b) Ker. 
   (c) As per treatments. 
   (v) N.A. 
   (vi) C-164. 
   (vii) Irrigated. 
   (viii) One hoeing 
   (ix) 9cm. 
   (x) 10th week of April, 66.

2. TREATMENTS:
   Main-plot treatments
   3 levels of spacing: S₁=15, S₂=23 and S₃=30cm.

   Sub-plot treatments:
   3 levels of seed-rate: R₁=60, R₂=86 and R₃=111 Kg/ha.

3. DESIGN:
   (i) Split-plot. 
   (ii) (a) 3 main-plots/repetition; 3 sub-plots/main-plot. 
   (b) N.A. 
   (iii) 6. 
   (iv) (a) N.A. 
   (v) 10’12. sq.metre. 
   (vi) N.A. 
   (vii) Yes.

4. GENERAL:
   (i) Good. 
   (ii) Nil. 
   (iii) Germination, no. of plants/meter; no. of ears head etc. 
   (iv) 1965-continued. 
   (v) N.A. 
   (vi) Nil. 
   (vii) Nil.

5. RESULTS:
   (i) 3005 Kg/ha. 
   (ii) (a) 392.5 Kg/ha. 
   (b) 529.8 Kg/ha. 
   (iii) None of the effects is significant. 
   (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>S₁</th>
<th>S₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>R₁</td>
<td>2897</td>
<td>3134</td>
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<tr>
<td>R₂</td>
<td>3282</td>
<td>2827</td>
</tr>
<tr>
<td>R₃</td>
<td>2808</td>
<td>2857</td>
</tr>
<tr>
<td>Mean</td>
<td>2997</td>
<td>2939</td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 442.4 Kg/ha.
Crop :- Barley (Rabi).  
Site :- Punjab Agri. University, Ludhiana.  
Object :- To study the effect of different levels of N and seed-rates on the yield of Barley.

1. BASAL CONDITIONS:
   (i) (a) Fallow or maize-barley. (b) Maize. (c) N.A. (ii) Loamy sand. (iii) 15 and 30.11.65. (iv) 2 ploughings. (b) Kera. (c) 75 to 110 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) C-164. (vii) Irrigated. (viii) One hoeing. (ix) 9cm. (x) 1st week of April, 66.

2. TREATMENTS:
   Main-plot treatments :-
   3 levels of N : N₁ = 0, N₂ = 35 and N₃ = 70 Kg/ha.
   Sub-plot treatments:-
   2 seed-rates: R₁ = 75 and R₂ = 110 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication, 2 sub-plots in main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 20'24. sq. cm. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965 cm-md. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2801 Kg/ha. (ii) (a) 278.7 Kg/ha. (b) 334.6 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>2879</td>
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<td>2422</td>
<td>2698</td>
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<td>2928</td>
<td>3212</td>
<td>2570</td>
<td>2903</td>
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<tr>
<td>Mean 2904</td>
<td>3002</td>
<td>2570</td>
<td>2801</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=341·0 Kg/ha.
Sub-plot treatments:
3 levels of $N$: $N_0=0, N_1=35$ and $N_2=70$ Kg/ha.

3. DESIGN:
(i) Split-plot (ii) 3 main-plots/replication, 3 sub-plots/main-plot (b) N.A. (iii) 4. (iv) (a) N.A. (b) 20.24 sq metres. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965-const. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 2103 Kg/ha. (ii) (a) 420.4 Kg/ha. (b) 317.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>I₁</th>
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<th>I₃</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>$N_0$</td>
<td>2373</td>
<td>2258</td>
<td>1984</td>
<td>2175</td>
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<tr>
<td>$N_1$</td>
<td>2046</td>
<td>2347</td>
<td>2120</td>
<td>2171</td>
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<td>$N_2$</td>
<td>1984</td>
<td>2120</td>
<td>1787</td>
<td>1964</td>
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<tr>
<td>Mean</td>
<td>2101</td>
<td>2245</td>
<td>1964</td>
<td>2103</td>
</tr>
</tbody>
</table>

Crop: Bajra. (Kharif). Ref: Pb. 61(26),62(30),63(46).

Object:—To study the effect of different levels of N, P and K on the yield of Bajra.

BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 27.7 61, 4.7.62, 19.7.63. (iv) (a) to (c) N.A. (v) Nil. (vi) A 1/3
(vii) Irrigated. (viii) 2 hoeins. (ix) N.A. (x) 16.10.61, 14.10 62, 18.10.63.

2. TREATMENTS

Main-plot treatments:
2 levels of $P_0$: $P_0=0$, and $P_1=44.8$ Kg/ha.

Sub-plot treatments:
2 levels of $K_0$: $K_0=0$ and $K_1=44.8$ Kg/ha.

Sub-Sub-plot treatments:
4 levels of $N$: $N_0=0$, $N_1=22.4$, $N_2=44.8$ and $N_3=67.2$ Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) 2 main-plots/replication, 2 sub-plots/main-plot, and 4 sub-sub-plots/sub-plot. (b) N.A. (iii) 2 for 61; 4 for others. (iv) (a) N.A. (b) 1/247 ha. for 61; 1/296.5 ha. for others. (v) N.A. (vi) Yes.

4 GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961 to 63. (b) No. (c) Nil. (v) N.A. (vi) Heavy rain fall in 62. (vii) Since the sub-sub-plot error variances are heterogeneous, therefore the results of individual years are given below.

5. RESULTS:
61(26)
(i) 1803 Kg/ha. (ii) (a) 119.1 (b) 518.8 Kg/ha. (c) 93.7 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.
### Table 1: Mean Yields

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>P₀</th>
<th>P₁</th>
<th>Mean</th>
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<td>1719</td>
<td>1969</td>
<td>2058</td>
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<td>1831</td>
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<tr>
<td>K₁</td>
<td>1468</td>
<td>1730</td>
<td>1825</td>
<td>2073</td>
<td>1779</td>
<td>1768</td>
<td>1774</td>
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<tr>
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<td>1724</td>
<td>1817</td>
<td>2066</td>
<td>1864</td>
<td>1741</td>
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<td>P₀</td>
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<td>P₁</td>
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<td>1612</td>
<td>1813</td>
<td>2003</td>
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</tbody>
</table>

C.D. for N marginal means = 102.6 Kg/ha.

62(30)

(i) 1006 Kg/ha. (ii) (a) 286.8 Kg/ha. (b) 181.7 Kg/ha. (c) 121.8 Kg/ha. (iii) Main effect of N alone is highly significant.

### Table 2: Mean Yields

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
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<td>1102</td>
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<tr>
<td>Mean</td>
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<td>1110</td>
<td>1078</td>
<td>1015</td>
<td>997</td>
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<td>P₀</td>
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<td>1008</td>
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<td>P₁</td>
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<td>1108</td>
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</tbody>
</table>

C.D. for N marginal means = 87.4 Kg/ha.

63(46)

(i) 1036 Kg/ha. (ii) (a) 175.9 Kg/ha. (b) 149.9 Kg/ha. (c) 166.8 Kg/ha. (iii) Main effect of N alone is highly significant.

### Table 3: Mean Yields

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>P₀</th>
<th>P₁</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>K₀</td>
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<td>1080</td>
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<td>K₁</td>
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<td>1000</td>
<td>1209</td>
<td>1029</td>
<td>967</td>
<td>998</td>
</tr>
<tr>
<td>Mean</td>
<td>834</td>
<td>1015</td>
<td>1046</td>
<td>1250</td>
<td>1042</td>
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<td>P₀</td>
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<td>995</td>
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</table>

C.D. for N marginal means = 119.7 Kg/ha.
Crop: Bajra (Kharif).


Ref: Pb. 61(24), 62(33), 63(37).

Type: 'M'.

Object: To study the effect of different methods and times of application of N on the yield of Bajra.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Gram for 61; N.A. (c) N.A. (ii) Clay loam. (iii) 14.7.61; 1st week of July, mid of July. (iv) (a) 3 to 4 ploughs, (b) 1 to 2 N.A. (v) N.A. (vi) 1/3. (vii) Irrigated. (viii) and (ix) N.A. (x) 7.10.61; mid of Nov.; 1st week of Oct.

2. TREATMENTS

8 times and methods of application of 44.8 Kg/ha. of N: T0 = Control, T1 = Full dose applied at sowing by broad casting, T2 = Full dose applied by plough furrow, T3 = 1/2 dose at sowing + 1/2 dose at thinning, T4 = 1/2 dose at sowing + 1/2 dose at earing, T5 = Full dose at thinning, T6 = Full dose at earing and T7 = 1/2 dose at thinning + 1/2 dose at earing.

3. DESIGN:

(i) R.B.D. (ii) 8. (b) N.A. (iii) 6. (iv) (a) 19.51m. x 3.05m. for 61; 18.29m. x 3.05 m. for others. (b) 16.00m. x 2.44m. (v) 145cm. x 30cm. for 61, 85cm. x 30cm. for others. (vi) Yes.

4. GENERAL:

(i) Satisfactory for 61 and 63; Unsatisfactory for 62. (b) N.A. (iii) Yield of grain. (iv) (a) 1961–63. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Unusual weather conditions and heavy rains for 62 only. Nil. for others. (vii) Error variances are heterogeneous and Treatments x Years interaction is present.

5. RESULTS:

(i) 170.9 Kg/ha. (ii) 607.8 Kg/ha. (based on 14 def. made up of Treatments x Years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1694</td>
<td>1893</td>
<td>1772</td>
<td>1734</td>
<td>1449</td>
<td>1775</td>
<td>1704</td>
<td>1729</td>
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<table>
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<th>Year</th>
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<th>1963</th>
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<td>2373</td>
<td>1055</td>
<td>1712</td>
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</tr>
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<td>2338</td>
<td>1285</td>
<td>1765</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>1225</td>
<td>1757</td>
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<td>2387</td>
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<td>2033</td>
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<td>2299</td>
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<td>N.S.</td>
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<td>1762</td>
<td></td>
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<tr>
<td>N.S.</td>
<td>3970</td>
<td>1719</td>
<td></td>
</tr>
<tr>
<td>N.S.</td>
<td>6078</td>
<td>1633</td>
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</tbody>
</table>

Crop: Bajra (Kharif).


Ref: Pb. 63(51).

Type: 'C'.

Object: To study the effect of different methods of sowing and cultural practices on the yield of Bajra.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 13.7.63. (iv) (a) N.A. (b) As per treatments. (c) to (e) N.A. (v) N.A. (vi) T-55. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) 28.10.63.
2. TREATMENTS:
Main-plot treatments:
3 methods of sowing: \( M_1 = \text{Pora, } M_2 = \text{Kera and } M_3 = \text{Broadcasting} \).

Sub-plot treatments:
2 cultural treatments: \( T_1 = \text{Control (no thinning) and } T_2 = \text{Thinning} \).

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/644 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 1358 Kg/ha. (ii) (a) 2540 Kg/ha. (b) 1977 Kg/ha. (iii) Interaction \( M \times T \) is highly significant. (iv) Av. yield of grain in Kg/ha.

\[
\begin{array}{ccc|c}
M_1 & M_2 & M_3 & \text{Mean} \\
\hline
T_1 & 1468 & 1441 & 1174 & 1361 \\
T_2 & 1231 & 1303 & 1532 & 1355 \\
\hline
\text{Mean} & 1350 & 1372 & 1353 & 1338 \\
\end{array}
\]

C.D. for \( T \) means at the same level of \( M = 243.2 \) Kg/ha.
C.D. for \( M \) means at the same level of \( T = 287.8 \) Kg/ha.

---

Cop : Bajra. (Kharif).
Ref : Pb. 65(86), Type :- ‘CV’.

Object : To study the effect of spacings, thinnings and varieties on the yield of Bajra.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) Mid of July, 65. (iv) (a) and (b) N.A. (c) 6.25 Kg/ha. for T.S.S., 3.75 Kg/ha. for HB-1 (d) As per treatments. (e) Nil. (v) 75 Kg/ha. of N. (vi) As per treatments (vii) to (ix) N.A. (x) Nov., 65.

2. TREATMENTS:
Main-plot treatments:
2 varieties: \( V_1 = \text{T.S.S. and } V_2 = \text{H.B.-1} \).

Sub-plot treatments:
2 cultural treatments: \( T_1 = \text{No thinning and } T_2 = \text{2 thinnings} \).

Sub-sub-plot treatments:
3 row spacings: \( S_1 = 30, S_2 = 60 \) and \( S_3 = 90 \) cm.

3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication; 2 sub-plots/main-plot and 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/644 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.
5. RESULTS.

(i) 521 Kg/ha.

(ii) (a) 315.6 Kg/ha.

(iii) (b) 152.6 Kg/ha.

(iv) (c) 91.4 Kg/ha.

(iii) Main effects of V, S and interaction V x S are highly significant.

(iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T0</th>
<th>T1</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>754</td>
<td>760</td>
<td>720</td>
<td>775</td>
<td>765</td>
<td>757</td>
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<td>V</td>
<td>1039</td>
<td>1132</td>
<td>1162</td>
<td>1122</td>
<td>972</td>
<td>1085</td>
</tr>
<tr>
<td>Mean</td>
<td>896</td>
<td>946</td>
<td>946</td>
<td>948</td>
<td>868</td>
<td>921</td>
</tr>
</tbody>
</table>

C.D. for V marginal means=191.2 Kg/ha.

C.D. for S marginal means=53.3 Kg/ha.

C.D. for S means at the same level of V=75.4 Kg/ha.

C.D. for V means at the same level of S=200.2 Kg/ha.

Cop = Bajra. (Kharif).


Ref := .Pb. 65(94).

Type := 'M'.

Object := To find out the best method of application of N on Bajra crop.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A.

(ii) Sandy loam.

(iii) to (v) N.A.

(iv) Al3.

(vi) Irrigated.

(vii) to (x) N.A.

2. TREATMENTS :

8 times and methods of application of 110 Kg/ha. of N :- 

T0 = Control. T1 = Full dose applied at sowing, by broad casting;

T2 = Full dose applied by plough furrow, T3 = 1/2 dose at sowing + 1/2 dose at thinning,

T4 = 1/2 dose at sowing + 1/2 dose at earing. T5 = Full dose at thinning, T6 = Full dose at earing and T7 = 1/2 dose at thinning + 1/2 dose at earing.

3. DESIGN :

(i) R.B.D.

(ii) (a) 8.

(iii) to (v) N.A.

(iv) 4.

(v) (a) N.A.

(vi) 1/247 ha.

(vii) N.A.

(viii) Yes.

4. GENERAL :

(i) Normal.

(ii) Nil.

(iii) Yield of grain.

(iv) (a) 1965 only.

(b) No, (c) Nil.

(v) N.A.

(vi) and (vii) Nil.

5. RESULTS :

(i) 1045 Kg/ha.

(ii) 1362 Kg/ha.

(iii) Treatment differences are significant.

(iv) Av. yield of grain in Kg/ha.

Treatment | T0  | T1  | T2  | T3  | T4  | T5  | T6  | T7  | Av. yield | C.D. = 200.3 Kg/ha.
<table>
<thead>
<tr>
<th></th>
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<td>1271</td>
<td>1109</td>
<td>1106</td>
<td>904</td>
<td>975</td>
<td>803</td>
<td>1045</td>
<td>200.3 Kg/ha.</td>
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</tbody>
</table>
Crop: Bajra (Rahi).

Ref.: Pb. 60 and 61 (S.F.T.), Type: "M".

for Ferozepur and Sangrur

Object: - Type A: To study the response of Bajra to different levels of N, P and K applied individually and in combination

1. BASAL CONDITIONS:

(i) to (x) N.A.

2. TREATMENTS:

8 manurai treatments:

O = Control (no manure),

N = 22.4 Kg/ha. of N,

P = 22.4 Kg/ha. of P₂O₅,

K = 22.4 Kg/ha. of K₂O,

NP = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P₂O₅,

NK = 22.4 Kg/ha. of N + 22.4 Kg/ha. of K₂O,

PK = 22.4 Kg/ha. of P₂O₅ + 22.4 Kg/ha. of K₂O and

NPK = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P₂O₅ + 22.4 Kg/ha. of K₂O.

3. DESIGN:

(i) and (ii): The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within in the same zone. Each field assistant is required to conduct 16 trials in a year, 8 on a Kharif cereal, 8 on a Rabi cereal, 8 on Cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. Three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) A 1/98.3 ha. (b) 1/197.7 ha. (iv) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 and 61. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS

Av. response of grain in Kg/ha.

60 (S.F.T.):

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferozepur</td>
<td>5</td>
<td>180</td>
<td>90</td>
<td>50</td>
<td>40</td>
<td>9.0</td>
<td>-10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sangrur</td>
<td>2</td>
<td>1180</td>
<td>160</td>
<td>120</td>
<td>270</td>
<td>84.0</td>
<td>60</td>
<td>0</td>
<td>0</td>
<td>-10</td>
<td>78.0</td>
</tr>
</tbody>
</table>

61 (S.F.T.):

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferozepur</td>
<td>4</td>
<td>700</td>
<td>280</td>
<td>60</td>
<td>70</td>
<td>52.0</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>-10</td>
<td>45.0</td>
</tr>
<tr>
<td>Sangrur</td>
<td>2</td>
<td>1180</td>
<td>320</td>
<td>290</td>
<td>190</td>
<td>24.0</td>
<td>90</td>
<td>70</td>
<td>-30</td>
<td>-10</td>
<td>26.0</td>
</tr>
</tbody>
</table>
Crop: Bajra (Kharif).
District: Ferozepur.

Ref: Pb. 60(S.F.T).
Type: 'M'.

Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:
   7 manurial treatments:
   O=Control (no manure)
   N₁=22.4 Kg/ha. of N as A/S,
   N₂=44.8 Kg/ha. of N as A/S,
   N₃=22.4 Kg/ha. of N as Urea,
   N₄=44.8 Kg/ha. of N as Urea,
   N₅=22.4 Kg/ha. of N as C/A/N and
   N₆=44.8 Kg/ha. of N as C/A/N.

3. DESIGN:
   Same as in type A conducted on Rajra crop on page No. 565.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   Av. response in Kg/ha.
   District No. of Control yield N₁ N₂ N₃ N₄ N₅ N₆ S.E.
   Ferozepur 3 920 160 230 110 220 130 210 30 0

Crop: Bajra (Kharif).
District: Sangrur and Ferozepur.

Ref: Pb. 61(S.F.T.)
Type: 'M'.

Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:
   7 manurial treatments:
   O=Control (no manure),
   N₁=22.4 Kg/ha. of N as A/S,
   N₂=44.8 Kg/ha. of N as A/S,
   N₃=22.4 Kg/ha. of N as Urea,
   N₄=44.8 Kg/ha. of N as Urea,
   N₅=22.4 Kg/ha. of N as A/S/N and
   N₆=44.8 Kg/ha. of N as A/S/N
3. DESIGN:
Same as in type A conducted on Bajra crop on page No. 565

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961 only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N1</th>
<th>N2</th>
<th>N2'</th>
<th>N3</th>
<th>N3'</th>
<th>N4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangrur</td>
<td>2</td>
<td>960</td>
<td>350</td>
<td>640</td>
<td>240</td>
<td>580</td>
<td>440</td>
<td>740</td>
<td>50'</td>
</tr>
<tr>
<td>Ferozepur</td>
<td>4</td>
<td>860</td>
<td>490</td>
<td>670</td>
<td>390</td>
<td>600</td>
<td>250</td>
<td>790</td>
<td>43'</td>
</tr>
</tbody>
</table>

Crop: Bajra (Kharif).

District: Sangrur.

Ref.: Pb. 63, 65 (S.F.T.).

Type: 'M'.

Object: Type A: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manural treatments:
O = Control (no manure)
N1 = 35 Kg/ha. of N,
N2 = 70 Kg/ha. of N,
P1 = 35 Kg/ha. of P2O5,
N1P1 = 35 Kg/ha. of N + 35 Kg/ha. of P2O5,
N1P2 = 70 Kg/ha. of N + 35 Kg/ha. of P2O5,
N2P2 = 70 Kg/ha. of N + 70 Kg/ha. of P2O5 and
N1P2K1 = 70 Kg/ha. of N + 70 Kg/ha. of P2O5 + 35 Kg/ha. of K2O.

3. DESIGN:
(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil and cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A1, 11 of type A2, 11 of type A3 and 3 are of type C. The eleven experiments each under type A1, A2 and A3 are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a Cash crop and 2 on Oilseed crop. All the three type-C experiments are conducted on legume crop. For the purpose of conducting the A1, A2 and A3 experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A1, A2 and A3 are laid out. For conducting these experiments, three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 61. (b) and (c) N.A. (v) to (vii) N.A.
5. RESULTS:

Sangrur
63(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P</th>
<th>N1P</th>
<th>N2P</th>
<th>N4P</th>
<th>N2P4K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>252</td>
<td>425</td>
<td>133</td>
<td>641</td>
<td>591</td>
<td>820</td>
<td>988</td>
<td>46.9</td>
</tr>
</tbody>
</table>

Control yield=2658 Kg/ha., No. of trials=3

65(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N4P1</th>
<th>N2P4K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>266</td>
<td>666</td>
<td>366</td>
<td>800</td>
<td>200</td>
<td>266</td>
<td>1000</td>
<td>281.6</td>
</tr>
</tbody>
</table>

Control yield=1866 Kg/ha., No. of trials=3

---

**Crop:** Bajra (Kharif).

**District:** Sangrur.

**Ref:** Pb. 64(S.F.T).

**Type:** 'M'.

Object:—Type A1: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS

   (i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN:

   Same as in type A1 conducted under irrigated condition on Bajra crop on Page No. 567.

3. RESULTS:

   Sangrur

64(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P</th>
<th>N1P</th>
<th>N2P</th>
<th>N4P</th>
<th>N2P4K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>164</td>
<td>336</td>
<td>69</td>
<td>298</td>
<td>456</td>
<td>652</td>
<td>794</td>
<td>391</td>
</tr>
</tbody>
</table>

Control yield=1950 Kg/ha.; No. of trials=4

---

**Crop:** Bajra (Kharif).

**District:** Sangrur and Ferozepur.

**Ref:** Pb. 63, 64(S.F.T), for Sangrur, and 62(S.F.T) for Ferozepur.

**Type:** 'M'.

Object:—Type A1: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.
1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O=Control (No manure)
   \(N_1 = 35\) Kg/ha. of N,
   \(P_1 = 35\) Kg/ha. of \(P_2O_5\),
   \(P_1 = 70\) Kg/ha. of \(P_2O_5\),
   \(N_1P_1 = 35\) Kg/ha. of \(N+35\) Kg/ha. of \(P_2O_5\),
   \(N_1P_2 = 35\) Kg/ha. of \(N+70\) Kg/ha. of \(P_2O_5\),
   \(N_2P_2 = 70\) Kg/ha. of \(N+70\) Kg/ha. of \(P_2O_5\) and
   \(N_2P_2K_1 = 70\) Kg/ha. of \(N+70\) Kg/ha. of \(P_2O_5+35\) Kg/ha. of \(K_2O\).

3. DESIGN:
   Same as in type A. Conducted under irrigated condition on Bajra crop on page No. 567.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 to 66 for Sangrur (62, 64 N.A.) and 1962—only for Ferozepur. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   Sangrur
   63 (S.F.T.)
   Treatment | \(N_1\) | \(P_1\) | \(P_2\) | \(N_1P_1\) | \(N_1P_2\) | \(N_2P_2\) | \(N_2P_2K_1\) | S.E.
   Av. response of grain in Kg/ha.
   Control yield: 2406 Kg/ha. No. of trials=3.
   
   65 (S.F.T.)
   Treatment | \(N_1\) | \(P_1\) | \(P_2\) | \(N_1P_1\) | \(N_1P_2\) | \(N_2P_2\) | \(N_2P_2K_1\) | S.E.
   Av. response of grain in Kg/ha.
   Control yield: 1966 Kg/ha. No. of trials=3.

   Ferozepur
   62 (S.F.T.)
   Treatment | \(N_1\) | \(P_1\) | \(P_2\) | \(N_1P_1\) | \(N_1P_2\) | \(N_2P_2\) | \(N_2P_2K_1\) | S.E.
   Av. response of grain in Kg/ha.
   Control yield: 1563 Kg/ha. No. of trials=3.

Cop :- Bajra (Kharif).

Ref. :- Pb. 63, 65 (S.F.T.).

District :- Sangrur.

Type :- 'M'.

Object :- Type As : To study the response curves of important cereal, cash and oil seed crops applied to K singly and in combination with other nutrients.
1. BASAL CONDITIONS:
(i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O = Control (no manure)
N_1 = 35 Kg/ha. of N,
K_1 = 35 Kg/ha. of K_2O,
K_1 = 70 Kg/ha. of K_2O,
N_1 K_1 = 35Kg/ha. of N + 35 Kg/ha. of K_2O,
N_1 K_2 = 35Kg/ha. of N + 70 Kg/ha. of K_2O,
N_2 K_2 = 70 Kg/ha. of N + 70 Kg/ha. of K_2O and
N_1 P_1 K_1 = 15Kg/ha. of N + 35Kg/ha. of P_2O_5 + 35Kg/ha. of K_2O,

DESIGN:
Same as in type A, conducted under irrigated condition on Bajra crop on page No. 567.

4. GENERAL
(i) and (ii) N.A.  (iii) Yield of grain  (iv) (a) 1962 to 66 (1962 and 64 N.A.)  (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:
Sangrur
63 (S. F. T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1 K_1</th>
<th>N_1 K_2</th>
<th>N_2 K_2</th>
<th>N_1 P_1 K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>202</td>
<td>44</td>
<td>232</td>
<td>365</td>
<td>370</td>
<td>686</td>
<td>968</td>
<td>83</td>
</tr>
<tr>
<td>Control yield = 2194 Kg/ha.;  No. of trials = 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65 (S. F. T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1 K_1</th>
<th>N_1 K_2</th>
<th>N_2 K_2</th>
<th>N_1 P_1 K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>1213</td>
<td>326</td>
<td>100</td>
<td>820</td>
<td>1240</td>
<td>913</td>
<td>1060</td>
<td>32</td>
</tr>
<tr>
<td>Control yield = 1659 Kg/ha.;  No. of trials = 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop := Bajra (Kharif).
Ref := Pb. 65(87).
Type := 'MV'.
Object := To study the effect of different levels of N on the yield of different varieties of Bajra crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) to (v) N.A.  (vi) As per treatments.  (vii) to (x) N.A.
Main-plot treatments: --
2 varieties: - V1=AI/3 and V2=H.B.-1.

Sub-plot treatments:
5 levels of N: N0=0, N1=45, N2=90, N3=135 and N4=180 Kg/ha.

3. DESIGN:
(i) Split-plot (ii) (a) 2 main-plots/replication, 5 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal (ii) N.A. (iii) Yield of grain (iv) (a) 1965-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 876 Kg/ha. (ii) (a) 327.1 Kg/ha. (b) 74.8 Kg/ha. (iii) Main effects of V, N and interaction Vx N are highly significant (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V1</th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>562</td>
<td>646</td>
<td>706</td>
<td>769</td>
<td>891</td>
<td>715</td>
<td></td>
</tr>
<tr>
<td>694</td>
<td>901</td>
<td>1035</td>
<td>1199</td>
<td>1360</td>
<td>1038</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>628</td>
<td>774</td>
<td>870</td>
<td>984</td>
<td>1126</td>
<td>876</td>
</tr>
</tbody>
</table>

C.D. for V marginal means=256.8 Kg/ha.
C.D. for N marginal means=68.1 Kg/ha.
C.D. for V means at the same level of N=273.6 Kg/ha.
C.D. for N means at the same level of V=109.6 Kg/ha.

Crop: Bajra (Kharif),
Ref: Pb. 61(27),62(39),63(44).
Type: 'C'.

Object: To study the effect of dates of sowing and methods of planting on the yield of Bajra.

1. BASEL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam for 61; Sandy loam for others (iii) As per treatments. (iv) (a) N.A. (b) As per treatments. (c) to (e) N.A. (v) Nil. (vi) AI/3 (vii) Irrigated. (vii) 2 hoeings. (ix) N.A. (a) 25.10.61; 27.10.62; 14.10.63.

2. TREATMENTS

Main-plot treatments:
4 dates of planting: - D1=30th June, D2=16th June, D3=1st August and D4=17 August.

Sub-plot treatments:
2 methods of planting- S1=Sowing and S2=Transplanting.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/247ha. (v) N.A. (vi) Yes.
4 GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961 to 63. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Main-plot error variances are heterogeneous and Treatments X Years interaction is present. Sub-plot error variances are homogeneous and Treatments X Years interaction is present.

5 RESULTS:
Pooled results:
(i) 791 Kg/ha. (ii) 1705.4 Kg/ha. (based on 6 d.f. made up of Treatments X Years interaction). (b) 369.4 Kg/ha. (based on 8 d.f. made up of Treatments X Years interaction). None of the effects is significant.
(iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treat-</th>
<th>S1</th>
<th>S2</th>
<th>Sig.</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1961</td>
<td>961</td>
<td>1210</td>
<td>**</td>
<td>1496</td>
<td>2397</td>
<td>296</td>
<td>152</td>
<td>733</td>
</tr>
<tr>
<td>1962</td>
<td>387</td>
<td>430</td>
<td>N.S.</td>
<td>428</td>
<td>619</td>
<td>541</td>
<td>45</td>
<td>**</td>
</tr>
<tr>
<td>1973</td>
<td>851</td>
<td>968</td>
<td>N.S.</td>
<td>769</td>
<td>1528</td>
<td>945</td>
<td>276</td>
<td>**</td>
</tr>
<tr>
<td>Pooled</td>
<td>733</td>
<td>849</td>
<td>N.S.</td>
<td>897</td>
<td>1514</td>
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Individual results

Crop: Bajra (Kharif).
Object: --To study the effect of spacings and number of plants per hill on the yield of Bajra.

1. BASAL CONDITIONS:
(i) (a) to (x) N.A. (ii) Clay loam; Sandy loam. (iii) 26.67; 27.67. (iv) (a) N.A.; 3 to 4 ploughings. (b) and (c) N.A. (d) and (e) As per treatments. (v) Nil. (vi) AU5; T-55. (vii) Irrigated. (viii) N.A.; 2 botlings. (ix) N.A. (x) 14.10.62; 18.10.63.

2. TREATMENTS:
All combinations of (1) and (2):
(i) 3 spacings between rows: S1 = 30, S2 = 46, and S3 = 64cm.
(2) No. of plants/hill: P1 = 1 and P2 = 2.

3. DESIGN:
(i) Cact. in R.B.D. (b) (a) 6. (b) N.A. (iii) 4. (v) (a) N.A. (b) 1/148.3 ha. (v) N.A. (vii) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-63. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments X Years interaction is absent.
5. RESULTS:

Pooled results

(i) 1529 Kg/ha. (ii) 180.9 Kg/ha. (based on 35 d.f. made up of Treatments x Years interaction and pooled error). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>S3</th>
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Individual results:

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Crop Bajra (Kharif)

Ref.: Ph. 61(28), 62(34), 63(43).


Type: 'CM'.

Object:—To study the effect of different spacings and levels of N on the yield of Bajra.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 14.10.61; 13.7.62; 26.7.63 (iv) (a) to (c) N.A. (d) As per treatments. (e) N.A. (v) Nil. (vi) Al/3. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) 25.10.61; 13.10.62; 14.10.63.

2. TREATMENTS:

Main-plot treatments:—

3 spacings: S1=30, S2=46 and S3=61cm. between rows.

Sub-plot treatments:—

3 levels of N: N1=0, N2=44.8 and N3=89.6 Kg/ha.

3. DESIGN:

(i) Split-plot. (ii) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (ii) 4. (iv) (a) N.A. (b) 1/148 3 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961 to 63. (b) N.A. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is present.
5. RESULTS:

Pooled results

(i) 1398 Kg/ha.  
(ii) (a) 551.8 Kg/ha. (based on 4 d.f. made up of Treatments×Years interaction) (b) 309.0 Kg/ha. (based on 12 d.f. made up of Treatments×Years interaction). (iii) None of the effects is significant.

(v) Av. yield of grain in Kg/ha,

\[ \begin{array}{c|ccc|c}
\text{Treatment} & S_1 & S_2 & S_3 & \text{Mean} \\
\hline
N_0 & 1204 & 1480 & 1543 & 1442 \\
N_1 & 1185 & 1240 & 1472 & 1299 \\
N_2 & 1346 & 1487 & 1525 & 1453 \\
\hline
\text{Mean} & 1245 & 1402 & 1547 & 1398 \\
\end{array} \]

Individual results:

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<tr>
<th>Year</th>
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<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
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Crop: Bajra (Kharif).


Ref: Pb. 61(30),62(37),63(52).

Type: CM'.

Object: To study the effect of different doses and times of application of N in combination with spacings on the yield of Bajra.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A.  
(ii) Sandy loam.  
(iii) 27.6.61; 15.6.62; 16.7.63.  
(iv) (a) 3 to 4 ploughings (b) and (c) N.A.  
(d) As per treatments.  
(e) N.A.  
(f) T-55 for 61 and 63; A1/3 for 62.  
(g) Unirrigated.  
(h) 2 weedings.  
(i) N.A.  
(j) 10.10.61; 10.10.62; 28.10.63.

2. TREATMENTS:

Main-plot treatments:

- 3 times of application of N: T_1=Full dose at sowing, T_2=Full dose at thinning and T_3=dose at sowing.

Sub-plot treatments:

- 3 spacings between rows: S_1=30, S_2=46 and S_3=61cm.

Sub-sub-plot treatments:

- 3 levels of N: N_0=0, N_1=22.4 and N_2=44.8 Kg/ha.

3. DESIGN:

(i) Split-plot, (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot and 3 sub-sub-plots/sub-plot. (b) N.A.  
(iii) 4. (iv) (a) N.A. (b) 1598 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Good for 61 and 63; poor for 62.  
(ii) Nil.  
(iii) Yield of grain.  
(iv) (a) 1961 to 63.  
(b) No.  
(c) Nil.  
(v) and (vi) Nil.  
(vii) Because all the error variances are heterogeneous, there fore the results of individual years are given below.
5. RESULTS:

61(39)

(i) 1414 Kg/ha.  (ii) (a) 1291.6 Kg/ha.  (b) 509.9 Kg/ha.  (c) 232.2 Kg/ha.  (iii) Main effect of N alone is highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
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<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
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C.D. for N marginal means = 113.0 Kg/ha.

62(37)

(i) 1276 Kg/ha.  (ii) (a) 57.8 Kg/ha.  (b) 146.3 Kg/ha.  (c) 79.4 Kg/ha.  (iii) Interaction N x S is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
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<th>N₂</th>
<th>N₃</th>
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C.D. for N means at the same level of S = 65.0 Kg/ha.
C.D. for S means at the same level of N = 89.9 Kg/ha.

63(52)

(i) 1012 Kg/ha.  (ii) (a) 131.3 Kg/ha.  (b) 268.1 Kg/ha.  (c) 232.5 Kg/ha.  (iii) Main effect of N alone is highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
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</table>

C.D. for N marginal means = 100.6 Kg/ha.
Crop: Bajra. (Kharif).
Ref: Pb. 65(92).
Type: 'CM'.

Object: To study the effect of different levels of N and spacings on the yield of Bajra.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) to (c) N.A. (d) As per treatments. (e)-(v) N.A. (vi) Hybrid no. 1. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   Main-plot treatments:—
   3 levels of N:—N1 = 50, N2 = 100 and N3 = 150 Kg/ha.
   Sub-plot treatments:—
   3 row to row spacings:—R1 = 30, R2 = 60, and R3 = 90cm.
   Sub-sub-plot treatments:—
   (3) 3 plant to plant spacings:—S1 = 10, S2 = 20 and S3 = 30cm.

3. DESIGN:
   (i) Split-split-plot (ii) 3 main-plots/replication, 3 Sub-plots/main-plot, 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/540 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—only. (b) No. (c) Nil. (v) Ludhiana. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2100 Kg/ha. (ii) (a) 508.1 Kg/ha. (b) 403.9 Kg/ha. (c) 216.0 Kg/ha. (iii) Main effect of R alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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   C.D. for R marginal means = 200.0 Kg/ha.
Crop: Bajra (Kharif).

Object: To study the effect of fertilizers and spacings at different levels on the yield of Bajra.

1. BASAL CONDITIONS
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) to (v) N.A. (vi) Al/3. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   (a) 3 levels of N: N=0, N1=50 and N2=100 Kg/ha.
   Sub-plot treatments:
   3 spacings between rows: S1=30, S2=45 and S3=60cm.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A.
   (b) 1/163 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—only. (b) No. (c) Nil. (v) N.A. (vi) and
   (vii) Nil.

5. RESULTS:
   (i) 1282 Kg/ha. (ii) (a) 135-6 Kg/ha. (b) 212-4 Kg/ha. (iii) Main effects of N and S are highly significant.
   (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>N1</th>
<th>N4</th>
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</table>

C.D. for N marginal means = 135-5 Kg/ha.
C.D. for S marginal means = 182-2 Kg/ha.

Crop: Bajra. (Kharif).
Site: Punjab Agri. University, Ludhiana.

Object: To study the effect of different doses of N and spacings on the yield of Bajra.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil. (ii) Sandy soil. (iii) Last week of July, 65. (iv) (a) 3 to 4 ploughings. (b) Dibbling.
   (c) N.A. (d) As per treatments. (e) 3 to 4 seeds/hill. (f) Nil. (g) H.B. No. 1. (h) Irrigated. (ii) 2 hoeings.
2. TREATMENTS:

Main-plot treatments:
3 levels of N: N_1 = 45, N_2 = 90 and N_3 = 135 Kg/ha.

Sub-plot treatments:
3 spacings between rows: D_1 = 30, D_2 = 60 and D_3 = 90 cm.

Sub-sub-plot treatments:
3 spacings between plants: S_1 = 10, S_2 = 20 and S_3 = 30 cm.

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot; 3 sub-sub-plots/sub plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/357.5 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965-constd. (b) No. (c) Nil. (v) Ferozepur. (vi) and (vii) Nil.

5. RESULTS:

(i) 3766 Kg/ha. (ii) (a) 595.0 Kg/ha. (b) 530.0 Kg/ha. (c) 456.0 Kg/ha. (iii) Main effects of N, D, S and interactions, N x S and D x S are highly significant. (iv) Av yield of grain in Kg/ha.

| N_1 | N_2 | N_3 | S_1 | S_2 | S_3 | Mean
|-----|-----|-----|-----|-----|-----|-----|
| D_1 | 2881 | 3892 | 4339 | 3445 | 3847 | 3816 | 3703
| D_2 | 2949 | 3682 | 4097 | 3601 | 3894 | 3444 | 3576
| D_3 | 2944 | 4558 | 4554 | 3713 | 3822 | 4441 | 4019
| Mean | 2925 | 4043 | 4311 | 3593 | 3805 | 3900 | 3766

C.D. for N marginal means = 343.2 Kg/ha.
C.D. for D marginal means = 257.5 Kg/ha.
C.D. for S marginal means = 215.7 Kg/ha.
C.D. for S means at the same level of N = 373.5 Kg/ha.
C.D. for N means at the same level of S = 456.8 Kg/ha.
C.D. for D means at the same level of S = 373.5 Kg/ha.
C.D. for D means at the same level of N = 387.1 Kg/ha.

Crop: Gram (Kabuli) (Rahi).
Site: Govt. Agri. College, Ludhiana.
Object: To study the effect of different levels of N, P, and K on the yield of Kabuli Gram.
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Alluvial.  (iii) End. of Oct., 64.  (iv) (a) 3 to 4 ploughings.  (b) Kura method.  
   (c) 123 Kg/ha.  (d) 30cm between rows.  (v) Nil.  (vi) C-104.  (vii) Irrigated.  (viii) 2 hoeings.  (ix) N.A.  
   (x) April, 65.

2. TREATMENTS:
   Main-plot treatments :
   3 levels of K₂O as Mur. Pot. :-Kₐ=0, Kₐ=22.4 and Kₐ=44.8 Kg/ha.
   Sub-plot treatments :
   All combinations (1) and (2),
   (1) 2 levels of N as C/A/N :-Nₐ=0 and Nₐ=22.4 Kg/ha.
   (2) 4 levels of P₉O₄ as Super :-P₉=0, P₉=22.4, P₉=44.8 and P₉=67.0 Kg/ha.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 3 main-plots/replication, 8 sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) N.A.,  
   (b) 1/405 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) Nil  (iii) Yield of grain  (iv) (a) 1964 - only.  (b) No.  (c) Nil.  (v) N.A.  (vi) and  
   (vii) Nil.

5. RESULTS:
   (i) 770 Kg/ha.  (ii) (a) 597.6 Kg/ha.  (b) 215.0 Kg/ha.  (iii) None of the effects is significant.  (iv) Av.  
   yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>P₄</th>
<th>K₁</th>
<th>K₂</th>
<th>K₃</th>
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<td>715</td>
<td>697</td>
<td>810</td>
<td>804</td>
<td>770</td>
</tr>
</tbody>
</table>

Crop : Gram (Rabi).
District: Patiala, Ferozepur, Sangrur, Ludhiana and Jullundur.

Ref :- Pb. 61(S.F.T.).
Type :- 'M'.

Object :- Type C : To compare the relative responses to alternative sources of Phosphatic fertilizers each at two levels.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Alluvial.  (iii) to (c) N.A.
2. TREATMENTS:

7 manurial treatments:

- Control (no manure),
- P<sub>1</sub> = 33.6 kg/ha. of P<sub>105</sub> as Super,
- P<sub>2</sub> = 33.6 kg/ha. of P<sub>101</sub> as mono. Amm. Phos.,
- P<sub>3</sub> = P<sub>4</sub> = 7.7 kg/ha. of N,
- P<sub>5</sub> = 66.2 kg/ha. of P<sub>205</sub> as Super,
- P<sub>6</sub> = 67.2 kg/ha. of P<sub>201</sub> as mono. Amm. Phos., and
- P<sub>7</sub> = P<sub>5</sub> + 15.4 kg/ha. of N.

3. DESIGN:

(i) and (ii) the district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle or thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year 8 on Kharif cereal, 8 on a Rabi cereal, 8 on cash crop, 4 on an oilseed crop and.

3 on leguminous, three crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C, Residual effects of phosphate application Type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/97.7 ha. (iv) Yes.

4. GENERAL:

(i) and (iii) N.A. (iii) Yield of grain. (iv) (a) 1961-only. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>P&lt;sub&gt;5&lt;/sub&gt;</th>
<th>P&lt;sub&gt;6&lt;/sub&gt;</th>
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<td>90</td>
<td>180</td>
<td>100</td>
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<td>350</td>
<td>65</td>
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<td>8</td>
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<td>320</td>
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<tr>
<td>Ludhiana</td>
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<td>300</td>
<td>450</td>
<td>670</td>
<td>470</td>
<td>410</td>
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<td>270</td>
<td>360</td>
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Crop: Gram (Rabi).


Ref: Pb. 64(213).

Type: 'M'.

Object: To see the effect of trace-elements on Gram.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 1.11.64. (iv) (a) to (e) N.A. (v) - (vi) 5-26. (vii) Un-irrigated. (viii) and (ix) N.A. (ix) Mid of April, 65.

2. TREATMENTS:

5 trace-elements: T<sub>1</sub> = Control, T<sub>2</sub> = 11.2 kg/ha. of Sparrin, T<sub>3</sub> = 11.2 kg/ha. of Borax, T<sub>4</sub> = 11.2 kg/ha. of Zinc Sul, and T<sub>5</sub> = 5.6 kg/ha. of Zinc Sul.+5.6 kg/ha. of Borax.

3. DESIGN:

(i) R.B.D. (ii) (a) 5, (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/454 ha. (v) N.A. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964-contd. (Modified in 65) (b) N.A. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 83.0 Kg/ha. (ii) 85.9 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.
Treatment
T_0  T_1  T_2  T_3  T_4
Av. yield. 565.2 595.6 701.9 681.0 721.4
C.D. = 132.2 Kg/ha.

Crop :- Gram (Rabi).
Site :- Agri. Res. Sta., Ferozepur Cantt.
Object :- To see the effect of trace-elements on the yield of Gram.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 3.11.65. (iv) and (v) N.A. (vi) S-26. (vii) Irrigated.
(viii) to (x) N.A.

2. TREATMENTS:
7 trace-elements: T_0 - Control. T_1 = 5.6 Kg/ha. of Copper Sul.+Borax at 5.6 Kg/ha. T_2 = Zinc Sul. at 11.2 Kg/ha. T_3 = Borax at 11.2 Kg/ha. T_4 = Zinc Sul.+Ferrous Sul. at 5.6 Kg/ha. T_5 = Ferrous Sul. at 11.2 Kg/ha. T_6 = 5.6 Kg/ha. of Ferrous Sul.+Borax at 5.6 Kg/ha. and T_7 = Spartin at 11.2 Kg/ha.

3. DESIGN:
(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/670 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Poor. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964-contd. (Modified in 65) (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 186.3 Kg/ha. (ii) 56.95 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
Treatment
T_0  T_1  T_2  T_3  T_4  T_5  T_6  T_7
Av. yield. 142.3 234.4 217.6 209.3 209.3 184.2 150.7 142.3

Crop :- Gram (Rabi).
Ref :- Pb. 61(23), 64(36), 65(97).
Site :- Agri. Res. Sta., Ferozepur Cantt.
Type :- 'C'.
Object :- To study the effect of dates of sowing and seed-rates on the yield of Gram.
1. **BASAL CONDITIONS**:

(i) (a) N.A. (b) Jowar for 61, N.A. for others, (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) and (b) N.A. (c) As per treatments. (d) and (e) N.A. (v) N.A. (vi) Pb-7 (vii) Irrigated. (viii) and (ix) N.A. (x) Last week of April.

2. **TREATMENTS**:

**Main-plot treatments**:


**Sub-plot treatments**:

4 seed-rates — S1 = 28, S2 = 37, S3 = 46 and S4 = 55 Kg/ha.

3. **DESIGN**:

(i) Split-plot. (ii) (a) 4 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4 for 61 and 64, 3 for 65. (iv) (a) N.A. (b) 1/26ha. (v) N.A. (vi) Yes.

4. **GENERAL**:

(i) Satisfactory for 62, 64; poor for 65. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961 to 65, (v) Treatments changed in 62 and 63. (b) No. (c) Nil. (d) and (e) Nil. (vii) As both the error variances are heterogeneous, results of individual years are given under 5. Results.

5. **RESULTS**:

**61(28)**

(i) 648 Kg/ha. (ii) (a) 341.0 Kg/ha. (b) 129.0 Kg/ha. (iii) Main effect of 'S' alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Mean</th>
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<td>804</td>
<td>754</td>
<td>849</td>
<td>808</td>
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<td>660</td>
<td>667</td>
<td>541</td>
<td>634</td>
<td>626</td>
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<tr>
<td>D4</td>
<td>378</td>
<td>471</td>
<td>452</td>
<td>634</td>
<td>484</td>
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<tr>
<td>Mean</td>
<td>614</td>
<td>634</td>
<td>604</td>
<td>742</td>
<td>648</td>
</tr>
</tbody>
</table>

C.D. for S marginal means = 92.6 Kg/ha.

**64(36)**

(i) 1726 Kg/ha. (ii) (a) 384.9 Kg/ha. (b) 177.2 Kg/ha. (iii) Main effect of 'S' alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Mean</th>
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<td>1781</td>
<td>1681</td>
<td>1658</td>
</tr>
<tr>
<td>D2</td>
<td>1508</td>
<td>1781</td>
<td>1793</td>
<td>1833</td>
<td>1734</td>
</tr>
<tr>
<td>D3</td>
<td>1419</td>
<td>1753</td>
<td>1822</td>
<td>1919</td>
<td>1728</td>
</tr>
<tr>
<td>D4</td>
<td>1602</td>
<td>1841</td>
<td>1754</td>
<td>1944</td>
<td>1785</td>
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<td>Mean</td>
<td>1527</td>
<td>1741</td>
<td>1788</td>
<td>1849</td>
<td>1726</td>
</tr>
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</table>

C.D. for S marginal means = 127.3 Kg/ha.
Crop :- Gram (Rabi).
Site :- Agri. Res. Stn., Ferozepur Cantt.

Object :- To study the effect of dates of sowing and seed-rates on the yield of Gram.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) and (b) N.A. (c) As per treatments.
(d) and (e) N.A. (v) N.A. (vi) Pb-7. (vii) Irrigated. (viii) and (ix) N.A. (x) 14.4.63.

2. TREATMENTS
Main-plot treatments :-
4 dates of sowing :- D₁ = 25th Oct., D₂ = 1st Nov., D₃ = 8th Nov. and D₄ = 15th Nov.
Sub-plot treatments :-
4 seed-rates :- S₁ = 28, S₂ = 37, S₃ = 47 and S₄ = 57 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A.
(b) 1/296ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Growth stunted (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-65. (Treatments changed in 62 and 63). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 563 Kg/ha. (ii) (a) 287-9 Kg/ha. (b) 82-4 Kg/ha. (iii) Main effect of D alone is highly significant.
(iv) Av. yield of grain in Kg/ha.
Object:—To study the effect of dates of sowing and seed-rates on the yield of Gram.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 3 to 4 ploughings. (b) N.A. (c) As per treatments. (d) and (e) N.A. (v) Nil. (vi) Pb.-7. (vii) 2 hoeings. (ix) N.A. (x) N.A.

   Site:—Agri. Res. Stn., Ferozepur Cantt.

2. TREATMENTS:
   Main-plot treatments:
   Sub-plot treatments:
   4 seed-rates—S1=28, S2=37, S3=47 and S4=57 Kg/ha.

3 DESIGN:
   (i) Split-plot. (ii) 4 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/506 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-65. (Treatments changed in 64) (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

5. RESULTS:
   (i) 706 Kg/ha. (ii) 376.7 Kg/ha. (b) 100.8 Kg/ha. (iii) Main effect of D is significant and that of S is highly significant. (iv) Av. yield of grain in Kg/ha.

```
<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Mean</th>
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<tr>
<td>D1</td>
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<td>767</td>
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<tr>
<td>D2</td>
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<td>606</td>
<td>660</td>
<td>738</td>
<td>663</td>
</tr>
<tr>
<td>D3</td>
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<td>511</td>
<td>656</td>
<td>630</td>
<td>577</td>
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<td>D4</td>
<td>131</td>
<td>226</td>
<td>289</td>
<td>265</td>
<td>228</td>
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</tbody>
</table>

C.D. for D marginal means=226.2 Kg/ha.
```

Crop:—Gram (Rabi).

Ref:—Ph. 63(42).

Type:—C'.

C.D. for S marginal means=72.6 Kg/ha.
Crop : Gram (Rabi).


Object : To study the effect of rotation of crops on the yield of Gram.

1. BASAL CONDITIONS:
   (i) (a) and (b) As per treatments (c) N.A. (ii) Clay loam. (iii) and (iv) N.A. (v) Nil. (vi) Pb-7. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) 18.4.64.

2. TREATMENTS:
   4 crop rotations: R_1 = Gram-Fallow-Gram, R_2 = Chari-Gram, R_3 = Gram-Fallow-Wheat-Fallow-Gram and R_4 = Bajra-Gram

3. DESIGN:
   (i) R B D (ii) (a) 4 (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal (ii) Nil. (iii) Yield of grain. (iv) (a) 1963 (Treatments modified in 64) (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS
   (i) 562 Kg/ha. (ii) 103 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>R_1</th>
<th>R_2</th>
<th>R_3</th>
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<td>749</td>
<td>418</td>
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<tr>
<td>C. D.</td>
<td>-127.6 Kg/ha.</td>
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</table>

Crop : Gram (Rabi).


Object : To see the effect of crop rotation on the yield of Gram.

1. BASAL CONDITIONS:
   (i) (a) and (b) As per treatments, (c) N.A. (ii) Sandy loam. (iii) 1st week of Nov. (iv) (a) to (e) N.A. (v) N.A. (vi) 104. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   3 crop rotations: T_1 = Gram Fallow-Gram, T_2 = Gram-Chari-Gram and T_3 = Gram-Bajra-Gram

3. DESIGN:
   (i) R B D (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963 to 65 (treatments modified in 64) (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As error variances are heterogeneous and Treatments x Years interaction is absent, results of individual years are given under 5. Results.
5. RESULTS:

64 (214)

(i) 1450 Kg/ha.  (ii) 1094 Kg/ha.  (iii) Treatments differences are significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
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<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
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<td>C.D. = 99.5 Kg/ha.</td>
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</table>

65 (88)

(i) 3075 Kg/ha.  (ii) 319 Kg/ha.  (iii) Treatments differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
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<tbody>
<tr>
<td>Av. yield:</td>
<td>329.5</td>
<td>313.0</td>
<td>280.5</td>
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</table>

Crop :- Gram (Rabi).

Site :- Punjab Agri. University, Ludhiana.

Object :- To study the effect of different cultural operations on the yield of Gram.

1. BASAL CONDITIONS:

(i) N.A.  (ii) Loamy sand.  (iii) As per treatments.  (iv) (a) 2 ploughings.  (b) Line sowing-kera.  (c) As per treatments  (v) N.A.  (vi) C=104.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) April, 65.

2. TREATMENTS:

All combinations of (1),(2) and (3)


(2) 3 spacings between rows: S₁ = 20 cm, S₂ = 37.5 cm and S₃ = 45 cm.

(3) 3 seed-rates: R₁ = 100, R₂ = 112 and R₃ = 124 Kg/ha.

3. DESIGN:

(i) Fact. In R.B.D.  (ii) (a) 27.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/296 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:

(i) Normal.  (ii) N.A.  (iii) Yield of grain (iv) 1964-only.  (b) No.  (c) Nil.  (v) and (vi) Nil.

5. RESULTS:

(i) 1568 Kg/ha.  (ii) 496 Kg/ha.  (iii) Main effect of D alone is highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
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<th>R₂</th>
<th>R₃</th>
</tr>
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<tbody>
<tr>
<td>Mean</td>
<td>1548</td>
<td>1501</td>
<td>1602</td>
</tr>
<tr>
<td>C.D. for D marginal means = 231.8 Kg/ha.</td>
<td></td>
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</tbody>
</table>
Crop :- Gram. (Rabi). Ref :- Ph. 60(20).
Site :- Agri. Res. Stn., Ferozepur Cantt. Type :- 'CM'.

Object :—To study the effect of dates of sowing in combination with different levels of N and P on the yield of Gram.

1. BASAL CONDITIONS
(i) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 3 to 4 ploughings. (b) to (e) N.A. (v) Nil.
(vi) Pb. 7. (vii) Irrigated. (viii) 2 hoeing and thrashing. (ix) N.A. (x) 26.4.61.

2. TREATMENTS:
Main-plot treatments
3 dates of sowing : D1 =20th Oct., D2 =28th Oct. and D3 =5th Nov.
Sub-plot treatments
All combinations of (i) and (2)
(1) 2 levels of N : N0 =0 and N1 =22.4 Kg/ha.
(2) 4 levels of P2O5: P0 =0, P1 =33.6, P2 =67.2 and P3 =100.8 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots replication; 8 sub-plots/main-plot. (iii) 3. (iv) (a) N.A. (b) 1/494 ha.
(v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-only. (b) and (c) No. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 391 Kg/ha. (ii) (a) 227.3 Kg/ha. (b) 197.3 Kg/ha. (iii) Main effect of D is significant and that of P is highly significant. Interaction P X D is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
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<tr>
<td>N0</td>
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<td>693</td>
<td>555</td>
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<td>462</td>
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<td>594</td>
<td>696</td>
<td>723</td>
<td>614</td>
<td>437</td>
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</tbody>
</table>

C.D. for D marginal means=182.1 Kg/ha.
C.D. for P marginal means=133.6 Kg/ha.
C.D. for P means at the same level of D=255.7
C.D. for D means at the same level of P=218.7 Kg/ha.
1. BASAL CONDITIONS:
   (i) N.A. (b) Jowar. (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) N.A. (v) Nil. (vi) Ph.7.
   (vii) Irrigated. (viii) and (ix) N.A. (a) 27.1.62.

2. TREATMENTS:
   Main-plot treatments:
   2 dates of sowing: D1 = 20th Oct. and D2 = 31st Oct.
   Sub-plot treatments:
   4 levels of P: P0 = 0, P1 = 22·4, P2 = 44·8 and P3 = 67·2 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) 2 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) N.A. (b) 1/148 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1984-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) N.A.

5. RESULTS:
   (i) 1740 Kg/ha. (ii) (a) 843·6 Kg/ha. (b) 252·0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>P2</th>
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<td>1881</td>
<td>1623</td>
<td>1601</td>
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<tr>
<td>D2</td>
<td>1244</td>
<td>1245</td>
<td>1245</td>
<td>1294</td>
<td>1257</td>
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<td>Mean</td>
<td>1437</td>
<td>1563</td>
<td>1434</td>
<td>1447</td>
<td>1470</td>
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Crop: Gram (Rabi).
Ref: Pb. 62(38), 63(49), 64(35), 65(96).
Site: Agri. Res. Stn., Ferozepur Cantt. Type: -CM'.

Object: To study the effect of P2O5 and seed-rates on the yield of Gram.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 27.10.62; 16.10.63; 13.10.64; 13.10.65. (iv) (a) 3 to 4 ploughings.
   (b) Jowar. (c) As per treatments. (d) 30cm. x 7-5cm. (e) N.A. (f) Nil. (vi) S-26 (vii) Un-irrigated.
   (viii) 2 hoeings and weeding. (x) N.A. (x) 14·4 65; 14·4 66; 15·4 65; N.A.

2. TREATMENTS:
   Main-plot treatments:
   4 levels of P2O5: P0 = 0, P1 = 10·1, P2 = 20·2 and P3 = 30·3 Kg/ha.
   Sub-plot treatments:
   4 seed-rates: S1 = 28, S2 = 37, S3 = 47 and S4 = 57Kg/ha.
3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4 (iv) (a) N.A. (b) 1/247 ha. for 62; 1/296 ha. for others. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962 to 65. (b) No. (c) N.A. (v) and (vi) N.A. (vii) Since the main-plot error variances are heterogeneous and Treatments x Years interaction is absent therefore individual year results are presented below.

5. RESULTS:
62 (38)
(i) 1327 Kg/ha. (ii) (a) 359·8 Kg/ha. (b) 109·5 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<td>S2</td>
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<td>1421</td>
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<td>1229</td>
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<tr>
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<td>1288</td>
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</table>

C.D. for S marginal mean=78·6 Kg/ha.

63 (49)
(i) 425 Kg/ha. (ii) (a) 122·0 Kg/ha. (b) 90·6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
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<tr>
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<td>362</td>
<td>503</td>
<td>472</td>
<td>446</td>
<td>446</td>
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<tr>
<td>S4</td>
<td>375</td>
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<td>431</td>
<td>484</td>
<td>450</td>
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<tr>
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<td>364</td>
<td>457</td>
<td>413</td>
<td>448</td>
<td>425</td>
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</table>

64 (35)
(i) 397 Kg/ha. (ii) (a) 322·8 Kg/ha. (b) 121·4 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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C.D. for S marginal mean=87·1 Kg ha.
CROP: Gram (Rabi).


Ref: Ph. 64(27).

Type: "CMV".

Object: To study the effect of P₂O₅, directions of sowing on the different varieties of Gram.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 10.11.64. (iv) (a) to (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) Last week of April.

2. TREATMENTS

Main-plot treatments:
4 levels of P₂O₅: P₀ = 0, P₁ = 10, P₂ = 20, P₃ = 30 Kg/ha.

Sub-plot treatments:
2 varieties: V₁ = S-33 and V₂ = C-104.

Sub-sub-plot treatments:
2 directions of sowing: D₁ = East-West and D₂ = North-South.

3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/28ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964 only (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 766 Kg/ha. (ii) (a) 202.0 Kg/ha. (b) 129.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>P₀</th>
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<th>P₂</th>
<th>P₃</th>
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<td>667</td>
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<tr>
<td>S₂</td>
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<tr>
<td>S₃</td>
<td>801</td>
<td>726</td>
<td>993</td>
<td>860</td>
</tr>
<tr>
<td>S₄</td>
<td>823</td>
<td>793</td>
<td>986</td>
<td>964</td>
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</table>

Mean 699 704 825 838 766
Crop: Gram (Rabi).


Object: To study the effect of dates of sowing, no. of irrigations and levels of P on the yield of Gram.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) to (e) N.A. (v) Nil. (vi) Pb-7. (vii) Irrigated. (viii) and (ix) N.A. (x) 14.4.63.

2. TREATMENTS:
   Main-plot treatments:
   All combinations of (1) and (2)
   (2) 2 Irrigational treatments: I_1=One irrigation before sowing, I_2=One irrigation before sowing and one irrigation in Dec.

Sub-plot treatments:
4 levels of P_2O_5: P_6=0, P_1=10.1, P_2=20.2 and P_3=30.3 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/286 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-63 (N.A. for 63 and modified in 64 and 65) (b) No. (c) Nil. (v) N.A. (vi) Affected by wilt. (vii) N.A.

5. RESULTS:
   (i) 1146 Kg/ha. (ii) (a) 357.7 Kg/ha. (b) 302.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.
Crop: Gram (Rabi)  
Ref: Pb. 62(35).  
Type: ICV.  


Object: To study the effect of irrigations and cultural treatments on different varieties of Gram.

1. **Basal Conditions:**
   1. (a) to (c) N.A.
   2. Sandy loam.
   3. <i>NI</i> 12.10.62.
   4. (a) 3 to 4 ploughings.
   5. N.A.
   6. As per treatment.
   7. Irrigated.
   8. and 19. N.A.

2. **Treatments:**
   1. Main-plot treatments:
      1. Seven irrigational treatments: 7 irrigation after sowing, 6 irrigation after December, 1 irrigation after January.
      2. One irrigation after January.
      3. One irrigation February.
      4. One irrigation each Dec. and January.
      5. One irrigation in Dec. and Feb. and 1 irrigation in January and February.
   2. Sub-plot treatments:
      1. 2 varieties: 2 varieties: V1=Pb-7, V2=Cloy.
   3. Sub-sub-plot treatments:
      1. 2 cultural treatments: 1 No. tops and 1 Topping.

3. **Design:**
   1. Split-plot.
   2. (a) 7 main-plots/replication; 2 sub-plots/main-plot and 2 sub-sub-plots/sub-plot.
   3. N.A. (iv) 4. (v) N.A. (b) 1/294 ha. (v) N.A. (vi) Yes.

4. **General:**
   1. Satisfactory.
   2. Nil.
   3. Yield of grain.
   4. (a) 1952—only.
   5. No. (c) Nil. (v) to (vii) Nil.

5. **Results:**
   1. 958 Kg/ha.
   2. (a) 580.7 Kg/ha.
   3. 237.2 Kg/ha.
   4. 281.7 Kg/ha.
   5. Main effect of V alone is highly significant.
   6. Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>D1</th>
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<td>963</td>
<td>1153</td>
<td>980</td>
<td>1032</td>
<td>1006</td>
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</tbody>
</table>

C.D. for V marginal means=28.6 Kg/ha.
C.D. for D marginal means=11.8 Kg/ha.
Crop :- Gram (Rabi).
Site :- Agri. Res. Stn., Ferozepur Cantt.

Object :- To study the effect of dates of sowing, times of irrigation and application of P on the yield of Gram.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (b) Heavy loam; Sandy loam. (iii) As per treatments. (iv) (a) to (c) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) Mid of April. 65; N.A.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1) and (2)
(1) 2 dates of sowing : D₁ = 15th Oct. and D₂ = 31st October.
(2) 2 times of irrigation : I₁ = Rauni (before sowing) and I₂ = One irrigation in Dec.

Sub-plot treatments:
4 levels of P₂O₅ : P₀ = 0, P₁ = 22.4, P₂ = 44.5 and P₃ = 67.2 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) 4 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/300 ha. (v) N.A. (vi) Yes.

4 GENERAL:
(i) Satisfactory; Poor. (ii) N.A. (iii) Yield of grain. (iv) (a) 1952-65 (1963 N.A., Modified in 1964 and 65). (b) No. (c) Nil. (v) N.A. (vi) N.A. (vii) Since the error variances are heterogeneous and Main-plot Treatments x Years interaction is absent, individual years results are presented under 5. Results.

5. RESULTS:
64(30)
(i) 1505 Kg/ha. (iii) (a) 182.5 Kg/ha. (b) 181.7 Kg/ha. (iii) None of the effects is significant. (iv) Average yield of grain in Kg/ha.
Crop :- Mash (Kharif).
Site :- Punjab Agri. University, Ludhiana.

Object :- To study the effect of different levels of P<sub>2</sub>O<sub>5</sub> on the yield of Mash.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 2nd week of July, 64.  (iv) (a) 2 ploughings  (b) Kera method.
   (c) 20 Kg/ha.  (d) and (e) N.A.  (v) 11·2 Kg/ha. of N as C/A/N.  (vi) 1-1.  (vii) Irrigated.  (viii) 2 hoeings.
   (ix) N.A.  (x) End of Oct.; 64.

2 TREATMENTS :
   5 levels of P<sub>2</sub>O<sub>5</sub> as Super :  P<sub>S</sub>=0, P<sub>1</sub>=16·8, P<sub>2</sub>=33·6, P<sub>3</sub>=50·4 and P<sub>4</sub>=67·2 Kg/ha.

3. DESIGN :
   (i) R.B.D.  (ii) (a) 5.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/427;9ha.  (v) N.A.  (vi) Yes.

4. GENERAL :
   (i) Normal.  (ii) Nil.  (iii) Yield of grain.  (iv) (a) 1964-only.  (b) No.  (c) Nil.  (v) to (vii) Nil.
5. RESULTS:
(i) 1180 Kg/ha. (ii) 189.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain
in Kg/ha.

<table>
<thead>
<tr>
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<th>P₀</th>
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<th>P₂</th>
<th>P₃</th>
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<td>1237</td>
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</table>

Crop: Mash (Kharif).
Site: Agri. Stn, Gurdaspur.

Object: To study the effect of dates of sowing, spacings and seed-rates on the yield of Mash.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 3-4 ploughings. (b) Kerai line sowing.
(c) and (d) As per treatments. (e) N.A. (v) (vi) I-I. (vii) Irrigated. (viii) and (ix) N.A. (x) Oct., 64.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1) and (2)
(1) 3 dates of sowing: D₁=Mid-June, D₂=End of June and D₃=Mid-July.
(2) 3 spacings between row to row: S₁=30, S₂=46 and S₃=61 cm.

Sub-plot treatments:
4 seed-rates: R₁=15, R₂=20, R₃=25 and R₄=30 Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 9 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/457 ha. (v) N.A. (vi) Yes.

4. GENERAL
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964-only (b) No. (c) Nil. (v) Ludhiana. (vi) and (vii) N.A.

5. RESULTS:
(i) 485 Kg/ha. (ii) (a) 194 Kg/ha. (b) 111 Kg/ha. (iv) Main effect of D is highly significant and that
of R is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<th>D₃</th>
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C.D. for D marginal means=81.7 Kg/ha.
C.D. for R marginal means=52.2 Kg/ha.
Crop: Mash (Kharif).


Object: To study the effect of different spacings, seed-rates and dates of sowing on the yield of Mash.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 2 to 3 ploughings. (b) Ker. (c) and (d) As per treatments. (e) Nil. (v) 11-2 Kg/ha. of N + 22-4 Kg/ha. of P2O5 as Superphosphate. (vi) N.A. (vii) Irrigated. (viii) 2 hoeings. (ix) and (x) N.A.

2. TREATMENTS:

Same as in Expt. no. 64(194) and presented on page No. 595.

3. DESIGN:

(i) Split-plot. (ii) (a) 9 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b)1/494ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv)(a) 1964-only, (b) No. (c) Nil. (v) Gurdaipur. (vi) and (vii) Nil.

5. RESULTS:

(i) 773 Kg/ha. (ii) (a) 338.9 Kg/ha. (b) 121.0 Kg/ha. (iii) Main effect of R is highly significant and interaction R x D is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. [for R marginal means=57.0 Kg/ha.
C.D. for R means at the same level of D=98.8 Kg/ha.
C.D. for D means at the same level of R=180.5 Kg/ha.
Crop : Masoor (Rabi).
Site : Govt. Agri. Res. Sta., Gurdaspur.

Ref :- Pb. 64(205).

Type :- 'M'.

Object :- To study the effect of different doses of P<sub>2</sub>O<sub>5</sub> on the yield of Lentil.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 3rd week of Oct, 64.  (iv) (a) 3-4 ploughings and 2 plankings.
   (b) Line sowing (Kera).  (c) 37 Kg/ha.  (d) Furrows 23cm.  (e) N.A.  (vi) 9-12.  (vii) Un-irrigated.
   (viii) 2 weedings and one hoeing.  (ix) N.A.  (x) last week of April, 65.

2. TREATMENTS:
   (i) 5 doses of P<sub>2</sub>O<sub>5</sub> as Super : - P<sub>0</sub>=0, P<sub>1</sub>=22.4, P<sub>2</sub>=44.8, P<sub>3</sub>=67.2 and P<sub>4</sub>=89.6 Kg/ha.

3. DESIGN:
   (i) R.B.D.  (ii) 5.  (b) N.A.  (iii) 5.  (iv) (a) N.A.  (b) 1/247 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of grain.  (iv) (a) 1964-only.  (b) No.  (c) Nil.  (v) and (vi) Nil.  (vii) N.A.

5. RESULTS:
   (i) 647 Kg/ha.  (ii) 135.9 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain
   in Kg/ha.

   Treatment  | P<sub>0</sub>  | P<sub>1</sub>  | P<sub>2</sub>  | P<sub>3</sub>  | P<sub>4</sub>
   Av. yield  | 544      | 618      | 613      | 717      | 741      

Crop : Masoor (Rabi).
Site : Govt. Agri. Res. Sta., Gurdaspur.

Ref :- Pb. 64(204).

Type :- 'C'.

Object :- To study the effect of dates of sowing and seed-rates on the yield of Masoor crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) As per treatments.  (iv) (a) 3 to 4 ploughings. 2 plankings.
   (b) Line sowing by Kera.  (c) As per treatments.  (d) In furrows 23cm. apart (e) Nil.  (vi) N.A.  (vi) 9-12.  (vii)
   Irrigated.  (viii) 1 hoeing and 2 weedings.  (ix) N.A.  (x) last week of April, 65.

2. TREATMENTS:
   Main-plot treatments:—
   4 dates of sowing :- D<sub>1</sub>=7.10.64, D<sub>2</sub>=14.10.64, D<sub>3</sub>=21.10.64 and D<sub>4</sub>=28.10.64.

   Sub-plot treatments:—
   4 seed-rates : S<sub>1</sub>=30, S<sub>2</sub>=35, S<sub>3</sub>=40 and S<sub>4</sub>=45 Kg/ha.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 4 main-plots/replication. 4 sub-plots/main-plot.  (b) N.A.  (iii) 5.  (iv) (a) N.A.
   (v) 181/3ha.  (v) N.A.  (vi) Yes.
4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) Nil. (v) Ludhiana (vi) and (vii) N.A.

5. RESULTS:
(i) 2002 Kg/ha. (ii) (a) 397 Kg/ha. (b) 239 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for D marginal means—273.5 Kg/ha.

Crop = Peas (Rabi).
Site = Agri. Res. Farm, Gurdaspur.

Object: —To study the effect of different levels of N and P on the yield of Peas.

1. BASAL CONDITIONS:
(i) to (c) N.A. (ii) Sandy loam. (iii) Mid of Nov., 64. (iv) (a) 3-4 ploughings and 2 plankings. (b) Kera line sowing (c) 62 Kg/ha. (d) Rows 46cm. apart. (e) N.A. (vi) T-163. (vii) Un-irrigated. (viii) 3 hoeings and weeding. (ix) N.A. (x) April, 65.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 levels of N :- N₀=0 and N₁=22.4 Kg/ha.
(2) 4 levels of P₁O₁ as Super :- P₀=0, P₁=22.4, P₂=44.8 and P₃=67.2 Kg/ha.

3. DESIGN:
(i) Fact. in R.B.D. (ii) N.A. (iii) 4. (iv) (a) N.A. (b) 1/24.7 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) Nil. (v) Ludhiana. (vi) and (vii) N.A.

5. RESULTS:
(i) 2707 Kg/ha. (ii) 194 Kg/ha. (iii) Main effect of P alone is highly significant. (iv) Av. yield of grain in Kg/ha.
Crop :- Peas (Rabi).
Site :- Punjab University, Ludhiana.

Object :- To study the effect of different levels of N and P on the yield of Peas.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Loamy sand. (iii) Nov., 64. (iv) (a) 2 ploughings. (b) Keran. (c) 62 Kg/ha. (d) 40cm. between rows. (e) N.A. (v) Nil. (vi) T-163. (vii) 2 hoelings. (ix) N.A. (x) April, 65.

2. TREATMENTS:
   Same as in expt no. 64(202) and presented on page, No.598.

3. DESIGN
   (I) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 7. (iv) (a) N.A. (b) 1/593 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964-only. (b) No. (c) Nil. (v) Gurdaspur. (vi) and (vii) Nil.

5. RESULTS:
   (i) 625 Kg/ha. (ii) 200 Kg/ha. (iii) None of the effects is significant. (vi) Av. yield of peas in Kg/ha.

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Crop: Potato (Rabi).
Site: Agri. Sta., Jullundur.

Object:—To study the effect of different levels of N, P and K on different varieties of Potato.

1. BASAL CONDITIONS:
   (i) and (ii) N.A. (iii) 18 to 21.10.60. (iv) (a) to (e) N.A. (v) 627 Q/ha. of FYM was applied on 17.10.60 to replication no. 3 and 4. (vi) As per treatments. (vii) Irrigated. (viii) 2 hoeings and 2 earthing up. (ix) N.A. (x) 24.1.61; 14.2.61 to 23.2.61.

2. TREATMENTS:
   Main-plot treatments:—
   2 varieties:—V1—Kufri white and V2—Kufri red.
   Sub-plot treatments:—
   All combinations of (1), (2) and (3)
   (1) 4 levels of N:—N0=0, N1=56, N2=112, and N3=168 Kg/ha.
   (2) 2 levels of P2O5:—P0=0 and P1=56 Kg/ha.
   (3) 2 levels of K2O: K0=0, K1=56 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) 2 main-plots/replication; 16 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) and (b) 1/988 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of tuber. (iv) (a) and (b) No. (c) Nil. (v) and (vi) No. (vii) Nil.

5. RESULTS:
   (i) 130'0 Q/ha. (ii) (a) 47'5 Q/ha. (b) 27'5 Q/ha. (iii) Main effect of N and interaction N×P are significant. (iv) Av. yield of tuber in Q/ha.

<table>
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<th>N2</th>
<th>N3</th>
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C.D. for N marginal means=13'7 Q/ha.
C.D. for the body of the N×P table=19'2 Q/ha.
Crop: Potato (Kharif).


Ref: Pb. 60(6).

Type: 'MV'.

Object:—To study the effect of different levels of N, P and K on different varieties of Potato.

1. BASAL CONDITIONS
(i) (a) N.A. (b) G.M. (c) N.A.  (ii) N.A.  (iii) 18 to 21.10.60.  (iv) (a) tel(e) N.A.  (v) 627 Q/ha. of F.Y.M. applied on 17.10.60.  (vi) As per treatments.  (vii) 2 hoeings, 2 earthing up.  (ix) N.A.  (x) 21.1.61, 14.2.61 and 23.2.61.

2. TREATMENTS:
Main plot treatments:
3 varieties :—V1=Up to date, V2=ON 2236 and V3=Craig’s Defiance.

Sub-plot treatments:
All combinations of (1), (2) and (3).
(1) 4 levels of N :—N0=0, N1=56, N2=112 and N3=168 Kg/ha.
(2) 2 levels of P03 :—P0=0, and P1=56 Kg/ha.
(3) 2 levels of K0 :—K0=0, and K1=56 Kg/ha.

Fertilizers applied at the time of sowing.

3. DESIGN:
(i) Splt-plot.  (ii) (a) 3 main-plots/replication; 16 sub-plots/main-plot.  (b) N.A.  (iii) 4 (one replication rejected).  (iv) (a) N.A.  (b) 1/162ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) Normal  (ii) N.A.  (iii) Yield of tuber.  (iv) (a) and (b) Nil.  (c) Nil.  (v) (a) and (b) N.A.  (vi) and (vii) Nil.

5. RESULTS:
(i) 104·2 Q/ha.  (ii) (a) 60’0 Q/ha.  (b) 22·4 Q/ha.  (iii) Main effects of N and K are highly significant. and that of V and P are significant. (iv) Av. yield of tuber in Q/ha.

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C.D. for V marginal means=33·9 Q/ha.
C.D. for N marginal means=16·5 Q/ha.
C.D. for P or K marginal means=7·3 Q/ha.
Crop: Sugarcane.

Site: Sugarcane Sub. Stn, Gurdaspur.

Object: To study the effect of different levels of N, P and K on the yield of Sugarcane.

1. BASAL CONDITIONS:

   (i) (a) N.A.; Char-i-Senji-Sugarcane. (b) N.A.; Senji. (c) N.A. (ii) Loamy. (iii) 21 to 23.4.61; 29.2.62.
   (iv) (a) 4 ploughings and 4 subhaas. (b) N.A. (c) 89920 two bodded setta/ha. (d) N.A. (e) Nil.(v) 112 Kg/ha. of N as F.Y.M, applied two weeks before sowing. (vi) Co-312; N.A. (vii) Irrigated. (viii) 6 hoeings. (ix) 114cm.: 95cm. (x) 20.1.62 to 6.2.62; 25.12.62.

2. TREATMENTS:

   All combinations of (1), (2) and (3).
   (1) 2 levels of N: N₀ = 0, and N₁ = 56 Kg/ha.
   (2) 2 levels of P₂O₅: P₀ = 0 and P₁ = 56 Kg/ha.
   (3) 2 levels of K₂O: K₀ = 0 and K₁ = 56 Kg/ha.

   N was applied as top dressing in two equal doses in May and June. P₂O₅ and K₂O were drilled in furrows at sowing time.

3. DESIGN:

   (i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 21'95m. X 12'19m. 1/40 ha. (v) N.A. (vi) Yes.

4. GENERAL:

   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1960-65 (yield data for 60 N.A. treatments modified in 63) (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil.

   (vii) Error variances are homogeneous and Treatments x Years interaction is present.

5. RESULTS:

   Pooled results

   (i) 542.0 Q/ha. (ii) 105.1 Q/ha. (based on 6 d.f. made up of Treatments x Years interaction). (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.

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   C.D. for N marginal means = 64.3 Q/ha.


Individual results

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Crop: Sugarcane.

Site: Sugar-cane Sub. Sta., Gurdaspur.

Ref: Ph. 63(209).

Type: ‘M’.

Object: To study the effect of different levels of N, P and K on the yield of Sugar-cane.

1. BASAL CONDITIONS:
   (i) (a) Chari-Senji-Sugarcane. (b) Senji. (c) N.A. (ii) (a) Loamy (b) N.A. (iii) 28.3.63. (iv) (a) 4 ploughings and subhagas. (b) N.A. (c) 88/20 two budded setts/ha. (d) N.A. (e) 66 Kg/ha. of N as F.Y.M. applied two weeks before planting. (vi) Co-312. at (vii) Irrigated. (viii) 6 hoeings. (ix) 61cm. (x) 9.2.64.

2. TREATMENTS:
   All combinations of (1), (2) and (3).
   (1) 2 levels of N as C/A/N: N0=0, and N1=Kg/ha.
   (2) 2 levels of P2O5 as S/P: P0=0, and P1=56 Kg/ha.
   (3) 2 levels of K2O as Mur. Pot. : K0=0 and K1=56 Kg/ha.

C/A/N, applied as top dressing in two equal doses at planting time and June, P and K drilled at the time of sowing.

3. DESIGN:
   (i) 25 fact. confd. (ii) (a) 4 plots/block; 2 blocks/repllication. (b) N.A. (iii) 4. (iv) (a) 21'95m. x 12'19m. (b) 21'05m. x 12'19m. (v) 45cm. on either side. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1960-65 (Modified in 1963). (b) No. (c) Nil. (v) to (vii) Nil.

5 RESULTS:
   (i) 625.0 Q/ha. (ii) 36.1 Q/ha. (iii) Main effect of N is highly significant and interactions N x K, N x P x K are significant. (iv) Av. yield of cane in Q/ha.
Crop : Sugarcane.
Site : Sugarcane Sub-Stn., Gurdaspur.

Object: —To study the effect of different levels of N, P and K on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Wheat-Fallow-Sugarcane. (b) Fallow. (c) Nil. (ii) Loamy. (iii) 22.2.64. (iv) (a) 4 ploughings and 4 sulhas. (b) N.A. (c) 98800 two budded setts/ha. (d) N.A. (e) 1. (f) N.A. (vi) Co-312. (vii) Irrigated. (viii) 6 bootings. (ix) 87cm. (x) 2.1.65.

2. TREATMENTS
   Main-plot treatments:
   2 levels of N as A/S: —$N_0=0$ and $N_1=123.5$ Kg/ha.

   Sub-plot treatments:
   All combinations (1) and (2).
   (1) 2 levels of $K_2O$ as Mur. Pot. $—K_0=0$ and $K_1=123.5$ Kg/ha.
   (2) 2 levels of $P_2O_5$ as Super $—P_0=0$ and $P_1=123.5$ Kg/ha.

   Mur. Pot. and Super and 62 Kg of N drilled at the time of planting while 62 Kg of N applied on 4.3.64

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 24 x 08cm. x 3 66m. (b) 22 x 13m x 3 66m. (v) 96cm. on either side of the plot. (vii) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1960-64 (modified in 1965). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 619.6 Q/ha. (ii) (a) 65.2 Q/ha. (b) 41.3 Q/ha. (iii) Main effect of N alone is highly significant. (iv) AV. yield of cane in Q/ha.
Object:---To study the effect of different levels of N, P and K on the yield of Sugar-cane.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 26.2.65.  (iv) (a) 6 ploughings.  (b) Flat sowing.  (c) 75,00 two budded setts/ha.  (d) 60cm. with in rows.  (e) Nil.  (v) N.A.  (vi) C-312 late.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 29.1.66.

2. TREATMENTS:

All combinations of (1), (2) and (3).

(1) 2 levels of N : N₀ = 0 and N₁=124 Kg/ha.

(2) 2 levels of P₁₀ : P₀ = 0 and P₁=124 Kg/ha.

(3) 2 levels of K₁₀ : K₀ = 0, K₁=124 Kg/ha.

* dose of N and full dose of P and K is applied at sowing and rest * dose of N at tillering stage.

3. DESIGN:

(i) 2² fact.  (ii) (a) 8.  (b) N.A.  (iii) 4.  (iv) (a) 24’08m x 3’66m.  (b) 22.07m x 3’66m.  (v) One metre at both ends.(vi) Yes.

4. GENERAL:

(i) Normal.  (ii) N.A.  (iii) Yield of cane.  (iv) (a) 1960-65. (Treatment levels are different in other years (b) No.  (c) Nil.  (v) Jullundur.  (vi) and (vii) Nil.

5. RESULTS:

(i) 559’6 Q/ha.  (ii) 80’9 Q/ha.  (iii) Main effect of N alone is highly significant.  (iv) Av. yield of cane in Q/ha.
Crop: Sugarcane.


Object: To study the effect of P through green manures on the yield of Sugarcane

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 4.3.65.  (iv) 10 ploughings.  (b) Flat sowing.  (c) 75000 two budded roots/ha.  (d) 60 cm between rows.  (e) Nil.  (v) N.A.  (vi) Co-312.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 2.2.66.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 green manures: $G_1$=Dhiancha, $G_2$=Suna-hemp and $G_3$=Guara.
   (2) 2 levels of $P_1$, $P_2$ applied to G.M. crops: $P_1$=0 and $P_2$=56 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D.  (ii) A=6.  (b) N.A.  (iii) 4.  (iv) (a) 21.95 m x 6.10 m.  (b) 16.59 m x 6.10 m.  (v) 2 rows on either side.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of cane.  (iv) (a) 1965 only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
   (i) 727.2 Q/ha.  (ii) 718 Q/ha.  (iii) None of the effects is significant.  (iv) Av. yield of cane in Q/ha.
Object—To study the effect of different levels of N, P and K on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Fallow. (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) Co-312. (v) (a) to (c) N.A. (vi) 11.4.60. (vii) Irrigated. (viii) and (ix) N.A. (a) 6 to 8.3 61.

2. TREATMENTS:
All combinations of (1), (2) and (3)
   (1) 2 levels of N :—N₀=0and N₁=112 Kg/ha.
   (2) 2 levels of P :—P₀=0 and P₁=56 Kg/ha.
   (3) 2 levels of K₀ :—K₀=0 and K₁=56 Kg/ha.
All Fertilizers applied at sowing.

3. DESIGN:
   (i) Pact. in R.B.D. I, 4. (ii) N.A.
   (iv) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) and (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 236.9 Q/ha. (ii) 37.8 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.

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C.D. for N marginal means = 27.8 Q/ha.
Cop :- Sugarcane  
Re :- Pb. 60(4), 61(21).
Site :- Sugarcane Res. Sta., Jullundur.
Type :- 'M'.

Object—To study the effect of different sources and methods of application of N on the yield of sugar cane.

1. BASAL CONDITIONS
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 7.4-6.0; 29/29.3/61. (iv) (a) and (b)N.A. (c) 135 setts/row; 74/60 to 85/500 setts two budded ha. (d) and (e) N.A. (v) N.A. (vi) Coj-39. (vii) Irrigated. (viii) and (ix) N.A. (x) 20/21.3/61; N.A.

2 TREATMENTS :
All combinations of (1) and (2)
(1) 2 methods of application of N — M1—Broadcasting and M2—Drilling.
(2) 5 sources of N — S1 — A/S, S2 — Urea, S3 — C/A N, S4 — A/S/N and S5 — A/C.

N applied at 112 Kg/ha in each treatment.

3. DESIGN
(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/1976 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good. (ii) N.A.; 15 Kg/ha. of gemmaxene applied against white ant at planting. (iii) Yield of cane. (iv) (a) 1960-61. (b) N.A. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Crop affected badly by abnormal frost for 61(21); Nil for others. (vii) Error variances are homogeneous and Treatments X Years interaction is absent.

5. RESULTS
Pooled results
(i) 484.5 Q/ha. (ii) 70.0 Q/ha. (based on 68 d.f. made up of Treatments X Years interaction and pooled error). (iii) Main effect of S alone is highly significant. (iv) Av. yield of cane in Q/ha.

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C.D. for S marginal means = 48.4 Q/ha.

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Crop: Sugarcane.  
Ref: Pb. 61(82), 62(89), 63(138).  
Site: Sugarcane Res. Sta., Jullundur.  
Type: 'M'.

Object: To study the effect of different levels of N, P, and K alone and in combination on the yield of Sugarcane.

1. BASEL CONDITIONS:
   (i) (a) N.A. (b) N.A. for 61; Chari for others. (c) N.A.  
   (ii) Sandy loam. (iii) 1.4.61: 26 to 29.3.62; 22.3.63. (iv) (a) and (b) N.A.  
   (c) 74100 two budded setts/ha. (d) and (e) N.A.  
   (v) Irrigated. (vi) 3 hoeings for 62; N.A. for others.  
   (vii) 20-21 1.62; 16 to 19.1.63; 24.12.63.

2. TREATMENTS:
   All combinations of (1), (2), and (3)  
   (1) 3 levels of N as A/S: N₀=0, N₁=112 and N₂=224 Kg/ha.  
   (2) 3 levels of P₀ as Super: P₀=0, P₁=112, and P₂=224 Kg/ha.  
   (3) 3 levels of K₀ as Pot. Sul.: K₀=0, K₁=112 and K₂=224 Kg/ha.

3. DESIGN:
   (i) 3 partially confd. (NPK and NPK confd).  
   (ii) (a) 9 plots/block; 3 blocks/replication.  
   (iii) 1.62. (iv) (a) N.A. for 61 and 62; 1/98.8 ha.  
   (v) N.A. for 61 and 62; 1/98.8 ba.  
   (vi) N.A. for 61 and 62; 1/36.25 ha.  
   (vii) Yes.  
   (viii) N.A.  
   (ix) N.A.

4. GENERAL:
   (i) Good.  
   (ii) N.A.  
   (iii) Yield of cane.  
   (iv) (a) 1961-63. (b) N.A.  
   (v) N.A.  
   (vi) N.A.  
   (vii) Error variances are homogeneous and Treatments x Years interaction is present.

5. RESULTS:
   Pooled results
   (i) 615.6 Q/ha.  
   (ii) 98.3 Q/ha. (based on 36 d.f., made up of Treatments x Years interaction).  
   (iii) Main effect of N alone is highly significant.  
   (iv) Av. yield of cane in Q/ha.

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<th>P₂</th>
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Individual results:

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Crop: Sugarcane.  
Site: Sugarcane, Res. Sta., Jullundur.  
Ref: Pb. 61(400), 62(81), 63(137).  
Type: 'M'.

Object: To study the effect of different levels of N, P and K on the yield of Sugarcane crop.

1. Basal Conditions:
   (i) (a) N.A. (b) N.A. for 61; Chari for others. (c) N.A.  
   (ii) Sandy loam. (iii) 1,4,3,61; 26,29,3,62; 22,3,63.  
   (iv) (a) and (b) N.A.  
   (v) 74130 two budded setts/ha. (d) and (e) N.A.  
   (vi) 112 Kg/ha. of N as compost,  
   (vii) CO2:39. (viii) Irrigated. (ix) 3 hoeings for 62; N.A. for others. (x) N.A.  
   (xi) 1-l.A.  
   (xii) 20/21.1.62; 16.1.63 to 19.1.63; 24.12.64.

2. Treatments:
   All combinations of (1), (2) and (3).
   (1) 3 levels of N: N₀, N₁ = 112 and N₂ = 224 Kg/ha.  
   (2) 3 levels of P₂O₅: P₀ = 0, P₁ = 112 and P₂ = 224 Kg/ha.  
   (3) 3 levels of K₂O: K₀ = 0, K₁ = 112 and K₂ = 224 Kg/ha.

3. Design:
   (i) 3² partially confd. (NPK², NP²K confd; NP²K, NPK confd; NPK, NP²K).  
   (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A.

4. General:
   (i) Good. (ii) N.A. (iii) Yield of cane (iv) (a) 1961-63. (b) No.  
   (v) Results of combined analysis are presented under 5. Results. (vi) N.A. (vii) Nil.  
   (viii) Error variances are heterogeneous and Treatments X Years interaction is present.

5. Results:
   Pooled results
   (i) 707 Q/ha. (ii) 155.0 Q/ha.  
   (based on 36 d.f. made up of Treatments X Years interaction). (iii) Main effect of P alone is highly significant.  
   (iv) Av. yield of cane in Q/ha.

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C.D. for P marginal mean=60.5 Q/ha.

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Crop :- Sugarcane

Site :- Sugarcan, Res. Sta., Jullundur.

Ref :- Pb. 63(22).
Type :- 'M'.

Object :- To study the effect of dhaincha intercropped in standing crop of sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 27.3.63. (iv) (a) 7 plantings, 5 ploughings. (b) N.A. (c) 74120 setts/ha. (d) Row to row 61cm. (e) N.A. (v) N.A. (vi) CoL-46 (vii) Irrigated. (viii) One blind hoeing and one hoeing. (x) N.A. (x) 21.1.64.

2. TREATMENTS:
   All combinations of (1) and (2).
   (1) 2 levels of manure :- M0 = No manure and M1 = 56 Kg/ha. of P2O5.
   (2) 2 levels of intercropping :- I0 = No intercropping and I1 = Dhaincha as intercrop.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 3.66m. x 32.00m. (b) 3.66m. x 27.66m. (v) 2 17 metre on either side. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) N.A. (iii) Yield of Sugarcane. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 766.0 Q/ha. (ii) 32.6 Q/ha, (iii) Interaction M x I is highly significant. (iv) Av. yield of cane in Q/ha.

<table>
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</table>

C.D. for the body of M x I table = 52.1 Q/ha.

Crop :- Sugarcane

Site :- Sugarcan, Res. Sta., Jullundur.

Ref :- Pb. 63(23).
Type :- 'M'.

Object :- To study the effect of different sources of N on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.I. (ii) Sandy loam. (iii) 28/29.3.63. (iv) (a) and (b) N.A. (c) 74120 two banded setts/ha. (v) Nil. (vi) COL-29 (vii) Irrigated (viii) and (x) N.A. (a) 20.12.63.

2. TREATMENTS:
   2 manural treatments :- M1 = 56/0 Kg/ha. of N as C/A/N at the time of planting + 56/0 Kg/ha. of N C/A/N on 16.5.63. and M2 = 112 0 Kg/ha. of N as steera meal at planting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 6. (iv) (a) 32.00m. x 32.00m. (b) 27.66m. x 27.66m. (v) 2 17 metre on either side. (v) Yes.
4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of cane. (iv) (a) 1963—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 31'4 Q/ha. (ii) 32'8 Q/ha. (iii) Treatment difference is not significant. (iv) Av. yield of cane in Q/ha.
Treatment $M_1$ $M_2$
Av. yield 310 318

---

**Crop:** Sugarcane.

**Site:** Sugarcane. Res. Stn., Jullundur.

Object:—To study the effect of compost and Ipomea on the yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 10.4.63. (iv) (a) and (b) N.A. (c) 74130 setts/ha. (d) and (e) N.A. (v) Nil. (vi) Co-46 (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) 5/6.2.64.

2. TREATMENTS:
Two manurial treatments: $N_1=112$ Kg/ha. of N as compost and $N_1=112$ Kg/ha. of N as Ipomea.

3. DESIGN:
(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 8. (iv) (a) N.A. (b) 1/179 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1963-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 513Q/ha. (ii) 30'3 Q/ha. (iii) Treatment difference is not significant. (iv) Av. yield of cane in Q/ha.
Treatment $M_1$ $M_2$
Av. yield 529'4 498'5

---

**Crop:** Sugarcane.

**Site:** Sugarcane. Res. Stn., Kheri.

Object:—To study the effect of dhaincha, on the yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) G.M.–Sugarcane-G.M. (b) G.M. (c) N.A. (ii) Sandy loam. (iii) 28.3.62. (iv) (a) 6 to 8 ploughings, (b) Flat sowing. (c) 86450 two budded setts/ha. (d) and (e) N.A. (v) Nil. (vi) Co-976 (early) (vii) Irrigated. (viii) 2 seedings. (ix) N.A. (x) 3rd week of Dec., 62.

2. TREATMENTS:
2 manurial treatments: $N_1=$Control and $N_1=$Dhaincha inter cropped.

3. DESIGN:
(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 8. (iv) (a) 1/74 ha. (b) 1/92 ha. (v) N.A. (vi) Yes.
4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a)1962-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 392.2 Q/ha. (ii) 46.6 Q/ha. (iii) Treatment differences are significant. (iv) Av. yield of cane in Q/ha.
   Treatment  M4          M1
   Av. yield    364.8        422.3
   C.D. = 55.1 Q/ha.

   Type: 'M'.

Object: To study the effect of different levels of N on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) G.M. = Sugarcane - G.M. (b) N.A. (c) Sandy loam. (iii) 17.3.62; 23.3.63. (iv) (a) 6 to 8 ploughings. (b) Flat sowing. (c) 86450, two budded setts/ha. (d) 2 cm. apart. (e) N.A. (f) Nil. (vi) C.O.J-46. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) Last week of Feb., 63; 20.1.64.

2. TREATMENTS:
   8 manural treatments: - M0=Control, M1=28 Kg/ha. of N at sowing+28 Kg/ha. of N at 2nd irrigation, M2=56 Kg/ha. of N at sowing+28 Kg/ha. of N each at 2nd and 4th irrigation, M3=56 Kg/ha. of N at sowing+56 Kg/ha. of N each at 2nd and 4th irrigation, M4=56 Kg/ha. of N at sowing+84 Kg/ha. of N each at 2nd and 4th irrigation, M5=56 Kg/ha. of N at sowing+112 Kg/ha. of N each at 2nd to 4th irrigation, M6=56 Kg/ha. of N at sowing+28 Kg/ha. of N each from 2nd to 5th irrigation, M7=56 Kg/ha. of N at sowing+28 Kg/ha. of N each from 2nd to 7th irrigation and M8=56 Kg/ha. of N at sowing+28 Kg/ha. of N each from 2nd to 9th irrigation.

3. DESIGN:
   (i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 1/74.1 ha. (b) 1/296.4 ha.; 1/98.1 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of cane. (iv) (a) 1962-63. (b) No. (c) N.A. (v) Nil. (vi) Nil. (vii) Since the error variances are heterogeneous and Treatment X Years interaction is absent, individual years results are presented under 5. Results.

5. RESULTS:
   (i) 317.4 Q/ha. (ii) 99.6 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of cane in Q/ha.
   Treatment  M0          M1          M2          M3          M4          M5          M6          M7          M8
   Av. yield    161.6        220.2        256.5        296.5        381.8        355.8        296.5        370.7        216.7
   C.D. = 147.1 Q/ha.

   63(72)
   (i) 470.2 Q/ha. (ii) 64.6 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of cane in Q/ha.
   Treatment  M0          M1          M2          M3          M4          M5          M6          M7          M8
   Av. yield    343.5        442.3        439.8        434.9        527.6        541.2        432.4        542.4        527.6
Crop :- Sugarcane.
Site :- Sugarcane Sub-Stn., Kheri.

Object :- To study the effect of press-mud on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (e) N.A. (ii) Sandy loam. (iii) 15.3.63; 13.3.64. (iv) (a) to (e) N.A. (v) N.A. (vi) CoJ-46 (late). (vii) Irrigated. (viii) and (ix) N.A. (a) Last week of February.

2. TREATMENTS:
   3 manurial treatments :- M₀=Control, M₁=50 Q/ha. of fresh press-mud and M₂=50 Q/ha. of old press-mud.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 1/74'1 ha. (b) 1/98'1 ha.; 1/197'6 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of cane. (iv) (a) 1963-64. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous. and Treatments x Years interaction is absent, therefore individual years results are presented under 5. Results.

5. RESULTS:

63'70:
(i) 517'8 Q/ha. (ii) 57'9 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of cane in Q/ha.
Treatment
M₀ M₁ M₂
Av. yield 588'1 577'2 501'9

64'59:
(i) 803'9 Q/ha. (ii) 118'6 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of cane in Q/ha.
Treatment
M₀ M₁ M₂
Av. yield 749'2 854'0 808'5

Crop :- Sugarcane.
Site :- Sugarcane Sub-Stn., Kheri.

Object :- To study the effect of different sources of N on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 24.3.63; 6.3.64. (iv) (a) to (e) N.A. (v) N.A. (vi) CoJ-46 (late) (vii) Irrigated. (viii) and (ix) N.A. (a) 18.1.64; 5.1.65.

2. TREATMENTS:
   2 sources of N at 112 Kg/ha. :-S₁=Stearamol and S₂=C/AN.

3. DESIGN:
   (i) (a) R.B.D. (ii) (a) 2. (b) N.A. (iii) 8. (iv) (a) 1/74'1 ha. (b) 1/197'6 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of cane. (iv) (a) 1963-64 (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is present.
5. RESULTS:

Pooled results
(i) 662.4 Q/ha. (ii) 206.0 Q/ha. (based on 1d.f. made up of interaction of Treatments × Years) (iii) Treatment difference is not significant. (iv) Av. yield of cane in Q/ha.

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Individual results:

Crop: Sugarcane.
Site: Sugarcane Sub-Stn., Kheri.
Type: 'M'.

Object: To study the effect of P and green manure on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 17.3.63; 27.3.64; 23.3.65. (iv) (a) and (b) N.A. (c) 87500 two budded sets/ha. (d) and (e) N.A. (v) N.A. (vi) Co-976; Co-46; N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) 20.12.63; 10.1.64; N.A.

2. TREATMENTS:
   Same as in expt. no. 63(22) conducted on Sugarcane crop and presented on page no. 611.

3. DESIGN:
   (i) R.R.D. (ii) 4. (b) N.A. (iii) 5. (iv) (a) 1/74.1 ha.; 1/74.1 ha.; N.A. (b) 1/98.9 ha.; 1/98.9 ha; 1/100 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since expt. is contd. beyond 65, hence individual years results are presented under 5. Results.

5. RESULTS:

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<tr>
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616

(i) 601.9 Q/ha. (ii) 36.4 Q/ha. (iii) Interaction M x I is highly significant. (iv) Av. yield of cane in Q/ha.

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C.D. for the body of M x I table = 50.2 Q/ha.

(i) 486.9 Q/ha. (ii) 123.1 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

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Crop : Sugarcane.
Site : Sugarcane Sub-Stn., Kheri.
Object : To study the effect of different levels of N, P and K on the yield of Sugarcane.

1. BASAL CONDITIONS:
(i) N.A. (ii) Sandy loam. (iii) 17 to 26.3.64. (iv) (a) and (b) N.A. (c) 86450 setts/ha. (d) 61 cm. (e) N.A. (v) N.A. (vi) CoJ-46. (vii) Irrigated. (viii) and (ix) N.A. (x) 26.1.65.

2. TREATMENTS:
Main-plot treatments:
4 levels of N as CA/N: N₀ = 0, N₁ = 56, N₂ = 112 and N₃ = 168 Kg/ha.
Sub-plot treatments:
All combinations of (1) and (2)
(1) 2 levels of P₂O₅ as Super: P₀ = 0 and P₁ = 56 Kg/ha.
(2) 2 levels of K₂O as Mur. Pot.: K₀ = 0 and K₁ = 56 Kga/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/repl. 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) 1/74.1 ha. (b) 1/97.6 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal (ii) N.A. (iii) Yield of cane. (iv) (a) 1964 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 536.7 Q/ha. (ii) (a) 102.3 Q/ha. (b) 76.70 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.
Crop := Sugarcane.

Site := Sugarcane Sub-Stn., Kheri.

Object := To study the effect of different levels of N, P and K on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil. (ii) Sandy loam. (iii) 22.3.65. (iv) (a) and (b) N.A. (c) 875000 two budded setts/ha. (d) and (e) N.A. (v) N.A. (vi) C&J-36. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 4 levels of N-N0=0, N1=56, N2=112 and N3=168 Kg/ha.
   (2) 2 levels of P2O5-P0=0 and P1=56 Kg/ha.
   (3) 2 levels of K2O-K0=0 and K1=56Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (a) 16. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/100 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1964-only. (b) and (c) No. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 474.7 Q/ha. (ii) 119.2 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>K0</th>
<th>K1</th>
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<td>332.8</td>
<td>547.3</td>
<td>585.4</td>
<td>630.1</td>
<td>520.2</td>
<td>527.7</td>
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<td>P1</td>
<td>325.7</td>
<td>555.0</td>
<td>620.2</td>
<td>697.1</td>
<td>547.1</td>
<td>551.9</td>
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<tr>
<td>Mean</td>
<td>329.3</td>
<td>551.2</td>
<td>602.8</td>
<td>663.6</td>
<td>533.6</td>
<td>539.8</td>
<td>536.7</td>
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<td>K0</td>
<td>320.0</td>
<td>555.5</td>
<td>597.0</td>
<td>662.0</td>
<td>547.5</td>
<td>551.9</td>
<td>549.1</td>
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<tr>
<td>K1</td>
<td>338.5</td>
<td>546.8</td>
<td>608.6</td>
<td>665.2</td>
<td>533.6</td>
<td>539.8</td>
<td>536.7</td>
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</table>

C.D. for N marginal means = 81.8 Q/ha.

---

C.D. for N marginal means = 81.8 Q/ha.
Crop :- Sugarcane.
Site :- Sugarcane Sub-Stn., Kheri.

Object :- To study the effect of green manures with P on the yield of Sugarcane.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 20.2.65. (iv) and (v) N.A. (vi) Coj-46. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   Main-plot treatments :
   4 green manures : G1 = Fallow, G2 = Guara, G3 = Sunhemp and G4 = Dhaincha.
   Sub-plot treatments :
   2 levels of P2O5 - P0 = 0 and P1 = 55 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/replication and 2 sub-plots/main-plot. (iii) 4. (iv) (a) N.A. (b) 1/100ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1985 - Contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 623'4 Q/ha. (ii) (a) 138'0 Q/ha. (b) 71'0 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>Mean</th>
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<tr>
<td>G1</td>
<td>495'0</td>
<td>530'0</td>
<td>512'3</td>
</tr>
<tr>
<td>G2</td>
<td>620'0</td>
<td>592'5</td>
<td>606'2</td>
</tr>
<tr>
<td>G3</td>
<td>680'0</td>
<td>640'0</td>
<td>650'0</td>
</tr>
<tr>
<td>G4</td>
<td>721'2</td>
<td>708'8</td>
<td>715'0</td>
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<tr>
<td>Mean</td>
<td>629'1</td>
<td>617'8</td>
<td>623'4</td>
</tr>
</tbody>
</table>
2. **TREATMENTS:**

7 manurial treatments:
- O = Control (no manure)
- N7 = 22.4 Kg/ha. of N at A/S
- N8 = 44.8 Kg/ha. of N at A/S
- P = 44.8 Kg/ha. of P
- K = 44.8 Kg/ha. of K
- NP = 67.2 Kg/ha. of N + 44.8 Kg/ha. of P
- NK = 67.2 Kg/ha. of N + 44.8 Kg/ha. of K
- PK = 44.8 Kg/ha. of P + 44.8 Kg/ha. of K
- NPK = 67.2 Kg/ha. of N + 44.8 Kg/ha. of P + 44.8 Kg/ha. of K

3. **DESIGN:**

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years with in the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on Rabi cereal, 8 on Cash crop, 4 on a oilseed crop and 3 on a leguminous crop. The number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of Phosphate application are studied on Type C trials in two cut of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village.

(iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

4. **GENERAL:**

(i) and (ii) N.A. (iii) Yield of cane (iv) to (vii) N.A.

5. **RESULTS:**

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>P</td>
</tr>
<tr>
<td>60(S.F.T.)</td>
<td></td>
<td></td>
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<tr>
<td>Jullundur</td>
<td>30</td>
<td>49880</td>
<td>6150</td>
</tr>
<tr>
<td>Hoshiarpur</td>
<td>9</td>
<td>26680</td>
<td>5110</td>
</tr>
<tr>
<td>Sangur</td>
<td>4</td>
<td>33663</td>
<td>9313</td>
</tr>
<tr>
<td>61(S.F.T.)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Jullundur</td>
<td>28</td>
<td>47930</td>
<td>12090</td>
</tr>
<tr>
<td>Hoshiarpur</td>
<td>13</td>
<td>28840</td>
<td>24920</td>
</tr>
</tbody>
</table>

**Crop:** Sugarcane.  
**Site:** Jullundur and Sangur.  
**Ref:** Pb. 60(S.F.T.).  
**Type:** 'M'.

Object: --Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. **BASAL CONDITIONS**

(i) to (x) N.A.

2. **TREATMENTS:**

7 manurial treatments:
- O = Control (no manure),  
- N7 = 22.4 Kg/ha. of N at A/S,  
- N8 = 44.8 Kg/ha. of N at A/S,
3. DESIGN:
Same as in type A conducted on Sugarcane crop on page No. 619.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of cane. (iv) (a) 1960 only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

\[
\text{Crop: Sugarcane.} \\
\text{Site: Hoshiarpur.} \\
\text{Ref: Pb. 60 and 61(S.F.T.).} \\
\text{Type: 'M'.}
\]

Object: - Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
(i) to (x) N.A.

2. TREATMENTS:
7 manurial treatments:
0=Control (no manure),
N,=67.2 Kg/ha. of N as A/S,
N,=134.4 Kg/ha. of N as A/S,
N,=67.2 Kg/ha. of N as Urea,
N,=134.4 Kg/ha. of N as Urea,
N,=67.2 Kg/ha. of N as C/A/N and
N,=134.4 Kg/ha. of N as C/A/N.

3. DESIGN:
Same as in type A conducted on Sugar cane crop on page No. 619.

4. GENERAL:
(iii) Yield of cane. (iv) (a) 1960 to 61. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

\[
\text{Av. response in Kg/ha.} \\
\text{District No. of trials Control yield in Kg/ha. N, N, N, N, N, N, S.E.} \\
\text{Hoshiarpur 5} 15440 14780 24990 13380 23660 18050 27890 2590.0 \\
\text{S.E. 2590.0} \\
\text{60 (S.F.T.)} \\
\text{District No. of trials Control yield in Kg/ha. N, N, N, N, N, N, N, S.E.} \\
\text{Hoshiarpur 8} 26100 26100 18170 6990 14140 16250 20000 14047.0 \\
\text{61 (S.F.T.)} \\
\text{District No. of trials Control yield in Kg/ha. N, N, N, N, N, N, N, S.E.} \\
\text{Hoshiarpur 8} 29190 29190 17290 10410 18650 22340 22710 36190 6689.0 \\
\text{S.E. 6689.0}
\]
Crop : Sugarcane. 
District: Gurdaspur, Hoshiarpur, Patiala, Sangrur, Jullundur and Ludhiana.

Object: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vii) N.A. (viii) Irrigated. (ix) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O = Control (no manure),
N = 70 Kg/ha. of N,
N2 = 140 Kg/ha. of N,
P = 70 Kg/ha. of P2O5,
N1P1 = 70 Kg/ha. of N + 70 Kg/ha. of P2O5,
N2P1 = 140 Kg/ha. of N + 70 Kg/ha. of P2O5,
N2P2 = 140 Kg/ha. of N + 140 Kg/ha. of P2O5 and
N1P2K1 = 140 Kg/ha. of N + 140 Kg/ha. of P2O5 + 70 Kg/ha. of K2O.

3. DESIGN:
(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil cropping pattern etc., in each zone one block is selected at random. A block normally consists of a group of 50-100 villages, in each block 36 experiments are conducted in a year of which 11 are of type A1, 11 of type A2 and 11 of type A3 and 3 are of type C. The eleven experiments under type A1, A2 and A3 are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a cash crop and 2 on oil seed crops. All the three type-C experiments are conducted on a legume crop and for the purpose of conducting the A1, A2 and A3 experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A1, A2 and A3 are laid out. For conducting the three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/20 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of cane. (iv) (a) 63,65 (S.F.T.) for Gurdaspur, Hoshiarpur, Patiala and Sangrur, 62 (S.F.T.) for Jullundur and 65 (S.F.T.) for Ludhiana. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
Gurdaspur
63(S.F.T.)
Treatment | N1 | N2 | P1 | N1P1 | N2P1 | N1P1K1 | S.E. | Av. response of cane in Kg/ha.
8831 | 12183 | 439 | 10652 | 16341 | 19218 | 21173 | 3500 | 8
Control yield = 3773 Kg/ha.; No. of trials = 8

65(S.F.T.)
Treatment | N1 | N2 | P1 | N1P1 | N2P1 | N1P2K1 | S.E. | Av. response of cane in Kg/ha.
7933 | 10488 | 1355 | 10177 | 15799 | 19688 | 22399 | 1897 | 3
Control yield = 44022 Kg/ha.; No. of trials = 9

Hoshiarpur
62(S.F.T.)
Treatment | N1 | N2 | P1 | N1P1 | N2P1 | N2P2 | N1P2K1 | S.E. | Av. response of case in Kg/ha.
8500 | 16407 | 823 | 9818 | 16769 | 19702 | 20097 | 2565
Control yield = 25645 Kg/ha.; No. of trials = 6
62(S.F.T.)

<table>
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<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
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<tbody>
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<td>Av. response of cane in Kg/ha.</td>
<td>6766</td>
<td>17433</td>
<td>266</td>
<td>8833</td>
<td>18816</td>
<td>22666</td>
<td>21400</td>
<td>2680</td>
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<td>Control yield</td>
<td>34349 Kg/ha.</td>
<td>No. of trials</td>
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Patiala

62(S.F.T.)

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<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>5238</td>
<td>9293</td>
<td>3835</td>
<td>7511</td>
<td>11712</td>
<td>11366</td>
<td>15863</td>
<td>4358</td>
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<tr>
<td>Control yield</td>
<td>52373 Kg/ha.</td>
<td>No. of trials</td>
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65(S.F.T.)

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<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>7588</td>
<td>14533</td>
<td>7988</td>
<td>11155</td>
<td>18222</td>
<td>23744</td>
<td>19311</td>
<td>3777</td>
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<tr>
<td>Control yield</td>
<td>49855 Kg/ha.</td>
<td>No. of trials</td>
<td>8</td>
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Sangrur

65(S.F.T.)

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<tr>
<th>Treatment</th>
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<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
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<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>1581</td>
<td>5337</td>
<td>-864</td>
<td>2747</td>
<td>7511</td>
<td>8994</td>
<td>11514</td>
<td>1682</td>
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<tr>
<td>Control yield</td>
<td>40647 Kg/ha.</td>
<td>No. of trials</td>
<td>8</td>
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Jullundur

65(S.F.T.)

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<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>6700</td>
<td>16466</td>
<td>2233</td>
<td>7533</td>
<td>18566</td>
<td>26533</td>
<td>22223</td>
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<tr>
<td>Control yield</td>
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<td>No. of trials</td>
<td>6</td>
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Ludhiana

64(S.F.T.)

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<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>10938</td>
<td>18149</td>
<td>5053</td>
<td>11304</td>
<td>17906</td>
<td>22704</td>
<td>2383</td>
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<td>Control yield</td>
<td>39025 Kg/ha.</td>
<td>No. of trials</td>
<td>13</td>
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Ludhiana

64(S.F.T.)

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<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>11855</td>
<td>19922</td>
<td>6955</td>
<td>116600</td>
<td>27522</td>
<td>27944</td>
<td>30600</td>
<td>4392</td>
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<tr>
<td>Control yield</td>
<td>57122 Kg/ha.</td>
<td>No. of trials</td>
<td>7</td>
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</table>
Crop: Sugarcane.  
District: Hoshiarpur.  
Ref: Pb. 63(S.F.T.).  
Type: 'M'.

Object: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A.  (vii) Unirrigated.  (viii) to (x) N.A.

2. TREATMENTS: and 3. DESIGN:
   Same as in type A1 conducted under irrigated condition on Sugarcane crop on page. No. 621.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of care.  (iv) (a) 1%3-coly.  (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:

   Hoshiarpur  
   Treatment  
   N  
   N  
   P  
   N\_P  
   N\_P  
   N\_P  
   N\_P\_K  
   S.E.  
   Av. response of  
   cane in Kg/ha.  
   16325  
   28548  
   371  
   18450  
   30541  
   36208  
   37921  
   8828.0  
   Control yield = 41381 Kg/ha.;  No. of trials = 5.

---

Crop: Sugarcane.  
District: Gurdaspur, Hoshiarpur, Patiala, Sangrur, Ludhiana and Jullundur.
Ref: Pb. 62(S.F.T.) for Gurdaspur, Hoshiarpur, Patiala, Sangrur, 64(S.F.T.) for Ludhiana and 65(S.F.T.) for Jullundur.  
Type: 'M'.

Object: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O = Control (no manure).
   N\_1 = 70 Kg/ha. of N,
   P\_1 = 70 Kg/ha. of P\_20\_5,
   P\_2 = 140 Kg/ha. of P\_20\_5,
   N\_1\_P\_1 = 70 Kg/ha. of N + 70 Kg/ha. of P\_20\_5,
   N\_2\_P\_2 = 70 Kg/ha. of N + 140 Kg/ha. of P\_20\_5,
   N\_2\_P\_1 = 140 Kg/ha. of N + 140 Kg/ha. of P\_20\_5 and
   N\_2\_P\_3 = 140 Kg/ha. of N + 140 Kg/ha. of P\_20\_5 + 140 Kg/ha. of K\_2O.

3. DESIGN:
   Same as in type A1 conducted under irrigated condition on Sugarcane crop on page. No. 621.
4. GENERAL:
(i) and (ii) N.A. (iii) Yield of cane. (iv) (a) 1961 to 66 for Gurdaspur, Hoshiarpur, Patiala and Sangrur; 1964 to 66 for Ludhiana and 1963 for Jullundur. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

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<th>Treatment</th>
<th>( N_1 )</th>
<th>( P_1 )</th>
<th>( P_2 )</th>
<th>( N_1P_1 )</th>
<th>( N_1P_2 )</th>
<th>( N_2P_2 )</th>
<th>( N_2P_2K_2 )</th>
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<td>Gurdaspur 63(S.F.T.)</td>
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<td>6193</td>
<td>1537</td>
<td>2130</td>
<td>7555</td>
<td>9927</td>
<td>13098</td>
<td>13050</td>
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<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>Control yield=36065 Kg/ha. ; No. of trials=8</td>
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<tr>
<td>Hoshiarpur 63(S.F.T.)</td>
<td>Treatment</td>
<td>6677</td>
<td>2602</td>
<td>5721</td>
<td>8511</td>
<td>11930</td>
<td>18724</td>
<td>21382</td>
<td>23207</td>
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<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>Control yield=23304 Kg/ha. ; No. of trials=8</td>
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<td>Patiala 63(S.F.T.)</td>
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<td>8366</td>
<td>428</td>
<td>3286</td>
<td>13499</td>
<td>14834</td>
<td>25327</td>
<td>23433</td>
<td>27153</td>
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<td>Av. response of cane in Kg/ha.</td>
<td>Control yield=35651 Kg/ha. ; No. of trials=11</td>
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<tr>
<td>64(S.F.T.)</td>
<td>Treatment</td>
<td>13689</td>
<td>7699</td>
<td>15330</td>
<td>13837</td>
<td>20064</td>
<td>16951</td>
<td>20113</td>
<td>74410</td>
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<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>Control yield=36521 Kg/ha. ; No. of trials=3</td>
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</table>
Crop: Sugarcane (Annual).  
District: Hoshiarpur.  
Object: To study the response curves of important cereal, cash and oil seed crops to P applied singly and in combination with other nutrients.
1. BASAL CONDITIONS:
   (i) to (vi) N.A. (viii) Unirrigated. (xiii) N.A.

2. TREATMENTS:
   Same as in Type A2 conducted under irrigated condition on page No. 621.

3. DESIGN:
   Same as in type A2 conducted under irrigated condition on Sugarcane crop on page No. 621.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of cane. (iv) (a) 1963-only, (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS
   Hoshiarpur
   63(S.F.T)
   Treatment N_1 P_1 K_1 N_1P_1 N_1K_1 N_1P_1K_1 S.E.
   Av. response of cane in Kg/ha.
   6444 922.4348 13178 12173 22848 23466 8411.0
   Control yield-26176 Kg/ha. ; No. of trials=9

Crop :- Sugarcane (Annual),  Ref :- Pb, 63 to 65 (S.F.T.) for Gurdaspur;
District :- Gurdaspur, Hoshiarpur, 63 to 65(S.F.T.) for Hoshiarpur; 63(S.F.T.)
Jullundur, Patiala, Sangrur and for Jullundur; 63 to 65(S.F.T.) for Patiala; 63
Ludhiana.

Type :- 'M'.

Object :- Type A2: To study the response curves of important cereal, cash and oil seed crops to K applied
  singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (xiii) N.A.

2. TREATMENTS:
   8 manural treatments:
   O=Control (no manure),
   N_1=70 Kg/ha. of N,
   K_1=70 Kg/ha. of K_2O,
   K_1=140 Kg/ha. of K_2O,
   N_1K_1=70 Kg/ha. of N+70 Kg/ha. of K_2O,
   N_1K_1=70 Kg/ha. of N+140 Kg/ha. of K_2O,
   N_1K_1=140 Kg/ha. of N+140 Kg/ha. of K_2O
   N_1P_1K_1=70 Kg/ha. of N+70 Kg/ha. of P_2O_5+70Kg/ha. of K_2O.

3. DESIGN:
   Same as in type A2 conducted under irrigated condition on Sugarcane crop on page No. 621.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of cane. (iv) (a) 1963 to 66 for Gurdaspur, Hoshiarpur, Patiala and Sangrur
   (vii) N.A., 1963 for Jullundur, 1964 to 66 for Ludhiana. (v) to (xii) N.A.
### 5. RESULTS:

Gurdaspur

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<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>K&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;5&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;6&lt;/sub&gt;</th>
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<td>Av. response of cane in Kg/ha.</td>
<td>4458</td>
<td>-1021</td>
<td>-702</td>
<td>4788</td>
<td>5249</td>
<td>7522</td>
<td>6954</td>
<td>14850</td>
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<td>Control yield=33989 Kg/ha.;</td>
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<th>Treatment</th>
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<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;3&lt;/sub&gt;</th>
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<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
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<th>K&lt;sub&gt;6&lt;/sub&gt;</th>
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<td>Av. response of cane in Kg/ha.</td>
<td>9450</td>
<td>472</td>
<td>2366</td>
<td>9120</td>
<td>9713</td>
<td>15808</td>
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<td>35290</td>
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<td>Control yield=28713 Kg/ha.;</td>
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Hoshiarpur

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<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;5&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;6&lt;/sub&gt;</th>
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<td>Av. response of cane in Kg/ha.</td>
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<td>-1044</td>
<td>200</td>
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<td>15844</td>
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<td>18284</td>
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<td>Control yield=41044 Kg/ha.;</td>
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Jullundur

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<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;5&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;6&lt;/sub&gt;</th>
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<td>428</td>
<td>-312</td>
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<td>Control yield=20526 Kg/ha.;</td>
<td>No. of trials=5</td>
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Patiala

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<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
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<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
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<th>K&lt;sub&gt;5&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;6&lt;/sub&gt;</th>
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<td>Av. response of cane in Kg/ha.</td>
<td>10930</td>
<td>-650</td>
<td>3253</td>
<td>11572</td>
<td>13919</td>
<td>200080</td>
<td>12430</td>
<td>34129</td>
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<td>Control yield=35541 Kg/ha.;</td>
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Patiala

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<th>K&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;4&lt;/sub&gt;</th>
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<td>Av. response of cane in Kg/ha.</td>
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<td>1861</td>
<td>4192</td>
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<td>11210</td>
<td>19792</td>
<td>16520</td>
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<td>Control yield=35693 Kg/ha.;</td>
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<th>K&lt;sub&gt;3&lt;/sub&gt;</th>
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<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;6&lt;/sub&gt;</th>
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<td>Av. response of cane in Kg/ha.</td>
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<td>197</td>
<td>741</td>
<td>5189</td>
<td>12058</td>
<td>14134</td>
<td>1846</td>
<td>41280</td>
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<td>Control yield=31777 Kg/ha.;</td>
<td>No. of trials=4</td>
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<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;6&lt;/sub&gt;</th>
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<td>Av. response of cane in Kg/ha.</td>
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<td>-4598</td>
<td>543</td>
<td>4200</td>
<td>11310</td>
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<td>35232</td>
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<td>Control yield=27279 Kg/ha.;</td>
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Crop: Sugarcane (Annual).
District: Hoshiarpur.

Ref: Pb. 63(S.F.T.).
Type: 'M'.

Object: — Type A1: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. **BASAL CONDITIONS:**
   (i) (a) to (c) N.A.   (ii) Radish chestnut.   (iii) to (vi) N.A.   (vii) Unirrigated.   (viii) to (x) N.A.

2. **TREATMENTS:**
   Same as in type A1 on Sugarcane crop conducted under irrigated condition on page, No. 626.

3. **DESIGN:**
   Same as in type A1 conducted under irrigated condition on Sugarcane on page No. 621.
4. GENERAL

(i) and (ii) N.A. (iii) Yield of cane. (iv) (a) 1963-only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

63 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1K_1 )</th>
<th>( N_1K_2 )</th>
<th>( N_1P_1K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of cane in Kg/ha.</td>
<td>12453</td>
<td>131</td>
<td>2174</td>
<td>13145</td>
<td>13475</td>
<td>25863</td>
<td>23787</td>
</tr>
</tbody>
</table>

Control yield = 32847 Kg/ha.; No. of trials = 5

Crop: Sugarcane. 
Site: Sugarcane Sub-Stn., Gurdaspur. 
Object: To study the effect of different levels of N on the yield of different varieties of Sugarcane.

Ref: Pb. 62(229). 
Type: "MV".

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Fallow. (c) Nil. (ii) Loamy. (iii) 27.3.62. (iv) 4 ploughings and 4 subagas. (b) N.A. (c) 88920 two budded setts/ha. (d) N.A. (e) 1. (f) N.A. (g) As per treatments. (h) Irrigated. (i) N.A.

2. TREATMENTS:

Main-plot treatments: 4 varieties: \( V_1 = \text{Co-976}, V_2 = \text{Co-1007}, V_3 = \text{Co-46}, \) and \( V_4 = \text{Co-312} \)

Sub-plot treatments: 4 levels of N as A/S: \( N_0 = 0, N_1 = 112, N_2 = 168 \) and \( N_4 = 224 \) Kg/ha.

3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/repetition, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 21.95m. X 2.44m. (b) 20.73m. X 2.44m. (v) 61cm. on either side of the plot. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1962-65. (modified in 1963) (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 676.0 Q/ha. (ii) (a) 132.2 Q/ha. (b) 74.5 Q/ha. (iii) Main effect of N is highly significant, and that of V is significant (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>( N_0 )</th>
<th>( V_1 )</th>
<th>( V_2 )</th>
<th>( V_3 )</th>
<th>( V_4 )</th>
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</tr>
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<tbody>
<tr>
<td>( N_1 )</td>
<td>583.7</td>
<td>662.9</td>
<td>652.9</td>
<td>821.1</td>
<td>685.2</td>
</tr>
<tr>
<td>( N_2 )</td>
<td>563.9</td>
<td>672.8</td>
<td>742.0</td>
<td>775.7</td>
<td>688.6</td>
</tr>
<tr>
<td>( N_4 )</td>
<td>435.3</td>
<td>603.5</td>
<td>643.1</td>
<td>672.8</td>
<td>588.7</td>
</tr>
<tr>
<td>Mean</td>
<td>613.4</td>
<td>640.9</td>
<td>831.1</td>
<td>880.5</td>
<td>741.5</td>
</tr>
</tbody>
</table>

C.D. for V marginal means = 105.7 Q/ha.
C.D. for N marginal means = 53.6 Q/ha.
Crop: Sugarcane.  
Site: Sugarcane Sub-Stn., Gurdaspur.
Ref: Ph. 63(210).  
Type: 'MV'.

Object: To study the effect of different manures and varieties on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Fallow. (c) Nil. (ii) Loamy. (iii) 13 to 16.3.63. (iv) 4 ploughings, 4 subagas. (b) N.A. (c) 74100 two budded setts/ha. (d) N.A. (e) I. (vi) N.A. (vii) As per treatments. (viii) Irrigated. (vii) 5 hoeings. (ix) 69cm. (x) 7/8.2.64.

2. TREATMENTS:
   Main-plot treatments:
   4 varieties: \( V_1 = \text{Co}-976, V_2 = \text{Co}-1007, V_3 = \text{CoJ}-46 \) and \( V_4 = \text{Co}-312. \)
   Sub-plot treatments:
   4 levels of N as C/A/N: \( N_1 = 0, N_2 = 124, N_3 = 185 \) and \( N_4 = 247 \)Kg/ha. 50% of the dose of N applied at planting and 50% on 17.7.63.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/per replication. 4 sub-plots/main-plot. (b) N.A. (iii) 23'77m. x 4'88m. (b) 20'73m. x 4'88m. (v) 1'52m. on either side of the plot. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1962-65 (modified in 1963 and 64) (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 316.9 Q/ha. (ii) (a) 64.0 Q/ha. (b) 48.8 Q/ha. (iii) Main effects of \( V \) and \( N \) are highly significant. (iv) Av. yield of cane in Q/ha.

\[
\begin{array}{cccc}
 & N_0 & N_1 & N_2 & N_3 & \text{Mean} \\
V_1 & 341.3 & 460.1 & 533.3 & 485.3 & 455.0 \\
V_2 & 328.7 & 479.1 & 540.7 & 554.3 & 475.7 \\
V_3 & 456.4 & 602.9 & 676.8 & 696.8 & 608.2 \\
V_4 & 391.7 & 521.6 & 585.2 & 616.8 & 528.8 \\
\text{Mean} & 379.5 & 515.9 & 584.0 & 580.3 & 516.9
\end{array}
\]

C.D. for \( V \) marginal means = 51.9 Q/ha.
C.D. for \( N \) marginal means = 35.1 Q/ha.

---

Crop: Sugarcane.  
Site: Sugarcane Sub-Stn., Gurdaspur.  
Ref: Ph. 64(199).  
Type: 'MV'.

Object: To study the effect of different doses of N on different varieties of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Fallow. (c) Nil. (ii) Loamy. (iii) 20.3.64. (iv) (a) 4 ploughings and 4 subagas. (b) N.A. (c) 8920 two. budded setts/ha. (d) N.A. (e) I. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 6 hoeings. (ix) 87cm. (x) 87cm. (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   3 varieties: \( V_1 = \text{Col}-79, V_2 = \text{Col}-1007 \) and \( V_4 = \text{CoJ}-46. \)
Sub-plot treatments:
4 levels of N as A/S: \(N_0 = 0, N_1 = 124, N_2 = 185,\) and \(N_3 = 247\) Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot (b) N.A. (iii) 4. (iv) (a) 21.95m. x 4.68 m. (b) 21.03m. x 4.88m. (v) 47 cm. on either side of the plot. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1962-65 (treatments modified in 65). (b) Nil. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 703.5 Q/ha. (ii) (a) 74.6 Q/ha. (b) 26.7 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>(N_0)</th>
<th>(N_1)</th>
<th>(N_2)</th>
<th>(N_3)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>(V_1)</td>
<td>496.1</td>
<td>637.4</td>
<td>631.9</td>
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<td>(V_2)</td>
<td>447.4</td>
<td>542.9</td>
<td>599.7</td>
<td>576.0</td>
<td>541.5</td>
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<tr>
<td>(V_3)</td>
<td>432.8</td>
<td>611.7</td>
<td>646.2</td>
<td>624.4</td>
<td>570.4</td>
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<tr>
<td>Mean</td>
<td>458.8</td>
<td>597.3</td>
<td>625.9</td>
<td>678.0</td>
<td>575.0</td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 22.3 Q/ha.

---

Crop: Sugarcane.
Object: To find the optimum dose of N for the latest improved varieties.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 6.3.65. (iv) (a) 7 ploughings. (b) Flat sowing. (c) 7000 two budded sets/ha. (d) 60cm. (e) Nil. (f) N.A. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) 11.2.66.

2. TREATMENTS:
Main-plot treatments:
3 varieties: \(V_1 =\) CoJ-148, \(V_2 =\) CoJ-975 and \(V_3 =\) CoJ-46.

Sub-plot treatments:
6 levels of N as A/S: \(N_0 = 0, N_1 = 112, N_2 = 140, N_3 = 168, N_4 = 196\) and \(N_5 = 224\) Kg/ha.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication and 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1.494 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of cane. (iv) (a) 1962-65. (modified every year). (b) N.A. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 703.5 Q/ha. (ii) (a) 74.6 Q/ha. (b) 26.7 Q/ha. (iii) Main effect of N and interaction V\(X\)N are highly significant. (iv) Av. yield of cane in Q/ha.
Crop: Sugarcane.  
Site: Sugarcane Res. Stn., Jullundur.  
Ref: Ph. 60(8).  
Type: 'MV'.

Object: To study the effect of graded doses and times of application of Nitrogen on the yield of different varieties of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 28/2.3.60.  (iv) (a) and (b) N.A.  (c) 24/100 two budded setts/ha.  (d) and (e) N.A.  (v) Nil.  (vi) As per treatments.  (vii) Irrigated.  (viii) Hoeings.  (ix) N.A.  (x) 8/9.2.61.

2. TREATMENTS:
   All combinations of (1) and (2)
   (i) 2 varieties: V₁=Co-28 and V₂=Co-39.
   (2) 4 levels of N as A/S: N₀=0, N₁=112 Kg/ha. (28 Kg/ha. of N at planting+43 Kg/ha. of N applied in May and June), N₂=112 Kg/ha. of N (28 Kg/ha. of N at planting+16 Kg/ha. of N applied in May to Sept.-each), N₃=2 N₂ (224 Kg/ha. of N at A/S applied at planting, 123 Kg/ha. of N each on 2.5.60 and 21.6.60, 56 Kg/ha. of N on 21.7.60 and 28 Kg/ha. of N on 2.8.61.)

3. DESIGN:
   (i) Plct. in R.B.D.  (ii) 8.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/98.8 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) Nil.  (iii) Yield of cane.  (iv) (a) 1950-62 (modified in 1961).  (b) No.  (c) Nil.  (v) N.A.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 711Q/ha.  (ii) 61.3Q/ha.  (iii) Main effect of N alone is highly significant.  (iv) Ar. yield of cane, in Q/ha.
Crop: Sugarcane.

Ref. := Ph. 61(3), 62(23).

Site := Sugarcane Res. Sta., Jullundur.

Type := ‘MV’.

Object := To study the effect of graded doses and times of application of N on the yield of different varieties of Sugarcane.

1. BASAL CONDITIONS:

(i) (1) to (2) N.A. (ii) Sandy loam. (iii) 9/10, 3.61; 9 to 11.3.61. (iv) (a) and (b) N.A. (c) 74100 to 85450 two budded sets/ha. (d) and (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A.; 2.12.62.

2. TREATMENTS

All combinations of (1) and (2)
(1) 2 varieties: V1 = Col-29 and V2 = Col-39.
(2) 5 levels of N: N0 = Control, N1 = 112 Kg/ha. of N (28 Kg/ha at planting +42 Kg each in May and June), N2 = 112 Kg/ha. of N (28 Kg at planting+16.8 Kg each in May to Sept.), N3 = 224 Kg/ha. of N (56 Kg at planting+44 Kg each in May and June) and N4 = 224 Kg/ha. of N (56 Kg at planting+33.6 Kg each in May to September)

60 Kg of A/S applied at planting, 10 Kg/ha. of C/A/N on 25th May, 50 Kg of Urea on 20th June and 150 Kg of Soda nitrate on 22nd July for 61.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a)10. (b) N.A. (iii) 3. (iv) (a) 3.66m. x 3.200m., 1/98.8 ha. (b) 3.66m. x 3.200 m; 1/98.8 ha. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good (ii) 1 Kg of Agallol and 20 Kg of Gastrazine applied at planting for 61; 20 Kg of B, H, C, (5%) and 14 Kg of Agallol sprayed for 62. (iii) Yield of cane. (iv) (a) 1960-61 (modified in 1961) (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments X Years interaction is present.

5. RESULTS:

Pooled results

(i) 4960 Q/ha. (ii) 1684 Q/ha. (based on P d. f. made up of Treatments X Years Interaction) (iii) Main effect of V alone is highly significant. (iv) Av. yield of cane in Q/ha.
Crop :- Sugarcane.

Ref :- Pb. 60(47), 61(53), 62(67).

Site :- Sugarcane, Sub-Stn., Kheri.

Type :- 'MV'

Objec1:- To study the effect of different levels of N on the different varieties of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) G.M-Sugarcane-G.M. (b) G.M. (c) N.A. (ii) Sandy loam. (iii) 9/10.4, 60; Last week of April, 61; 23.1.62, (iv) (a) 6 to 8 ploughings. (b) Flat sowing (c) 86487, 98842, 86487 two banded sets/ha. for 60, 61 and 62 respectively. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (a) N.A. (x) 1st week of Dec., 61; Last week of Feb., 62; 23.12.62.

2. TREATMENTS:
   Main-plot treatments:
   4 varieties: V1=Col-29, V2=Co S-515, V3=Co-312 and V4=Col—46.

   Sub-plot treatments:
   5 levels of N: N0=0, N1=56, N2=112, N3=168 and N4=224 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/pri:replication and 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 1/741 ha. (b) 1/98 8 ha. (v) N.A. (vi) Yes.

4. GENERAL
   (i) Poor for 60 and 62 and Normal for 61 (ii) Nil. (iii) Yield of cane. (iv) 1960—62. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogenous and Main-plot treatments X Years and Sub-plot treatments X Years interactions are present.

5. RESULTS:
   Pooled results
   (i) 333.5 Q/ha. (ii) (a) 564; 3 Q/ha. (based on 6 d.f., made up of Treatments X Years interaction) (b) 82.4 Q/ha. (based on 24 d.f., made up of Treatments X Years interaction) (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.
Crop Sugarcane.

Site :- Sugarcane Sub-Stn., Kheri.

Ref: :- Pb. 65(83).
Type:- 'MV'.

Object :- To study the requirements of N to the different varieties of Sugarcane.

1. BASAL CONDITIONS:

   (i) (a) Sugarcane-Fallow-Sugarcane (b) Fallow, (c) N.A. (ii) Sandy loam. (iii) 19.3,65. (iv) (a) 10 ploughings. (b) Flat sowing. (c) 75 to 88 Q/ha. (proportion to thickness of varieties.) (d) 60 cm. apart. (e) Nil. (v) 56 Kg/ha. of N at sowing. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) March, 66.

2. TREATMENTS:

   Main-plot treatments.

   Sub-plot treatments:
   6 levels of N:- N₀=Control, N₁=56 Kg/ha. at sowing +56 Kg/ha. at second irrigation, N₂=56 Kg/ha. at sowing +42 Kg/ha. at second irrigation +42 Kg/ha. at fourth irrigation, N₃=56 Kg/ha. at sowing +70 Kg/ha. at second irrigation +70 Kg/ha. at fourth irrigation and N₄=56 Kg/ha. at sowing +70 Kg/ha. at second irrigation +84 Kg/ha. at fourth irrigation.

3. DESIGN:

   (i) Split-plot. (ii) (a) 4 main-plots replication and 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/145 ha. (v) N.A. (vi) Yes.

4. GENERAL:

   (i) Normal. (ii) Attack of black bug + Pysillo and Guraspur top boxer with red root. 75%Mellotin was sprayed + 2%2% of B.H.C. sprayed and 10%B.H.C. (25 Kg/ha.) by mechanical method is applied with 1.25 Kg/ha. of Agallol. (iii) Yield of cane. (iv) (a) 1965- contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.
5. RESULTS:

(i) 708 Q/ha. (ii) (a) 234·1 Q/ha. (b) 122·2 Q/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>557</td>
<td>699</td>
<td>690</td>
<td>690</td>
<td>684</td>
<td>665</td>
</tr>
<tr>
<td>V2</td>
<td>657</td>
<td>709</td>
<td>803</td>
<td>899</td>
<td>784</td>
<td>770</td>
</tr>
<tr>
<td>V3</td>
<td>637</td>
<td>721</td>
<td>672</td>
<td>788</td>
<td>755</td>
<td>737</td>
</tr>
<tr>
<td>V4</td>
<td>594</td>
<td>608</td>
<td>699</td>
<td>703</td>
<td>664</td>
<td>650</td>
</tr>
</tbody>
</table>

Mean 611 684 716 770 722 742

C.D. for N marginal means = 87·0 Q/ha.

Crop: Sugarcane.  
Type ‘C’.

Object: To study the effect of different methods of sowing and seed-rates on the yield of Sugarcane.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Fallow. (c) N.l. (ii) Loamy soil for 63 and 64, sandy loam for 65. (iii) 7.3.63; 28.2.64; 16.3.65. (iv) (a) 4 ploughings and 4 subagas for 63 and 64; N.A. for 65. (b) to (d) As per treatments. (e) 1. (vi) N.A. for 63 and 64; 57 Kg/ha. of each of N at sowing and at tillering for 65. (vi) N.A. for 63 and 64; Co=312 for 65. (vii) Irrigated. (viii) 4 to 5 hoeings for 63 and 64; N.A. for 65. (ix) 74 cm.; 87 cm.; N.A. (x) N.A.; N.A.; 3.2. 66.

2. TREATMENTS:

All combinations of (1) and (2)+one extra treatment.

(i) 2 methods of sowing at 90cm. apart: M1—Flat sowing and M2—Trench planting.

(ii) 2 seed-rates: S1=49400 and S2=74100 setts/ha.

Extra treatment (E)=74100 setts/ha, sown at 60cm. apart by flat method.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 22·56m. x 7·32m.; 21·95m. x 14·63m.; 21·95m. x 7·32m. (b) 19·81m. x 7·32m.; 1/34·6 ha.; 18·44m. x 7·32m. (v) 130 cm. on either side, N.A.; 176 cm. on either side along length (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1963-65. (b) N.A. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments X Years interaction is present.

5. RESULTS:

Pooled results.

(i) 769·6 Q/ha. (ii) 759·3 Q/ha. (based on 8 d.f. made up of Treatments X Years interaction) (iii) Extra vs. others alone is significant. (iv) Av. yield of cane in Q/ha.
### Individual results.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$M_1$</th>
<th>$M_2$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963</td>
<td>725.0</td>
<td>726.5</td>
<td>725.3</td>
</tr>
<tr>
<td>1964</td>
<td>789.5</td>
<td>788.9</td>
<td>789.2</td>
</tr>
<tr>
<td>1965</td>
<td>718.9</td>
<td>786.9</td>
<td>752.9</td>
</tr>
<tr>
<td>Pooled</td>
<td>744.4</td>
<td>767.1</td>
<td>755.7</td>
</tr>
</tbody>
</table>

C.D. for extra $V_s$ vs. others = 56.2 Q/ha.

### Results:

- **Crop**: Sugarcane
- **Site**: Sugarcane Sub-Sta., Gurdaspur
- **Object**: To see the ill effect of early harvesting on deep sown crop

#### Ref.:
- Ph. 64(196).
- Type: ‘MV’.

---

**1. BASAL CONDITIONS:**

(i) (a) N.A. (b) Sugarcane. (c) 50 Kg/ha of N as C/A/N. (ii) Loamy. (iii) 7.3.63. (iv) (a) 4 ploughings, 4 subagas (to plant crop). (b) to (d) As per treatments (e) I. (f) 65 Kg/ha, of N as top dressing. (vi) N.A. (vii) Irrigated. (viii) 3 hoeings. (ix) 70 cm. (x) 22.12.63 (plant crop). 26.12.64 (rato<crop>.

---

**2. TREATMENTS:**

- **Main-plot treatments:**
  - All combinations of (1) and (2) i.e. 1 Extra treatment (E)
  - (1) 2 methods of sowing: $M_1$=Flat and $M_2$=Trench.
  - (2) 2 seed-rates: $S_1$=49421 and $S_2$=74132 two budded setts/ha.
  - (E) Extra treatment: $M_1S_1$ with spacing 60 cm.

- **Sub-plot treatments:**
  - 2 cultural treatments: $C_0$=Unshaved and $C_1$=Shaved.
  - Date of sowing was 15.2.64.

---

**3. DESIGN:**

- (i) Split-plot. (ii) 5 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) 22:55 m x 3:66 m. (b) 15:40 m x 3:66 m. (v) 3:57 m at each end and one row on each side. (vi) Yes.

---

**4. GENERAL:**

- (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1964-only. (b) No. (c) Nil (v) Nil. (vi) N.A. (vii) Nil.

---

**5. RESULTS:**

- (i) 412.3 Q/ha. (ii) (a) 99.2 Q/ha. (b) 16.0 Q/ha. (iii) Main effect of C and interactions $M\times C$ and $S\times C$ are highly significant. (iv) Av. yield of cane in Q/ha.

Object: To study the effect of spacings and seed-rates on the yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A., (ii) Sandy loam, (iii) 7.3.65, (iv) (a) 7 ploughings, (b) Flat sowing, (c) and (d) As per treatments, (e) Nil, (v) N.A., (vi) CoJ-46, (vii) Irrigated, (viii) and (ix) N.A., (x) 29.1.66.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 spacings: $S_1 = 60$ and $S_2 = 90$ cm.
(2) 3 seed-rates: $R_1 = 37500$, $R_2 = 50000$ and $R_3 = 75000$ two budded setts/ha.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 6, (b) N.A., (iii) 4, (iv) (a) 7.32 m $\times$ 15.80 m, (b) 7.32 m $\times$ 13.60 m, (v) 1:10 m, between rows. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1965—only, (b) No. (c) Nil. (v) to (vii) N.A.

RESULTS:
(i) 711.6 Q/ha, (ii) 41.5 Q/ha, (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>$R_1$</th>
<th>$R_2$</th>
<th>$R_3$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_1$</td>
<td>699.8</td>
<td>734.6</td>
<td>747.4</td>
<td>727.0</td>
</tr>
<tr>
<td>$S_2$</td>
<td>683.9</td>
<td>710.4</td>
<td>693.8</td>
<td>696.0</td>
</tr>
<tr>
<td>Mean</td>
<td>691.8</td>
<td>722.5</td>
<td>720.6</td>
<td>711.6</td>
</tr>
</tbody>
</table>
Crop: Sugarcane.  
Site: Sugarcane Res. Sta., Jullundur.  

Object: To study the effect of different methods of planting on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) N.A.  (ii) Sandy loam.  (iii) 31.3.63 to 1.4.63.  (iv) and (v) N.A.  (vi) CoJ-45.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 6th Feb. to 8th Feb., 64.

2. TREATMENTS:
   6 methods of planting of Sugarcane:  
   \( T_1 = \text{Pit method (six three budded setts/pit)}, \)  
   \( T_2 = \text{Poona method with two rows of 90 two budded setts in each row, (sown in trenches 91cm apart, each trench contains two rows of cane setts),} \)  
   \( T_3 = \text{Trenches 91cm. apart (18cm. to 20cm. deep with 74100 two budded setts/ha),} \)  
   \( T_4 = \text{Trenches (18cm. to 20cm. deep) with 49400 two budded setts/ha}, \)  
   \( T_5 = \text{Furrows (flat sowing) 30cm. x 6cm. apart alternating each other with 74100 two budded setts/ha}, \)  
   \( T_6 = \text{Flat sowing 61cm. apart with 74100 two budded setts/ha. (Normal recommended practice).} \)

3. DESIGN:
   (i) R.B.D.  (ii) 6.  (b) N.A.  (iii) 3.  (iv) (a) 7.32m. x 31.10m.  (b) 7.32m. x 27.6cm.  (v) 1.72 m, on either side of the plot.  (vi) Yes.

4. GENERAL:
   (i) Good.  (ii) Nil.  (iii) Yield of cane.  (iv) (a) and (b) No.  (c) Nil.  (v) Kheri.  (vi) Nil.  (vii) Pit/plot=68 pits of 22 cm. diameter and 23cm. depth, trenches about 20cm. deep.

5. RESULTS:
   (i) 83.9Q/ha.  (ii) 45.9 Q/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
<th>( T_5 )</th>
<th>( T_6 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>549</td>
<td>843</td>
<td>874</td>
<td>773</td>
<td>896</td>
<td>767</td>
</tr>
</tbody>
</table>

C.D.=83.5Q/ha.

---

Crop: Sugarcane.  
Site: Sugarcane Sub-Stn., Kheri.  

Object: To study the effect of Normal and close sowing with different seed-rates on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 6.3.63, 15.3.64.  (iv) (a) N.A.  (b) to (d) As per treatments.  (c) N.A.  (v) N.A.  (vi) CoJ-976 (Early); CoJ-46 (Late).  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 15.12.63, 1.2.65.

2. TREATMENTS:
   4 cultural treatments:  
   \( C_1 = \text{Normal sowing at 61cm. apart in rows with seed-rate 74100 two budded setts/ha.} \)  
   \( C_2 = \text{Normal sowing at 61 cm. apart in rows with seed-rate 98300 two budded setts/ha.} \)  
   \( C_3 = \text{Close sowing at 30cm. apart between 2 rows 61cm. apart in subsequent 2 rows with seed-rate 74100 two budded setts/ha.} \)  
   \( C_4 = \text{Close sowing at 30cm. apart between 2 rows 61cm. apart in subsequent 2 rows with seed-rate 98300 two budded setts/ha.} \)
3. DESIGN:
(i) R.B.D. (ii) (a) 4, (b) N.A. (iii) 4. (iv) (a) 1/74'1 ha. (b) 1/98'8 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1963-64. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments X Years interaction is absent.

5. RESULTS:
Pooled results:
(i) 730'5 Q/ha. (ii) 88'1 Q/ha. (based on 21 d.f. made up of Pooled error and Treatments X Years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1963</td>
<td>564'9</td>
<td>560'2</td>
<td>558'5</td>
<td>627'7</td>
<td>N.A.</td>
<td>777'8</td>
</tr>
<tr>
<td>Year 1964</td>
<td>936'5</td>
<td>900'2</td>
<td>848'3</td>
<td>847'8</td>
<td>N.A.</td>
<td>883'2</td>
</tr>
<tr>
<td>Pooled</td>
<td>750'7</td>
<td>730'2</td>
<td>703'4</td>
<td>737'7</td>
<td>N.A.</td>
<td>730'5</td>
</tr>
</tbody>
</table>

Crop :- Sugarcane.  
Site :- Sugarcane Sub-Stn., Kheri.  
Ref :- Pb. 64(43), 65(80).  
Type :- 'C'.

Object :- To study the effect of different methods of sowing on the yield of Sugarcane,

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 24.3.64; 22.2.65. (iv) (a) 8 lb 10 ploughings. (b) to (d) As per treatments. (e) Nil. (v) N.A.; 28 Kg/ha. of P2O5+67 Kg/ha. of N as C/A/N. (vi) CoJ-46 (Late). (vii) Irrigated. (viii) and (ix) N.A. (x) 29.1.65: N.A.

2. TREATMENTS:
Same as in Expt. No. 63(26) conducted at Jullundur and presented on page no. 639.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 1/74'1 ha; N.A. (b) 1/98'4 ha.; 1/133 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) N.A.; Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1964-contd. (b) No. (c) Nil. (v) Jullundur. (vi) Nil. (vii) Since the exp. is continued beyond 65, therefore individual years results are presented under 5. Results.

5. RESULTS:
64(63)
(i) 520'0 Q/ha. (ii) 51'3 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>408'0</td>
<td>452'0</td>
<td>475'9</td>
<td>447'3</td>
<td>689'4</td>
<td>647'2</td>
</tr>
<tr>
<td>C.D. = 77'3 Q/ha</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65(80)
(i) 553'4 Q/ha. (ii) 142'0 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>564'3</td>
<td>535'0</td>
<td>588'8</td>
<td>422'5</td>
<td>501'3</td>
<td>708'7</td>
</tr>
</tbody>
</table>
Crop : Sugarcane.  Ref : Ph. 64(67), 65(76).

Site : Sugarcane Res. Sta., Jullundur.  Type : ‘C’.

Object :—To study the effect of different methods of sowing on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 22-3.64; 9-3.65.  (iv) (a) 10 ploughings.  (b) to (d) As per treatments.  (e) Nil.  (f) N.A.  (vi) Col-46; CoJ-46 (Late).  (vii) Irrigated.  (viii) N.A.; 3 hoeings.  (ix) N.A.  (x) 2.2.65; March, 66.

2. TREATMENTS:
   4 cultural treatments :—
   (a) Normal sowing at 60cm. apart with 75000 setts/ha.,  
   (b) Normal sowing at 90cm. apart with 75000 setts/ha.,  
   (c) Trench sowing at 90cm. apart with 75000 setts/ha. and 40% Germination.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 4.  (iv) (a) 1/74·1 ha.; N.A.  (b) 1/197·6 ha.; 1/100 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.; Attack of white ants and 1·24 Kg/ha. of Agalloch was sprayed against it.  (iii) Yield of cane.  (iv) 1964-contd.  (b) N.A.  (c) Nil  
   (v) Nil.  (vi) Since the expr. is consid. beyond 65, hence individual results are presented under 5. Results.

5. RESULTS:
   64 (67)
   (i) 466·2 Q/ha.  (ii) 59·1 Q/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
<th>C₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>559·9</td>
<td>475·9</td>
<td>376·1</td>
<td>452·7</td>
</tr>
</tbody>
</table>

65(76)
   (i) 494·0 Q/ha.  (ii) 113·7 Q/ha.  (iii) Treatment differences are not significant.  (iv) Av yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
<th>C₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>508·0</td>
<td>474·0</td>
<td>512·0</td>
<td>481·0</td>
</tr>
</tbody>
</table>

---

Crop : Sugarcane.  Ref : Ph. 62(25).

Site : Sugarcane Res. Sta., Jullundur.  Type : ‘CM’.

Object :—To study the effect of N with and without stubble shaving and trash burning on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) N.A.  (b) Sugarcane.  (c) 168 Kg/ha. of N applied to plant crop.  (ii) Sandy loam.  (iii) N.A.  
   (iv) (a) and (b) N.A.  (c) 58800 two budded setts/ha.  (d) and (e) N.A.  (v) N.A.  (vi) CoJ-46.  
   (vii) Irrigated.  (viii) and (ix) N.A.  (x) 10.1.64.

2 TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 2 trash treatments : T₄ = NO trash burning and T₅ = Trash burning.
2 stubble treatments: S0 — No stubble shaving, and S1 — stubble shaving.

4 levels of N: N0 = 0, N1 = 112, N2 = 168 and N3 = 224 Kg/ha.
N was applied to the required plots in three split doses i.e. on 9.5.63, 21.5.63 and 24.6.63. Trash burning, and stubble shaving was done on 29.1.63; 8.4.63 and 17.4.63.

3. DESIGN:

(i) Fact. in R.B.D.
(ii) (a) 16.
(iii) 3.
(iv) (a) 4’27m. x 32’00m.
(iv) (b) 4’27m. x 27’33m.
(iv) 2/3 m. on either side. (v) Yes.

4. GENERAL:

(i) Good.
(ii) Endrine sprayed at 0.02% on 26.8.63 against Pysilla and whitefly on 7.9.63.
(iii) Yield of cane.
(iv) (a) and (b) No.
(v) Nil. (vi) to (vii) N.A.

5. RESULTS:

(i) 674 Q/ha.
(ii) 39’4 Q/ha.
(iii) Main effects of N and S are highly significant.
(iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>S0</th>
<th>S1</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>478</td>
<td>717</td>
<td>744</td>
<td>794</td>
<td>712</td>
<td>655</td>
<td>683</td>
</tr>
<tr>
<td>Mean</td>
<td>482</td>
<td>698</td>
<td>735</td>
<td>779</td>
<td>699</td>
<td>648</td>
<td>674</td>
</tr>
<tr>
<td>S0</td>
<td>499</td>
<td>724</td>
<td>773</td>
<td>800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>485</td>
<td>613</td>
<td>698</td>
<td>758</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 32’8 Q/ha.
C.D for S marginal means = 23’2 Q/ha.

Crop : Sugarcane.
Type : 'CM'.

Object: To study the effect of rotational crops and application of N on the yield of Sugarcane.

1. BASAL CONDITIONS:

(i) (a) and (b) As per treatments.
(ii) Sandy loam.
(iii) 22.3.62; 23.3.63.
(iv) (a) 7 ploughings and 7 subhas; N.A.
(v) (b) N.A.
(vi) (c) 74100 two budded setts/ha; N.A.
(vii) (d) and (e) N.A.
(viii) N.A.
(ix) and (x) N.A.

2. TREATMENTS:

6 crop rotations: T1 = Fallow-Sugarcane, T2 = Fallow-Sugarcane, T3 = Maize-Senji-Sugarcane, T4 = Sann-hemp (G.M.) Sugarcane, T5 = Chari for fodder-Sugarcane and T6 = Guava for seed-Sugarcane.

112 Kg/ha. of N applied to each treatment except T0.

3. DESIGN:

(i) R.B.D.
(ii) (a) 6.
(b) N.A.
(iii) 4.
(iv) (a) 1/44’5 ha.
(b) 1/49’4 ha.
(v) N.A.
(vi) Yes.
4. GENERAL:
(i) Normal. (ii) Dusting, with sulphur against red mite on 11.3.62; N.A. for others. (iii) Yield of cane. (iv) (a) 1962-63. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments × Years interaction is absent.

5. RESULTS:
Pooled results:
(i) 720.5 Q/ha. (ii) 43.8 Q/ha. (based on 35 d.f. made up of Pooled error and Treatments × Years interaction), (iii) Treatment differences are highly significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>756.5</td>
<td>746.0</td>
<td>764.5</td>
<td>676.0</td>
<td>795.0</td>
<td></td>
</tr>
</tbody>
</table>
C.D. = 43.8 Q/ha.

Individual results:

<table>
<thead>
<tr>
<th>Year</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>616.0</td>
<td>767.0</td>
<td>767.0</td>
<td>771.0</td>
<td>694.0</td>
<td>792.0</td>
<td>**</td>
<td>735.0</td>
<td>51.5</td>
</tr>
<tr>
<td>1963</td>
<td>558.0</td>
<td>797.0</td>
<td>658.0</td>
<td>721.0</td>
<td>746.0</td>
<td>758.0</td>
<td>**</td>
<td>786.0</td>
<td>37.1</td>
</tr>
<tr>
<td>Pooled</td>
<td>587.0</td>
<td>756.5</td>
<td>744.0</td>
<td>764.5</td>
<td>676.0</td>
<td>795.0</td>
<td>**</td>
<td>720.5</td>
<td>43.3</td>
</tr>
</tbody>
</table>

Crop: Sugarcane.  
Ref: Pb. 62(22), 63(25).  
Type: ‘CM’  
Object: To study the effect of methods of sowing and manurings on the yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) Wheat-Cotton-Soja-Sugarcane. (b) Soja. (c) N.A. (d) Sandy loam, (iii) 28.7.62. and 1.3.62; 15.3.63. (iv) (a) N.A. (b) As per treatments. (c) 74100 setts/ha. (d) As per treatments. (e) N.A. (v) As per treatments. (vi) CoJ-46. (vii) Irrigated. (viii) and (ix) N.A. (x) 14.3.63; 12.1.64 to 16.1.64.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 4 methods of sowing: S_1 = 61 cm. flat sowing, S_2 = 61 cm. trench sowing, S_3 = 91 cm. flat sowing and S_4 = 91 cm. trench sowing.
(2) 2 levels of manuring: M_1 = 112·1 Kg/ha. of N as C/A/N and M_2 = 112·1 Kg/ha. of F.Y.M. + 224·2 Kg/ha. of N as C/A/N.

3. DESIGN:
(i) Fact. in R.B.D. (ii) 8. (b) N.A. (iii) 4. (iv) (a) 31.5m. × 5.49m., N.A. (b) 27.66m. × 5.49m.; 15.49m. × 5.49m. (v) 186cm. on either side; N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1962-63. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments × Years interaction is present.
5. RESULTS:

Pooled results

(i) 798 Q/ha. (ii) 136.1 Q/ha. (based on 7 d.f. made up of Treatments x Years in interaction) (iii) None of the effects is significant.

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M₁</td>
<td>760</td>
<td>823</td>
<td>803</td>
<td>726</td>
<td>778</td>
</tr>
<tr>
<td>M₂</td>
<td>799</td>
<td>860</td>
<td>833</td>
<td>780</td>
<td>818</td>
</tr>
<tr>
<td>Mean</td>
<td>779</td>
<td>841</td>
<td>818</td>
<td>753</td>
<td>798</td>
</tr>
</tbody>
</table>

Individual results:

Crop: Sugarcane.

Site: Sugarcane Res. Stn., Jullundur.

Ref: Ph. 63(20).

Type: 'GM'.

Object: To study the effect of methods of sowing and manuring on the yield of Sugarcane (Ratoon trial).

1. BASAL CONDITIONS:

(i) Ratoon of 62(22). (ii) Sandy loam. (iii) 14/5.3.63. Ratoon of 62(22). (iv) (a) and (b) N.A. (c) 74100 two budded setts/ha. (d) and (e) N.A. (v) As per treatments. (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) 13.3.63 to 16.3.64.

2. TREATMENTS:

Same as in expt. no. 62(22), 63(25) presented on page No. 643.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8, (b) N.A. (iii) 4. (iv) (a) 31.39m x 5.49m. (b) 27.66m x 5.49m. (v) 186cm. on either side. (vi) Yes.

4. GENERAL:

(i) Good. (ii) N.A. (iii) Yield of cane. (iv) (a) 1963-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 195 Q/ha. (ii) 86.1 Q/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of cane in Q/ha.
Crop: Sugarcane (Kharif).
Site: Sugarcane Res. Stn., Jullundur.

Object: To study the effects of different levels of N with different irrigational intervals on the different varieties of sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.
   (ii) Sandy loam.
   (iii) 18.3.62.
   (iv) (a) to (c) N.A.
   (v) Nil.
   (vi) As per treatments.
   (vii) Irrigated.
   (viii) and (ix) N.A.
   (x) Mid of Dec., 62.

2. TREATMENTS:
   Main-plot treatments:
   Sub-plot treatments:
   3 intervals of irrigation: I1 = 15, I2 = 10 and I3 = 5 days.
   Sub-Sub-plot treatments:
   3 levels of N: N1 = 0, N2 = 112 and N3 = 224 Kg/ha.

3. DESIGN:
   (i) Split-plot.
   (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot and 3 sub-sub-plots/sub-plot.
   (b) N.A.
   (iii) 3.
   (iv) (a) 1/87·0 ha.
   (b) 1/98·8 ha.
   (v) N.A.
   (vi) Yes.

4. GENERAL:
   (i) Good.
   (ii) Nil.
   (iii) Yield of cane.
   (iv) (a) N.A.
   (b) No.
   (c) Nil.
   (v) to (vii) Nil.

5. RESULTS:
   (i) 712 Q/ha.
   (ii) (a) 167·2 Q/ha.
   (b) 87·1 Q/ha.
   (c) 115·9 Q/ha.
   (iii) Main effect of V is significant and that of I and N are highly significant.
   (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>I1</th>
<th>I2</th>
<th>I3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>571</td>
<td>768</td>
<td>848</td>
<td>666</td>
<td>754</td>
<td>766</td>
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<tr>
<td>V2</td>
<td>515</td>
<td>626</td>
<td>715</td>
<td>574</td>
<td>623</td>
<td>659</td>
</tr>
<tr>
<td>V3</td>
<td>658</td>
<td>798</td>
<td>908</td>
<td>718</td>
<td>770</td>
<td>876</td>
</tr>
<tr>
<td>Mean</td>
<td>581</td>
<td>731</td>
<td>824</td>
<td>653</td>
<td>716</td>
<td>767</td>
</tr>
</tbody>
</table>

C.D. for V marginal means = 122·5 Q/ha.
C.D. for I marginal means = 51·6 Q/ha.
C.D. for N marginal means = 63·8 Q/ha.
Cop :- Sugarcane. Site :- Sugarcane Sub-Stn., Kheri. Ref. :- Pb. 64(65). Type :- 'IC'.

Object:—To study the effect of irrigations on the different trash coverings of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 3.4.64. (iv) (a) N.A. (b) to (d) As per treatments. (e) N.A. (f) N.A. (v) CoJ-46. (vi) Irrigated. (vii) and (ix) N.A. (x) 16.1.65.

2. TREATMENTS:
   Main-plot treatments:
   2 intervals of irrigation: $I_1=10$ and $I_2=20$ days.

   Sub-plot treatments:
   8 cultural treatments: $C_1=74100$ setts/ha. without trash cover,
   $C_2=49400$ setts/ha. with out trash cover,
   $C_3=74100$ setts/ha. with 8 cm. thick chopped trash cover,
   $C_4=49400$ setts/ha. with 8 cm. thick chopped trash cover,
   $C_5=74100$ setts/ha. with 8 cm. thick unchopped trash cover,
   $C_6=49400$ setts/ha. with 8 cm. thick unchopped trash cover,
   $C_7=74100$ setts/ha. with 61 cm. apart (Normal sowing) and
   $C_8=74100$ setts/ha. 91 cm. apart (Normal sowing),

   Note:—In treatments $C_1$ to $C_6$, shallow trench sowing at 91cm. apart, 15cm. deep and 22cm. covered by earth was done.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/replication, 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 1/274 ha. (b) 1/198 ha. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1964-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 406/6 Q/ha. (ii) (a) 182.3 Q/ha. (b) 93/7 Q/ha. (iii) Main effects of I and C are significant. Interaction I x C is significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>$C_1$</th>
<th>$C_2$</th>
<th>$C_3$</th>
<th>$C_4$</th>
<th>$C_5$</th>
<th>$C_6$</th>
<th>$C_7$</th>
<th>$C_8$</th>
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<tr>
<td>$I_1$</td>
<td>429 0</td>
<td>404 3</td>
<td>472 5</td>
<td>385 4</td>
<td>427 5</td>
<td>334 1</td>
<td>507 6</td>
<td>562 4</td>
<td>439 3</td>
</tr>
<tr>
<td>$I_2$</td>
<td>360 8</td>
<td>315 3</td>
<td>408 2</td>
<td>381 5</td>
<td>355 8</td>
<td>306 9</td>
<td>473 9</td>
<td>460 6</td>
<td>382 9</td>
</tr>
<tr>
<td>Mean</td>
<td>394 9</td>
<td>359 8</td>
<td>440 3</td>
<td>343 5</td>
<td>391 7</td>
<td>320 5</td>
<td>490 7</td>
<td>511 5</td>
<td>460 6</td>
</tr>
</tbody>
</table>

C.D. for I marginal means=-145.1 Q/ha.
C.D. for C marginal means=95.4 Q/ha.
C.D. for C means at the same level of I=133.8 Q/ha.
C.D. for I means at the same level of C=192.3 Q/ha.

---
3. DESIGN:
(i) R.B.D. (ii) 7. (b) N.A. (iii) 6. (iv) (a) 1.1977 ha.; N.A.; 8.15m. x 3.00m. (b) 1.2471 ha.; 6.40m. x 1.83m.; 7.20m. x 1.80m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) 0.02% SoJ. of Endrioe spray. (iii) Yield of kapas. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the ext. is contd. beyond 65, individual years results are presented below.

5. RESULTS
63 (38)
(i) 901 Kg/ha. (ii) 173.0 Kg/ha. (iii) Treatment differences are not significant (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>856</td>
<td>888</td>
<td>972</td>
<td>967</td>
<td>934</td>
<td>849</td>
</tr>
</tbody>
</table>

64 (40)
(i) 718 Kg/ha. (ii) 173.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>626</td>
<td>639</td>
<td>674</td>
<td>742</td>
<td>977</td>
<td>597</td>
</tr>
</tbody>
</table>

65 (57)
(i) 971 Kg/ha. (ii) 1290 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>889</td>
<td>911</td>
<td>885</td>
<td>965</td>
<td>1206</td>
<td>859</td>
</tr>
</tbody>
</table>

Crop: Cotton (Kharij).

Site: Cotton Res. Stn., Abohar.

Ref: Pb. 63 (39), 64(41), 65(58).

Type: ‘M’.

Object: To study the effect of soil application of micronutrients on the yield of Cotton.

1. BASAL CONDITIONS:
(ii) (a) to (c) N.A. (iii) Sandy loam. 18.4.62; 6.5.64; 17.4.65. (iv) (a) 3 ploughings. (b) to (d) N.A. (e) — (v) 74.1 Kg/ha. of N as A/S; Nil; 50Kg/ha. of P2O5 as Super+50 Kg/ha. of K2O. (vi) 320-F. (vii) Irrigated. (viii) Interculture, hoeing and weeding. (ix) N.A. (a) 3 pickings in Nov. and Dec.; 12.11.65 and 12.12.65.

2. TREATMENTS:
7 micronutrient treatments: T0 — Control, T1 = 11.2 Kg/ha. of Borax, T2 = 22.4 Kg/ha. of Manganese Sulphate, T3 = 11.2 Kg/ha. of Copper Sulphate, T4 = 22.4 Kg/ha. of Zinc Sulphate, T5 = 22.4 Kg/ha. of Ferrous Sulphate and T6 = 1.12 Kg/ha. of Ammonium molybdate.

Treatments were applied to soil before irrigation.

3. DESIGN:
(i) R.B.D. (ii) 7. (b) N.A. (iii) 6. (iv) (a) 10.97m. x 4.27m.; N.A.; 8.10m. x 3.00m. (b) 10.06m. x 3.05m.; 6.40m. x 1.83m.; 7.20m. x 1.80m. (v) N.A.; 45cm. x 61cm.; N.A.; 45cm. x 60cm. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) Nil. for 63 and 64. Jassids attack and 2 aerial spray of 0.2% Sol of Endrine. (ii) Yield of kapas (iv) (a) 1963—Contd. (b) No. (c) Nil. (v) Gardanpur. (vi) Nil. (vii) In 1964 the land was too sandy and very little manure was given. (viii) Since the exp. is contd. beyond 65, individual years results are presented under 5. Results.

5. RESULTS:
63 (39)
(i) 113 Kg/ha. (ii) 226·0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1120</td>
<td>976</td>
<td>1266</td>
<td>1165</td>
<td>1180</td>
<td>1192</td>
<td>1061</td>
</tr>
</tbody>
</table>

64 (41)
(i) 509 Kg/ha. (ii) 204.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>468</td>
<td>356</td>
<td>436</td>
<td>562</td>
<td>665</td>
<td>513</td>
<td>560</td>
<td></td>
</tr>
</tbody>
</table>

65 (58)
(i) 1244 Kg/ha. (ii) 246.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1156</td>
<td>1337</td>
<td>1215</td>
<td>1080</td>
<td>1429</td>
<td>1309</td>
<td>1200</td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Cotton (Kharif).
Site :- Cotton Res. Stn., Abohar.
Object :- To find out the best method of fertiliser placement for Cotton.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 23.5.63, 7.5.64, 17.5.65. (iv) (a) 3 to 5 ploughings, (b) to (e) N.A. (v) Nil. (vi) F-230. (vii) Irrigated. (viii) Hooing and interculturing. (ix) N.A. (a) End of Nov., 65; 9.11.64 and 2.12.64; 13.11.65 and 12.12.65.

2. TREATMENTS
10 methods of application of fertilizers: T₀=Control, T₁=A week before sowing 12cm. deep, T₂=By S.C.F. drill in the same line, the seed in the one bowl and fertilizers in the other. T₃=By S.C.F. drill to drop the fertilizers 4cm. deeper than the seed, T₄=Fertilizers 10cm. deep and 5cm. away from seed line, T₅=By broadcast before last ploughing at sowing, T₆=By broadcast at final thinning, T₇=By top dressing at flowering, T₈=By top dressing at final thinning and T₉=BY top dressing at flowering.
Fertilizers applied at 60 Kg/ha. of N+40 Kg/ha. of P₂O₅.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 1/197 ha.; N.A.; 8·10 m. x 2·00m. (b) 1/247 ha.; 6·40m. x 1·83m.; 7·20m. x 1·80m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Aerial spray of 0.2% Sol of Endrine. (iii) Yield of kapas (iv) (a) 1963—Contd. (b) No. (c) Nil. (v) Jullundur and Ludhiana. (vi) Nil. (vii) Since the exp. is contd. beyond 65, individual years results are presented under 5. Results.
Crop: Sugarcane.  
Site: Sugarcane Sub-Sta., Kheerl.  
Ref: Pb. 64(66),65(82).  
Type: D.

Object: To study the effect of methods of sowing with the application of Agallol on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 8.3.64; 26.2.65  (iv) (a) 8 to 10 ploughings.  (b) As per treatments.
   (c) 86450 sets/ha.; 87500 sets/ha.  (d) N.A.  (e) Nil.  (f) N.A.  (g) Col.-29.  (h) Irrigated.
   (i) N.A.  (x) 3.1.65; N.A.

2. TREATMENTS:
   Main-plot treatments:  
   2 Agallol applications: \( A_1 \) = Untreated sets and \( A_2 \) = Sets treated with Agallol and sown.
   Sub-plot treatments:  
   7 cultural treatments: \( C_1 \) = 2 budded sets normal sowing, \( C_2 \) = 3 budded sets normal sowing, \( C_3 \) = 2 budded sets 2 buds up and 1 down, \( C_4 \) = 1 budded sets 1 bud up and 2 down, \( C_5 \) = 2 budded sets side way, \( C_6 \) = 2 budded sets 1 up and 1 down and \( C_7 \) = 2 budded sets side-way.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 2 main-plots/replication, 7 sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) 1/148 ha.; N.A.  (b) 1/198 ha.; 1/538 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of cane.  (vi) (a) 1964-contd.  (b) N.A.  (c) Nil.  (iv) Gurdaspur.  (v) Nil.

5. RESULTS:
   64(66)
   (i) \( 387 \) Q/ha.  (ii) \( 117 \) Q/ha.  (b) \( 79\% \) Q/ha.  (iii) Main effect of \( C \) alone is significant.  (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>( C_1 )</th>
<th>( C_2 )</th>
<th>( C_3 )</th>
<th>( C_4 )</th>
<th>( C_5 )</th>
<th>( C_6 )</th>
<th>( C_7 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A_0 )</td>
<td>335.6</td>
<td>388.0</td>
<td>412.7</td>
<td>462.6</td>
<td>366.2</td>
<td>317.3</td>
<td>323.2</td>
<td>371.8</td>
</tr>
<tr>
<td>( A_1 )</td>
<td>366.2</td>
<td>411.9</td>
<td>443.8</td>
<td>440.8</td>
<td>436.9</td>
<td>358.3</td>
<td>338.5</td>
<td>402.3</td>
</tr>
<tr>
<td>Mean</td>
<td>350.9</td>
<td>410.0</td>
<td>428.2</td>
<td>451.7</td>
<td>401.5</td>
<td>337.8</td>
<td>329.4</td>
<td>387.1</td>
</tr>
</tbody>
</table>

C.D. for \( C \) marginal means: \( 81.2 \) Q/ha.

65(82)
   (i) \( 395 \) Q/ha.  (ii) \( 184 \) Q/ha.  (b) \( 148 \) Q/ha.  (iii) None of the effects is significant.  (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>( C_1 )</th>
<th>( C_2 )</th>
<th>( C_3 )</th>
<th>( C_4 )</th>
<th>( C_5 )</th>
<th>( C_6 )</th>
<th>( C_7 )</th>
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</tr>
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<tbody>
<tr>
<td>( A_0 )</td>
<td>329.5</td>
<td>433.1</td>
<td>362.4</td>
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<td>348.4</td>
<td>417.0</td>
<td>384.3</td>
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<td>312.0</td>
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<tr>
<td>Mean</td>
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<td>420.3</td>
<td>373.3</td>
<td>336.2</td>
<td>420.3</td>
<td>393.7</td>
</tr>
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</table>
Crop: Cotton (Kharif).

District: Cotton Res. Sta., Abohar.

Object: To find the optimum time of application of N on the yield of Cotton.

1. **BASAL CONDITIONS:**
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 3.5.62.  (iv) (a) 4 to 5 ploughings.  (b) to (c) N.A.  (v) Nil.  (vi) 320-3.  (vii) Irrigated.  (viii) 2 hoeings.  (ix) N.A.  (x) Nov. and Dec., 62.

2. **TREATMENTS:**
   All combinations of (1) and (2)+Control (two plots).
   (i) 2 levels of N: N₁ = 56 and N₂ = 112 Kg/ha.
   (2) 6 times of application of N: T₁ = Full dose at sowing, T₂ = Full dose at thinning, T₃ = Full dose at flowering, T₄ = ½ dose at sowing and ½ dose at thinning, T₅ = ½ dose at sowing and ½ dose at flowering and T₆ = ½ dose at thinning and ½ dose at flowering.

3. **DESIGN:**
   (i) Facts in R.B.D.  (ii) (a) 14.  (b) N.A.  (iii) 3.  (iv) (a) 3'10m. x 3'05m.  (b) 5'47m. x 1'83m.  (v) 30cm. x 61cm.  (vi) Yes.

4. **GENERAL:**
   (i) Satisfactory.  (ii) Nil.  (iii) Yield of kapas.  (iv) (a) 1962-only.  (b) No.  (c) Nil.  (v) (a) and (b) N.A.  (vii) and (vii) Nil.

5. **RESULTS:**
   (i) 911 Kg/ha.  (ii) 345'8 Kg/ha.  (iii) Interaction T x N is highly significant.  (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₁</td>
<td>1000</td>
<td>372</td>
<td>435</td>
<td>934</td>
<td>1183</td>
<td>940</td>
</tr>
<tr>
<td>N₂</td>
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<td>1332</td>
<td>1162</td>
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<td>1415</td>
<td>1096</td>
</tr>
<tr>
<td>Mean</td>
<td>700</td>
<td>832</td>
<td>798</td>
<td>841</td>
<td>1299</td>
<td>1018</td>
</tr>
</tbody>
</table>

C.D. for the body of the table = 410'6 Kg/ha.

Crop: Cotton (Kharif).

Site: Cotton Res. Sta., Abohar.

Object: To study the effect of spray of micronutrients on the yield of Cotton.

1. **BASAL CONDITIONS:**
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 18.4.63; 6.5.64; 17.4.65.  (iv) (a) 3 ploughings.  (b) N. A.  (c) 28 Kg/ha.  (d) N.A.  (e) — (v) Nil.  (vi) P-320.  (vii) Irrigated.  (viii) Hoeing and weeding.  (ix) N.A.  (x) 3 pickings in Nov. and Dec.

2. **TREATMENTS:**
   7 micronutrient treatments: T₀ = Control, T₁ = Borax at 0.62 Kg/ha, T₂ = Manganese Sul at 2.47 Kg/ha.
Crop: Sugarcane.

Site: Sugarcane Sub-Stn., Gurdaspur.

Object: To study the behaviour of two important varieties grown under liberal and restricted levels of irrigation during pre-monsoon period i.e. from May to June.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Senji. (c) Nil (ii) Loamy. soil. (iii) 31.3.61. (iv) (a) 4 ploughings, 4 subguas. (b) N.A. (c) 68974 two budded setts/ha. (d) N.A. (e) 1. (v) Nil. (vi) A 4 per treatments. (vii) Irrigated. (viii) 1 hoeing. (ix) 122 cm. (x) 17.3.62.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 varieties:—V1=Co.312 and V2=Co.453.
   (2) Irrigational intervals:—11=7 days without trash mulch, 12=7 days with mulch, 13=21 days with mulch and 14=33 days with mulch.
   112 Kg/ha. of N was applied in two equal doses at sowing time and July by top dressing.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 8, (b) N.A. (iii) 4. (iv) (a) 2 x 55m. x 2.44m. (b) 1/198 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1960-only (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 692.1 Q/ha. (ii) 44.2 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>I1</th>
<th>I2</th>
<th>I3</th>
<th>I4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>691.9</td>
<td>720.3</td>
<td>650.3</td>
<td>689.9</td>
<td>689.1</td>
</tr>
<tr>
<td>V2</td>
<td>661.8</td>
<td>730.0</td>
<td>701.4</td>
<td>687.6</td>
<td>695.2</td>
</tr>
<tr>
<td>Mean</td>
<td>678.8</td>
<td>725.1</td>
<td>655.8</td>
<td>688.7</td>
<td>692.1</td>
</tr>
</tbody>
</table>

Crop: Sugarcane.

Site: Sugarcane Sub-Stn., Gurdaspur.

Object:—To study the effect of different methods of sowing with Agallol on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Senji. (c) N.A. (ii) Loamy. (iii) 16.3.64. (iv) (a) 4 ploughings, 4 subguas. (b) N.A. (c) 1. (v) 785 Kg/ha. of N as CaO/N applied in 2 equal doses on 23.5.64 and 6.7.64. (vi) N.A. (vii) Irrigated. (viii) 6 hoeings. (ix) 87cm. (x) 22.1.65.

2. TREATMENTS:
   Main-plot treatments:
   2 seed-treatments: A1—Setts untreated and A2—Treated with Agallol, were planted.
   Sub-plot treatments:
   7 cultural treatments: C1=2 budded setts normally planted, C2=3 budded setts normally planted, C3=3 budded setts, 2 planted upward and 1 downward, C4=3 budded setts, 1 planted upward and 2 downward, C5=3 budded setts planted side ways, C6=2 budded setts planted 1 upward and 1 downward and C7=2 budded setts planted side ways.
3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication, 7 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 1'83m. x 9'14m (b) 1'83m. x 8'50m. (v) 32cm on either side of the plot. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) 1964—only. (b) No. (c) Nil. (v) Kheri. (vi) N.A. (vii) Nil.

5. RESULTS:
(i) 912'3 Q/ha. (ii) (a) 288'1 Q/ha. (b) 104'3 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>C7</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0</td>
<td>751'9</td>
<td>899'7</td>
<td>1032'3</td>
<td>902'9</td>
<td>968'8</td>
<td>872'4</td>
<td>878'8</td>
<td>963'8</td>
</tr>
<tr>
<td>A1</td>
<td>885'2</td>
<td>885'2</td>
<td>935'0</td>
<td>975'2</td>
<td>910'9</td>
<td>938'2</td>
<td>915'8</td>
<td>920'8</td>
</tr>
</tbody>
</table>

Mean 818'6 892'4 993'6 939'1 939'8 905'3 897'3 912'3

Crop: Sugarcane.
Site: Sugarcane Sub-Stn., Kheri.

Object:—To study the effect of different chemicals on the germination of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 30,3,64. (iv) (a) 6 to 8 ploughings. (b) N.A. (c) 98 setts/row. (d) 61cm. apart. (e) N.A. (v) CoJ—46. (vi) Irrigated. (vii) 2 weedings. (ix) N.A. (x) 10.1.65.

2. TREATMENTS:
8 chemical treatments: T0=Control, T1=7'6 Kg/ha. (3%mercury) of Aexason, T2=3'8 Kg/ha. (3%mercury) of Aexason, T3=3'8 Kg/ha. (6% mercury) of Aexason, T4=1'9 Kg/ha. (6% mercury) of Tofsan, T5=3'8 Kg/ha. (6% mercury) of Azasan, T6=1'9 Kg/ha. (6% mercury) of Azasan and T7=3'8 Kg/ha. (5% mercury) of Agailol.

3. DESIGN:
(i) R.B.O. (ii) 8. (b) N.A. (iii) 4. (iv) (a) 1/148 ha. (b) 1/198 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of cane. (iv) (a) and (b) No. (c) Nil. (v) to (vi) N.A.

5. RESULTS:
(i) 480'8 Q/ha. (ii) 86'5 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of cane in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. Yield</td>
<td>501'6</td>
<td>444'8</td>
<td>421'1</td>
<td>494'7</td>
<td>479'9</td>
<td>521'9</td>
<td>499'6</td>
<td>482'8</td>
</tr>
</tbody>
</table>
5. RESULTS:

63 (54)

(i) 423 Kg/ha. (ii) 125·0 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_0</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
<th>T_8</th>
<th>T_9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>463</td>
<td>331</td>
<td>294</td>
<td>392</td>
<td>636</td>
<td>404</td>
<td>425</td>
<td>349</td>
<td>488</td>
<td>446</td>
</tr>
</tbody>
</table>

C.D. = 11.9 Kg/ha.

64 (44)

(i) 473 Kg/ha. (ii) 145·2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_0</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
<th>T_8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>534</td>
<td>528</td>
<td>531</td>
<td>508</td>
<td>487</td>
<td>538</td>
<td>438</td>
<td>431</td>
<td>587</td>
</tr>
</tbody>
</table>

C.D. = 39·7 Kg/ha.

65 (50)

(i) 1149 Kg/ha. (ii) 233·8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_0</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
<th>T_8</th>
<th>T_9</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>654</td>
<td>1196</td>
<td>745</td>
<td>1346</td>
<td>1466</td>
<td>1177</td>
<td>1229</td>
<td>1082</td>
<td>1318</td>
<td>1281</td>
</tr>
</tbody>
</table>

C.D. = 33·2 Kg/ha.

---

Crop: Cotton (Kharif).

Site: Cotton Res. Stn., Abohar.

Ref.: Pb 63(55), 65(52).

Type: 'M'.

Object: To work out the critical level of N, P and K in plant system at different fertility levels and to work out the optimum ratio among three manures.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 25.4.65; 14.4.65. (iv) (a) 3 to 5 ploughings. (b) to (e) N.A. (v) 124Q/ha. of F.Y.M. (vi) F-320 (vii) Irrigated. (viii) 2 thinings and interculturings; 2 hoeings. (ix) N.A. (a) Nov. and Dec., 63; 7.11.65 and 13.12.65.

2. TREATMENTS:

All combinations of (1), (2) and (3)

(i) 3 levels of N asCaN: N_0=0, N_1=60 and N_2=120 Kg/ha.

(ii) 2 levels of P as Super: P_0=0 and P_1=60 Kg/ha.

(iii) 2 levels of K as Mur. pot: K_0=0 and K_1=60 Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) 12. (b) N.A. (iii) 4. (iv) (a) 4·88m.×10·97m. (b) 1·83m.×10·97m. (v) 1·52m., on either side. (vi) Yet.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1963-contd. (46 failed). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the exp. is contd. beyond 65, individual years results are presented below.

5. RESULTS:

61 (55)

(i) 717 Kg/ha. (ii) 229·0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.
<table>
<thead>
<tr>
<th></th>
<th>$N_0$</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_0$</th>
<th>$P_1$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$K_0$</td>
<td>569</td>
<td>787</td>
<td>862</td>
<td>723</td>
<td>756</td>
<td>739</td>
</tr>
<tr>
<td>$K_1$</td>
<td>708</td>
<td>703</td>
<td>673</td>
<td>661</td>
<td>728</td>
<td>695</td>
</tr>
<tr>
<td>Mean</td>
<td>638</td>
<td>745</td>
<td>767</td>
<td>692</td>
<td>742</td>
<td>717</td>
</tr>
<tr>
<td>$P_0$</td>
<td>677</td>
<td>676</td>
<td>723</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$P_1$</td>
<td>600</td>
<td>814</td>
<td>812</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sheet (52)

(i) 1254 Kg/ha. (ii) 2360 Kg/ha. (iii) Main effect of $N$ alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$N_0$</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_0$</th>
<th>$P_1$</th>
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</tr>
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<tbody>
<tr>
<td>$K_0$</td>
<td>878</td>
<td>1344</td>
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<tr>
<td>$K_1$</td>
<td>762</td>
<td>1378</td>
<td>1610</td>
<td>1185</td>
<td>1315</td>
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<td>820</td>
<td>1361</td>
<td>1582</td>
<td>1207</td>
<td>1302</td>
<td>1254</td>
</tr>
<tr>
<td>$P_0$</td>
<td>766</td>
<td>1291</td>
<td>1562</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>$P_1$</td>
<td>873</td>
<td>1431</td>
<td>1582</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

C.D. for $pq$ marginal means = 1.101 Kg/ha.

---

**Crop:** Cotton (*Kharif*).  
**Ref.:** Ph. 62/215.  
**Site:** Agri. Res. Stn., Gurdaspur.  
**Type:** ‘M’

Object:—To study the effect of different times of application of $N$ on the yield of Cotton.

1. **BASAL CONDITIONS:**
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 10.4.62. (iv) (a) 5 ploughings. (b) to (e) N.A. (v) N.A.  
   (vi) R.-231. (vii) Irrigated. (viii) 2 weodings. (a) N.A. (x) 15.9.62. to 23.10.62.

2. **TREATMENTS:**
   All combinations of (1) and (2) + control (2 plots)

   (1) 2 levels of $N$ as $C/A/N: N_1=56$ and $N_2=112$ Kg/ha.

   (2) 6 times of application: $T_1=$Full dose at sowing, $T_2=$Full dose at thinning, $T_3=$Full dose at flowering,  
   $T_4=$dose at sowing+$\frac{1}{2}$ dose at thinning, $T_5=$at sowing+$\frac{1}{2}$ dose at flowering and $T_6=$dose at thinning  
   +$\frac{1}{2}$ dose at flowering.

3. **DESIGN:**
   (i) Fecr. in R. B. D. (ii) (a) 14. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 1/4942 ha. (v) N.A. (vi) Yes.


d5 (52)
4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of kapes. (iv) (a) and (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 647 Kg/ha. (ii) 111.2 Kg/ha. (iii) Main effect of T above is highly significant. (iv) Av. yield of kapes in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>Mean</th>
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<tr>
<td>N1</td>
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<td>623</td>
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<td>758</td>
<td>823</td>
<td>578</td>
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<tr>
<td>N2</td>
<td>423</td>
<td>623</td>
<td>670</td>
<td>840</td>
<td>922</td>
<td>608</td>
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<tr>
<td>Mean</td>
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<td>623</td>
<td>652</td>
<td>819</td>
<td>874</td>
<td>593</td>
<td>664</td>
</tr>
</tbody>
</table>

C.D. for marginal means = 168.6 Kg/ha.

Cree : Cotton.
Site :- Agri. Res. Stn., Gurdaspur.

Object :—To study the effect of different levels of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Cotton. (c) N.A. (ii) Heavy loam. (iii) 21.4.62. (iv) (a) 6 ploughings. (b) to (e) N.A.

2. TREATMENTS:
   3 levels of N’ as C/A/N : N₀ = 0, N₁ = 62 and N₂ = 123 Kg/ha.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/213 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of kapes. (iv) (a) and (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 767 Kg/ha. (ii) 1140 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapes in Kg/ha

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>688</td>
<td>817</td>
<td>795</td>
</tr>
</tbody>
</table>
Crop: Cotton (Kharif).
Ref: Ph. 62 (212), 63 (171), 64 (164).
Type: 'M'.

Object: To study the effect of different levels of N, P, and K alone and in combination on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Cotton. (c) N.A.
   (ii) Loamy soil for 62; heavy loam for others. 
   (iii) 8.5.62; 29.4.63; 13.4.64.
   (iv) 5 ploughings. (v) Nil. (vi) R-231.
   (vii) Irrigated. (viii) 4 weedings.
   (ix) N.A.
   (x) 13.10.62 to 7.12.62; 19.9.63 to 17.12.63; 22.9.64 to 27.11.64.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N: N₀ = 0, N₁ = 60, N₂ = 120 Kg/ha.
   (2) 2 levels of P₀ = 0 and P₁ = 60 Kg/ha.
   (3) 2 levels of K₀ = 0 and K₁ = 60 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) 12. (b) N.A.
   (iii) 8 for 62; 4 for others. (iv) N.A.: 1/123 ha.; 11’89m. x 5’49m.
   (b) 1/1494 ha.; 1/247 ha., 10’67m. x 3’05m. (v) N.A. for 62 and 63; 61cm. x 122cm.
   (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) 10% R.H.C. against toka was sprayed.
   (iii) Yield of kapas. (iv) (a) 1962 to 64. (b) Nil.
   (v) N.A. (vi) Nil. (vii) Since the error variances are heterogeneous and varying no. of replications individual years results are presented under 5. Results.

5. RESULTS:

62 (212)
(i) 423 Kg/ha. (ii) 79’8 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>K₀</th>
<th>K₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₀</td>
<td>368</td>
<td>446</td>
<td>482</td>
<td></td>
<td></td>
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<td>342</td>
<td>460</td>
<td>440</td>
<td></td>
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<td>397</td>
</tr>
<tr>
<td>Mean</td>
<td>355</td>
<td>453</td>
<td>461</td>
<td></td>
<td></td>
<td>416</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>432</td>
<td>439</td>
<td>423</td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 39.8 Kg/ha.

63 (171)
(i) 658 Kg/ha. (ii) 109’9 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>K₀</th>
<th>K₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₀</td>
<td>535</td>
<td>696</td>
<td>752</td>
<td></td>
<td></td>
<td>659</td>
</tr>
<tr>
<td>P₁</td>
<td>487</td>
<td>706</td>
<td>772</td>
<td></td>
<td></td>
<td>617</td>
</tr>
<tr>
<td>Mean</td>
<td>511</td>
<td>701</td>
<td>762</td>
<td></td>
<td></td>
<td>638</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>661</td>
<td>663</td>
<td>655</td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 79’1 Kg/ha.
(i) 218 Kg/ha, (ii) 58.7 Kg/ha, (iii) Main effect of K alone is highly significant, (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>K0</th>
<th>K1</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P6</td>
<td>242</td>
<td>234</td>
<td>196</td>
<td>170</td>
<td>261</td>
<td>224</td>
</tr>
<tr>
<td>Mean</td>
<td>216</td>
<td>237</td>
<td>202</td>
<td>159</td>
<td>241</td>
<td>218</td>
</tr>
<tr>
<td>K0</td>
<td>185</td>
<td>210</td>
<td>190</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K1</td>
<td>245</td>
<td>264</td>
<td>214</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for K marginal means = 34.5 Kg/ha.

Crop :- Cotton (Kharif).
Site :- Agri. Res. Stn., Gurdaspur.

Object :- To study the effect of different micronutrients on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 23.4.63; 6.5.64. (iv) (a) 6 to 7 ploughings.
   (b) to (e) N.A. (v) 62 Kg/ha. of N at sowing; 92.6 Kg/ha. of N as Cl:4:N. (vi) R-231. (vii) Irrigated.
   (viii) 4. weedings, (ix) N.A. (x) 20.8.63 to 17.12.63; 15.9.64. to 26.10.64.

2. TREATMENTS
   Same as in exp. no. 63(39), 64 (41), 65(58) conducted at Abohar on page No.651.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 6. (iv) (a) 12’80m.x 3’05m. (b) 11’58m.x 1’83m. (v) 61cm.x 61cm.
   (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) 10% B.H.C. sprayed against tika attacked by jasinda. Endrin sprayed (iii) Yield of kapas.
   (iv) (a) 1963-64. (b) No. (c) Results of combined analysis are given under 5. Results (v) Abohar. (vi) Nil.
   (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:
   Pooled results
   (i) 572 Kg/ha. (ii) 101.5 Kg/ha. (based on 66 d.f. made up of Treatments x Years interaction and Pooled error).
   (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
<th>T10</th>
<th>T11</th>
<th>T12</th>
<th>T13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>580</td>
<td>576</td>
<td>562</td>
<td>578</td>
<td>568</td>
<td>584</td>
<td>556</td>
<td></td>
</tr>
</tbody>
</table>
Crop: Cotton (Kharif).

Ref: Pb. 63(173), 64(160).


Type: M.

Object: To study the effect of different methods of fertilizer placement on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 21.4.63; 29.4.64. (iv) (a) 6 to 7 ploughings.
   (b) to (e) N.A. (v) N.A. (vi) R-231. (vii) Irrigated (viii) 4 weeding. (ix) N.A. (x) 20.9.63 to 17.12.63,
   13.9.64 to 11.11.64.

2. TREATMENTS:
   Same as in exp. no. 63(54), 64(44), 65(56) conducted at Abobhar on page No. 652.

3. DESIGN:
   (i) R.B.D. (ii) 10. (b) N.A. (iii) 4. (iv) (a) 1/197 ha.; 11.48m. X 3.66m. (b) 1/247 ha.; 10.76m. X
   2.44m. (v) N.A.; 61cm. x 16cm. (vi) Yes.

4. GENERAL:
   (i) Normal (ii) 10% R.H. C. sprayed against tika; Attacked by jasids and endrioe sprayed. (iii) Yield of kapas.
   (iv) (a) 1963 (crop failed in 65.) (b) No. (c) Nil. (v) Abobhar. (vi) Nil. (vii) Since the exp. is contd,
   beyond 65, individual years results are presented under 5. Results.

5. RESULTS:

63(173)
   (i) 428 Kg/ha. (ii) 74.1 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of kapas in
   Kg/ha.
   Treatment T0 T1 T2 T3 T4 T5 T6 T7
   Av. yield 426 447 371 355 374 490 537 433 476 369
   C.D.—107.5 Kg/ha.

64(160)
   Treatment T0 T1 T2 T3 T4 T5 T6 T7 T8 T9
   Av. yield 519 481 360 519 384 529 660 519 454 488
Crop : Cotton (Khadi).


Object : To study the effect of different levels of N, P and K on the yield of Cotton.

1. BASAL CONDITIONS:


2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) 3 levels of N : N,=0, N,=60, and N,=120 Kg/ha.
(2) 2 levels of P,0 : P,=0 and P,=60 Kg/ha.
(3) 2 levels of K,0 : K,=0 and K,=60 Kg/ha.

Manures were applied at the time of sowing with the last cultural operation.

3. DESIGN:

(1) Factor in R.B.D. (ii) (a) 12. (b) N.A. (iii) 8. (iv) (a) N.A. (b) 1/398 ha. (v) N.A. (vi) Yes.

4. GENERAL

(i) Normal. (ii) Attacked by jassids; endrine sprayed. (iii) Yield of kapas. (iv) (a) and (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 852 Kg/ha. (ii) 154.0 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>K0</th>
<th>K1</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>929</td>
<td>780</td>
<td>812</td>
<td>834</td>
<td>847</td>
<td>840</td>
</tr>
<tr>
<td>P1</td>
<td>949</td>
<td>869</td>
<td>772</td>
<td>862</td>
<td>865</td>
<td>863</td>
</tr>
<tr>
<td>Mean</td>
<td>939</td>
<td>824</td>
<td>792</td>
<td>848</td>
<td>856</td>
<td>852</td>
</tr>
<tr>
<td>K0</td>
<td>960</td>
<td>798</td>
<td>786</td>
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<tr>
<td>K1</td>
<td>918</td>
<td>851</td>
<td>798</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N marginal means—76.7 Kg/ha.

Ref : Pb. 62(216).
2. TREATMENTS:
3 levels of N as O/A/N: \( N_0 = 0 \), \( N_1 = 50 \), and \( N_2 = 100 \) Kg/ha.

3. DESIGN:
(i) R.B.D.  (ii) 4. (b) N.A.  (iii) 4.  (iv) N.A.  (b) 1/429 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) Normal.  (ii) Attacked by jassids, endrine sprayed. (iii) Yield of kapas.  (iv) (a) and (b) No.  (c) Nil.  (v) to (vii) N.A.

5. RESULTS:
(i) 121 Kg/ha.  (ii) 137.4 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_0 )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1098</td>
<td>1173</td>
<td>1092</td>
</tr>
</tbody>
</table>

Object: To study the effect of different sources of N on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 25-4-62.  (iv) (a) 5 ploughings. (b) to (e) N.A.  (v) F-320.  (vi) Irrigated.  (vii) 5 weedings.  (viii) N.A.  (a) Sg. 10/62 to 7-11-62.

2. TREATMENTS:
4 sources of 44.8 Kg/ha of N: \( S_0 = \text{Control} \), \( S_1 = F.Y.M. \), \( S_2 = A/S \) and \( S_3 = \text{Amm. plos.} \)

3. DESIGN:
(i) R.B.D.  (ii) 4.  (b) N.A.  (iii) Refer 4.  General  (vii) (iv) (a) N.A.  (b) 1/12'4 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) Normal.  (ii) N.A.  (iii) Yield of kapas.  (iv) (a) 1960-62.  (b) No.  (c) Nil.  (v) and (vi) Nil.  (vii) This capt. has been continued for 3 years vs. 1960-61, 1961-62, 1962-63 and each year has been considered as a replication for analysis.

5. RESULTS:
(i) 579 Kg/ha.  (ii) 192 Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( S_0 )</th>
<th>( S_1 )</th>
<th>( S_2 )</th>
<th>( S_3 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>437</td>
<td>582</td>
<td>280</td>
<td>717</td>
</tr>
</tbody>
</table>
| C.D. = 38'4 Kg/ha.
Crop :- Cotton.  \((Kharif)\).


Object :- To study the effect of G.M. and P on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) and (ii) N.A.  \((iii) 12.5.63\)  \((iv) (a) and (b) N.A. \((c) 21 Kg/ha. \((d) and (e) N.A. \((v) N.A. \((vi) F-320\) \((vii) Irrigated. \((viii) and (ix) No. \((x) 15.10.63 to 18.11.63\)

2. TREATMENTS:
   3 manurial treatments : \(N_0=\) Control, \(N_1=\) G.M. + 44.8 Kg/ha. of \(P_2O_5\) and \(N_2=G.M.\)

3. DESIGN
   (i) R.B.D. \((ii) (a) 3. \(b) N.A. \((iii) 2. \(iv) (a) N.A. \(b) 1/19.8 ha. \(v) N.A. \(vi) Yes.\)

4. GENERAL:
   (i) Satisfactory \((ii) N.A. \((iii) Yield of kapas. \((iv) (a) and (b) No. \(c) Nil. \(v) Nil. \(vi) No. \(vii) Nil.\)

5. RESULTS:
   (i) 295 Kg/ha. \(ii) 76.4 Kg/ha \((iii) Treatment differences are not significant. \(iv) Av. yield of kapas in Kg/ha.

   Treatment | \(N_0\) | \(N_1\) | \(N_2\)
--- | --- | --- | ---
Av. yield | 315 | 328 | 242.

Crop :- Cotton.  \((Kharif)\).


Object :- To find out the best method of fertilizer placement on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) NE. \(b) Barley. \(c) No. \((ii) Sandy loam. \((iii) 1.6.65. \((iv) (a) 4 ploughings. \(b) to (e) No. \(v) Nil. \(vi) F-320. \((vii) Irrigated. \((viii) and (ix) N.A. \(x) 3 pickings from 14.10.65 to 28.12.65.\)

2. TREATMENTS:
   10 methods of application of fertilizers: \(T_0=\) Control, \(T_1=\) A week before sowing, \(T_2=\) seed and fertilizer on same line and level, \(T_3=\) Fertilizer in the same line but 4 cm. deeper than seed, \(T_4=\) Fertilizer 10 cm. deep and 8 cm. away from seed \(T_5=\) Broad cast before first ploughing at sowing, \(T_6=\) Broad cast at final thinning, \(T_7=\) Broad casted at flowering, \(T_8=\) At top dressing at final thinning, and \(T_9=\) As top dressing at flowering.

Fertilizer applied at 90Kg/ha of \(N + 40Kg/ha.\) of \(P_2O_5\)

3. DESIGN:
   (i) R.B.D. \((ii) (a) 10. \(b) N.A. \(c) 4. \(iv) (a) 8 km x 4.7 km. \(b) 20 Sq.m. \(v) N.A. \(vi) Yes.\)

4. GENERAL:
   (i) Normal. \(ii) Endrine sprayed against jassid Aphid attack. \(iv) Yield of kapas. \(a) 1965-contd. \(b) No. \(c) Nil. \(v) Hissar. \(Abohar. \Ludhiana. \(vi) and (vii) Nil.\)
5. RESULTS:

(i) 354 Kg/ha. (ii) 270 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>262</td>
<td>289</td>
<td>430</td>
<td>436</td>
<td>366</td>
<td>407</td>
<td>297</td>
<td>402</td>
<td>335</td>
<td></td>
</tr>
</tbody>
</table>

5. RESULTS:

(i) 354 Kg/ha. (ii) 270 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

Crop :- Cotton. (Kharif).
Ref :- Pb. 65(29).
Type :- 'M'.

Object :- To find out the optimum levels of N, P and K for the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Senji. (c) No. (ii) Sandy loam. (iii) 24.5.65. (iv) (a) 5 ploughings. (b) to (e) N.A. (v) N.A. (vi) F-320. (vii) Irrigated. (viii) 3 hoeings (ix) N.A. (x) Pickings from 16.10.65 to 29.11.65

2. TREATMENTS:

All combinations of (i), (ii) and (iii)

(i) 3 levels of N : N0=0, N1=60 and N2=120 Kg/ha.
(ii) 2 levels of P2O5 : P0=0 and P1=50Kg/ha.
(iii) 2 levels of K2O : K0=0 and K1=50Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12, (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/333 3 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Sprayings of Endrine against jassids and Aphid. attack (iii) Yield of cotton. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) Hissar and Ludhiana. (vii) and (vii) Nil.

5. RESULTS:

(i) 268 Kg/ha. (ii) 101'3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>P0</th>
<th>P1</th>
<th>K0</th>
<th>K1</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>355</td>
<td>272</td>
<td>283</td>
<td>344</td>
<td>313</td>
</tr>
<tr>
<td>264</td>
<td>263</td>
<td>253</td>
<td>274</td>
<td>263</td>
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<tr>
<td>205</td>
<td>252</td>
<td>237</td>
<td>220</td>
<td>228</td>
</tr>
<tr>
<td>Mean</td>
<td>275</td>
<td>262</td>
<td>258</td>
<td>279</td>
</tr>
<tr>
<td>K0</td>
<td>K1</td>
<td>Mean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>244</td>
<td>271</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>306</td>
<td>259</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop :- Cotton (Kharif).

Site :- Cotton Res. Sta., Jallundur.

Object :- To determine the effect of soil application of micronutrients.

1. BASAL CONDITIONS:
   (i) N.A. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 10.5.65, (iv) 3 ploughings. (b) to (c) N.A. (v) 40 Kg/ha. of N as urea. (vi) F-320. (vii) Irrigated. (viii) 3 hoeings. (ix) N.A. (x) 2 pickings on 19.10.65 to 30.11.65.

2. TREATMENTS:
   7 micronutrient treatments: T₁ = Control, T₂ = Boron at 11.2 Kg/ha., T₃ = Manganese sul. at 2.47 Kg/ha., T₄ = Copper sul. at 11.2 Kg/ha., T₅ = Zinc sul. at 22.4 Kg/ha. and T₆ = Amm. molybdate at 1.12 Kg/ha.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 6. (iv) (a) 7’92m. x 5’94m. (b) 6’00m. x 4’17m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Endrinc sprayed against jassids attack. (iv) (a) 1965-only. (b) No. (c) Nili. (v) Jullundur, Abohar, Ludhiana. (vi) and (vii) N.A.

5. RESULTS:
   (i) 319 Kg/ha. (ii) 258.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

   Treatment
   Av. yield
   T₁  T₂  T₃  T₄  T₅  T₆  T₇
   313 310 340 294 343 310 322

Crop :- Cotton (Kharif).

Site :- Cotton Res. Sta., Jallundur.

Object :- To determine the effect of foliar spray of micronutrients on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) N.A. (b) Senji. (c) N.A. (ii) Sandy loam. (iii) 25.5.65. (iv) (a) 5 ploughings. (b) to (c) N.A. (v) 50 Kg/ha. of N as Urea. (vi) F-320. (vii) Irrigated. (viii) 2 weedicings and 2 hoeings. (ix) N.A. (x) 3 pickings on 8.10.65, 21.11.65 and 29.11.65.

2. TREATMENTS:
   7 micronutrient treatments: T₁ = Control, T₂ = Boron as Borax at 62Kg/ha., T₃ = Manganese sul. at 2.47 Kg/ha., T₄ = Copper sul. at 1.2 Kg/ha., T₅ = Zinc sul. at 2.47 Kg/ha., T₆ = Ferrous sul. at 6.18 Kg/ha. and T₇ = Amm. molybdate at 0.62 Kg/ha.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 6. (iv) (a) 10’67m. x 5’49m. (b) 9’40m. x 4’25m. (v) N.A. (vi) Yes.
4. **GENERAL:**

(i) Normal. (ii) Endrine sprayed against jassid attack. (iii) Yield of kapas. (iv) (a) 1963-only. (b) No. (c) Nil. (v) Jullundur, Hisar, Abohar and Ludhiana. (vi) and (vii) N.A.

5. **RESULTS:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>396</td>
<td>444</td>
<td>427</td>
<td>430</td>
<td>450</td>
<td>401</td>
</tr>
</tbody>
</table>

**Crop:** Cotton, *(Kharif).*  
**Site:** Punjab Agri. University, Ludhiana.  
**Ref:** Pb. 63(93), 64(82).  
**Type:** 'M'.

Object:—To find out the best method of fertilizer placement for Cotton.

1. **BASAL CONDITIONS:**

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) Mid of May, 63:23, 5.64. (iv) (a) 4 ploughings. (b) to (e) N.A. (v) N.A. (vi) F.-320. (vii) Irrigated. (viii) 2 hoings, 1 thinning. (ix) N.A. (x) 24.9.63 and 2.11.63. Nov., 64.

2. **TREATMENTS:**

Same as in expt. no. 63 (54), 64 (44), 65 (56) conducted at Abohar on page, No. 652.

3. **DESIGN:**

(i) R.B.D. (ii) (a) f0. (b) N.A. (iii) 4. (iv) (a) N.A., 7:32m. x 5:49m. (b) 1/70 ha.; 6:10m. x 4:75m. (v) N.A.; 61cm. x 46cm. (vi) Yes.

4. **GENERAL:**

(i) Normal. (ii) Endrine sprayed against jassid attack. (iii) Yield of kapas. (iv) (a) 1963-only. (b) No. (c) Nil. (d) N.A. (e) Abohar. (f) Nil. (g) Since the expt. is contd. beyond 65, individual years results are presented under 5. Results.

5. **RESULTS:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>796</td>
<td>692</td>
<td>724</td>
<td>526</td>
<td>815</td>
<td>734</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>71</td>
<td>843</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D.—207:2 Kg/ha.

60(73)

(i) 741 Kg/ha. (ii) 142:8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>796</td>
<td>692</td>
<td>724</td>
<td>526</td>
<td>815</td>
<td>734</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>71</td>
<td>843</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D.—207:2 Kg/ha.

62(82)

(i) 101 Kg/ha. (ii) 81:7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>91</td>
<td>200</td>
<td>36</td>
<td>96</td>
<td>126</td>
<td>105</td>
</tr>
</tbody>
</table>
Crop: Cotton (Kharif).

Site: Punjab Agri. University, Ludhiana.

Ref: Ph. 63(95), 64(73), 65(19).

Type: 'M'.

Object: To determine the effect of foliar spray of micro-nutrients on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 15.5.62; 15.5.64; 20.5.65. (iv) (a) 3 to 5 ploughings. (b) to (e) N.A. (v) N.A. (vi) F-320. (vii) Irrigated. (viii) 3 hoeings, 1 weeding. (a) N.A. (a) 15.11.63 and 27.12.63 2:11. 64 to 10.12.64; 14.10.65, 24.10.65 and 15.11.65.

2. TREATMENTS:
   Same as in exp. no. 63(38), 64(40), 65(57) conducted at Abchar en pcge no.650.

3. DESIGN:
   (i) K.B.D. (ii) A. (iii) 6. (iv) (a) 9'14m. x 4'27m.; 9.14m. x 4'27m.; 8'00m. x 4'00m. (b) 7.39 m. x 3'05m.; 8'23m. x 3'90m.; 6'00m. x 3'50m. (v) 8'00cm. x 6'00cm.; 4'00cm. x 6'00cm. 60cm. x 50cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Jassids attack; Endrine sprayed. (iii) Yield of kapas. (iv) In 34.34-34.34. (v) No. (vi) N.A. (vii) Abchar and Jullundur. (viii) N.A. (vii) Since the exp. is crop, between 65, individual years results are presented under 3. Results.

5. RESULTS:

   63(95)

   (i) 148 Kg/ha. (ii) 79 Kgs/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

   Treatment
<table>
<thead>
<tr>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>178</td>
<td>145</td>
<td>176</td>
<td>122</td>
<td>153</td>
<td>155</td>
<td>110</td>
</tr>
</tbody>
</table>

   64(73)

   (i) 120 Kg/ha. (ii) 53 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

   Treatment
<table>
<thead>
<tr>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
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</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td>118</td>
<td>119</td>
<td>122</td>
<td>133</td>
</tr>
</tbody>
</table>

   65(19)

   (i) 505 Kg/ha. (ii) 171 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

   Treatment
<table>
<thead>
<tr>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
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</thead>
<tbody>
<tr>
<td>479</td>
<td>541</td>
<td>459</td>
<td>502</td>
<td>556</td>
</tr>
</tbody>
</table>

Crop: Cotton (Kharif).

Site: Punjab Agri. University, Ludhiana.

Ref: Ph. 63(96), 64(72), 65(22).

Type: 'M'.

Object: To determine the effect of soil application of micro nutrients on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 15.5.63; 15.5.64; 20.5.65. (iv) (a) 3 to 5 ploughings. (b) to (e) N.A. (v) N.A. (vi) F-320. (vii) Irrigated. (viii) 2 to 3 hoeings; 1 weeding. (ix) N.A. (x) 15.11.63 and 27.12.63; 27.12.63 and 10.12.64; 3 pickings on 14,19.65, 24,10.65 and 15.11.65.
2. TREATMENTS

Same as in exp n., 63 (19), 64 (41), 65 (58: can read at Abhar on page No. 65).

3. DESIGN:

(i) R.B.D. (ii) 7. (b) N.A. (iii) 6. (iv) (a) 9'14m. × 4'27m. ; 9'14m. × 4'27m. ; 8'00m. × 4'00m. (b) 7'39m. × 3'05 n. ; 8'23m. × 3'05m. ; 6'50m. × 3'90m. (v) 87 cm. × 61 cm. ; 61 cm. × 45 cm. ; N.A. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Endrine sprayed against Jamsida attack. (iii) Yield of kapas. (iv) (a) 1963-continued. (b) No. (c) Nil. (v) Abhar. Jullundur. (vi) Nil. (vii) Since the exp. is continued beyond 65, individual year results are presented under 5. Results.

5. RESULTS:

63(96)

(i) 267 Kg/ha. (ii)95'0 Kg/ha. (iii) Treatment differences are not significant (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>259</td>
<td>231</td>
<td>383</td>
<td>276</td>
<td>246</td>
<td>240</td>
<td>235</td>
</tr>
</tbody>
</table>

64(72)

(i) 106 Kg/ha. (ii)66'2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>38</td>
<td>103</td>
<td>153</td>
<td>72</td>
<td>99</td>
<td>85</td>
<td>173</td>
</tr>
</tbody>
</table>

65(221)

(i) 398 Kg/ha. (ii) 148'3 Kg/ha. (iii) Treatment differences are not significant (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>34</td>
<td>564</td>
<td>369</td>
<td>496</td>
<td>414</td>
<td>345</td>
<td>368</td>
</tr>
</tbody>
</table>

Crep = Cotton (Kharif).
Ref :- Pb. 63(97), 64(71), 65(18).
Site :- Punjab Agri. University, Ludhiana. Type :- 'M'.

Object :- To study the effect of different levels of N, P and K on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) to (e) N.A. (ii) Sandy loam. (iii) 29-4.5; 2.5; 15.5.65. (iv) (a) 3 to 5 ploughings. (b) to (e) N.A. (v) N.A. (vi) P320. (vii) Irrigated. (viii) 2 to 4 hoistings. (ix) N.A. (x) 2 pickings on 11.11.63 and 6.1.64; 2 pickings on 11.11.64 and 10.12.64; Pickings from 20.9.65 to 13.11.65.

2. TREATMENTS:

All combinations of (1), (2) and (3).

(1) 3 levels of N as C/A/N: N₀=0, N₁=60 and N₂=120 Kg/ha.
(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=60 Kg/ha.
(3) 2 levels of K₂O as Mur. pot : K₀=0 and K₁=60 Kg/ha.
3. DESIGN:

(i) Fact. in R.B.D. (ii) 12. (b) N.A. (iii) 4. (iv) (a) 32'19m. x 4'57m.; 12'19m. x 4'19m.; 12'00m. x 4'40m. (b) 10'97m. x 3'20m.; 10'97m. x 3'16m.; 10'08m. x 3'60m. (v) 61cm. x 69cm.; 61cm. x 61cm.; 60cm. x 62cm. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) Jassids attack; Endrine sprayed. (iii) Yield of kapas. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) Abhar, Jullundur. (vi) Nil. (vii) Since the caps. is could beyond 65, results of individual years are presented under 5. Results.

5. RESULTS:

63(97)

(i) 598 Kg/ha. (ii) 940 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$N_0$</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$K_0$</th>
<th>$K_1$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_0$</td>
<td>492</td>
<td>656</td>
<td>674</td>
<td>629</td>
<td>590</td>
<td>607</td>
</tr>
<tr>
<td>$P_1$</td>
<td>474</td>
<td>685</td>
<td>607</td>
<td>546</td>
<td>631</td>
<td>589</td>
</tr>
<tr>
<td>Mean</td>
<td>483</td>
<td>670</td>
<td>640</td>
<td>585</td>
<td>610</td>
<td>598</td>
</tr>
<tr>
<td>$K_0$</td>
<td>513</td>
<td>656</td>
<td>587</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$K_1$</td>
<td>413</td>
<td>684</td>
<td>694</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N marginal means - 67.6 Kg/ha.

64(71)

(i) 334 Kg/ha. (ii) 106.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$N_0$</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$K_0$</th>
<th>$K_1$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_0$</td>
<td>287</td>
<td>341</td>
<td>359</td>
<td>323</td>
<td>336</td>
<td>329</td>
</tr>
<tr>
<td>$P_1$</td>
<td>306</td>
<td>359</td>
<td>414</td>
<td>336</td>
<td>383</td>
<td>360</td>
</tr>
<tr>
<td>Mean</td>
<td>296</td>
<td>350</td>
<td>386</td>
<td>329</td>
<td>359</td>
<td>344</td>
</tr>
<tr>
<td>$K_0$</td>
<td>270</td>
<td>358</td>
<td>360</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$K_1$</td>
<td>323</td>
<td>342</td>
<td>413</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65(18)

(i) 580 Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$N_0$</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$K_0$</th>
<th>$K_1$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_0$</td>
<td>593</td>
<td>553</td>
<td>566</td>
<td>580</td>
<td>561</td>
<td>571</td>
</tr>
<tr>
<td>$P_1$</td>
<td>497</td>
<td>683</td>
<td>587</td>
<td>552</td>
<td>627</td>
<td>589</td>
</tr>
<tr>
<td>Mean</td>
<td>545</td>
<td>610</td>
<td>576</td>
<td>566</td>
<td>594</td>
<td>580</td>
</tr>
<tr>
<td>$K_0$</td>
<td>588</td>
<td>582</td>
<td>528</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$K_1$</td>
<td>502</td>
<td>654</td>
<td>625</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Cotton (Kharif)  
Site: Punjab Agri. University, Ludhiana.  
Ref.: Pb. 65(16).  
Type: M.  

Object: To study the effect of beta Naphthoacetic acid on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Wheat. (c) N.A. (iii) Sandy loam. (iii) 16.4.65. (iv) (a) 3 ploughings. (b) to (e) N.A. (v) N.A. (vi) F. F. 320. (vii) Irrigated. (viii) 2 hoings. (ix) N.A. (x) 3 pickings on 5.10.65; 10.10.65 and 21.11.65.

2. TREATMENTS:
Main-plot treatments:
4 concentrations: C_0 = 0, C_1 = 5, C_2 = 10 and C_3 = 15 PPM.
Sub-plot treatments:
3 times of spraying: T_1 = 1, T_2 = 2 and T_3 = 3 weeks after flowering.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5'00m. X 10'00m. (b) 3'00m. X 9'10m. (v) 10cm. X 45cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Endrine sprayed as precaution. (iii) Yield of kapa. (iv) (a) 1964-contd. (64 N.A.). (b) No. (c) Nil. (v) Hisar, Abohar and Jullundur. (vi) and (vii) Nil.

5. RESULTS:
(i) 269 Kg/ha. (ii) (a) 113 Kg/ha. (b) 131 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapa in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C_0</th>
<th>C_1</th>
<th>C_2</th>
<th>C_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T_1</td>
<td>350</td>
<td>195</td>
<td>159</td>
<td>359</td>
<td>266</td>
</tr>
<tr>
<td>T_2</td>
<td>212</td>
<td>260</td>
<td>267</td>
<td>286</td>
<td>258</td>
</tr>
<tr>
<td>T_3</td>
<td>300</td>
<td>283</td>
<td>287</td>
<td>266</td>
<td>284</td>
</tr>
<tr>
<td>Mean</td>
<td>267</td>
<td>249</td>
<td>238</td>
<td>304</td>
<td>269</td>
</tr>
</tbody>
</table>
2. TREATMENTS:
7 micronutrient treatments: T0= Control, T1= Borax, T2= Manganese, T3= Copper, T4= Zinc, T5= Iron and T6= Molybdenum.

3. DESIGN:
(i) R.B.D. (ii) (a) 7, (b) N.A. (iii) 6. (iv) 4.27m x 4.27m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Crop sprayed after 60–70 days of planting. (iii) Yield of kapas. (iv) (a) and (b) No. (c) N.A. (vi) N.A.

5. RESULTS:
(i) 1520 Kg/ha. (ii) 128.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1541</td>
<td>1479</td>
<td>1430</td>
<td>1472</td>
<td>1580</td>
<td>1570</td>
<td>1440</td>
</tr>
</tbody>
</table>

Crop :- Cotton (Kharij).
Site :- M.A.E. Centre, Nasirpur.

Object :- To find out the best method of fertilizer placement for Cotton.

Ref : Pb. 63(177).
Type ’M’.

1. BASAL CONDITIONS :
(i) (a) to (c) N.A. (ii) Loamy soil. (iii) 11.5.63. (iv) (a) 5 to 6 ploughings. (b) to (e) N.A. (v) N.A. (vi) Nil. (vii) Irrigated. (viii) 3 weeddings. (xx) N.A. (a) 26.11.63 to 27.12.63.

2. TREATMENTS:
Same as in exp. no. 63(54), 64(34), 65(56) conducted at Ababar on page. No. 652.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4.27m x 4.27m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of kapas. (iv) (a) and (b) No. (c) Nil. (v) Ababar and Ludhiana. (vi) and (vii) Nil.

5. RESULTS:
(i) 1580 Kg/ha. (ii) 226.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1648</td>
<td>1503</td>
<td>1648</td>
<td>1720</td>
<td>1722</td>
<td>1600</td>
<td>1595</td>
<td>1545</td>
<td>1545</td>
</tr>
</tbody>
</table>
**Crop**: Cotton (Kharif).

**Site**: M.A.E. Centre, Nasirpur.

**Objec**: To study the effect of different levels of N, P, K and F.Y.M. on the yield of Cotton.

(Three phases: cumulative, direct and residual).

1. **BASAL CONDITIONS**

   (i) (a) to (c) N.A.
   (ii) Sandy loam, Alluvial soil; N.A. Indus alluvium for others.
   (iii) N.A.; 26.4.61; N.A. 29.4.63 and 9.5.64.
   (iv) (a) 4-5 ploughings, (b) By cotton drill.
   (c) 23 Kg/ha, (d) 76cm × 30cm.
   (e) Nil.
   (v) Nil. (vi) 320 P. (vii) Irrigated. (viii) 3 h.ings.
   (ix) N.A. (x) N.A.; 3 pickings on 12.10.61, 13.11.61 and 15.12.61; N.A.; 15.12.63 and 15.12.64.

2. **TREATMENTS**

   All combinations of (1), (2), (3) and (4)

   (1) 3 levels of N as Ca/N : N₁ = 0, N₂ = 22.4 and N₃ = 44.8 Kg/ha.
   (2) 3 levels of P₂O₅ as Super: P₁ = 0, P₂ = 22.4 and P₃ = 44.4 Kg/ha.
   (3) 3 levels of K₂O as mur. pot: K₁ = 0, K₂ = 22.4 and K₃ = 44.8 Kg/ha.
   (4) 3 levels of F.Y.M.: F₀ = 0, F₁ = 56.0 and F₂ = 112.0 Q/ha.

3. **DESIGN**

   (i) 3 Plots confd. (ii) 9 plots/block and 9 blocks/replication. (b) N.A. (iii) 1. (iv) and (v) N.A.
   (vi) Yes.

4. **GENERAL**

   (i) and (ii) N.A. (iii) Yield of kapas. (iv) (a) 1960—N.A. (b) Yes for cumulative phase only. (c) Nil.
   (v) N.A. (vi) and (vii) Nil.

5. **RESULTS**

   1960

   (i) 1224 Kg/ha. (ii) 189.1 Kg/ha.
   (iii) Main effects of N and F are highly significant. (iv) Av. yield of kapas in Kg/ha.

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C.D. for N or F marginal means = 100.8 Kg/ha.
**Phase I (Cumulative effect)**

(i) 1071 Kg/ha. (ii) 153.6 Kg/ha. (iii) Main effects of N and P are highly significant. Interaction F × N is highly significant. (iv) Av. yield of kapas in Kg/ha.

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C.D. for the body of F × N table—141.9 Kg/ha.

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**Phase II (Direct effect)**

(i) 1060 Kg/ha. (ii) 160.4 Kg/ha. (iii) Main effect of N is highly significant. Main effects of F and P are significant. (iv) Av. yield of kapas in Kg/ha.

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C.D. for N, for P marginal means—85.6 Kg/ha.
Phase III (Residual effect)

(i) 887 Kg/ha.  (ii) 136·6 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of kapas in Kg/ha.

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1962

Cumulative Phase

(i) 924 Kg/ha.  (ii) 216·9 Kg/ha.  (iii) Main effects of F and N are highly significant. Interaction F x P is significant.  (iv) Av. yield of kapas in Kg/ha.

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C.D. for F or N marginal means=115·7 Kg/ha.
C.D. for the body of F x P table=200·4 Kg/ha.
### Residual phase

(i) 699 Kg/ha.  
(ii) 172.6 Kg/ha.  
(iii) None of the effects is significant.  
(iv) Av. yield of kapas in Kg/ha.

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### Direct phase

(i) 899 Kg/ha.  
(ii) 198.4 Kg/ha.  
(iii) Main effects of F and N are highly significant.  
(iv) Av. yield of kapas in Kg/ha.

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C.D. for F or N marginal means = 10.8 Kg/ha.
Direct phase

(i) 921 Kg/ha.  (ii) 192.4 Kg/ha.  (iii) Main effect of N alone is highly significant.  (iv) Av. yield of kapas in Kg/ha.

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C.D. for N marginal means = 104.4 Kg/ha.

Cumulative phase

(i) 561 Kg/ha.  (ii) 113.8 Kg/ha.  (iii) Main effect of N alone is significant.  (iv) Av. yield of kapas in Kg/ha.

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C.D. for N marginal means = 61.6 Kg/ha.
(i) 830 Kg/ha.  (ii) 167·6 Kg/ha.  (iii) None of the effects is significant.  (vi) Av. yield of kapas in Kg/ha.

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Cumulative phase

(i) 968 Kg/ha.  (ii) 125·6 Kg/ha.  (iii) Main effects of F, N and interaction F×N, F×P are highly significant.  (iv) Av. yield of kapas in Kg/ha.

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C.D. for N or F marginal means = 72·3 Kg/ha.
C.D. for the body of F×N or F×P table = 125·3 Kg/ha.
Direct phase

(i) 895 Kg/ha. (ii) 152.5 Kg/ha. (iii) Main effects of F and N are highly significant. (iv) Av. yield of kapas in Kg/ha.

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C.D. for N or F marginal means=81.3 Kg/ha.

Residual phase

(i) 753 Kg/ha. (ii) 144.0 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

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C.D. for F marginal means=76.8 Kg/ha.
Crop: Cotton (Kharif).
Site: M.A.E. Centre, Nasirpur.

Ref: Pb. 61 (M.A.E.).
Type: M'.

Object: Type to compare nitrophosphate at different levels and different methods of application.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Maize fodder in Kharif and Sonji in Rabi 1960. (c) N.A. (d) Alluvial. (iii) Last week of April.
(iv) (a) (b) With cotton drill. (c) 134 Kg/ha. (d) 76 cm. x 30 cm. (e) Nil. (v) F-320. (vi) Irrigated. (vii) 3 hoeings with Taqshali and Kasutala. (ix) N.A. (x) Pickings from November and December.

2. TREATMENTS:
All combinations of (1), (2), (3), and (4) and 4 extra treatments in each block.
(1) 2 levels of F.Y.M.: F1 = 0 and F2 = 5000 Kg/ha.
(2) 3 types of phosphates: P1 = Single Super. P2 = O.P. (20-20-0) and P3 = P1 E (16-14-0).
(3) 3 levels of fertilizers: L1 = 12 Kg/ha. of N+10.5 Kg/ha. of P2O5. L2 = 2 L1 and L3 = 4 L1.
(4) 3 methods of application: M1 = Broadcast before final cultivation, M2 = 6 cm. below seed and M3 = Band placement.
Extra treatments: N0 = 0, N1 = 12, N2 = 24, and N3 = 48 Kg/ha, of N.

3. DESIGN:
(i) Fact in R.B.D. (ii) (a) 13 plots/ block and 6 blocks/replication (3 blocks receiving F0 treatment and other 3 blocks receiving F1 treatment). (b) N.A. (iii) 1. (iv) (a) 3'38m. x 7'66m. (b) 2'82m. x 7'18m. (v) 2'12cm. x 2'4cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1961-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1222 Kg/ha. (ii) 166'9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

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Crop: Cotton (Kharif).

Ref: Ph. 60 (S.F.T) for Ferozepur, Jullundur, Ludhiana, Patiala and Sangrur. and 61 (S.F.T.) for Ferozepur, Jullundur and Ludhiana.

Districts: Ferozepur, Jullundur, Patiala, Sangrur and Ludhiana. Type: 'M'.

Object: — Type A: To study the response of Cotton to different levels of N, P and K applied individually and in combination.

1. BASAL CONDITIONS:
   (i) N.A.  (ii) Alluvial.  (iii) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   
   O = Control (no manure).
   N = 44.8 Kg/ha. of N,
   P = 22.4 Kg/ha. of P2O5,
   K = 22.4 Kg/ha. of K2O,
   NP = 44.8 Kg/ha. of N+22.4 Kg/ha. of P2O5,
   NK = 44.8 Kg/ha. of N+22.4 Kg/ha. of K2O,
   PK = 22.4 Kg/ha. of P2O5+22.4 Kg/ha. of K2O and
   NPK = 44.8 Kg/ha. of N+22.4 Kg/ha. of P2O5+22.4 Kg/ha. of K2O.

3. DESIGN:
   (i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years with in the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on a Cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha.  (b) 1/197.7 ha.  (iv) Yes.

4. GENERAL:
   (i) and (ii) N.A.  (iii) Yield of kapas.  (iv) to (vii) N.A.

5. RESULTS:

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<th>No. of trials</th>
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<th>P</th>
<th>K</th>
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<td>20.0</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>14.0</td>
</tr>
</tbody>
</table>
Crop :- Cotton (Kharif).

District :- Ferozepur and Sangur

Object :- Type B : To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS :

(i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

7 manurial treatments:

O = Control (no manure)

N1 = 28 Kg/ha. of N as A/S,
N2 = 56 Kg/ha. of N as A/S,
N3 = 28 Kg/ha. of N as Urea,
N4 = 56 Kg/ha. of N as Urea,
N5 = 28 Kg/ha. of N as CIAN, and
N6 = 56 Kg/ha. of N as CIAN.

3. DESIGN :

Same as in type A conducted under irrigated condition on Cotton crop on page No. 678.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of kapas. (iv) (a) 1960—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS :

Av. response in Kg/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of Control yield trials in Kg/ha.</th>
<th>N1</th>
<th>N2</th>
<th>N3′</th>
<th>N4′</th>
<th>N5′</th>
<th>N6′</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferozepur</td>
<td>4</td>
<td>450</td>
<td>120</td>
<td>170</td>
<td>120</td>
<td>140</td>
<td>130</td>
<td>180</td>
</tr>
<tr>
<td>Sangur</td>
<td>9</td>
<td>830</td>
<td>100</td>
<td>40</td>
<td>170</td>
<td>30</td>
<td>110</td>
<td>80.0</td>
</tr>
</tbody>
</table>

Crop :- Cotton (Kharif).

District :- Jullundur, Ferozepur, Patiala and Ludhiana. 

Type :- 'M'.

Object :- Type B : To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS :

(i) to (vi) N.A. (vii) Unirrigated. (viii) to (a) N.A.

2. TREATMENTS :

7 manurial treatments:

O = Control (no manure),

N1 = 28 Kg/ha. of N as A/S,
N2 = 56 Kg/ha. of N as A/S,
N3 = 28 Kg/ha. of N as Urea,
N4 = 56 Kg/ha. of N as Urea,
N5 = 28 Kg/ha. of N as CIAN, and
N6 = 56 Kg/ha. of N as CIAN.
3. DESIGN:
Same as in type A conducted under irrigated condition on Cotton crop on page No. 673.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of kapas. (iv) (a) 1961-only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N1</th>
<th>N2</th>
<th>N1'</th>
<th>N2'</th>
<th>N1''</th>
<th>N2''</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoshiarpur</td>
<td>5</td>
<td>790</td>
<td>520</td>
<td>170</td>
<td>110</td>
<td>320</td>
<td>100</td>
<td>770</td>
<td>680</td>
</tr>
<tr>
<td>Ferozepur</td>
<td>14</td>
<td>780</td>
<td>170</td>
<td>210</td>
<td>150</td>
<td>200</td>
<td>120</td>
<td>220</td>
<td>220</td>
</tr>
<tr>
<td>Patiala</td>
<td>7</td>
<td>340</td>
<td>70</td>
<td>120</td>
<td>60</td>
<td>100</td>
<td>70</td>
<td>120</td>
<td>180</td>
</tr>
<tr>
<td>Ludhiana</td>
<td>8</td>
<td>1270</td>
<td>130</td>
<td>230</td>
<td>20</td>
<td>110</td>
<td>180</td>
<td>240</td>
<td>510</td>
</tr>
</tbody>
</table>

Crop: Cotton (Kharif).
Site: Ferozepur and Jullundur.

Ref.: Pb. 61 (S.F.T.)
Type: 'M'

Object:—Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Alluvial. (iii) to (vii) N.A. (viii) to (x) N.A.

2. TREATMENTS:
7 manurial treatments:
- O=Control (no manure),
- N1=44.8 Kg/ha. of N as A/S,
- N2=89.6 Kg/ha. of N as A/S,
- N1'=44.8 Kg/ha. of N as Urea,
- N2'=89.6 Kg/ha. of N as Urea,
- N1"=44.8 Kg/ha. of N as A/S/N and
- N2"=89.6 Kg/ha. of N as A/S/N.

3. DESIGN:
Same as in type A conducted under irrigated condition on Cotton crop on page No. 673.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of kapas. (iv) (a) 1961-only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N1</th>
<th>N2</th>
<th>N1'</th>
<th>N2'</th>
<th>N1''</th>
<th>N2''</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferozepur</td>
<td>10</td>
<td>910</td>
<td>150</td>
<td>280</td>
<td>170</td>
<td>250</td>
<td>190</td>
<td>270</td>
<td>360</td>
</tr>
<tr>
<td>Jullundur</td>
<td>4</td>
<td>1050</td>
<td>70</td>
<td>210</td>
<td>-30</td>
<td>150</td>
<td>40</td>
<td>150</td>
<td>1490</td>
</tr>
</tbody>
</table>

---
Crop : Cotton (Kharif).
Site : Jullundur.

Object:—Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS
(i) (a) to (c) N.A. (ii) Alluvial. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
7 manurial treatments:
O = Control (no manure),
N₁ = 44.8 Kg/ha. of N as A/S,
N₂ = 89.6 Kg/ha. of N as A/S,
N₃ = 44.8 Kg/ha. of as Urea,
N₄ = 89.6 Kg/ha. of N as Urea,
N₅ = 44.8 Kg/ha. of N as C/A/N and
N₆ = 89.6 Kg/ha. of N as C/A/N

3. DESIGN
Same as in type A conducted under irrigated condition on Cotton crop on page No. 678.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of kapas. (iv) (a) 1961-only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control trials yield in Kg/ha.</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
<th>N₆</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jullundur</td>
<td>11</td>
<td>670</td>
<td>40</td>
<td>80</td>
<td>440</td>
<td>580</td>
<td>480</td>
<td>730</td>
<td>430</td>
</tr>
</tbody>
</table>

Crop : Cotton (Kharif).
Ref : Pb. 61(S.F.T.).
Type : ‘M’.

Object:—Type A₁: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments
O = Control (no manure),
N₁ = 60 Kg/ha. of N,
N₂ = 120 Kg/ha. of N,
P₁ = 15 Kg/ha. of P₂O₅.
N, P = 60 Kg/ha. of N+35 Kg/ha. of P₂O₅,
N₂P₁ = 120 Kg/ha. of N+35 Kg/ha. of P₂O₅,
N₂P₁ = 120 Kg/ha. of N+70 Kg/ha. of P₂O₅. and
N₂P₂K₁ = 120 Kg/ha. of N+70 Kg/ha. of P₂O₅+35 Kg/ha. of K₂O.

3. DESIGN:
(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil and cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A₁, 11 of type A₂, 11 of type A₃ and 3 are of type C. The eleven experiments each under type A₁, A₂ and A₃ are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a Cash crop and 2 on an Oilseed crop. All the three type-C experiments are conducted on legume crop. For the purpose of conducting the A₁, A₂ and A₃ experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A₁, A₂ and A₃ are laid out. For conducting these experiments, three villages are randomly selected in each block.

(ii) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of kapas. (iv) (a) 1962 to 66 for Patiala and Sangrur (63 N.A.) 1962-63 for Jullundur, 1962 for Ludhiana and 1962 to 66 for Ferozepur (62, 63 N.A.) (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
Patiala
62 (S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₅P₁</th>
<th>N₆P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>125</td>
<td>152</td>
<td>82</td>
<td>130</td>
<td>175</td>
<td>188</td>
<td>201</td>
<td>211</td>
</tr>
<tr>
<td>Control yield = 511 Kg/ha., No. of trials = 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

64 (S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₅P₁</th>
<th>N₆P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>289</td>
<td>316</td>
<td>220</td>
<td>319</td>
<td>415</td>
<td>408</td>
<td>457</td>
<td>614</td>
</tr>
<tr>
<td>Control yield = 1067 Kg/ha., No. of trials = 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65 (S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₅P₁</th>
<th>N₆P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>307</td>
<td>333</td>
<td>224</td>
<td>357</td>
<td>438</td>
<td>433</td>
<td>535</td>
<td>450</td>
</tr>
<tr>
<td>Control yield = 1115 Kg/ha., No. of trials = 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sangrur
64 (S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₅P₁</th>
<th>N₆P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>150</td>
<td>330</td>
<td>113</td>
<td>143</td>
<td>275</td>
<td>295</td>
<td>345</td>
<td>1049</td>
</tr>
<tr>
<td>Control yield = 572 Kg/ha., No. of trials = 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65 (S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₃P₁</th>
<th>N₄P₁</th>
<th>N₅P₁</th>
<th>N₆P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>436</td>
<td>546</td>
<td>168</td>
<td>583</td>
<td>713</td>
<td>820</td>
<td>1060</td>
<td>691</td>
</tr>
<tr>
<td>Control yield = 841 Kg/ha., No. of trials = 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop - Cotton (Kharif).

Site - Ludhiana.

Ref. - Pb.62 (S.F.T.).

Type - 'M'.

Object - Type A1: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. Basal Conditions:
   (i) to (vi) N.A. (vii) Unirrigated. (viii) to (a) N.A.
2. TREATMENTS:

8 manurial treatments:

O=Control (no manure),

N1=35 Kg/ha. of N,

N2=70 Kg/ha. of N,

P1=25 Kg/ha. of P2O5,

N1P1=35 Kg/ha. of N+25 Kg/ha. of P2O5,

N2P1=70 Kg/ha. of N+25 Kg/ha. of P2O5,

N1P2=70 Kg/ha. of N+50 Kg/ha. of P2O5,

N2P2=120 Kg/ha. of N+70 Kg/ha. of P2O5,

and

N1P1K1=70 Kg/ha. of N+50 Kg/ha. of P2O5+25 Kg/ha. of K2O.

3. DESIGN:

Same as in type A1 conducted under irrigated condition on Cotton crop on page No. 682.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of kapas. (iv) (a) 1962-only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

Ludhiana
62(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P1</th>
<th>N2P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>115</td>
<td>256</td>
<td>147</td>
<td>277</td>
<td>373</td>
<td>304</td>
<td>483</td>
<td>34 5</td>
</tr>
</tbody>
</table>

Control yield=931 Kg/ha.; No. of trials=2

Crop: Cotton (Kharif).

Ref.- Pb, 62,64, 65(S.F.T) for Ferozepur, Patiala and Sangur and 62,65(S.F.T.) for Ludhiana.

District: Ferozepur, Patiala, Sangur and Ludhiana. Type: 'M'.

Object — Type A2: To study the response curves of important cereal, cash, and oil seed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:

(i) to (vi) N.A. (vii) Irrigated. (viii) to (cx) N.A.

2. TREATMENTS:

8 manurial treatments:

O=Control (no manure),

N1=60 Kg/ha. of N,

P1=35 Kg/ha. of P2O5,

N1P2=60 Kg/ha. of N+35 Kg/ha. of P2O5,

N2P2=60 Kg/ha. of N+70 Kg/ha. of P2O5,

N3P2=120 Kg/ha. of N+70 Kg/ha. of P2O5,

and

N1P2K1=120 Kg/ha. of N+70 Kg/ha. of P2O5+70 Kg/ha. of K2O.
3. DESIGN:

Same as in Type A1 conducted under irrigated condition on Cotton crop on page No. 682.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of kapas. (iv) (a) 1962 to 66 for Ferozepur, Patiala, Sangrur (i.e. N.A.); 1962 to 66 for Ludhiana (63), 64 N.A. (v) to (vii) N.A.

5. RESULTS:

Ferozepur

62 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30</td>
<td>30</td>
<td>11</td>
<td>37</td>
<td>91</td>
<td>51</td>
<td>19.0</td>
<td></td>
</tr>
</tbody>
</table>

Control yield= 342 Kg/ha.; No. of trials = 2

64 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>62</td>
<td>113</td>
<td>146</td>
<td>423</td>
<td>525</td>
<td>631</td>
<td>650</td>
<td>68.9</td>
</tr>
</tbody>
</table>

Control yield= 792 Kg/ha.; No. of trials = 3

65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>76</td>
<td>65</td>
<td>140</td>
<td>235</td>
<td>289</td>
<td>361</td>
<td>407</td>
<td>19.7</td>
</tr>
</tbody>
</table>

Control yield= 480 Kg/ha.; No. of trials = 14

Patiala

62 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>156</td>
<td>163</td>
<td>199</td>
<td>177</td>
<td>195</td>
<td>243</td>
<td>40.9</td>
<td></td>
</tr>
</tbody>
</table>

Control yield= 584 Kg/ha.; No. of trials = 5

64 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>283</td>
<td>161</td>
<td>289</td>
<td>326</td>
<td>349</td>
<td>405</td>
<td>451</td>
<td>55.4</td>
</tr>
</tbody>
</table>

Control yield= 965 Kg/ha.; No. of trials = 3

65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>320</td>
<td>189</td>
<td>182</td>
<td>274</td>
<td>358</td>
<td>245</td>
<td>374</td>
<td>78.8</td>
</tr>
</tbody>
</table>

Control yield= 1457 Kg/ha.; No. of trials = 5

Sangrur

62 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P2K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>128</td>
<td>22</td>
<td>101</td>
<td>200</td>
<td>245</td>
<td>358</td>
<td>481</td>
<td>73.2</td>
</tr>
</tbody>
</table>

Control yield= 604 Kg/ha.; No. of trials = 2
Crop: Cotton (Kharif). \text{Ref.:} \text{Ph. 62, 64, 65(S.F.T.) for Patiala, 64, 65(S.F.T.) for Ferozepur and 64, 65(S.F.T.) for Sangrur.}

\text{District:} Patiala, Ferozepur and Sangrur. \text{Type:} \text{‘M’}.

Object: To study the response curves of important cereal, cash and oil seed crops applied to K singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   O—Control (No manure)
   \( N_1 = 60 \text{ Kg/ha. of } N \), \( K_1 = 35 \text{ Kg/ha. of } K_2 O \),
   \( K_1 = 70 \text{ Kg/ha. of } K_2 O \), \( N_1 K_1 = 60 \text{ Kg/ha. of } N + 35 \text{ Kg/ha. of } K_2 O \),
   \( N_1 K_1 = 60 \text{ Kg/ha. of } N + 70 \text{ Kg/ha. of } K_2 O \),
   \( N_1 K_1 = 120 \text{ Kg/ha. of } N + 70 \text{ Kg/ha. of } K_2 O \) and
   \( N_1 P_1 K_1 = 60 \text{ Kg/ha. of } N + 35 \text{ Kg/ha. of } P_2 O_5 + 35 \text{ Kg/ha. of } K_2 O \).
3. DESIGN
Same as in type A conducted under irrigated condition on Cotton crop on Page No. 682.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of kapas. (iv) (a) 1962 to 66 for Patiala (63N.A.) 1962 to 66 for Ferozepur (62 and 63N.A.) and 1962 to 66 for Sangrur (62 and 63N.A.) (b) and (c) N.A. (v) to (vi) N.A.

5. RESULTS:

Patiala
64(S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K3</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>141</td>
<td>138</td>
<td>153</td>
<td>144</td>
<td>119</td>
<td>183</td>
<td>189</td>
<td>87.5</td>
</tr>
</tbody>
</table>

Control yield = 612 Kg/ha.; No. of trials = 3

Ferozepur
64(S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K3</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>168</td>
<td>113</td>
<td>256</td>
<td>207</td>
<td>227</td>
<td>370</td>
<td>311</td>
<td>124.1</td>
</tr>
</tbody>
</table>

Control yield = 1027 Kg/ha.; No. of trials = 2

Sangrur
64(S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K3</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>309</td>
<td>102</td>
<td>225</td>
<td>279</td>
<td>376</td>
<td>355</td>
<td>473</td>
<td>102.2</td>
</tr>
</tbody>
</table>

Control yield = 1260 Kg/ha.; No. of trials = 5

65(S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K3</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>380</td>
<td>39</td>
<td>122</td>
<td>361</td>
<td>419</td>
<td>598</td>
<td>478</td>
<td>64.6</td>
</tr>
</tbody>
</table>

Control yield = 875 Kg/ha.; No. of trials = 3

65(S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K3</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>118</td>
<td>27</td>
<td>97</td>
<td>218</td>
<td>258</td>
<td>324</td>
<td>297</td>
<td>16.1</td>
</tr>
</tbody>
</table>

Control yield = 992 Kg/ha.; No. of trials = 12

64(S.F.T.)
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N1K2</th>
<th>N1K3</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>410</td>
<td>233</td>
<td>304</td>
<td>502</td>
<td>596</td>
<td>678</td>
<td>785</td>
<td>127.5</td>
</tr>
</tbody>
</table>

Control yield = 733 Kg/ha.; No. of trials = 4
Crop: Cotton. (Kharif).

Site: Cotton Res. Stn, Abohar.

Object: To find out the best method of fertilizers placement for Cotton.

1. BASAL CONDITIONS:

(i) (a) N.A.  (b) Sewji-Fodder. (c) N.A. (ii) Sandy loam. (iii) 23.5.63. (iv) (a) One ploughing. (b) to (e) N.A. (v) Nil. (vi) F-320. (vii) Irrigated. (viii) and (ix) N.A. (x) End of Nov., 63.

2. TREATMENTS:

10 cultural treatments: T₀ = Control, T₁ = By plough sole method to drop the fertilizer 12cm. deep with the help of wooden plough about a week before sowing, T₂ = By seed-cum fertilizer drill to drop the fertilizer in the same line. The seed will be sown in one bowl and fertilizer in the other bowl, T₃ = By seed-cum-fertilizers drill to drop the fertilizers 4cm. deeper than the seed drill fertilizers will be applied in the bowl and the seed sown in the same line by attaching a shovel behind the drill. T₄ = By seed-cum fertilizers drill, the seed will be sown in one bowl and fertilizers in another bowl but with arrangement to make the fertilizers drop 5cm. deep and 5cm. away from the seed line as band on one side only. This will be done by attaching the shovels, T₅ = As basal dose before the last ploughing operation at sowing, T₆ = As basal dose at final thinning, T₇ = As basal dose at flowering, T₈ = As top dressing along with cotton rows at final thinning and T₉ = As top dressing along with cotton row at flowering.

Levels of fertilizer is (62 Kg/ha. of N + 37 Kg/ha. of P₂O₅).

3. DESIGN

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 1/197 ha. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 423 Kgs/ha. (ii) 125 Kgs/ha. (iii) Treatment differences are significant. (iv) Av. yield of cotton in Kgs/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
<th>T₈</th>
<th>T₉</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>463</td>
<td>331</td>
<td>294</td>
<td>392</td>
<td>436</td>
<td>404</td>
<td>425</td>
<td>349</td>
<td>488</td>
<td>446</td>
</tr>
<tr>
<td>C.D.</td>
<td>-181 Kgs/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Cotton. Site: Cotton Res. Sta., Abohar

Object: To study the effect of deep ploughing and interculture on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) Wheat-Cotton. (b) Wheat. (c) N.A. (d) Sandy loam.
   (ii) N.A. (iii) 25 Kg/ha. of P_{2}O_{5}. (iv) 1-320. (v) Irrigated.

2. TREATMENTS:
   Main-plot treatments:
   3 ploughing treatments: T_{1} = Normal ploughing. T_{2} = Deep ploughing (22cm. every year after wheat and cotton harvest) and T_{3} = Deep ploughing (22cm. once in two years after wheat harvest only)
   Sub-plot treatments:
   3 interculturing treatments: C_{1} = 1, C_{2} = 2 and C_{3} = 3 intercultures.

3. DESIGN:
   (i) Split-plot. (ii) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 1/197.7 ha. for 63; 14/54m. x 3/66m. for others. (v) 1/247.1 ha. for 63, 13/72m. x 2/44m. for others. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Spraying. with D.D.T. and B.H.C. (iii) Yield of kapas. (iv) (a) 1963 - cond. (b) and (c) Nil. (v) Gurdaspur, Jullanaur. (vi) Nil. (vii) Since the exp. is cond. beyond 65, individual year results are presented under 5. Results.

5. RESULTS:

<table>
<thead>
<tr>
<th></th>
<th>T_{1}</th>
<th>T_{2}</th>
<th>T_{3}</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_{1}</td>
<td>1125</td>
<td>1416</td>
<td>1404</td>
<td>1315</td>
</tr>
<tr>
<td>C_{2}</td>
<td>1085</td>
<td>1376</td>
<td>1351</td>
<td>1271</td>
</tr>
<tr>
<td>C_{3}</td>
<td>1083</td>
<td>1361</td>
<td>1370</td>
<td>1248</td>
</tr>
<tr>
<td>Mean</td>
<td>1098</td>
<td>1384</td>
<td>1352</td>
<td>1278</td>
</tr>
</tbody>
</table>

64(43)

<table>
<thead>
<tr>
<th></th>
<th>T_{1}</th>
<th>T_{2}</th>
<th>T_{3}</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_{1}</td>
<td>617</td>
<td>830</td>
<td>744</td>
<td>720</td>
</tr>
<tr>
<td>C_{2}</td>
<td>561</td>
<td>785</td>
<td>800</td>
<td>715</td>
</tr>
<tr>
<td>C_{3}</td>
<td>546</td>
<td>790</td>
<td>680</td>
<td>672</td>
</tr>
<tr>
<td>Mean</td>
<td>575</td>
<td>802</td>
<td>741</td>
<td>706</td>
</tr>
</tbody>
</table>

C.D. for T marginal means = 59.7 Kg/ha.

65(51)

<table>
<thead>
<tr>
<th></th>
<th>T_{1}</th>
<th>T_{2}</th>
<th>T_{3}</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_{1}</td>
<td>983</td>
<td>621</td>
<td>1361</td>
<td>706</td>
</tr>
<tr>
<td>C_{2}</td>
<td>1621</td>
<td>361</td>
<td>800</td>
<td>715</td>
</tr>
<tr>
<td>C_{3}</td>
<td>1361</td>
<td>800</td>
<td>672</td>
<td>672</td>
</tr>
</tbody>
</table>

C.D. for T marginal means = 59.7 Kg/ha.
### Crop: Cotton, Ref.: Pb. 63(172), 64(166), 65(62).

**Site:** Agri. Res. Sta., Gurdaspur. Type = 'C'.

Object:—To study the effect of deep ploughing and interculture on the yield of Cotton.

1. **BASAL CONDITIONS:**
   (i) (a) Wheat—Cotton. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 13.4.63; 10.5.64; last week of April, 65. (iv) (a) 3 to 7 ploughings. (b) to (e) N.A. (v) Nil. (vi) R-231. (vii) Irrigated. (viii) As per treatments. (ix) N.A. (x) 29.10.63 to 7.12.63; 1.10.64 to 22.10.64; 16.10.65; 28.10.65 and 15.11.65.

2. **TREATMENTS:**
   Same as in exp. no. 63(56), 64(43), 65(51) conducted at Abobar on page No. 689.

3. **DESIGN:**
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 1/197 ha.; 11'56m. x 4'27m.; 11'89m. x 4'27m. (b) 1/247 ha.; 10'36m. x 3'05m.; 11'28m. x 3'05m. (v) N.A.; 61cm. x 61cm; 30cm. x 61cm. (vi) Yes.

4. **GENERAL:**
   (i) Normal. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) Abobar. (vi) Nil. (vii) Since the exp. is contd. beyond 65, individual years results are presented under 5. Results.

5. **RESULTS**

**63(172)**
   (i) 448 Kg/ha. (ii) (a) 140'1 Kg/ha. (b) 72'9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C₁</td>
<td>497</td>
<td>458</td>
<td>425</td>
<td>460</td>
</tr>
<tr>
<td>C₂</td>
<td>457</td>
<td>440</td>
<td>439</td>
<td>445</td>
</tr>
<tr>
<td>C₃</td>
<td>439</td>
<td>477</td>
<td>406</td>
<td>441</td>
</tr>
<tr>
<td>Mean</td>
<td>464</td>
<td>458</td>
<td>423</td>
<td>448</td>
</tr>
</tbody>
</table>

**64(166)**
   (i) 238 Kg/ha. (ii) (a) 90'9 Kg/ha. (b) 47'8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.
Crop: Cotton (Kharij).

Site: Cotton Res. Sta., Gurdaspur.

Ref: Ph. 63(266), 64(168).

Type: 'C'.

Object: To study the effect of pruning at different stages of crop growth on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.
   (ii) Heavy loam.
   (iii) 13.4.63, 18.4.64.
   (iv) 5 to 7 ploughings.
   (v) N.A.
   (vi) R-231.
   (vii) Irrigated.
   (viii) 5 weedings.
   (ix) N.A.
   (x) 25.9.63 to 3.12.63; 13.9.64 to 22.10.64.

2. TREATMENTS:

3. DESIGN:
   (i) R.B.D.
   (ii) (a) 10.
   (b) N.A.
   (iii) 6.
   (iv) (a) 11.41m. x 2.44m.; 4.81m. x 3.05m.
   (b) 10.67m. x 2.44m.; 3.66m. x 2.29m.
   (v) N.A.
   (vi) Yes.

4. GENERAL:
   (i) Normal.
   (iii) Yield of kapas.
   (iv) (a) 1963-contrd. (crop failed in 65) (b) No. (c) Nil (v) and (vi) Nil.
   (vii) Since the expr. is contrd. beyond 65, individual years results are presented under. 5. Results.

5. RESULTS:

63(266)

(i) 390 Kg/ha. (ii) 1160 Kg/ha.

(iii) Treatment differences are not significant.

(iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av yield</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>316</td>
<td>353</td>
<td>343</td>
<td>383</td>
<td>358</td>
<td>432</td>
<td>351</td>
<td>376</td>
<td>526</td>
<td>460</td>
</tr>
</tbody>
</table>

(65/62)

(i) 161 Kg/ha. (ii) (a) 163·0 Kg/ha. (b) 56·2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.
Object: To study the effect of pruning at different stages of crop growth on the yield of Cotton.

1. BASAL CONDITIONS:

(i) N/A
(ii) 20 Kg/ha.
(iii) 22.4.64, 25.5.65.
(iv) (a) 4 to 5 ploughings, (b) Dibbling, (c) N/A.
(v) 61cm. X 38cm.
(vi) 22.4.64, 18.11.64 to 15.12.64, 14.10.65, 3.12.65 and 28.12.65.

2. TREATMENTS:

Same as in exp. no. 63 (266), 64(268) conducted at Gurdaspur on page. No. 691.

3. DESIGN:

(i) R.B.D. (ii) 10. (b) N.A. (iii) 6. (iv) 4.88m. X 3.05m.; 10.06m. X 2.44m. (b) 3.66m. X 2.29m. N.A
(v) 61cm. X 38cm. N.A. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Attack of jassids, Endrine and B.H.C. sprayed. (iii) Yield of kapas. (iv) (a) 1964 - contd. (b) No. (c) N/A. (v) Gurdaspur. (vi) N/A. (vii) Since the exp. is contd. beyond 65, individual years results are given under 5. Results.

5. RESULTS:

64(9)

(i) 155.5 Kgf/ba. (ii) 646 Kgf/ba. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kgf/ba.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>646</td>
<td>530</td>
<td>558</td>
<td>632</td>
<td>441</td>
<td>471</td>
<td>544</td>
<td>514</td>
<td>451</td>
<td>593</td>
</tr>
</tbody>
</table>

65(28)

(i) 146.3 Kgf/ba. (ii) 177.3 Kgf/ba. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kgf/ba.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>332</td>
<td>442</td>
<td>229</td>
<td>434</td>
<td>506</td>
<td>316</td>
<td>284</td>
<td>269</td>
<td>341</td>
<td>356</td>
</tr>
</tbody>
</table>
Crop: Cotton (Kharif).
Site: Punjab Agri. University, Ludhiana.

Object: To study the effect of deep ploughing and interculture on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Sandy loam. (ii) 15.5.64. (iv) (a) As per treatments. (b) to (e) N.A. (v) 62 Kg/ha. of N+ 37 Kg/ha. of P2O5. (vi) irrigated. (vii) One thinning. (ix) N.A. (a) 2.11.64 to 9.12.64.

2. TREATMENTS:
   Same as in exp. no. 63(56), 64(43), 65(51) conducted at Abohar on page. No. 689.
3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 4'88m. x 4'88m. (b) 3'66m. x 4'27m. (v) 61cm. x 30cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Attack of jassids and white fly Endrine sprayed twice. (iii) Yield of kapao. (iv) (a) 1964-only (b) No. (c) Nil. (v) Abohar, Gurdaspur. (vi) and (vii) Nil.

5. RESULTS:
   (i) 272 Kg/ha. (ii) (a) 187.1 Kg/ha. (b) 105.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapao in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C₁</td>
<td>319</td>
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<tr>
<td>C₂</td>
<td>269</td>
<td>237</td>
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<tr>
<td>C₃</td>
<td>296</td>
<td>290</td>
<td>293</td>
<td>283</td>
</tr>
<tr>
<td>Mean</td>
<td>295</td>
<td>246</td>
<td>276</td>
<td>272</td>
</tr>
</tbody>
</table>


1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) Middle of May, 64; 3rd week of May, 65. (iv) (a) 4-5 ploughings (b) to (e) N.A. (vi) F-320. (vii) Irrigated. (viii) 3 weedings. (ix) N.A. (x) 30.10.64. and 15.12.64; middle of Oct. to last week of Dec.

2. TREATMENTS:

3. DESIGN:
   (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 4'88m. x 3'05m.; N.A. (v) 3'66m. x 2'29m.; 1/417 ha. (vi) 61cm. x 38cm.; N.A. (vii) Yes.

4. GENERAL:
   (i) Normal. (ii) Endrine sprayed against jassids attack (iii) Yield of kapao. (iv) (a) 1964-contd. (b) No. (c) Nil. (v) Abohar. (vi) Nil. (vii) Since the extnt. is contd. beyond 65, individual years results are presented under 5. Results.

5. RESULTS:
   (i) 727 Kg/ha. (ii) 155.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapao in Kha, Av. yield D₄ D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉
   87 748 763 824 624 665 717 713 654 793
65(20)

(i) 194 Kg/ha. (ii) 247·7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D_1</th>
<th>D_2</th>
<th>D_3</th>
<th>D_4</th>
<th>D_5</th>
<th>D_6</th>
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<tr>
<td>Av. yield</td>
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<td>127</td>
<td>188</td>
<td>178</td>
<td>257</td>
<td>186</td>
<td>111</td>
<td>116</td>
<td>193</td>
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</tbody>
</table>

CROP: Cotton (Kharif).

SITE: Agri. Farm, Nasirpur.

Object: To study the effect of different dates of pruning on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Loamy soil. (iii) 11.5.63. (iv) (a) 5 ploughings. (b) to (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) 10.10.63 to 6.11.63.

2. TREATMENTS:

Same as in ext. No. 64(78), 65(20) on page. No. 694.

3. DESIGN:

(i) R.B.D (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) and (b) 4.27m. X 4.88m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (iii) 10% B.H.C. sprayed against Tikka. (iii) Yield of kapas. (iv) (a) 1963-only. (b) No. (c) Nil. (v) Abohar, Ludhiana. (vi) and (vii) Nil.

5. RESULTS:

(i) 1287 Kg/ha. (ii) 182·1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_0</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
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<td>Av. yield</td>
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<td>1273</td>
<td>1233</td>
<td>1341</td>
<td>1149</td>
<td>1301</td>
<td>1305</td>
<td>1273</td>
<td>1321</td>
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</table>

CROP: Cotton (Kharif).

SITE: Cotton Res. Stn., Abohar

Object: To study the effect of different dates of sowing and spacing with different levels of N on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 3 to 4 ploughings. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) Nil. (vi) F-320. (vii) Irrigated. (viii) 3 hoeings. (ix) N.A. (x) during Dec., 62.
2. TREATMENTS:

Main-plot treatments :
All combinations of (1) and (2)
(1) 4 dates of sowing : D₁=30.3.62, D₂=20.4.62, D₃=9.5.62 and D₄=6.6.62.
(2) 3 spacings between rows : S₁=46, S₂=61 and S₃=76cm.

Sub-plot treatments :
3 levels of N : N₀=0, N₁=56 and N₂=112 Kg/ha.

3. DESIGN :
(i) Split-plot. (ii) (a) 12 main-plots/replication; 3 sub-plots/main-plot (b) N.A. (iii) 3. 
(iv) (a) 8.23m x 3.35m. (b) 8.23m x 2.29m. (v) 53cm. on either side. 
(vi) Yes.

4. GENERAL :
(i) Satisfactory. (ii) Nil. (iii) Yield of kaspas. 
(iv) (a) 1962-only. (b) No. (c) Nil. (v) N.A. (vi) 
and (vii) Nil.

5. RESULTS:
(i) 567 Kg/ha. (ii) (a) 260.3 Kg/ha. (b) 138.2 Kg/ha. (iii) Main effects of D, S and N are highly significant.
(iv) Av. yield of kaspas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>D₁</th>
<th>D₂</th>
<th>D₃</th>
<th>D₄</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
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<td>455</td>
<td>216</td>
<td>324</td>
<td>515</td>
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<td>796</td>
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<td>760</td>
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<td>315</td>
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</table>

C.D. for D marginal means=146.9 Kg/ha.
C.D. for S marginal means=127.2 Kg/ha.
C.D. for N marginal means=65.6 Kg/ha.

Crop :- Cotton (Kharif).
Site :- Cotton Res. Stn., Abohar.
Object :- To study the suitable crops that can be grown in rotation with Cotton under adequate manuring.

Ref :- Pb, 63(58).
Type :- 'CM'.

1. BASAL CONDITIONS :
(i) Asper treatments. (ii) Sandy loam. (iii) 16.5.63. (iv) (a) 4-5 ploughings. (b) to (e) N.A. (v) Nil. 
(vi) P-320. (vii) Irrigated. (viii) Thinning on 22.6.63. (ix) N.A. (a) Nov. and Dec., 63
2. TREATMENTS:

All combinations of (1) and (2).

(1) previous crops rotations of cotton: T1 = Cotton after Wheat-Guara-Torha, T2 = Cotton after Charis-Guara, T3 = Cotton after Guara-Wheat, T4 = Cotton after Guara. T5 = Cotton after Pea and T6 = Cotton (No previous crop).

(2) 3 levels of N: $N_0 = 0$, $N_1 = 28$ and $N_2 = 56$ Kg/ha. of N.

3. DESIGN:

(i) R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) (a) 1/197.7 ha. (b) 1/247.1 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) 1/2 litre endrine sprayed on 21.9.63. (iii) Yield of kapas. (iv) (a) 1963-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 1264 Kg/ha. (ii) 256.6 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
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<td>927</td>
<td>883</td>
<td>1082</td>
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<td>1248</td>
<td>1431</td>
<td>1269</td>
<td>1496</td>
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<td>1339</td>
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<tr>
<td>$N_2$</td>
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<td>1489</td>
<td>1517</td>
<td>1674</td>
<td>1575</td>
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</table>

Mean 1217 1282 1223 1417 1248 1196 1264

C.D. for N marginal means=148.9 Kg/ha.

---

Crop: Cotton (Kharif).

Site: Cotton Res. Sta., Abohar.

Type: 'CM'.

Object: To study the effect of intercropping on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 6.5.63. (iv) (a) 4 to 5 ploughings. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) 24-7 Kg/ha. of N applied as basal dose. (vi) F-320 (cotton), Pb-13 (Bhindi), Pb-10 (cow pea). (vii) Irrigated. (viii) Two thinnings. (ix) N.A. (x) Nov. and Dec., 63.

2. TREATMENTS:

All combinations of (1) and (2)+2 extra treatments.

(1) 8 intercropping treatments: $T_1$=Cotton (normal spacing 61cm. x 46cm.), $T_2$=Cotton (wide spacing 91cm. x 30cm.), $T_3$=Cotton with one row of Bhindi as intercrop (for seed), $T_4$=Cotton with two rows of Bhindi as intercrop (for seed), $T_5$=Cotton with one row of cowpea as intercrop (for pods), $T_6$=Cotton with two rows of cowpea as intercrop (for pods), $T_7$=Cotton with two rows of Guara as intercrop (for fodder) and $T_8$=Cotton with two rows of Guara as intercrop (for G.M.).

(2) 2 levels of N at flowering: $N_1 = 28$ and $N_2 = 56$ Kg/ha. of N as top dressing

Extra treatments $E_1$=Cotton with normal spacing and $E_2$=Cotton with wide spacing.

Treatments $T_1$ to $T_6$ were applied 15 Kha. of P$_2$O$_5$ at sowing.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) (a) 1/198 ha. (b) 1/247 ha. (v) N.A. (vi) Yes.
4. GENERAL:
(i) Satis factory. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1963 to 65 (modified every year) (b) No. (c) Nil. 
(v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 741 Kg/ha. (ii) 217.4 Kg/ha. (iii) Main effects of T and extra treatments as others are highly significant. (iv) Av. yield of kapas in Kg/ha. 
E1=1133, Kg/ha, and E2=959 Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
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<td>232</td>
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<td>949</td>
<td>658</td>
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<td>170</td>
<td>1194</td>
<td>838</td>
<td>748</td>
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<tr>
<td>Mean</td>
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<td>859</td>
<td>644</td>
<td>524</td>
<td>258</td>
<td>232</td>
<td>974</td>
<td>894</td>
<td>703</td>
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</tbody>
</table>

C.D. for T marginal means=218.5 Kg/ha.
C.D. for extra vs. others=169.9 Kg/ha.

Crop :• Cotton (Kharif).
Site :• Cotton Res. Stn; Abohar
Object :• To study the effect of intercropping on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 8.5.64. (iv) (a) 4 to 5 ploughings. (b) and (c) N.A. (d) As per treatments. (e) N.A. (vi) 25 Kg/ha. of N as basal dose. (vi) F-320. (vii) Irrigated. (viii) 2 hoeings (ix) N.A. (x) Nov. and Dec., 64.

2 TREATMENTS:
All combinations of (1) and (2)+4 Extra treatments
(1) 8 intercropping treatments: T1=Cotton with spacing 60cm. x 45cm (Normal), T2=Cotton with spacing 90cm. x 30cm (wide), T3=T1+one row of Bhindi Pb. 13 as intercrop (seed), T4=T2+two rows of Bhindi Pb. 13as intercrop (for seed), T5=T1+one row of cowpea Braco as intercrop (for pod) T6=T1+two rows of cowpea Pb. 10 as intercrop (for G.M.), T7=T2+two rows of Guara as intercrop (for fodder) and T8=T1+two rows of G.Sara as intercrop (for G.M.)
(2) 2 levels of N : N1=60 and N2=120 Kg/ha. of N, at flowering stage.
Extratreatments: E1=Cotton with normal spacing E2=Cotton with wide spacing, E3=E4+2 rows of cowpea Pb. 10 as intercrop (for G.M.) and E5=E4+2 rows of Guara as intercrop (for G.M.).
Treatments T1 to T8 were applied 40 Kg/ha. of P2O5.

3. DESIGN:
(i) R.B.D. (ii) (a) 20. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 244m. x 5.49m. for T1 and 1.83m. x 5.79m. for T2 to T8 (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1963-65. (1963 and 65 N.A. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil

5. RESULTS:
(i) 1119 Kg/ha. (ii) 323.7 Kg/ha. (iii) Main effects of T and N are highly significant. (iv) Av. yield of kapas in Kg/ha. 
E1=816, F3=1176, F4=1098 and F4=1258 Kg/ha.
Crop: Cotton (Kharif).

Type: 'CM'.

Site: Cotton Res. Stn., Abohar.

Object: To study the effect of intercropping on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 6.5 ft. (iv) (a) 3 to 4 ploughings. (b) to (e) N.A. (v) Nil. (vi) F-320. (vii) Irrigated. (viii) 1 subhage and 2 hoeings. (ix) N.A. (x) 16.11.65 to 10.12.65.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 8 cultural treatments: T1 = Cotton (Normal spacing 60cm. x 45cm.), T2 = Cotton (wide spacing 90cm. x 30 cm.), T3 = T2 + Bhindi one row for seeds, T4 = T3 + Bhindi 2 rows for seeds, T5 = T2 + Cowpea 1 row for grain, T6 = T5 + Cowpea (2 rows for G.M.), T7 = T2 + Guara (2 rows for fodder) and T8 = T2 + Guara (2 rows for G.M.)
   (2) 2 levels of N: N1 = 60, and N2 = 120 Kg/ha.

3. DESIGN:
   (i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) 3-60cm. x 6-30cm. (b) 2-40cm. x 5-40cm. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) 2 aerial spray of 0.2% sol. of endrine. (iii) Yield of kapas. (iv) (a) 1963-65 (modified every year). (b) No. (c) Nil. (v) Jullundur and Ludhiana. (vi) and (vii) Nil.

5. RESULTS:
   (i) 949 Kg/ha. (ii) 1440 Kg/ha. (iii) Main effects of T and N are highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
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<td>775</td>
<td>309</td>
<td>1029</td>
<td>657</td>
<td>1112</td>
<td>949</td>
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</tbody>
</table>

C.D. for T marginal means = 145.2 Kg/ha.
C.D. for N marginal means = 72.6 Kg/ha.
Crop := Cotton (Kharif).  
Site := Agr Res Stn, Gurdaspur.

Object:—To study the effect of crop rotation in combination with different doses of N on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Cotton. (c) N.A.  
   (ii) Heavy loam. (iii) 16.5.63.  
   (iv) (a) 5 ploughings. (b) to (c) N.A.  
   (v) N.A. (vi) 231-R. (vii) Irrigated. (viii) 4 weedings. (ix) N.A.  
   (x) 26,11.63 to 11.1.64.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 6 previous crop rotations to Cotton:  
      T1=Cotton after Wheat-Guara (G.M.), T2=Cotton after Guara-Gram,  
      T3=Cotton after G.M.—Wheat, T4=Cotton after Guara,  
      T5=Cotton after Peas and T6=Cotton (no previous crop)
   (2) 3 levels of N := N1=0, N2=28, and N3=56 Kg/ha.

3 DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) (a) and (b) N.A.  
   (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Endrine 20% sprayed against Jassids attack. (iii) Yield of kapas.  
   (iv) 1963-only. (b) No. (c) Nil.  
   (d) to (vii) N.A.

5. RESULTS:
   (i) 232 Kg/ha. (ii) 64’81 Kg/ha. (iii) None of the effects is significant.  
   (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
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<tr>
<td>N3</td>
<td>260</td>
<td>220</td>
<td>265</td>
<td>205</td>
<td>216</td>
<td>236</td>
<td>224</td>
</tr>
<tr>
<td>Mean</td>
<td>250</td>
<td>214</td>
<td>238</td>
<td>229</td>
<td>233</td>
<td>226</td>
<td>232</td>
</tr>
</tbody>
</table>
2. TREATMENTS:

All combinations of (1) and (2)

(1) 8 cultural treatments: 
- \( T_1 \) = Cotton with normal spacing 61cm. \( \times \) 46cm.
- \( T_2 \) = Cotton wide spacing of 91 cm. \( \times \) 30cm.
- \( T_3 \) = Cotton wide + two rows of Bhindi (for fruit).
- \( T_4 \) = Cotton cowpea one row for grain.
- \( T_5 \) = Cotton + Bhindi (for fruit).
- \( T_6 \) = Cotton + two rows of cowpea for G.M.
- \( T_7 \) = Cotton wide + two rows of cowpea for fodder.
- \( T_8 \) = Cotton cowpea one row for grain.

(2) 2 levels of N as C/A/N: \( N_1 \) = 28 and \( N_2 \) = 56 Kg/ha.

3. DESIGN:

- (i) Fact. in R.B.D.
- (ii) (a) 16, (b) N.A. (iii) 4.
- (iv) (a) 1/198ha.; 11'89m. \( \times \) 3'66m.
- (b) 1/247 ha.; 10'67m. \( \times \) 3'66m.
- (v) N.A.; 61cm. on either side.
- (vi) Yes.

4. GENERAL:

(i) Normal, Poor
(ii) 10% B.H.C. against tika; Jassids attack controlled by endrine

(vi) N.A.
(vii) Nil
(viii) Error variances are heterogeneous and Treatment x Years interaction is present.

5. RESULTS:

Pooled results.

(i) 245 Kg/ha. (ii) 245.3 Kg/ha. (based on 15 d.f. made up of Treatment x Years interaction) (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
<th>( T_5 )</th>
<th>( T_6 )</th>
<th>( T_7 )</th>
<th>( T_8 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( N_1 )</td>
<td>347</td>
<td>246</td>
<td>311</td>
<td>303</td>
<td>100</td>
<td>90</td>
<td>288</td>
<td>259</td>
<td>245</td>
</tr>
<tr>
<td>( N_2 )</td>
<td>314</td>
<td>288</td>
<td>303</td>
<td>292</td>
<td>80</td>
<td>109</td>
<td>317</td>
<td>317</td>
<td>252</td>
</tr>
<tr>
<td>Mean</td>
<td>330</td>
<td>267</td>
<td>307</td>
<td>297</td>
<td>90</td>
<td>99</td>
<td>302</td>
<td>288</td>
<td>248</td>
</tr>
</tbody>
</table>

---

\[ \text{Crop} \rightarrow \text{Cotton (Khariji)} \]

\[ \text{Site} \rightarrow \text{Cotton Res. Sta., Jallundur.} \]

Ref: Ph. 65(27).

Type: ‘CM’.

Object: To study the effect of intercropping on the yield of Cotton.

1. BASAL CONDITIONS:

- (i) (a) to (c) N.A.
- (ii) Sandy loam
- (iii) 16.5.65.
- (iv) (a) 3 ploughings (b) to (e) N.A.
- (v) N.A.
- (vi) F.320.
- (vii) Irrigated.
- (viii) and (ix) N.A.
- (x) 21.10.65 to 2.12.65.
2. TREATMENTS:

All combinations of (1) and (2)
(18 cultural treatments: T_1 = Cotton normal spacing 60 cm. x 45 cm., T_2 = Cotton with spacing 90 cm. x 30 cm., T_3 = T_1 + Bhindi (one row) as intercrop, T_4 = T_1 + Cowpea (2 rows) as intercrop, T_5 = T_1 + Cowpea (2 rows for G.M.) as intercrop, T_6 = T_2 + Guara (2 rows for fodder) as intercrop and T_8 = T_2 + Guara (2 rows for G.M.) as intercrop.

(2) 2 levels of N: N_1 = 60 and N_2 = 120 Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) 7’32m. x 3’81m. (b) 1/500 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) 2 endrine spray against Jassids aphids attack. (iii) Yield of kapas. (iv) 1963-65. (b) No. (c) Nil. (v) Abohar and Ludhiana. (vi) and (vii) Nil.

5. RESULTS:

(i) 683 Kg/ha. (ii) 1134 Kg/ha. (iii) Main effect of T alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N_1</td>
<td>799</td>
<td>662</td>
<td>699</td>
<td>705</td>
<td>741</td>
<td>537</td>
<td>692</td>
<td>546</td>
</tr>
<tr>
<td>N_2</td>
<td>876</td>
<td>814</td>
<td>739</td>
<td>698</td>
<td>689</td>
<td>491</td>
<td>612</td>
<td>632</td>
</tr>
<tr>
<td>Mean</td>
<td>837</td>
<td>738</td>
<td>719</td>
<td>702</td>
<td>715</td>
<td>514</td>
<td>652</td>
<td>589</td>
</tr>
</tbody>
</table>

C.D. for T marginal means = 134.5 Kg/ha.

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**Crop:** Cotton (Kharif)

**Site:** Punjab Agri. University, Ludhiana

**Ref:** Ph.63(92)

**Type:** ‘CM’

Object: To study the effect of intercropping on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) May, 63. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) 25 Kg/ha. of N at sowing. (vi) F-320 (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) Pickings from 20.11.63. to 9.1.64.

2. TREATMENTS:

All combinations of (1) and (2)+2 extra treatments.

6 intercropping treatments: T_1 = Cotton with normal spacing 60 cm. x 45 cm., T_2 = Cotton with wide spacing 90 cm. x 30 cm., T_3 = T_1 + one row of Bhindi as intercrop, T_4 = T_1 + two rows of Bhindi as intercrop, T_5 = T_1 + two rows of Guara (for fodder) as intercrop and T_6 = T_2 + two rows of Guara (for G.M.) as intercrop.

(2) 2 levels of N: N_1 = 60 and N_2 = 120 Kg/ha. of N at flowering.

Extra treatments: E_1 = Cotton with normal spacing and E_2 = Cotton with wide spacing. T_7 and T_8 were applied 40 Kg/ha of P_2O_5.

3. DESIGN:

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 5’49m. x 6’71m. (b) 4’27m. x 5’26m. (v) 6’6em. x 72cm. (vi) Yes.
4. GENERAL:
(i) Poor. (ii) Severe attack of jassid, folidol sprayed. (iii) Yield of kapas. (iv) 1963-65 (Treatments
temperature). (v) No. (vi) Nil. (vii) Abohar. (viii) and (ix) Nil.

5. RESULTS:
(i) 164 Kga/ha. (ii) 93.8 Kga/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

\[ E_1 = 188 \text{ and } E_2 = 70 \text{ Kg/ha.} \]

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>282</td>
<td>128</td>
<td>144</td>
<td>186</td>
<td>118</td>
<td>194</td>
</tr>
<tr>
<td>N2</td>
<td>202</td>
<td>96</td>
<td>182</td>
<td>218</td>
<td>165</td>
<td>133</td>
</tr>
<tr>
<td>Mean</td>
<td>242</td>
<td>112</td>
<td>163</td>
<td>202</td>
<td>142</td>
<td>158</td>
</tr>
</tbody>
</table>


Object :- To study the effect of intercropping on the yield of Cotton.

1. BASAL CONDITIONS:
(i) N.A. (ii) Sandy loam. (iii) Mid. of May, 65. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) As per treatments.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 8 cultural treatments: T1—Cotton with normal spacing (60cm. x 45cm.), T2—Cotton with wide spacing
90cm. x 90cm. T3=T4+Bhindi (one row) as intercrop, T5=T6+Bhindi (2 rows) as intercrop, T7=T8+Cowpea
(one row for G.M.) as intercrop, T9=T10+cowpea (2 rows for G.M.) as intercrop, T11=T12+Guara (2 rows for
fodder) as intercrop and T13=T14+Guara (2 rows for G.M.) as intercrop.
(2) 2 levels of N: N1=60, and N2=120 Kg/ha.
25 Kg of N at sowing and rest after flowering.

3. DESIGN:
(i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/280 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Spraying of endrine against jassid. (iii) Yield of kapas. (iv) 1963-65 (treatments
modified) (b) No. (c) Nil. (v) Abohar. (vi) Nil. (vii) Nil. (viii) Due to severe attack of jassids
in 1964. Yield was very low and experiment was treated as vitiated.

5. RESULTS:
(i) 196 Kg/ha. (ii) 150 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>189</td>
<td>240</td>
<td>167</td>
<td>157</td>
<td>171</td>
<td>190</td>
</tr>
<tr>
<td>N2</td>
<td>202</td>
<td>176</td>
<td>172</td>
<td>192</td>
<td>200</td>
<td>219</td>
</tr>
<tr>
<td>Mean</td>
<td>195</td>
<td>208</td>
<td>169</td>
<td>175</td>
<td>186</td>
<td>204</td>
</tr>
</tbody>
</table>
Crop: Cotton (Kharif).

Site: Cotton Res. Stn., Abohar.

Object: To determine the irrigation requirements of Cotton and its interaction with manuring.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Rayam. (c) N.A. (ii) Sandy loam. (iii) 8.5.64; 28.4.65. (iv) (a) 3 to 5 ploughings. (b) to (e) N.A. (v) 40 kg/ha of P2O5 + 40 kg/ha of K2O. (vi) F-220. (vii) Irrigated. (viii) and (ix) N.A. (x) 11.1.64 and 11.11.65. and 10.12.65.

2. TREATMENTS:
   Main-plot treatments: 8 irrigational treatments: W0=Local method of irrigation, W1=t1, W2=t1+t2, W3=t1+t2+t3, W4=t1+t2+t3+t4. W5=t1+t2+t3+t4+t5, W6=t1+t2+t3+t4+t5+t6, W7=t1+t2+t3+t4+t5+t6+t7. Where t1=25%, t2=50%, and t3=75% indicate the levels of the soil moisture consumed at irrigation. In any treatment the first letter with its suffix indicates the level of soil moisture consumed at the time of irrigation before flowering and the 2nd letter indicates after flowering and fruiting period.

   Sub-plot treatments:
   3 levels of N: N0=0, N1=60 and N2=120 kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 8 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 10m.x 4.8m.; 13.05m.x 3.40m. (b) 6.40m.x 1.83m.; 12.15m.x 1.80m. (v) N.A. (vi) Yes.

4. RESULTS:
   64/45
   (i) 779 kg/ha. (ii) (a) 209.6 kg/ha. (b) 172.0 kg/ha. (iii) Main effect of N alone is highly significant.
   (iv) Av. yield of kapas in kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>Mean</th>
</tr>
</thead>
</table>
   N0 | 483 | 555 | 515 | 510 | 579 | 643 | 679 | 551 | 564   |
   N1 | 771 | 643 | 920 | 709 | 754 | 876 | 826 | 747 | 787   |
   N2 | 993 | 974 | 1021 | 914 | 940 | 1153 | 1006 | 929 | 991   |
   Mean | 749 | 724 | 819 | 711 | 758 | 891 | 837 | 742 | 779   |

   C.D for N marginal means=86.6 kg/ha.

   65(1)
   (i) 851 kg/ha. (ii) (a) 205.7 kg/ha. (b) 114.3 kg/ha. (iii) Main effect of W is significant. Main effect of N is highly significant.
   (iv) Av. yield of kapas in kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>Mean</th>
</tr>
</thead>
</table>
   N0 | 747 | 740 | 666 | 701 | 547 | 609 | 627 | 630 | 657   |
   N1 | 932 | 1125 | 983 | 1041 | 751 | 904 | 817 | 740 | 912   |
   N2 | 981 | 1305 | 1089 | 1104 | 834 | 1061 | 849 | 882 | 1013  |
   Mean | 887 | 1057 | 913 | 949 | 711 | 838 | 764 | 747 | 861   |

   C.D for W marginal means=174.7 kg/ha.
   C.D. for N marginal means=37.6 kg/ha.
Object: To study the effect of beta naphthoxyacetic acid (NOA) spraying on crop growth and yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy Loam. (iii) 25.4.63 (iv) (a) to 5 ploughings. (b) to (e) N.A. (v) Nil. (vi) 320 F. (vii) Irrigated. (viii) Thinning. (ix) N.A. (x) Nov. and Dec., 63.

2. TREATMENTS:
All combinations of (1), (2) and (3)+Control.
(1) 3 concentrations of NOA: C₃=5, C₂=10 and C₁=15 ppm.
(2) 2 wetting agents: W₀=Without water and W₁=With water.
(3) 3 times of spray: T₁=One week after opening of 1st flower, T₃=2 weeks after opening of 1st flower and T₅=3 weeks after opening of 1st flower.

3. DESIGN:
(i) R.B.D. (ii) (a) 20 (2 control plots in each replication) (b) N.A. (iii) 4. (iv) (a) 1/198 ha. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Spray with 1% solution of NOA in Alcohol on 24.8.63, Endrine spray on 23.9.63. (iii) Yield of kapas. (iv) (a) 1963-only (b) No. (c) Nil. (v) Gurdaspur, (vi) and (vii) Nil.

5. RESULTS:
(i) 323 Kg/ha. (ii) 64.1 Kg/ha. (iii) Main effect of C alone is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>W₀</td>
<td>339</td>
<td>308</td>
<td>314</td>
<td>313</td>
<td>313</td>
<td>316</td>
<td>320</td>
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<tr>
<td>W₁</td>
<td>368</td>
<td>289</td>
<td>319</td>
<td>311</td>
<td>327</td>
<td>333</td>
<td>325</td>
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<tr>
<td>Mean</td>
<td>353</td>
<td>299</td>
<td>317</td>
<td>312</td>
<td>330</td>
<td>327</td>
<td>323</td>
</tr>
<tr>
<td>T₁</td>
<td>344</td>
<td>284</td>
<td>308</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T₃</td>
<td>356</td>
<td>322</td>
<td>312</td>
<td></td>
<td></td>
<td></td>
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<td>T₅</td>
<td>360</td>
<td>291</td>
<td>330</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for C marginal means=37 Kg/ha.

Object: To determine suitable method of controlling weeds and its effects on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 36.4.63: 26.6.64: 4.5.65. (iv) (a) 3 to 5 ploughings. (b) to (e) N.A. (v) N.A. (vi) F=320. (vii) Irrigated. (viii) Hoeings and thinning. (ix) N.A. (x) Nov. and Dec., 63; 11.11.64 and 6.12.64; 10.11.65 and 10.12.65.
2. TREATMENTS:

10 weedical treatments: W0 = Unweeded, W1 = Local method of weeding, first hoeing with Kasaula followed by two hoeings with Lyallpur hoe, W2 = Eptam (Ethyl-DDT-Di(2-ethylhexyl)diisothiocarbamate) at 2.2 Kg/ha, W3 = CMU (Chlorometazine) at 0.5 Kg/ha, W4 = PCP (Penta-chlorophenol) E.C. 12% at 24.7 Kg/ha, W5 = Dowpon (2,2-Dichloropropionic Acid) at 24.7 Kg/ha, W6 = Eptam at 4.2 Kg/ha, W7 = CMU at 1.0 Kg/ha, W8 = PCP, E.C. 12% at 49.4 Kg/ha, W9 = Dowpon at 9.9 Kg/ha.

Treatment W1, W4 were applied at pre-planting stage and W6 to W8 at pre-emergence stage.

3. DESIGN:

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 1/198 ha.; N.A.; 8'10m. x 3'06m. (b) 1/247 ha.; N.A. 7'20m. x 1'80m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Poor for 63; N.A. for others. (ii) D.D.T and B.H.C sprayed; Nil; Eodrine sprayed against Jassids. (iii) Yield of kapas (iv) (a) 1963-contd. (b) No (c) Nil, (v) Gurdaspur, Jullundur. (vi) Nil. (vii) Since the exp. is contd. beyond 65, individual years results are presented under 5. Results.

5. RESULTS:

63(53)

(i) 97 Kg/ha. (ii) 69.5 Kg/ha. (iii) Treatment differences are highly significant (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>77</td>
<td>498</td>
<td>49</td>
<td>32</td>
<td>53</td>
<td>69</td>
<td>63</td>
<td>47</td>
<td>47</td>
</tr>
<tr>
<td>C.D. - 70.4 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

64(37)

(i) 105 Kg/ha. (ii) 32.5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>133</td>
<td>204</td>
<td>74</td>
<td>87</td>
<td>106</td>
<td>86</td>
<td>85</td>
<td>102</td>
<td>89</td>
</tr>
<tr>
<td>C.D. - 37.8 Kg/ha.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

65(55)

(i) 600 Kg/ha. (ii) 229.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>505</td>
<td>1365</td>
<td>502</td>
<td>566</td>
<td>625</td>
<td>618</td>
<td>615</td>
<td>630</td>
<td>257</td>
</tr>
<tr>
<td>C.D. = 267.6 Kg/ha.</td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Crop : Cotton (Charif).

Ref. : Pb. 64(107).

Site : Cotton Res. Stn., Abohar.

Type : 'D'.

Object :—To study the effect of soaking cotton seed in different concentrations of some plant regulators on growth and yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Gram. (c) N.A. (ii) Sandy loam. (iii) 13.5.64. (iv) (a) One ploughing with desi plough, (b) to (e) N.A. (v) Nil. (vi) 320-F. (vii) Irrigated. (viii) Dry hoenig. (ix) N.A. (x) Nov/Dec, 64.
2. TREATMENTS:

All combinations of (1), (2), (3) and (4)

(1) 3 plant regulators: \( P_1 = N.A.A. \) (naphthalene acetic acid), \( P_2 = IAA \) (indole acetic acid) and \( P_3 = I.B.A - \) indole-3-butyric acid.

(2) 3 concentrations of plant regulators: \( C_1 = 10, C_2 = 20 \) and \( C_3 = 30 \) ppm.

(3) 3 spacings: \( S_1 = 60 \times 15, S_0 = 60 \times 30 \) and \( S_2 = 60 \times 45 \) cm.

(4) 3 levels of \( N \): \( N_1 = 60 \), \( N_2 = 120 \) and \( N_3 = 180 \) Kga/ha.

3. DESIGN:

(i) 3° partial confd. (ii) (a) 9 plots/block; 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) N.A. (b) 1.83 m × 0.6 m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1964-only. (b) N.A. (c) Nil. (v) Jullundur (vi) and (vii) N.A.

5. RESULTS:

(i) 639 Kga/ha. (ii) 191.7 Kga/ha. (iii) Main effects of \( N, S \) and \( P \) are highly significant. (iv) Av. yield of kapas in Kga/ha.

<table>
<thead>
<tr>
<th>( S_1 )</th>
<th>( S_2 )</th>
<th>( S_3 )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( N_3 )</th>
<th>( C_1 )</th>
<th>( C_2 )</th>
<th>( C_3 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( P_1 )</td>
<td>484</td>
<td>412</td>
<td>349</td>
<td>246</td>
<td>432</td>
<td>566</td>
<td>446</td>
<td>405</td>
<td>394</td>
</tr>
<tr>
<td>( P_2 )</td>
<td>985</td>
<td>770</td>
<td>675</td>
<td>568</td>
<td>834</td>
<td>1028</td>
<td>749</td>
<td>775</td>
<td>906</td>
</tr>
<tr>
<td>( P_3 )</td>
<td>883</td>
<td>675</td>
<td>516</td>
<td>557</td>
<td>652</td>
<td>865</td>
<td>566</td>
<td>784</td>
<td>725</td>
</tr>
<tr>
<td>Mean</td>
<td>784</td>
<td>619</td>
<td>513</td>
<td>457</td>
<td>639</td>
<td>820</td>
<td>587</td>
<td>655</td>
<td>675</td>
</tr>
</tbody>
</table>

\[ \text{C.D. for } \( N, S \) \text{ or } P \text{ marginal means } = 105.4 \text{ Kg/ha.} \]

**Crop:** Cotton (Kharif)  
**Site:** Cotton Res. Stn., Abolhar  
**Ref.-Fb. 64(133).**  
**Type-1D'.**

Object: To determine ideal plant population for obtaining high cotton yield under conditions of high fertilizer and restricted plant growth.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Guar for seed. (c) N.A. (ii) Sandy loam. (iii) 5.5.64. (iv) (a) to (c) N.A. (d) and (e) As per treatments. (v) Basal dressing of 40 Kga/ha each of \( P_4 O_3 \) and \( K_2 O \) (vi) 320-1. (vii) Irrigated. (viii) 1 weeding and one hoeing. (ix) N.A. (x) Picking on 7.11.64 and 26.11.64.
2. TREATMENTS:
All combinations of (1), (2), (3) and (4).
(1) 3 spacings: \( S_1 = 60 \text{ cm} \times 30 \text{ cm}, \ S_2 = 60 \text{ cm} \times 45 \text{ cm}\) and \( S_3 = 60 \text{ cm} \times 60 \text{ cm}\).
(2) 3 plant populations: \( P_1 = 1, P_2 = 2, P_3 = 3 \) plants/hill.
(3) 3 levels of \( N \): \( N_1 = 0, N_2 = 75, N_3 = 150 \) K/ha.
(4) 3 levels of \( N.A.A. \): \( H_1 = 0, H_2 = 20 \) and \( H_3 = 40 \) ppm.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 1 (b) N.A. (iii) 1 (iv) (a) N.A. (b) 6'40m. x 1'83m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of kapaa. (iv) (a) and (b) No, (c) Nil. (v) to (vii) N.A.

5. RESULTS
(i) 1085 Kg/ha. (ii) 217.2 Kg/ha. (iii) Main effect of \( N \) alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( N_a )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( H_1 )</th>
<th>( H_2 )</th>
<th>( P_1 )</th>
<th>( P_2 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( S_1 )</td>
<td>891</td>
<td>1166</td>
<td>1157</td>
<td>1121</td>
<td>993</td>
<td>1100</td>
<td>1037</td>
<td>996</td>
</tr>
<tr>
<td>( S_2 )</td>
<td>969</td>
<td>1059</td>
<td>1376</td>
<td>1141</td>
<td>1118</td>
<td>1146</td>
<td>1077</td>
<td>1144</td>
</tr>
<tr>
<td>( S_3 )</td>
<td>803</td>
<td>1110</td>
<td>1235</td>
<td>1021</td>
<td>1117</td>
<td>1004</td>
<td>1042</td>
<td>1042</td>
</tr>
<tr>
<td>Mean</td>
<td>888</td>
<td>1112</td>
<td>1256</td>
<td>1094</td>
<td>1076</td>
<td>1085</td>
<td>1052</td>
<td>1061</td>
</tr>
</tbody>
</table>

C.D. for \( N \) marginal means = 136.8 Kg/ha.

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Crop = Cotton.
Site = Cotton Res. Stn., Abohar.
Object = To study the effect of Naphthoxy acetic acid spray on growth and yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Gram, cotton. (c) N.A. (ii) Sandy loam. (iii) 6.5.64; 1.5.65. (iv) (a) 3 ploughings (b) to (c) N.A. (v) Nil. (vi) F-320. (vii) Irrigated. (viii) 1 hoeing and weeding. (ix) N.A. (x) 13.11.64 and 8.12.65; 13.11.65 and 12.12.65.

2. TREATMENTS:
All combinations of (1) and (2).
(1) 4 concentrations of \( N.A.A. \): \( C_1 = 0, C_2 = 5, C_3 = 10 \) and \( C_4 = 15 \) p.p.m.
(2) 3 times of spray: \( T_1 = 1, T_2 = 2, \) and \( T_3 = 3 \) weeks after flowering.
3. DESIGN:
(i) Fact. in R.B.D. (ii) 12. (b) N.A. (iii) 4. (iv) (a) N.A. : 5'85m. x 3'00m. (b) 6'40m. x 1'83m. ; 4'95m. x 1'60m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Aerial spray of Endrine. (iii) Yield of kapas. (iv) (a) 1964-contd. (b) No. (c) Nil. (v) Jullundur. (vi) Nil. (vii) Since the expt. is contd. beyond 65, individual years results are presented under 5. Results.

5. RESULTS:
64(39)
(i) 741 Kg/ha. (ii) 183.5 Kg/ha. (iii) None of the effects is significant (iv) Av. yield of kapas in Kg/ha.

<table>
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<tr>
<th></th>
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<th>C1</th>
<th>C2</th>
<th>C3</th>
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<tr>
<td>T1</td>
<td>700</td>
<td>878</td>
<td>850</td>
<td>666</td>
<td>774</td>
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<td>T2</td>
<td>660</td>
<td>658</td>
<td>692</td>
<td>750</td>
<td>690</td>
</tr>
<tr>
<td>T3</td>
<td>692</td>
<td>865</td>
<td>649</td>
<td>829</td>
<td>759</td>
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<tr>
<td>Mean</td>
<td>684</td>
<td>800</td>
<td>730</td>
<td>748</td>
<td>741</td>
</tr>
</tbody>
</table>

65(54)
(i) 1919 Kg/ha. (ii) 519 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C0</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>1936</td>
<td>2029</td>
<td>1692</td>
<td>1627</td>
<td>1821</td>
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<td>T2</td>
<td>2034</td>
<td>2287</td>
<td>1821</td>
<td>2093</td>
<td>2059</td>
</tr>
<tr>
<td>T3</td>
<td>2107</td>
<td>1692</td>
<td>1903</td>
<td>1804</td>
<td>1876</td>
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<tr>
<td>Mean</td>
<td>2028</td>
<td>2003</td>
<td>1805</td>
<td>1841</td>
<td>1919</td>
</tr>
</tbody>
</table>

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Crop : Cotton (Kharif). Ref : Pb. 63(176).
Site : Agri. Res. Stn., Gurdaspur. Type : 'D'.

Object : To study the effect of Naphtha acetic acid spraying on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Fallow. (c) Nil. (ii) Heavy loam. (iii) 16.5.63. (iv) (a) 7 ploughings. (b) to (e) N.A. (v) N.A. (vi) 231-R. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) 26.9.63 to 3.12.63.

2. TREATMENTS:
Same as in expt. no. 63(57) conducted at Abosar on page. No. 705.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 20(2 control plots in each replication). (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) 10% B.H.C. against Tika was sprayed. (iii) Yield of kapas. (iv) (a) 1963-only. (b) No. (c) Nil. (v) Abohar. (vi) and (vii) Nil.

5. RESULTS:
(i) 401 Kg/ha. (ii) 87.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
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<tbody>
<tr>
<td>W6</td>
<td>431</td>
<td>391</td>
<td>399</td>
<td>405</td>
<td>395</td>
<td>420</td>
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<td>W1</td>
<td>376</td>
<td>440</td>
<td>398</td>
<td>413</td>
<td>431</td>
<td>372</td>
<td>405</td>
</tr>
<tr>
<td>Mean</td>
<td>404</td>
<td>415</td>
<td>398</td>
<td>409</td>
<td>413</td>
<td>396</td>
<td>406</td>
</tr>
<tr>
<td>T1</td>
<td>393</td>
<td>403</td>
<td>430</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>398</td>
<td>470</td>
<td>370</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>420</td>
<td>373</td>
<td>395</td>
<td></td>
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</tr>
</tbody>
</table>

Crop: Cotton (Kharif).
Ref: Pb. 63(179), 64(162).
Site: Govt. Agri. Sta., Gurdaspur. Type: 'D'.

Object: To study the method of controlling weeds and its effect on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Senji; Cotton. (c) N.A. (ii) Heavy loam; Sandy loam. (iii) 13.4.63; 6.5.64. (iv) (a) 4 to 6 ploughings. (b) to (e) N.A. (v) Senji (G.M.); 35.5 Kg/ha. of C/A/N. (vi) R-231. (vii) Irrigated. (viii) 3 to 4 weedings. (ix) N.A. (x) 27.9.63 to 16.12.63; 10.10.64 to 6.11.64.

2. TREATMENTS:
Same as in expt. no. 63(53), 64(37), 65(35) conducted at Abohar on page No. 705.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 1/197 ha., 9-60m. X 4-72m. (b) 1/247 ha., 8-38m. X 3-05m. (v) N.A., 61cm. X 61cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) B.H.C. 10% at 10Kg against Tika for 63(179). Attack of jassids and pink boll worm was controlled by endrine spraying. (iii) Yield of kapas. (iv) 1963-64. (b) and (c) No. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments X Years interaction is present.

5. RESULTS:
Pooled results.
(i) 172 Kg/ha. (ii) 154.6 Kg/ha. [based on 9 d.f. made up of Treatments X Years interaction]. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W6</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
<th>W9</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>170</td>
<td>274</td>
<td>151</td>
<td>82</td>
<td>186</td>
<td>199</td>
<td>191</td>
<td>150</td>
<td>184</td>
<td>132</td>
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</table>
### Individual Results

<table>
<thead>
<tr>
<th>Treatment Year</th>
<th>W_1</th>
<th>W_2</th>
<th>W_3</th>
<th>W_4</th>
<th>W_5</th>
<th>W_6</th>
<th>W_7</th>
<th>W_8</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.E./plot</th>
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<tr>
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<td>245</td>
<td>461</td>
<td>217</td>
<td>110</td>
<td>248</td>
<td>268</td>
<td>242</td>
<td>182</td>
<td>278</td>
<td>195</td>
<td>** 245</td>
</tr>
<tr>
<td>1964</td>
<td>96</td>
<td>88</td>
<td>85</td>
<td>55</td>
<td>125</td>
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<td>141</td>
<td>119</td>
<td>90</td>
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<td>** 100</td>
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<tr>
<td>Pooled</td>
<td>170</td>
<td>274</td>
<td>151</td>
<td>82</td>
<td>186</td>
<td>199</td>
<td>191</td>
<td>150</td>
<td>184</td>
<td>132</td>
<td>N.S. 172</td>
</tr>
</tbody>
</table>

**Crop:** Cotton *(Kharif)*  
**Ref:** Ph. 64(165).  
**Site:** Agri. Res. Stn., Gardaspur.  
**Type:** D.  

Object: —To study the effect of spray of N.A.A (Napthalene acetic acid) on the yield of Cotton.

1. **BASAL CONDITIONS:**
   - (i) (a) N.A.  
   - (b) Cotton.  
   - (c) N.A.  
   - (ii) Loamy soil.  
   - (iii) 18.4.64.  
   - (iv) (a) 5 ploughings.  
   - (b) to (e) N.A.  
   - (v) Nil.  
   - (vi) R-231.  
   - (vii) Irrigated.  
   - (viii) Kharpa, Kasaula, and trifla for interculturating.  
   - (ix) N.A.  
   - (x) 13.9.64 to 22.10.64.

2. **TREATMENTS:**
   - All combinations of (1) and (2)
     - (1) 4 levels of N.A.A: C_0=0, C_1=5, C_2=10, C_3=15 ppm.
     - (2) 3 times of spray: T_1=1, T_2=2 and T_3=3 weeks after the opening of 1st flower.

3. **DESIGN:**
   - (i) Fact. in R.B.D.  
   - (ii) (a) 12. (b) N.A.  
   - (iii) 4.  
   - (iv) (a) 11'89m. x 3'05m.  
   - (b) 10'79m. x 3'05m.  
   - (v) 61cm. on either side.  
   - (vi) Yes.

4. **GENERAL:**
   - (i) Poor.  
   - (ii) Attack of jassid, endrina sprayed.  
   - (iii) Yield of kapas.  
   - (iv) (a) 1964-only.  
   - (b) No.  
   - (c) Nil.  
   - (v) to (vii) N.A.

5. **RESULTS:**
   - (i) 246 Kg/ha.  
   - (ii) 77.2 Kg/ha.  
   - (iii) None of effects is significant.  
   - (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C_0</th>
<th>C_1</th>
<th>C_2</th>
<th>C_3</th>
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<tr>
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<td>327</td>
<td>261</td>
<td>327</td>
<td>284</td>
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<td>T_2</td>
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<tr>
<td>Mean</td>
<td>237</td>
<td>258</td>
<td>253</td>
<td>236</td>
<td>246</td>
</tr>
</tbody>
</table>
Crop :- Cotton (Kharif).
Site :- Cotton Res. Stn., Jullundur.

Object: - To determine suitable method of controlling weeds and its effects on the yield of Cotton.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 2.6.64; 8.5.65.  (iv) (a) 4 to 5 ploughings.  (b) to (c) N.A.  (v) Nil.
   (vi) F-320.  (vii) Irrigated.  (viii) 2-3 hoeings and weedings.  (ix) N.A.  (a) 4.11.64 to 11.2.64;11.10.65, 3.
   11.65 to 14.12.65.

2. TREATMENTS:
   Same as in exp. no 63(53), 64(37), 65(55) conducted at Abobar on page No. 705.

3. DESIGN :
   (i) R.B.D.  (ii) (a) 10.  (b) N.A.  (iii) 6,  (iv) (a) 10'06m.×5'49m.  (b) 9'14m.×4'27m.  (v) 46cm.×61cm.
   (vi) Yts.  (vii) 4.11.64 to 11.2.64;11.10.65, 3.

4. GENERAL:
   (i) Normal.  (ii) Attacked by Jassids; endrine sprayed.  (iii) Yield of kapas.  (iv) (a) 1964-contd, (b) No.
   (c) Nil.  (v) Abohar, Gurdaspur.  (vi) Nil.  (vii) Since the exp. is contd, beyond 65, individual years results
   are presented under 5. Results.

5. RESULTS :
   64(159)
   (i) 357 Kg/ha.  (ii) 82'3 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of kapas in
   Kg/ha.
   Treatment | W6 | W5 | W4 | W3 | W2 | W1 | W0 | Av. yield 343 340 365 359 395 432 362 355 319 281
   C.D.=138'6 Kg/ha.

   65(32)
   (i) 306 Kg/ha.  (ii) 119'1 Kg/ha.  (iii) Treatment differences are significant.  (iv) Av. yield of kapas in
   Kg/ha.
   Treatment | W6 | W5 | W4 | W3 | W2 | W1 | W0 | Av. yield 342 471 315 313 315 373 356 202 229 148
   C.D.=138'6 Kg/ha.
3. DESIGN:
(i) Split-plot. (ii) 4 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 853 m × 4.88 m. (b) 1/500 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1965-only. (b) No. (c) Nil. (v) (a) Abolhar and Ludhiana. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 384 Kg/ha. (ii) (a) 112 Kg/ha. (b) 205 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C0</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>T1</td>
<td>368</td>
<td>450</td>
<td>424</td>
<td>454</td>
<td>424</td>
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<tr>
<td>T2</td>
<td>416</td>
<td>278</td>
<td>334</td>
<td>374</td>
<td>350</td>
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<tr>
<td>T3</td>
<td>422</td>
<td>356</td>
<td>348</td>
<td>380</td>
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<tr>
<td>Mean</td>
<td>422</td>
<td>362</td>
<td>368</td>
<td>402</td>
<td>384</td>
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</tbody>
</table>

Crop: Cotton (Kharif). Ref = Pb. 63(94),
Site = Punjab Agri. University, Ludhiana. Type = 'D'.

Object: To study the effect of beta Naphthoxyacetic acid (NOA) on the yield of Cotton.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) May, 63. (iv) (a) 4 ploughings. (b) to (e) N.A. (v) N.A. (vi) F-320. (vii) Irrigated. (viii) 3 hoings. (ix) N.A. (x) Pickings from 2.11.63 to 26.12.63.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 concentrations of NOA: C1=5, C2=10 and C3=15 ppm.
(2) 2 wetting agents: W0=Without water and W1=With water.
(3) 3 timings of spray: T1=1, T2=2 and T3=3 after opening of 1st flower.

3. DESIGN:
(i) Feet, in R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/444 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of kapas in Kg/ha. (iv) (a) and (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 611 Kg/ha. (ii) 2149 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.
Crop: Cotton (Kharif).
Site: Punjab Agri. University, Ludhiana.

Object: To determine suitable method of controlling weeds and its effect on the yield of Cotton.

1. BASAL CONDITIONS

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) Mid. of May, 63; N.A. (iv) (a) 3 ploughings, 4 ploughings and 2 subagas. (b) to (e) N.A. (v) F-320. (vi) Irrigated. (vii) 2 hoeings, weedinga. (ix) N.A.

2. TREATMENTS:

10 weedical treatments: W0=Control, W1=Local method of weeding, W2=Eptam at 2 Kg/ha., W3=Eptam at 4 Kg/ha., W4=CMU at 1 Kg/ha., W5=CMU at 1Kg/ha., W6=PCA at 25 Kg/ha. W7=PCA at 50 Kg/ha., W8=Dowpon at 5 Kg/ha. and W9=Dowpon at 10 Kg/ha.

3. DESIGN:

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) N.A., 10'60m. x 3'49m. (b) 1/269 ha.; 9'14m. x 4'27m. (v) N.A.; 46cm. x 61cm. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) 10% solution of Endrine sprayed. (iii) Yield of kapas. (iv) (a) 1963-64. (b) No. (c) Nil. (v) Abhar. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is present.

5. RESULTS:

Pooled results:

(i) 289 Kg/ha. (ii) 143-3 Kg/ha.(9 d.f. made up of Treatments x Years interaction). (iii) Treatment differences are not significa nt. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
<th>W9</th>
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<tr>
<td>Av. yield</td>
<td>276</td>
<td>374</td>
<td>254</td>
<td>272</td>
<td>305</td>
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<td>272</td>
<td>279</td>
<td>277</td>
<td>230</td>
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Individual results:

<table>
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<tr>
<th>Year</th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
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<td>1963</td>
<td>190</td>
<td>410</td>
<td>143</td>
<td>185</td>
<td>215</td>
<td>277</td>
<td>183</td>
<td>203</td>
<td>237</td>
<td>178</td>
<td>**</td>
<td>222</td>
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<td>1964</td>
<td>363</td>
<td>339</td>
<td>365</td>
<td>359</td>
<td>395</td>
<td>432</td>
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<td>277</td>
<td>230</td>
<td>N.S.</td>
<td>229</td>
<td>143.3</td>
</tr>
</tbody>
</table>
Crop: Cotton (Kharif).


Object: To determine the optimum time of spray and concentrations of alpha-naphthylacetic acid (NAA) for the yield of Cotton.

1. BASAL CONDITIONS:

(i) N.A. (ii) Sandy loam. (iii) 18.5.64. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) F-320. (vii) Irrigated. (viii) 1 hoisting. (ix) N.A. (x) 5.11.64 to 9.12.64.

2. TREATMENTS:

(i) 3 concentrations of NAA: C_1=5, C_2=10 and C_3=20 ppm.
(ii) 3 times of application: T_1=15.6.61, T_2=T_1+30.6.64 and T_3=T_2+15.7.64.
(iii) 3 times of irrigation: I_1=40, I_2=50 and I_3=60 days after sowing.
(iv) 3 spacings: S_1=60cm. x 13cm., S_2=60cm. x 30cm. and S_3=60cm. x 45cm.

3. DESIGN:

(i) 3 x 3 confd. (ii) 9 plots/block, 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 6 10am. x 7.62m. (b) 1/360 ha. (c) N.A. (d) Yes.

4. GENERAL:

(i) Normal. (ii) Attack of Jassid and whitefly. (iii) Yield of kapus. (iv) (a) 1964-only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) N.A.

5. RESULTS:

(i) 126 Kg/ha. (iii) 98.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapus in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C_1</th>
<th>C_2</th>
<th>C_3</th>
<th>T_1</th>
<th>T_2</th>
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<td>105</td>
<td>138</td>
<td>135</td>
<td>126</td>
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</table>

Other tables are not available.

Crop: Cotton. (Kharif).


Object: To study the effect of beta naphthylacetic acid (NOA) on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 5.5.64. (iv) (a) 3 ploughings. (b) to (e) N.A. (v) 25 C.L./ha. of F.Y.M. (vi) F-320. (vii) Irrigated. (viii) 2 thinnings. (ix) N.A. (x) Pickings on 9.11.64 and 9.12.64.
2. TREATMENTS:
All combinations of (1) and (2)
(1) 4 concentrations of NOA: \(C_0=0, \ C_1=5, C_2=10, \ \text{and} \ C_3=15 \ \text{ppm.}
(2) 3 times of applications of NOA: \(T_1=1, T_2=2 \ \text{and} \ T_3=3 \ \text{weeks after the opening of the first flower.}

3. DESIGN:
(i) Fclt. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 12-20m. x 4 ft.m. (b) 10'98m. x 3'66m. (v) Yes.

4. GENERAL:
(i) Poor yield. (ii) Attack of Jassid and white fly. endrine sprayed. (iii) Yields of kapas. (iv) (a) No. (v) to (vii) Nil.

5. RESULTS:
(i) 448 Kg/ha. (ii) 99.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>(C_0)</th>
<th>(C_1)</th>
<th>(C_2)</th>
<th>(C_3)</th>
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<tr>
<td>(T_3)</td>
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<td>543</td>
<td>451</td>
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</tr>
<tr>
<td>Mean</td>
<td>489</td>
<td>393</td>
<td>443</td>
<td>465</td>
<td>448</td>
</tr>
</tbody>
</table>

Crop :- Cotton (Kharif).
Site :- Punjab Agri. University, Ludhiana.

Object :- To determine the optimum plant population for Cotton yield under high fertilizer doses and regulating the crop growth.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 23/24.64. (iv) (a) 4 ploughings. (b) and (c) N.A. (d) As per treatments. (e) 75 Kg/ha of \(P_2O_5 + K_2O\) \& 10 C.L. of F.Y.M. (v) P-320. (vi) Irrigated. (vii) II 2 thinning. and 3 hoeings. (ix) N.A. (x) 12.11.64 to 10.12.64.

2. TREATMENTS:
Same as in expt. No. 64(133) conducted at Abohar and presented on Page No. 708, except 3 levels of N as C/A/N: \(N_0=0, N_1=125\) and \(N_2=250 \ \text{Kg/ha.}

3. DESIGN:
(i) 3 conf. (ii) (a) 9 plots/block ; 9 blocks/replication. (b) N.A. (iii) I. (iv) (a) 6-10m.X6-70m. (b) \(S_1=1/336, S_2=1/355, \ \text{and} \ S_3=1/374. \ \text{ha.} \ (v) N.A. \ (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of kapas. (iv) (a) 1964-only. (b) No. (c) N.A. (v) Abohar. (vi) and (vii) N.A.

5. RESULTS:
(ii) 385 Kg/ha. (ii) 147.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.
Crop: Cotton (Kharij).

Site: Punjab Agri. University, Ludhiana.

Object: To study the effect of soaking of seed in different concentrations of some plant regulators on growth and yield of Cotton.

1. BASAL CONDITIONS:
   (i) N.A. (ii) Sandy loam. (iii) May, 64. (iv) (a) 4 ploughings, 2-suhagas. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) P-320. (vii) Irrigated. (viii) 3 weeding. (ix) N.A. (x) 5.11.64. to 10.12.64.

2. TREATMENTS:
   Same as in exp. No. 64 (107) conducted at Abobar and presented on page No. 706.

3. DESIGN:
   (i) 3^2 confd. (ii) (a) 9 plots/block, 9 blocks/replcation. (b) N.A. (iii) L. (iv) (a) 10'67m. x 3'05m. (b) S_1=10'67m. x 3'05m., S_2=10'06m. x 3'05m. and S_3=9'75m. x 1'83m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Attack of Jauids, spraying of endrax and D.D.T. (iii) Yield of kapas. (iv) (a) 1964-only. (b) No. (c) Nil. (v) Abobar. (vi) and (vii) N.A.

5. RESULTS:
   (i) 1065 Kg/ha. (ii) 249·4 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of kapas in Kg/ha.

<table>
<thead>
<tr>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>P_1</th>
<th>P_2</th>
<th>P_3</th>
<th>H_1</th>
<th>H_2</th>
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<td>360</td>
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<td>405</td>
<td>388</td>
<td>385</td>
<td>388</td>
<td>382</td>
</tr>
</tbody>
</table>

Other tables are N.A.

Crop: Cotton (Kharij).

Ref: Pb. 64(77).

Type: 'D'.
Crop: Cotton (Kharif).
District: Nasirpur Farm.

Object: To study the effect of NOA spray on the yield of Cotton.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Loamy Soil.  (iii) 9.5.63.  (iv) 5 to 6 ploughings.  (b) to (e) N.A.  (v) and (vi) N.A.  (vii) Irrigated.  (viii) 4 weedings.  (ix) N.A.  (x) 10.10.63 to 6.11.63.

2. TREATMENTS:
   Same as in expt. no. 63(57) on page no. 705.

3. DESIGN:
   (i) Best in R.B.D.  (ii) (a) 20 (2 control plots in each replication).  (b) N.A.  (iii) 4.  (iv) 6-10m. x 4-8m.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of kapas.  (iv) (a) 1962-only.  (b) No.  (c) Nil.  (v) N.A.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 1176 Kg/ha.  (ii) 164.2 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of kapas in Kg/ha.

Control=1152 Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>T1</th>
<th>T2</th>
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<td>1180</td>
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<tr>
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<td>1160</td>
<td>1172</td>
<td>1174</td>
<td>1191</td>
<td>1179</td>
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</table>

T1  | 1221 | 1192 | 1194 |
T2  | 1228 | 1207 | 1087 |
T3  | 1131 | 1242 | 1200 |

Crop: Tobacco (Rabi).

Object: To study the effect of different methods of applications of different manures on the yield of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 29.2.60.  (iv) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   3 sources of 112 Kg/ha. of N: S1=Urea, S2=A/S, and S3=C/A/N.
Sub-plot treatments:
3 methods of application of N: \( M_1 = \text{Plough furrow}, \ M_2 = \text{Broadcast} \) and \( M_3 = \text{Band} \).

3. DESIGN:
(i) Split-plot. (ii) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 6\( 	imes 10 \)m. \( \times 3\frac{3}{4} \)m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of dry leaf and green leaf. (iv) (a) 1960-61 (modified in 61) (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 22\( \frac{5}{6} \) Q/ha. (ii) (a) 22\( \frac{5}{6} \) Q/ha. (b) 23\( \frac{1}{6} \) Q/ha. (iii) None of the effects is significant. (iv) Av. yield of dry leaves in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>( S_1 )</th>
<th>( S_2 )</th>
<th>( S_3 )</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>( M_1 )</td>
<td>19( \frac{5}{6} )</td>
<td>19( \frac{5}{6} )</td>
<td>19( \frac{5}{6} )</td>
<td>19( \frac{5}{6} )</td>
</tr>
<tr>
<td>( M_2 )</td>
<td>22( \frac{5}{6} )</td>
<td>21( \frac{5}{6} )</td>
<td>21( \frac{5}{6} )</td>
<td>21( \frac{5}{6} )</td>
</tr>
<tr>
<td>( M_3 )</td>
<td>21( \frac{5}{6} )</td>
<td>18( \frac{5}{6} )</td>
<td>21( \frac{5}{6} )</td>
<td>20( \frac{5}{6} )</td>
</tr>
<tr>
<td>Mean</td>
<td>21( \frac{5}{6} )</td>
<td>19( \frac{5}{6} )</td>
<td>20( \frac{5}{6} )</td>
<td>20( \frac{5}{6} )</td>
</tr>
</tbody>
</table>

Crop: Tobacco (Rabi).


Object: To study the effect of different methods of application of different manures on the yield of Tobacco.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Clay loam. (iii) 29.11.61. (iv) to (vi) N.A. (vii) Irrigated. (viii) N.A. (ix) 24\( \frac{5}{6} \) cm. (x) May, 62.

2. TREATMENTS:
Main-plot treatments:
3 methods of application of N: \( M_1 = \text{Plough furrow}, \ M_2 = \text{Broadcast} \) and \( M_3 = \text{Band} \).

Sub-plot treatments:
3 sources of 112 Kg/ha. of N: \( S_1 = \text{Urea}, \ S_2 = \text{A/S} \) and \( S_3 = \text{C/A/N} \).

3. DESIGN:
(i) Split-plot. (ii) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1\( \frac{5}{6} \)m. \( \times 1\frac{1}{6} \)m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of green leaf. (iv) (a) 1950-61. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 683 Q/ha. (ii) (a) 22\( \frac{5}{6} \) Q/ha. (b) 23\( \frac{1}{6} \) Q/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of green leaf in Q/ha.
<table>
<thead>
<tr>
<th>M</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>721</td>
<td>802</td>
<td>816</td>
<td>800</td>
</tr>
<tr>
<td>M2</td>
<td>616</td>
<td>640</td>
<td>679</td>
<td>645</td>
</tr>
<tr>
<td>M3</td>
<td>577</td>
<td>672</td>
<td>623</td>
<td>624</td>
</tr>
<tr>
<td>Mean</td>
<td>638</td>
<td>705</td>
<td>706</td>
<td>706</td>
</tr>
</tbody>
</table>

C.D. for S marginal means = 48.4 Q/ha.

Crop: Tobacco (Rabi).  
Ref: Ph. 61(72).  
Type: "M".

Object: To study the effect of different methods of application of manures on the yield of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) 1.3.6.1.  (iv) (a) to (c) N.A.  (d) 30cm. x 30cm.  (e) N.A.  (v) and (vi) N.A.  (vii) Irrigated.  (viii) N.A.  (ix) 24-6cm.  (x) N.A.

2. TREATMENTS:
   Same as in exp. no. 61(64) on page. No. 719.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot.  (b) N.A.  (iii) 6.  (iv) (a) N.A.  (b) 2-4m. x 6-10m.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal  (ii) N.A.  (iii) Yield of green leaf.  (iv) (a) 1960-61.  (b) No.  (c) Nil.  (v) to (vii) N.A.

5. RESULTS:
   (i) 159.5 Q/ha.  (ii) (a) 29.0 Q/ha.  (b) 19.2 Q/ha.  (iii) Main effects of M and S are significant.  (iv) Av. yield of green leaf in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>162.2</td>
<td>163.3</td>
<td>181.1</td>
<td>168.9</td>
</tr>
<tr>
<td>M2</td>
<td>159.7</td>
<td>159.7</td>
<td>184.6</td>
<td>168.0</td>
</tr>
<tr>
<td>M3</td>
<td>151.1</td>
<td>150.2</td>
<td>143.4</td>
<td>141.6</td>
</tr>
<tr>
<td>Mean</td>
<td>159.7</td>
<td>151.1</td>
<td>169.7</td>
<td>159.5</td>
</tr>
</tbody>
</table>

C.D. for M marginal means = 21.5 Q/ha.
C.D. for S marginal means = 13.1 Q/ha.
Crop: Tobacco.  (Rabi).
Site: Agri Res. Stn., Ferozepur.
Ref: Pb. 62(96).
Type: 'M'.

Object: To study the effect of different doses of N on the yield of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 1.3.62; 7.3.64. (iv) (a) 4 to 5 ploughings. (b) Transplanting. (c) 0.288 Kg/ha. (d) 61cm. x 30cm. (e) C. (v) N.A. (vi) T-17. (vii) Irrigated. (viii) 3 to 4 hoeings. (ix) June, 62.

2. TREATMENTS:
4 manurial treatments from two sources of N: M1 = 98.8, M2 = 222.4, M3 = 333.6 Kg/ha of N as compost and M4 = 111.2 Kg/ha of N as A/S.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 6.10m. x 3.05m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of green leaf. (iv) 1962-63 (modified in 63). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 266.1 Q/ha. (ii) 22.1 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of green leaf in Q/ha.

<table>
<thead>
<tr>
<th>Source of N</th>
<th>Compost</th>
<th>A/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>M1</td>
<td>M4</td>
</tr>
<tr>
<td>Av. yield</td>
<td>241.9</td>
<td>221.9</td>
</tr>
</tbody>
</table>

C.D. for means of the sources = 22.2 Q/ha.

Crop: Tobacco.  (Rabi).
Site: Agri Res. Stn., Ferozepur.
Ref: Pb. 62(97), 64(127).
Type: 'M'.

Object: To study the effect of trace elements on the yield of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 1.3.62; 7.3.64. (iv) (a) 4 to 5 ploughings. (b) Transplanting. (c) 0.288 Kg/ha. (d) 61cm. x 30cm. (e) One plant/hole. (v) N.A. (vi) N Tobacco, T-17. (vii) Irrigated. (viii) 3 to 4 hoeings. (ix) June, 62; June, 64.

2. TREATMENTS:
12 trace elements: T1 = Control (No trace element), T2 = 5.6 Kg/ha. of Ferrous Sul., T3 = 11.2 Kg/ha. of Ferrous Sul., T4 = 5.6 Kg/ha. of Copper Sul., T5 = 11.2 Kg/ha. of Copper Sul., T6 = 5.6 Kg/ha. of Copper Sul., T7 = 28.0 Kg/ha. of Manganese Sul., T8 = 5.6 Kg/ha. of Zine Sul., T9 = 22.4 Kg/ha. of Zine Sul., T10 = 5.6 Kg/ha. of Boric acid, T11 = 22.4 Kg/ha. of Boric acid and T12 = 11.0 Kg/ha. of mixture of Copper Sul., Zine Sul. and Manganese Sul.

3. DESIGN:
   (i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 1/1495 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of green leaf. (iv) 1962-63 (modified in 63). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x Years interaction is absent hence individual years results are presented under S. Results.
5. RESULTS:

62(97)

(i) 372.6 Q/ha. (ii) 34.70 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green leaf in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T8</th>
<th>T9</th>
<th>T10</th>
<th>T11</th>
<th>T12</th>
<th>T13</th>
<th>T14</th>
<th>T15</th>
<th>T16</th>
<th>T17</th>
<th>T18</th>
<th>T19</th>
<th>T20</th>
<th>T21</th>
<th>T22</th>
<th>T23</th>
<th>T24</th>
<th>T25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>507.0</td>
<td>345.0</td>
<td>333.0</td>
<td>347.0</td>
<td>320.0</td>
<td>311.0</td>
<td>311.0</td>
<td>338.0</td>
<td>322.0</td>
<td>314.0</td>
<td>335.0</td>
<td>335.0</td>
<td>393.0</td>
<td>393.0</td>
<td>393.0</td>
<td>393.0</td>
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<td></td>
</tr>
</tbody>
</table>

64(127)

(i) 326.5 Q/ha. (ii) 46.94 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green leaf in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T8</th>
<th>T9</th>
<th>T10</th>
<th>T11</th>
<th>T12</th>
<th>T13</th>
<th>T14</th>
<th>T15</th>
<th>T16</th>
<th>T17</th>
<th>T18</th>
<th>T19</th>
<th>T20</th>
<th>T21</th>
<th>T22</th>
<th>T23</th>
<th>T24</th>
<th>T25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>350.0</td>
<td>362.2</td>
<td>371.9</td>
<td>389.0</td>
<td>384.6</td>
<td>371.9</td>
<td>375.0</td>
<td>404.9</td>
<td>367.1</td>
<td>352.9</td>
<td>342.7</td>
<td>389.0</td>
<td>389.0</td>
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<td>389.0</td>
<td>389.0</td>
<td>389.0</td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Tobacco. (Rabi).

Site :- Agri. Res. Sta., Ferozepur.

Ref :- Pb. 63(120).

Type :- 'M'.

Object :- To study the effect of trace elements on the yield of Tobacco crop.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 24.2.63. (iv) (a) 4 to 5 ploughings. (b) Transplanting. (c) 0.288 Kg/ha. (d) 6cm x 30cm. (e) N.A. (v) N. Tobacco. (vi) Irrigated. (vii) N.A. (ix) 18.9cm. (x) Middle of June, 63.

2. TREATMENTS:

12 trace elements treatments :- T8= Control (no trace element) N.A. T9= 2.25 Kg/ha. of Ferrous Sul. T10=6.50 Kg/ha. of Ferrous Sul. T11= 2.25 Q/ha. of Copper Sul., T12= 4.50 Kg/ha. of Copper Sul., T13= 2.25 Kg/ha. of Manganese Sul., T14= 9 Kg/ha. of Manganese Sul., T15= 2.25 Kg/ha. of Zinc Sul., T16= 9 Kg/ha. of Zinc Sul., T17= 2.25 Kg/ha. of Boric acid., T18= 9 Kg/ha. of Boric acid., T19= 11 Kg/ha. of mixture of Copper Sul., Zinc Sul. and Manganese Sul. Trace elements applied before transplanting by kera method.

3. DESIGN:

(I) R.B.D. (ii) (a) 12. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/1495 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of green leaf. (iv) (a) 1962-64 modified in 63. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 507.0 Q/ha. (ii) 47.3 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green leaf in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T8</th>
<th>T9</th>
<th>T10</th>
<th>T11</th>
<th>T12</th>
<th>T13</th>
<th>T14</th>
<th>T15</th>
<th>T16</th>
<th>T17</th>
<th>T18</th>
<th>T19</th>
<th>T20</th>
<th>T21</th>
<th>T22</th>
<th>T23</th>
<th>T24</th>
<th>T25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>493.9</td>
<td>472.4</td>
<td>504.1</td>
<td>504.1</td>
<td>518.8</td>
<td>504.1</td>
<td>518.8</td>
<td>504.1</td>
<td>554.9</td>
<td>517.6</td>
<td>508.6</td>
<td>501.8</td>
<td>506.3</td>
<td>507.5</td>
<td>507.5</td>
<td>507.5</td>
<td>507.5</td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Tobacco. (Rabi).

Site :- Agri. Res. Sta., Ferozepur.

Ref :- Pb. 63(122).

Type :- 'M'.

Object :- To study the effect of of N on the yield of Tobacco.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 27.2.53. (iv) to (vii) N.A. (viii) Irrigated. (viii) N.A. (ix) 18.9 cm. (x) June., 63.
2. TREATMENTS:
4 manurial treatments from two sources of N: M₁=112, M₂=214, M₃=336 Kg/ha. of N as compost and M₄=112 Kg/ha. of N as A/S.

3. DESIGN:
(i) R.B.D. (ii) 4. (b) N.A. (iii) 6. (iv) 4. N.A. (b) 500m. x 540m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of green leaf. (iv) (a) 1963-only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 295.6 Q/ha. (ii) 108.5 Q/ha. (iii) Difference between means of two sources is highly significant. (iv) Av. yield of green leaf in Q/ha.

Crop: Tobacco. (Rabi).

Object: To study the effect of different trace elements on the yield of Tobacco.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Clay: 3.64. (iii) 4 to 5 ploughings. (b) Transplanting. (c) 0.288 Kg/ha. (d) 15 cm. x 30 cm. (e) N.A. (v) N.A. (vi) T-17. (vii) Irrigated. (viii) N.A. (ix) 17 cm. (x) June, 64.

2. TREATMENTS:
19 trace elements. T₀=Control (No trace element applied). T₁=Zinc Sul. at 5 Kg/ha., T₂=Zinc Sul. at 10 Kg/ha., T₃=Copper Sul. at 5 Kg/ha., T₄=Copper Sul. at 10 Kg/ha., T₅=Manganese Sul. at 22 Kg/ha., T₆=Spartin at 250 Kg/ha., T₇=Spartin at 500 Kg/ha., T₈=Spartin at 750 Kg/ha. and T₉=Mixture of Zinc Sul., Copper Sul. and Manganese Sul. at 11 Kg/ha. Trace elements applied before transplanting by Kera method.

3. DESIGN:
(i) R.B.D. (ii) 10. (b) N.A. (iii) 4. (iv) 4. N.A. (b) 122m. x 549m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of green leaf. (iv) (a) 1964-only. (b) N/A. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 399.0 Q/ha. (ii) 55.2 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of green leaf in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
<th>T₈</th>
<th>T₉</th>
<th>T₁₀</th>
<th>T₁₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>394.5</td>
<td>411.1</td>
<td>371.9</td>
<td>429.8</td>
<td>375.6</td>
<td>413.0</td>
<td>424.2</td>
<td>375.6</td>
<td>388.7</td>
<td>405.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop :- Tobacco. (Rabi).
Site :- Agri. Res. Sta., Ferozepur.

Object :- To study the effect of different times of application of different manures.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 6.3.64, 7.2.65. (iv) to (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A.
   July, 64; May, 65.

2. TREATMENTS:
   Main-plot treatments:
   3 sources of N :- S1 = C/A/N, S2 = A/S and S4 = Urea.

   Sub-plot treatments:
   4 times of application of N : - T1 = 1/2 before planting and 1/2 20 days after planting, T2=1/2 before planting and 1/2 40 days after planting, T3=1/2 before planting and 1/2 60 days after planting, T4=1/2 20 days after planting and 1/2 60 days after planting.

3. DESIGN:
   (i) Split-plot. (ii) (i) 3 main-plots/replcation and 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 2.44m. x 5.49m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of green leaf. (iv) (a) 1964-65. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:
   Pooled
   (i) 315.5 Q/ha. (ii) (a) 5160 Q/ha. (based on 22 d.f. made up of Treatments x Years interaction with pooled error). (b) 2340 Q/ha. (based on 99 d.f. made up of Treatments x Years interaction with pooled error). (iii) Main effect of T and interaction T x S are highly significant. (iv) Av. yield of green leaf in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>358.5</td>
<td>364.5</td>
<td>329.5</td>
<td>323.5</td>
<td>344.0</td>
</tr>
<tr>
<td>S2</td>
<td>355.0</td>
<td>340.0</td>
<td>360.5</td>
<td>330.5</td>
<td>346.5</td>
</tr>
<tr>
<td>S4</td>
<td>354.0</td>
<td>340.0</td>
<td>342.5</td>
<td>347.5</td>
<td>346.0</td>
</tr>
<tr>
<td>Mean</td>
<td>355.8</td>
<td>348.1</td>
<td>344.1</td>
<td>333.8</td>
<td>345.5</td>
</tr>
</tbody>
</table>

   C.D. for T marginal means=10.9 Q/ha.
   C.D. for T means at the same level of S=21.5 Q/ha.
   C.D. for S means at the same level of T=37.6 Q/ha.

   Individual results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S4</th>
<th>Sig.</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>Sig.</th>
<th>G.M.</th>
<th>S.R./plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1964</td>
<td>329.0</td>
<td>312.0</td>
<td>310.0</td>
<td>N.S.</td>
<td>324.0</td>
<td>312.0</td>
<td>302.0</td>
<td>330.0</td>
<td>*</td>
<td>317.0</td>
<td>317.0</td>
</tr>
<tr>
<td>1965</td>
<td>387.0</td>
<td>373.0</td>
<td>362.0</td>
<td>N.S.</td>
<td>370.0</td>
<td>367.0</td>
<td>374.0</td>
<td>385.0</td>
<td>N.S.</td>
<td>374.0</td>
<td>3164.0</td>
</tr>
<tr>
<td>Pooled</td>
<td>344.0</td>
<td>346.5</td>
<td>346.0</td>
<td>N.S.</td>
<td>355.8</td>
<td>348.1</td>
<td>344.1</td>
<td>333.8</td>
<td>**</td>
<td>345.5</td>
<td>315.0</td>
</tr>
</tbody>
</table>

   C.D. for T marginal means=10.9 Q/ha.
   C.D. for T means at the same level of S=21.5 Q/ha.
   C.D. for S means at the same level of T=37.6 Q/ha.
Crop : Tobacco. \((R\alpha b)^{i}\).


Ref : Ph. 61(70), 63(123).

Type : "MV".

Object — To study the effect of different doses of N on Tobacco varieties.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 29.1 l.6 l.; 2.12.63. (iv) (a) 4 to 5 ploughings. (b) Transplanting. (c) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 3 to 4 hoeings. (ix) 24.6 cm.; 16cm. (x) May, 62; June, 64.

2. TREATMENTS :

Main-plot treatments:
- 6 levels of N : \(N_1 = 168, N_2 = 224, N_3 = 336, N_4 = 392\) and \(N_5 = 448\) Kg/ha.

Sub-plot treatments:
- 3 varieties : \(V_1 = 190, V_2 = 238\) and \(V_3 = 302\).

3. DESIGN :

(i) Split-plot. (ii) 6 main-plots/replication and 3 sub-plots/main-plot. (b) N.A. (iii) 180 m. x 180 m.; 122 m. x 59 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Normal. (iii) N.A. (iiii) Yield of green leaf and dry leaf. (iv) (a) 1961 to 1963 (1962 - N.A.) (b) N.A. (c) N.A. (v) and (vi) N.A. (vii) As the sub-plot error variances are heterogeneous, the results of individual years are given below.

5. RESULTS :

Green leaf

61(70)

(i) 344.8 Q/ha. (ii) (a) 149.0 Q/ha. (b) 87.9 Q/ha. (iii) Main effect of \(V\) alone is highly significant. (iv)

\[
\begin{array}{ccccccc}
\text{Main effect of} & N_1 & N_2 & N_3 & N_4 & N_5 & \text{Mean} \\
V_1 & 384.4 & 478.4 & 341.7 & 439.8 & 427.0 & 357.5 \\
V_2 & 298.4 & 403.8 & 342.1 & 329.2 & 331.8 & 354.9 \\
V_3 & 228.9 & 360.1 & 362.3 & 288.1 & 313.8 & 257.2 \\
\text{Mean} & 305.2 & 414.1 & 316.4 & 352.4 & 357.5 & 323.2 \\
\end{array}
\]

C.D. for \(V\) marginal means \(= 41.4\) Q/ha.

63(123)

(i) 306.2 Q/ha. (ii) (a) 75.3 Q/ha. (b) 40.3 Q/ha. (iii) Main effect of \(T\) alone is highly significant. (iv)

\[
\begin{array}{ccccccc}
\text{Main effect of} & N_1 & N_2 & N_3 & N_4 & N_5 & \text{Mean} \\
V_1 & 245.5 & 287.8 & 310.7 & 287.8 & 280.3 & 293.4 \\
V_2 & 355.1 & 336.4 & 397.3 & 306.3 & 377.1 & 313.9 \\
V_3 & 246.7 & 296.9 & 320.3 & 286.7 & 259.0 & 278.4 \\
\text{Mean} & 283.4 & 297.8 & 314.1 & 313.6 & 305.3 & 295.2 \\
\end{array}
\]

C.D. for \(V\) marginal means \(= 23.5\) Q/ha.

Dry leaf

61(70)

(i) 41.5 Q/ha. (ii) (a) 6.57 Q/ha. (b) 4.26 Q/ha. (iii) All the effects are significant. (iv)

\[
\begin{array}{cccccc}
\text{Main effect of} & N_1 & N_2 & N_3 & N_4 & N_5 \\
V_1 & 245.5 & 287.8 & 310.7 & 287.8 & 280.3 \\
V_2 & 355.1 & 336.4 & 397.3 & 306.3 & 377.1 \\
V_3 & 246.7 & 296.9 & 320.3 & 286.7 & 259.0 \\
\text{Mean} & 283.4 & 297.8 & 314.1 & 313.6 & 305.3 \\
\end{array}
\]

C.D. for \(V\) marginal means \(= 23.5\) Q/ha.
Crop: Tobacco. (Rabi).


Ref: Pb. 62(101).

Type: ‘C’.

Object: - To study the effect of different spacings on the yield of Tobacco.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A.
(ii) Sandy loam.
(iii) 27.11.62.
(iv) (a) 4 to 5 ploughings. (b) Transplanting.
(c) 288 Kg/ha. (nursery).
(d) As per treatments. (e) N.A. (f) N.A. (g) Early Rustica, (h) Irrigated.
(vi) 3 to 4 hoeings. (ix) June, 63.

2. TREATMENTS:

6 spacings: S1 = 46 x 21, S2 = 61 x 23, S3 = 61 x 30, S4 = 61 x 38, S5 = 76 x 23 and S6 = 76 x 30, sq. cm.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/176 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of green leaves. (iv) (a) 1961-only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 308·3 Q/ha. (ii) 28·9 Q/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of green leaves in Q/ha.

Treatment
<table>
<thead>
<tr>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>354·6</td>
<td>344·4</td>
<td>263·9</td>
<td>315·5</td>
<td>303·3</td>
</tr>
</tbody>
</table>

C.D. = 42·1 Q/ha.

---

Crop: Tobacco. (Rabi).

Site: Govt. Agri. Stn., Ferozepur.

Ref: Pb. 60(63).

Type: ‘CV’.

1. BASAL CONDITIONS:

Object: - To study the effect of dates of planting on different varieties of Tobacco:

(i) (a) to (c) N.A.
(ii) Clay loam (Heavy soil).
(iii) As per treatments. (iv) (a) 4 to 5 ploughings. (b) Transplanting. (c) 0·288 Kg/ha. (nursery). (d) 61 cm. x 30 cm. (e) - (f) N.A. (g) As per treatments.
(h) Irrigated. (i) 3 to 4 hoeings. (ix) N.A. (x) May, of.

2. TREATMENTS:

Main-plot treatments:

3 dates of planting: D1 = 11.11.60, D2 = 21.11.60 and D3 = 12.12.60.
Sub-plot treatments:
2 varieties: $V_1 = 322$, $V_2 = 302$.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1.52m. x 4.06m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of seed per plant. (iv) (a) 1961-only. (b) No. (c) Nil. (v) and (vi) N.A.

5. RESULTS:
(i) 20.02 Q/ha. (ii) 5.3 Q/ha. (iii) Main effect of D is highly significant and that of V is significant. (iv) Av. yield of tobacco seed in Q/plant.

<table>
<thead>
<tr>
<th>D_1</th>
<th>D_2</th>
<th>D_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_1$</td>
<td>27.88</td>
<td>22.38</td>
<td>18.50</td>
</tr>
<tr>
<td>$V_2$</td>
<td>25.70</td>
<td>16.40</td>
<td>9.50</td>
</tr>
<tr>
<td>Mean</td>
<td>26.79</td>
<td>19.39</td>
<td>13.90</td>
</tr>
</tbody>
</table>

C.D. for D marginal means = 6.5 Q/plant.
C.D. for V marginal means = 4.5 Q/plant.

Crop: Tobacco. (Rabi).

Object: To study the effect of piercing on different Tobacco varieties.
Crop: Tobacco (Rabi).

Object: To study the effect of topping on the different varieties of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A., (ii) Clay loam, (iii) 1.12.61, (iv) (a) 4 to 5 ploughings, (b) Transplanting, (c) 238 Kg/ha (nursery) (d) 62cm. x 30cm. (e) — (vi) As per treatments. (vii) Irrigated. (viii) 4 hoeings. (ix) 24/6cm. (x) June, 6.

2. TREATMENTS:
   Main-plot treatments
   3 varieties: V1 = 238, V2 = 302 and V3 = 370.
   Sub-plot treatments
   3 cultural treatments: T0 = Untopping, T1 = Topping and T2 = Topping at 12 leaves stage.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/block and 3 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 1.80m. x 0.6m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of green leaves. (iv) (c) 1961-64. (modified in 62 and 63). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 126 Q/ha. (ii) (a) 14.6 Q/ha. (b) 181 Q/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of green leaves in Q/ha.

<table>
<thead>
<tr>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>144</td>
<td>110</td>
<td>116</td>
</tr>
<tr>
<td>148</td>
<td>173</td>
<td>114</td>
<td>145</td>
</tr>
<tr>
<td>109</td>
<td>117</td>
<td>117</td>
<td>126</td>
</tr>
</tbody>
</table>

C.D. for V marginal means = 126 Q/ha.

Crop: Tobacco (Rabi).

Object: To study the effect of topping on the different varieties of Tobacco.
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) Feb., 62. (iv) (a) to (b) 4 to 5 ploughings. (b) Transplanting. (c) 0.388 Kg/ha. (d) 61 cm x 38 cm. (e) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 4 hoeings. (ix) 19·3 cm. (x) June., 62.

2. TREATMENTS:
   Main-plot treatments
   4 varieties: \( V_1 = 0.17, V_2 = 0.59, V_3 = 0.59 \times 165 \) and \( V_4 = 0.337 / 65 \).
   Sub-plot treatments
   3 cultural treatments: \( T_0 = \) No topping, \( T_1 = \) Topping and \( T_2 = \) topping at 12 leaves stage.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1·20 m x 5·40 m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of green leaves. (iv) (a) 1961-64 (modified in 62 and 63) (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 184.7 Q/ha. (ii) (a) 26.3 Q/ha. (iii) 26.8 Q/ha. (iii) Main effects of \( V \) and \( T \) are highly significant. (iv) Av. yield of green leaves in Q/ha.

<table>
<thead>
<tr>
<th>( V )</th>
<th>( V_2 )</th>
<th>( V_3 )</th>
<th>( V_4 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( T_0 )</td>
<td>216.0</td>
<td>165.4</td>
<td>150.9</td>
<td>154.8</td>
</tr>
<tr>
<td>( T_1 )</td>
<td>255.7</td>
<td>224.3</td>
<td>151.0</td>
<td>212.2</td>
</tr>
<tr>
<td>( T_2 )</td>
<td>195.2</td>
<td>199.1</td>
<td>150.5</td>
<td>172.8</td>
</tr>
<tr>
<td>Mean</td>
<td>221.8</td>
<td>190.3</td>
<td>140.8</td>
<td>179.9</td>
</tr>
</tbody>
</table>

C.D. for \( V \) marginal means = 18.4 Q/ha.
C.D. for \( T \) marginal means = 15·6 Q/ha.

Crop: Tobacco (Rabi).
Ref: Pb. 62(104), 63(126), 64(129).
Type: 'CV'.

Object: To study the effect of piercing and topping on the different varieties of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) N.A. 12.2, 63 ; 7.3, 64. (iv) (a) to (c) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) N.A. (ix) 18·9 cm. (x) Mid. June, 62; May., 63 ; June 64.

2. TREATMENTS:
   Main-plot treatments
   4 varieties: \( V_1 = 0.17, V_2 = 0.59, V_3 = 0.59 \times 165 \) and \( V_4 = 0.605 \).
   in expt for 62, varieties \( V_1 = 0.399 \times 17 \) and \( V_4 = 0.59 \times 165 \).
   Sub-plot treatments:
   All combinations of (1) and (2): (1) 3 stages of topping: \( T_1 = \) topping at 10 leaves, \( T_2 = \) 12 leaf topping and \( T_3 = \) topping at flowering.
   (2) 2 piercing treatments: \( P_0 = \) No piercing and \( P_1 = \) piercing.
3. DESIGN:
(i) Split-plot. (ii) 4 main-plots/replication, 6 sub-plots/main-plot; (b) N.A. (iii) 6 for 62 and 63; 5 for 64. (iv) (a) N.A. (b) 0.52m. x 5.0m. for 62, 0.40m x 5.40m. for others. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of green leaves. (iv) (a) 1962 to 64. (b) N.A. (c) Nil. (v) and (vi) Nil. (vii) As the error variances for sub-plot are heterogeneous for 63 and 64, results of individual years are given below except for 62 has been treated separately.

5. RESULTS:
64(126)
(i) 377 Q/ha. (ii) (a) 53.4 Q/ha. (b) 33.8 Q/ha. (iii) Main effects of V, T and interaction T x V and x P are highly significant. (iv) Av. yield of green leaves in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>420</td>
<td>333</td>
<td>390</td>
<td>378</td>
<td>380</td>
</tr>
<tr>
<td>P1</td>
<td>394</td>
<td>329</td>
<td>401</td>
<td>374</td>
<td>374</td>
</tr>
<tr>
<td>Mean</td>
<td>407</td>
<td>331</td>
<td>395</td>
<td>376</td>
<td>377</td>
</tr>
<tr>
<td>T1</td>
<td>370</td>
<td>297</td>
<td>336</td>
<td>285</td>
<td>322</td>
</tr>
<tr>
<td>T2</td>
<td>397</td>
<td>320</td>
<td>377</td>
<td>333</td>
<td>357</td>
</tr>
<tr>
<td>T3</td>
<td>453</td>
<td>376</td>
<td>472</td>
<td>510</td>
<td>453</td>
</tr>
</tbody>
</table>

C.D. for the body of T x P table = 19.4 Q/ha.
C.D. for V marginal means = 26.8 Q/ha.
C.D. for T marginal means = 13.7 Q/ha.
C.D. for T means at the same level of V = 27.4 Q/ha.
C.D. for V means at the same level of T = 34.9 Q/ha.

64(138)
(i) 220 Q/ha. (ii) (a) 80.25 Q/ha. (b) 44.30 Q/ha. (iii) Main effect of T alone is highly significant. (iv) Av. yield of green leaves in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>212</td>
<td>209</td>
<td>238</td>
<td>218</td>
<td>219</td>
</tr>
<tr>
<td>P1</td>
<td>214</td>
<td>203</td>
<td>241</td>
<td>226</td>
<td>221</td>
</tr>
<tr>
<td>Mean</td>
<td>213</td>
<td>206</td>
<td>240</td>
<td>222</td>
<td>220</td>
</tr>
<tr>
<td>T1</td>
<td>162</td>
<td>178</td>
<td>166</td>
<td>175</td>
<td>170</td>
</tr>
<tr>
<td>T2</td>
<td>206</td>
<td>202</td>
<td>235</td>
<td>205</td>
<td>212</td>
</tr>
<tr>
<td>T3</td>
<td>271</td>
<td>237</td>
<td>318</td>
<td>287</td>
<td>278</td>
</tr>
</tbody>
</table>


62(104)
(i) 31.5 Q/ha. (ii) (a) 14.2 Q/ha. (b) 12.8 Q/ha. (iii) Main effect of T alone is significant. (iv) Av. yield of green leaves in Q/ha.
Crop: Tobacco (Rabi).


Object: To study the effect of topping on the yield of different varieties of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.
   (ii) Clay loam. (iii) 12.2.43; 0.5.4; (iv) (a) to (e) in plot Furs. (b) 3 rows planting. (c) 0.285 kg/ha. (nursery) (d) 61 cm. x 30 cm. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 4 hours. (ix) H 9 cm., 17 2cm. (x) June, 63; June, 64.

2. TREATMENTS:
   Main-plot treatments:
   - 8 varieties: V1 = V-17, V2 = V-59, V3 = V59 x 163, V4 = C-23, V5 = S-45, V6 = 545, V7 = C-31 and V8 = K337/7.
   - Sub-plot treatments
     Cultural treatments: T0 = No topping, T1 = Topping and T2 = Topping at 12 leaves stage.

3. DESIGN:
   (i) Split-plot. (ii) 8 main-plots/replication; 3 sub-plots, main-plot. (iii) 5; 4. (iv) (a) N.A. (b) 60 cm., x 5'40m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of green leaves. (iv) 1961-62 (modified in 62 and 63) (b) No. (c) Nil. (v) and (vi) N.A. (vii) As the error variances are heterogeneous, results of individual years are given under 5. Results.

5. RESULTS:

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0</td>
<td>821</td>
<td>759</td>
<td>1096</td>
<td>1173</td>
<td>978</td>
<td>741</td>
<td>951</td>
</tr>
<tr>
<td>T1</td>
<td>1043</td>
<td>981</td>
<td>1302</td>
<td>1352</td>
<td>1093</td>
<td>935</td>
<td>1086</td>
</tr>
<tr>
<td>T2</td>
<td>997</td>
<td>861</td>
<td>1123</td>
<td>963</td>
<td>880</td>
<td>846</td>
<td>870</td>
</tr>
<tr>
<td>Mean</td>
<td>954</td>
<td>867</td>
<td>1174</td>
<td>1163</td>
<td>984</td>
<td>841</td>
<td>909</td>
</tr>
</tbody>
</table>

C.D. for V marginal means = 103.6 Q/ha.
C.D. for T marginal means = 43.2 Q/ha.
Crop: Tobacco (Rabi).

Ref: Pb. 64(123).

Object: To study the effect of topping on the yield of different varieties of Tobacco crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Clay loam. (iii) 8.3% -4. (iv) (a) 4 to 5 ploughings. (b) Transplanting. (c) 0.288 Kg/ha. (d) 6cm. x 30cm. (e) N.A. (v) As per treatments (vi) Irrigated. (vii) 4 hoeings. (viii) 17.2cm. (x) June 64.

2. TREATMENTS:
Main-plot treatments:
8 varieties: V1 = T-17, V2 = T-59, V3 = 3377, V4 = C-23, V5 = C-31, V6 = 59 x 165, V7 = Ferozepur local and V8 = 45.

Sub-plot treatments:
3 stages of topping: T0 = No topping, T1 = Topping at flowering stage and T2 = Topping at 12 leaves stage.

3. DESIGN:
(i) Split-plot. (ii) (a) 8 main-plots/block and 3 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 0.60m x 5.40m, 0.60m x 5.40m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of green leaves. (iv) (a) 1964-only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 391.4 Q/ha. (ii) (a) 51.3 Q/ha. (b) 304 Q/ha. (iii) All the effects are highly significant. (iv) Av. yield of green leaves in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
<th>V7</th>
<th>V8</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0</td>
<td>237.7</td>
<td>351.9</td>
<td>330.2</td>
<td>345.7</td>
<td>438.3</td>
<td>339.5</td>
<td>503.1</td>
<td>478.4</td>
<td>378.1</td>
</tr>
<tr>
<td>T1</td>
<td>303.6</td>
<td>441.4</td>
<td>407.4</td>
<td>435.2</td>
<td>525.6</td>
<td>419.8</td>
<td>614.2</td>
<td>564.8</td>
<td>464.1</td>
</tr>
<tr>
<td>T2</td>
<td>261.1</td>
<td>344.4</td>
<td>341.8</td>
<td>319.1</td>
<td>345.7</td>
<td>336.4</td>
<td>390.7</td>
<td>385.8</td>
<td>337.2</td>
</tr>
<tr>
<td>Mean</td>
<td>269.1</td>
<td>379.2</td>
<td>330.8</td>
<td>366.7</td>
<td>435.2</td>
<td>365.2</td>
<td>502.7</td>
<td>476.3</td>
<td>393.1</td>
</tr>
</tbody>
</table>

C.D. for T marginal means = 23.49 Q/ha.
C.D. for V marginal means = 15.69 Q/ha.
Object: To study the effect of different levels of N, P and K and spacings on the yield of Tobacco.

1. BASAL CONDITIONS:
   (i) Clay loam. (ii) 25.12.62. (iii) 4 to 5 ploughings. (iv) Transplanting. (v) 0.144 Kg/ha. (vi) As per treatments. (vii) Irrigated. (viii) (a) 19'3 em. (x) May, 62.

2. TREATMENTS:
   Main-plot treatments:
   All combinations of (1) and (2)
   (1) 2 levels of P as Super : P₁ = 112 and P₂ = 168 Kg/ha.
   (2) 3 levels of K : K₀ = 0 : K₁ = 112 and K₂ = 168 Kg/ha.
   Sub-plot treatments:
   3 levels of N as C/A/N : N₁ = 161, N₂ = 224 and N₃ = 280 Kg/ha.
   Sub-Sub-plot treatments
   3 spacings : S₁ = 60 x 45, S₂ = 60 x 30 and S₃ = 45 x 45 sq.cm.

3. DESIGN:
   (i) Split-plot. (ii) (a) 6 main-plots/block; 3 sub-plots/main-plot; 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 1/1495 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of green leaves. (iv) (a) 1962-only. (v) N.A. (vi) N.A.

5. RESULTS:
   (i) 294.1 Q/ha. (ii) (a) 101.8 Q/ha. (b) 29.5 Q/ha. (c) 23.8 Q/ha. (iii) Main effects of N and S are highly significant, while S x N interaction is significant. (iv) Av. yield of green leaves in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>307.3</td>
<td>335.2</td>
<td>372.9</td>
<td>328.1</td>
<td>349.5</td>
<td>344.8</td>
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<td>340.9</td>
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C.D. for S marginal means = 7.80 Q/ha.
C.D. for S means at the same level of N = 14.3 Q/ha.
C.D. for N means at the same level of S = 15.2 Q/ha.
Crop :- Tobacco (Rabi).
Site :- Agri. Res. Sta., Ferozepur.

Object :- To study the effect of stages of toppings and spacing on the yield of Tobacco crop

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Clay loam. (iii) Feb., 64. (iv) (a) to (c) N.A. (d) As per treatments. (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) N.A. (ix) 25°Cm. (x) June, 64.

2. TREATMENTS:
Main-plot treatments:
3 levels of N as C/A/N: N₁=112, N₂=168 and N₃=224 Kg/ha
Sub-plot treatments:
3 stages of topping: — T₁=10 leaf stage, T₂=12 leaf stage and T₃=Flowering stage
Sub-Sub-plot treatments:
3 spacings between rows: S₁=23, S₂=30 and S₃=46cm.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/block; 3 sub-plots/main-plot; 3 sub-sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 0.60m x 5.40m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of green leaves. (iv) (a) 1964-only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 386.4 Q/ha. (ii) (a) 82.10Q/ha. (b) 56.40Q/ha. (iii) Main effects of N, T and S are highly significant while the interactions N x T and N x S are significant. (iv) Av. yield of green leaves in Q/ha.

<table>
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<tr>
<th></th>
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C.D. for N marginal means = 35.20 Q/ha.
C.D. for T marginal means = 22.19 Q/ha.
C.D. for S marginal means = 17.42 Q/ha.
C.D. for S means at the same level of N = 30.18 Q/ha.
C.D. for N means at the same level of S = 42.90 Q/ha.
C.D. for S means at the same level of T = 30.18 Q/ha.
C.D. for T means at the same level of S = 45.1 Q/ha.
Crop: Tobacco (Rabi).  
Type: ‘CMV’.

Ref.: Pb. 63(125), 64(126).

Object: To study the effect of N and spacings on the different varieties of Tobacco crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Clay loam.  (iii) Mid. of Feb.  (iv) (a) 4 to 5 ploughings.  (b) Transplanting.  (c) 0-288 Kg/ha.  (d) Between rows 30 cm and between plants as per treatments.  (e) As per treatments.  (v) N.A.  (vi) As per treatments.  (vii) Irrigated.  (viii) 4 hoeings.  (ix) 18.9 cm; N.A.  (x) June.

2. TREATMENTS:
   Main-plot treatments:
   3 varieties: \( V_1 = T-17, V_2 = T-59 \) and \( V_3 = T-165 \).

   Sub-plot treatments:
   3 doses of N: \( N_1 = 12, N_2 = 168 \) and \( N_3 = 224 \) Kg/ha.

   Sub-sub-plot treatments:
   4 spacings between rows: \( S_1 = 15, S_2 = 22.5, S_3 = 30 \) and \( S_4 = 45 \) cm.

   C/A/N broadcast half before transplanting, and 1/4 after 11 month and 1/4 at flowering.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot and 4 sub-sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 1/2990 ha., 30 cm × 54 cm.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield of green leaf, yield of dry leaf.  (iv) (a) 1963-64.  (b) No.  (c) Nil.  (v) and (vi) N.A.  (vii) As the error variances are heterogeneous, results of individual years are given under 5. Results.

5. RESULTS:
63(125)
   (i) 454.5 Q/ha.  (ii) (a) 59.7 Q/ha.  (b) 53.5 Q/ha.  (c) 43.9 Q/ha.  (iii) Main effects of N, V and S are highly significant.  (iv) Av. yield of green leaves of tobacco, in Q/ha.

\[
\begin{array}{cccccccc}
 & N_1 & N_2 & N_3 & S_1 & S_2 & S_3 & S_4 & \text{Mean} \\
V_1 & 379.2 & 453.2 & 461.1 & 520.4 & 433.8 & 408.7 & 362.0 & 431.2 \\
V_2 & 379.7 & 429.2 & 453.2 & 505.6 & 433.8 & 399.4 & 343.9 & 420.7 \\
V_3 & 455.4 & 531.1 & 548.7 & 611.9 & 515.5 & 493.9 & 425.6 & 551.7 \\
\text{Mean} & 404.8 & 471.2 & 487.7 & 545.9 & 461.0 & 424.0 & 377.2 & 454.5 \\
\hline
S_1 & 493.4 & 554.7 & 589.7 & & & & & \\
S_2 & 418.0 & 477.6 & 487.5 & & & & & \\
S_3 & 581.3 & 446.6 & 474.1 & & & & & \\
S_4 & 326.4 & 405.8 & 399.4 & & & & & \\
\end{array}
\]

C.D. for V marginal means = 44.8 Q/ha.
C.D. for N marginal means = 22.9 Q/ha.
C.D. for S marginal means = 20.5 Q/ha.
Crop: Tobacco (Rabi).

Object: To study the effect of different chemicals and oils on the suppression of suckers of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 29.11.61; Feb., 62. (iv) to (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) May, 62; June, 62.

2. TREATMENTS:
   8 chemicals and oils for suppression: T₁=Control, T₂=Coconut oil, T₃=Coconut oil 1:5 emulsion, T₄=Coconut oil 1:2 emulsion, T₅=Nepth Acetic Acid, T₆=Mustard oil, T₇=Malice hydrazide 1% in H₂O and T₈=Malice hydrazide 2% in H₂O.

3. DESIGN:
   (i) R.B.D. (ii) (a) B. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1'8m. x 1'8m.; 0'6m. x 5'4m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of dry leaves. (iv) (a) 1961-62. (b) No. (c) Nil, (v) and (vi) Nil. (vii) As error variances are heterogeneous and treatments × years interaction is absent, results of individual years are given under 5. Results.

5. RESULTS:
   61(71)
   (i) 49·30 Q/ha. (ii) 15·99 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of dry leaves in Q/ha.
   Treatment T₁ T₂ T₃ T₄ T₅ T₆ T₇ T₈
   Av. yield 36·96 69·21 55·71 51·70 44·06 43·67 44·06 50·08

   62(100)
   (i) 36·30 Q/ha. (ii) 10·24 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of leaves in Q/ha.
   Treatment T₁ T₂ T₃ T₄ T₅ T₆ T₇ T₈
   Av. yield 36·52 48·25 35·49 36·83 16·44 44·75 35·18 42·93

C.D. = 12·00 Q/ha
Crop :- Tobacco (Rabi).
Ref :- Pb 64(103), 64(120).
Site :- Agri. Res. Stn., Ferozepur.
Type:- 'D'.

Object :-To study the effect of different chemicals and oils in the suppression of suckers of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.
   (ii) Sandy loam. (iii) Feb. 62; 6.3.64. (iv) (a) to (e) N.A. (v) N.A. (vi) N -Tobacco; N.A. for 64. (vii) Irrigated. (viii) and (ix) N.A. (x) N.A.; June, 64.

2. TREATMENTS:
   8 Chemical treatments :- T0=Control, T1=Mustard oil, T2=Coconut oil, T3=Coconut oil emulsion 1:5, T4=Coconut oil emulsion 1:2, T5=Malic hydrazide 1% in H2O, T6=Malic hydrazide 2% in H2O and T7=Napthlene acetic acid.

3. DESIGN:
   (i) R.B.D. (ii) A. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 0'60m. X 5'40m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Green leaf weight. (iv) (a) 1962-64/1963 N.A.. (b) No. (c) Results of the combined analysis are presented, under 5. Results. (vi) and (vii) No. (vii) Error variances are homogeneous and Treatments X Years interaction is absent.

5. RESULTS:
   Pooled results
   (i) 266.5 Q/ha. (ii) 59.9 Q/ha. (based on 77 d.f., made up of Treatments X Years interaction and pooled error) (iii) Treatment differences are highly significant. (iv) Av. yield of green leaves in Q/ha.

   Treatment | T0 | T1 | T2 | T3 | T4 | T5 | T6 | T7 | Sig. | G.M. | S.E./plot
   Year
   1962
   279.8  307.1  249.5  270.1  244.3  256.2  290.6  259.8  N.S.  55.5  269.7
   1964
   273.7  292.2  240.2  238.7  265.4  339.5  284.0  173.9  **  59.9  263.4
   Pooled
   276.7  299.0  244.8  267.8  241.5  297.8  287.3  216.9  **  59.9  256.5

---

Crop :- Tobacco (Rabi).
Ref :- Pb 64(119).
Site :- Agri. Res. Stn., Ferozepur.
Type :- 'D'.

Object :-To study the effect of different chemicals and oils on the suppression of suckers.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 6.3.64. (iv) (a) to (e) N.A. (v) N.A. (vi) N -tobacco. (vii) Irrigated. (viii) and (ix) N.A. (x) June, 64.

2. TREATMENTS:
   7 treatments: T0=Control, T1=Mustard oil, T2=coconut oil, 1:5 emulsion, T3=Coconut oil 1:2, T4=Malic hydrazide 1% in H2O, T5=Malic hydrazide 2% in H2O and T6=Napthlene acetic acid.
3. DESIGN:
   (i) R.B.D. (ii) (a) 7, (b) N.A. (iii) 5. (iv) (a) N.A. (b) 0 60 n x 5 40 n. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of dry leaf. (iv) (a) 1954 only (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 20'31 Q/ha. (ii) 10'12 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of dry leaf in Q/ha.
   Treatment
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<th>T₀</th>
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<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
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<td>4'65</td>
<td>8'95</td>
<td>9'09</td>
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   C.D. = 13'21 Q/ha.

Crop: Groundnut (Kharif).
Object: To study the effect of micronutrients in the presence and absence of P on the yield of Groundnut.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 4th week of June, 63. (iv) and (v) N.A. (vi) PG. No.1. (vii) Irrigated. (viii) and (ix) N.A. (x) 3rd week of Nov., 63.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 levels of P₂O₅ as Super: P₀ = 0 and P₁ = 28 Kg/ha.
   (2) 7 micronutrients: T₀ = Control, T₁ = Manganese sul., T₂ = Ferrous sul., T₃ = Copper sul., T₄ = Zinc sul., T₅ = Magnesium sul., and T₆ = Boric acid.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/296.5 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of pod. (iv) (a) 1963 only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 1023 Kg/ha. (ii) 218'0 Kg/ha. (iii) Main effect of T alone is highly significant. (iv) Av. yield of pods in Kg/ha.

<table>
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Mean 1063 984 1023

C.D. for T marginal means = 220'5 Kg/ha.
Crop: Groundnut (Kharif).
Site: Punjab Agri. University, Ludhiana.

Object: To study the effect of different levels of N, P and K on the yield of Groundnut.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 28.6.60. (iv) (a) to (e) N.A. (v) N.A. (vi) PG. No. 1. (vii) Irrigated. (viii) and (ix) N.A. (x) 23.11.60.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 2 levels of N as C/A/N: N₀ =0, and N₁  =28 Kg/ha.
   (2) 2 levels of P₂O₅ as Super: P₀ =0, and P₁ =28 Kg/ha.
   (3) 3 levels of K₂O as Mar. pot.: K₀ =0, K₁  =14 and K₂ =28 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10·06m. x 3·66m. (b) 9·14m. x 3·05m. (v) 46cm. x 30cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of pod. (iv) (a) 1960-only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 2178 Kg/ha. (ii) 290·3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

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Crop: Groundnut (Kharif).
Site: Punjab Agri. University, Ludhiana.

Object: To study the effect of different manures on the yield of Groundnut.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 9.7.60. (iv) (a) to (d) N.A. (v) N.A. (vi) PG. No. 1. (vii) Irrigated. (viii) and (ix) N.A. (x) 24.11.60.

2. TREATMENTS:
   8 manures: M₀ = Control, M₁ = A/S, M₂ = A/C, M₃ = Cal. chlo., M₄ = Cal. sul., M₅ = Sod. sul., M₆ = Super (single) and M₇ = Super (Triple).
   N.B. doses of manures N.A.
3. DESIGN:
   (i) R.B.D. (ii) 8. (b) N.A. (iii) 4. (iv) (a) 13'72m x 3'66m. (b) 13'26m x 3'05m. (v) 23cm x 30cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of pod. (iv) (a) 1960-only. (b) and (c) —. (v) to (vii) N.A.

5. RESULTS:
   (i) 1953 Kg/ha. (ii) 87.7 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of pod in Kg/ha.

<table>
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<tr>
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<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
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<td>C.D.</td>
<td>-129.0 Kg/ha.</td>
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Crop: Groundnut (Kharif).
Ref: Pb. 60(148).
Site: Punjab Agri. University, Ludhiana.
Type: 'M'.

Object: To study the effect of balanced dose of N and P on the yield of Groundnut.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 21.7.60. (iv) (a) 3 to 4 ploughings. (b) Line sowing. (c) 30 Kg/ha. (d) 23cm x 20cm. (v) Nil. (vi) Pb-1. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) 7/8.11.60.

2. TREATMENTS:
   5 manurial treatments: M₅=Control (no manure). M₁=28 Kg/ha. of P₂O₅. M₂=56 Kg/ha. of P₂O₅. M₃=14 Kg/ha. of P₂O₅+14 Kg/ha. of N and M₄=28 Kg/ha. of P₂O₅+28 Kg/ha. of N. (All fertilizers drilled below seed. N applied as C/A/N and P₃O₅ as Super.)

3. DESIGN:
   (i) R.B.D. (ii) 5. (b) N.A. (iii) 4. (iv) (a) 1/49.4 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of pod. (iv) (a) 1960-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS:
   (i) 729 Kg/ha. (ii) 119/2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
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<tr>
<td>Av. yield</td>
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<td>735</td>
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Crop: Groundnut (Kharif).
Ref: Pb. 60(144).
Site: Punjab Agri. University, Ludhiana.
Type: 'M'.

Object: To study the effect of balanced dose of N, P and K on the yield of Groundnut.
1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 20.7.60.  (iv) (a) 3 to 4 ploughings.  (b) N.A.  (c) 30 Kg/ha.
(d) 23cm. ×23cm.  (v) Nil.  (vi) PG.  (vii) Irrigated.  (viii) 2 hoings.  (ix) N.A.  (x) 5/6.11.60.

2. TREATMENTS:
All combinations of (1), (2) and (3).
(1) 2 levels of N as C/A/N :- N₀ = 0 and N₁ = 28 Kg/ha.
(2) 2 levels of P₁₂₀ as Super :- P₀ = 0 and P₁ = 28 Kg/ha.
(3) 2 levels of K₂O as Mur. Pot : K₀ = 0 and K₁ = 28 Kg/ha.
All fertilizers directed below seed at sowing.

3. DESIGN:
(i) Fact in R.B.D.  (ii) (a) S.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 4(1/49)4 ha.  (v) N.A.  (vi) Yes.

4. GENERAL
(i) Normal.  (ii) Nil.  (iii) Yield of pod.  (iv) (a) 1960-only.  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
(i) 131 9 Kg/ha.  (ii) 193·3 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of pods in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
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Crop :- Groundnut.  
Site :- Govt. College, Ludhiana. 
Ref :- Pb. 60(139), 60(141), 60(148).  
Type :- 'M'

Object :- To study the effect of different levels of P and N on the yield of Groundnut.  (Expt. conducted at Sadbar, Ghungarli and Phullanwal respectively).
4. **GENERAL:**
   (i) Normal. (ii) Nil. (iii) Yield of pod. (iv) (a) 1960-only. (b) No. (c) Pooled results over places are presented under 5. Results. (v) At three villages. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Places interaction is present.

5. **RESULTS**
   (i) 19 Kg/ha. (ii) 258.6 Kg/ha. (based on 8 d.f. made up of interaction of Treatments x Places). (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>M₃</th>
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<td>Pooled</td>
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<td>996</td>
<td>878</td>
<td>1016</td>
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<th>M₂</th>
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<th>G.M.</th>
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**Crop:** Groundnut (*Kharij*).  
**Ref.:** Pb. 60(142), 60(143), 60(145).  
**Site:** Phullanwal, Sadhar and Ghungarli (c.f.).  
**Type:** 'M'.

1. **BASAL CONDITIONS:**
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) Nil. (iv) PG-1. (v) (a) 3 to 4 ploughings. (b) N.A. (c) 30 Kg/ha. (d) 23 cm. x 23 cm. (e) --. (vi) 13.7.60; 25.7.60 and 17.7.60 (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. (x) 25.10.60; 9.11.60 and 6.11.60.

2. **TREATMENTS:**
   All combinations of (1), (2) and (3).
   (1) 2 levels of N as C/A/N : N₁ = 0 and N₂ = 28 Kg/ha.
   (2) 2 levels of P₂O₅ as Super : P₁ = 0 and P₂ = 28 Kg/ha.
   (3) 2 levels of K₂O as Mur. Pot. : K₁ = 0 and K₂ = 28 Kg/ha.

3. **DESIGN:**
   (i) Fact, in R.B.D.; 8 plots/block; 4 replications. (ii) N.A. (iii) (a) N.A. (b) 1/49.4 ha. (iv) Yes.

4. **GENERAL:**
   (i) Normal. (ii) Nil. (iii) Yield of pod. (iv) (a) 1960-only. (b) No. (c) Nil. (v) 3 villages. (vi) Nil. (vii) Error variances are heterogeneous and (N x P x Places) and (P x K x Places) interactions are present.

5. **RESULTS:**
   Pooled results.
   (i) 840 Kg/ha. (ii) 192.5 Kg/ha. (based on 10 d.f. made up of interactions of N, P, K, N x P and P x K with places.) (iii) Main effect of N alone is significant. (iv) Av. yield of pod in Kg/ha.
N, N, K, K, Mean

<table>
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<th></th>
<th>N₀</th>
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C.D. for N marginal means = 87.5 Kg/ha.

Individual villages

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<th>N₁</th>
<th>Sig.</th>
<th>P₀</th>
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Crop :- Groundnut (Kharif).
Site :- Oil seed Res. Sta., Samrala.

Ref :- Pb. 60(21).
Type :- 'M'.

Object :- To study the effect of different levels of N, P and K on the yield of Groundnut.

1. BASAL CONDITIONS:
   (I) (a) to (c) N.A. (ii) Sandy loam. (iii) 17.7-6.0. (iv) (a) 3 to 4 ploughings. (b) N.A. (c) 30 Kg/ha. (d) 23cm. x 23cm. (e) N.A. (f) Nil. (vi) C-145. (vii) Un-irrigated. (viii) and (ix) N.A. (x) 15.11.60.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 2 levels of N: N₀=0 and N₁=28 Kg/ha.
   (2) 3 levels of K: K₀=0, K₁=14 and K₂=28 Kg/ha.
   (3) 2 levels of P₀=0 and P₁=28 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/358.3 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Yield of pod. (iv) (a) 1960-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 1219 Kg/ha. (ii) 3270 Kg/ha. (ii) Main effect of K and interaction N x K are significant. (iv) AY yield of pod in Kg/ha.
### Object:
To study the effect of calcium, N, and K on the yield of Groundnut.

#### 1. BASAL CONDITIONS:
- (i) (a) to (c) N.A.
- (ii) Sandy loam.
- (iii) 20.7.60.
- (iv) (a) 3 to 4 ploughings.
- (v) N.A.
- (vi) 23 cm. x 23 cm.
- (e) —
- (vii) Un-irrigated.

#### 2. TREATMENTS:
- All combinations of (1), (2), and (3)
  - (i) 3 levels of calcium: $C_0 = 0$, $C_1 = 56.0$, and $C_2 = 112.0$ Kg/ha.
  - (2) 2 levels of K: $K_0 = 0$ and $K_1 = 28$ Kg/ha.
  - (3) 2 levels of N: $N_0 = 0$ and $N_1 = 28$ Kg/ha.

#### 3. DESIGN:
- (i) Fact. in R.B.D.
- (ii) (a) 12.
- (iii) 4.
- (iv) (a) N.A.
- (b) 1.558.3 ha.
- (v) N.A.
- (vi) Yes.

#### 4. GENERAL:
- (i) Satisfactory.
- (ii) N.A.
- (iii) Yield of pod.
- (iv) (a) 1960-only.
- (b) and (c) —
- (v) to (vii) Nil.

#### 5. RESULTS:
- (i) 1179 Kg/ha.
- (ii) 13.9 Kg/ha.
- (iii) Main effect of C alone is significant.
- (iv) Av. yield of pod in Kg/ha.

### Crop: Groundnut (Kharij).

### Site: Oil seed Res. Sta., Samrala.

### Type: 'M'

### Ref: Pb. 60(22).

**Mean**

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C.D. for $K$ marginal means = 232.6 Kg/ha.
C.D. for the body of $N \times K$ table = 329.0 Kg/ha.

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<tr>
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C.D. for $C$ marginal means = 123 Kg/ha.
Crop: Groundnut (Kharif).  
Site: Oil seed Res. Stn., Samrala.

Object: To study the effect of different manures on the yield of Groundnut.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 1st week of July.  (iv) (a) 3 ploughings and 3 plankings.  (b) Dibbling.  (c) 79 Kg/ha.  (d) 30cm. x 30cm.  (v) Nil.  (vi) PG. No. 1.  (vii) Irrigated.  (viii) 2 weedicings.  (ix) 61.7cm.  (x) Dec., 63.

2. TREATMENTS:
   10 manurial treatments: M0 = Control, M1 = 112 Kg/ha. of A/S, M2 = 86.2 Kg/ha. of A/C, M3 = 174.7 Kg/ha. of Super, M4 = 82.2 Kg/ha. of Triple Super, M5 = 152.3 Kg/ha. of cal. sul., M6 = 44.9 Kg/ha. of cal. chlo. M7 = 32.9 Kg/ha. of P2O5, M8 = 122.1 Kg/ha. of Sod Sul. and M9 = 112 Kg/ha. of Sulphur.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 10.  (b) N.A.  (iii) 4.  (iv) (a) 29.26m. x 2.74m.  (b) 24.95m. x 2.74m.  (v) 2.28m. on either side along breadth.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) N.A.  (iii) Yield per pod.  (iv) (a) 1963-only.  (b) and (c) — (v) to (vii) Nil.

5. RESULTS:
   (i) 1035 Kg/ha.  (ii) 125.2 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of pod in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M0</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
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Crop: Groundnut (Kharif).  
Site: Oil seed Res. Stn., Samrala.

Object: To study the effect of micronutrients on the yield of Groundnut.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (b) Gram.  (c) N.A.  (iii) 11.7.64.  (iv) (a) 4 to 5 ploughings.  (b) N.A.  (c) 30 Kg/ha.  (d) 30cm. x 23cm.  (e) —.  (v) 28 Kg/ha. of P2O5.  (vi) Pb. No. 1.  (vii) Irrigated.  (viii) 2 hoeings.  (ix) N.A.  (x) 10.11.64.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 levels of P2O5 as Super: P0 = 0, and P1 = 28 Kg/ha.
   (2) 8 micronutrients: M0 = Control, M1 = 56 Kg/ha. of Manganese sul., M2 = 35.6 Kg/ha. of Zinc sul., M3 = 22.4 Kg/ha. of Ferrous Sul., M4 = 22.4 Kg/ha. of Copper Sul., M5 = 1.2 ppm./ha. of Boric acid, M6 = 1.2 ppm./ha. of Molybdenum acid and M7 = 112.0 Kg/ha. of Magnesium sul.

3. DESIGN:
   (i) Fact in R.B.D.  (ii) (a) 16  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) J/30/5-2 ha.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) Nil.  (iii) Yield of pod.  (iv) (a) 1954-contd. (expt., for 65 N.A.)  (b) No.  (c) Nil.  (v) to (vii) Nil.

5. RESULTS:
   (i) 2043 Kg/ha.  (ii) 1049.2 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of pod in Kg/ha.
Object:—Type A: To study the response of Groundnut to different levels of N, P and K applied individually and in combination.

BASAL CONDITIONS:
(i) N.A. (ii) Alluvial. (iii) to (x) N.A.

TREATMENTS:
8 manurial treatments:
O=Control (no manure),
N=22·4 Kg/ha. of N,
P=33·6 Kg/ha. of P₂O₅,
K=33·6 Kg/ha. of K₂O,
NP=22·4 Kg/ha. of N+33·6 Kg/ha. of P₂O₅,
NK=22·4 Kg/ha. of N+33·6 Kg/ha. of K₂O,
PK=33·6 Kg/ha. of P₂O₅+33·6 Kg/ha. of K₂O,
NPK=22·4 Kg/ha. of N+33·6 Kg/ha. of P₂O₅+11·6 Kg/ha. of K₂O.

DESIGN:
(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 8 on a Rabi cereal, 8 on Cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98 lha. (b) 1/197·7 lha. (iv) Yes.

GENERAL:
(i) and (ii) N.A. (iii) Yield of pod. (iv) to (vii) N.A.

RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
<th>Av. response in Kg/ha.</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.B.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>P</td>
<td>K</td>
<td>S.E.</td>
<td></td>
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<tr>
<td>60 (S.F.T.)</td>
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<td></td>
</tr>
<tr>
<td>Ludhiana</td>
<td>7</td>
<td>1440</td>
<td>90</td>
<td>90</td>
<td>150</td>
<td>33</td>
<td>40</td>
<td>30</td>
<td>10</td>
<td>10</td>
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<tr>
<td>Patiala</td>
<td>6</td>
<td>720</td>
<td>150</td>
<td>260</td>
<td>100</td>
<td>20</td>
<td>10</td>
<td>20</td>
<td>10</td>
<td>20</td>
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<tr>
<td>61 (S.F.T.)</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ludhiana</td>
<td>12</td>
<td>1230</td>
<td>140</td>
<td>240</td>
<td>120</td>
<td>55</td>
<td>30</td>
<td>60</td>
<td>10</td>
<td>30</td>
</tr>
</tbody>
</table>
Crop: Groundnut (Kharif).

Site: Patiala, Sangrur and Ludhiana.

Object: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:
   7 manurial treatments:
   O = Control (no manure),
   N₁ = 22.4 Kg/ha. of N as A/S,
   N₂ = 44.8 Kg/ha. of N as A/S,
   N₁' = 22.4 Kg/ha. of N as Urea,
   N₂' = 44.8 Kg/ha. of N as Urea,
   N₁'' = 22.4 Kg/ha. of N as C/A/N and
   N₂'' = 44.8 Kg/ha. of N as C/A/N.

3. DESIGN:
   Same as in type A conducted on Groundnut crop on page No. 746.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of pod. (iv) (a) 1960-only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield in Kg/ha.</th>
<th>N₁</th>
<th>N₂</th>
<th>N₁'</th>
<th>N₂'</th>
<th>N₁''</th>
<th>N₂''</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patiala</td>
<td>4</td>
<td>1010</td>
<td>200</td>
<td>440</td>
<td>160</td>
<td>250</td>
<td>160</td>
<td>330</td>
<td>43</td>
</tr>
<tr>
<td>Sangrur</td>
<td>3</td>
<td>660</td>
<td>60</td>
<td>330</td>
<td>100</td>
<td>250</td>
<td>130</td>
<td>270</td>
<td>57</td>
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<tr>
<td>Ludhiana</td>
<td>7</td>
<td>1330</td>
<td>70</td>
<td>10</td>
<td>120</td>
<td>10</td>
<td>180</td>
<td>160</td>
<td>63</td>
</tr>
</tbody>
</table>

Crop: Groundnut (Kharif).
District: Ludhiana.

Object: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:
   7 manurial treatments:
   O = Control (no manure),
   N₁ = 22.4 Kg/ha. of N as A/S,
   N₂ = 44.8 Kg/ha. of N as A/S,
   N₁' = 22.4 Kg/ha. of N as Urea,
   N₂' = 44.8 Kg/ha. of N as Urea,
N<sub>1</sub> = 22.4 Kg/ha. of N as A/S/N and N<sub>2</sub> = 44.8 Kg/ha. of N as A/S/N.

3. DESIGN:
Same as in type A conducted on Groundnut crop on page No. 746.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of pod. (iv) (a) 1961-only. (b) and (a) N.A. (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1'&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2'&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ludhiana</td>
<td>12</td>
<td>1390</td>
<td>270</td>
<td>310</td>
<td>140</td>
<td>180</td>
<td>70</td>
<td>340</td>
</tr>
</tbody>
</table>


Object: Type A: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
6 manurial treatments:
- O = Control (no manure),
- N<sub>1</sub> = 15 Kg/ha. of N,
- N<sub>2</sub> = 30 Kg/ha. of N,
- P<sub>1</sub> = 30 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
- N<sub>1</sub>P<sub>1</sub> = 12 Kg/ha. of N + 30 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
- N<sub>2</sub>P<sub>1</sub> = 30 Kg/ha. of N + 30 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,
- N<sub>2</sub>P<sub>2</sub> = 30 Kg/ha. of N + 60 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and N<sub>2</sub>P<sub>2</sub>K<sub>1</sub> = 30 Kg/ha. of N + 60 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 30 Kg/ha. of K<sub>2</sub>O.

3. DESIGN:
(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil and cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A<sub>1</sub>, 11 of type A<sub>2</sub> and 3 are of type C. The eleven experiments each under type A<sub>1</sub> and A<sub>2</sub> are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a Cash crop and 2 on an Oilseed crop. All the three type-C experiments are conducted on legume crop. For the purpose of conducting the A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are laid out. For conducting these experiments, three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of pod. (iv) (a) 1964-only; (b) and (c) N.A. (v) to (vii) N.A.
5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$N_1P_2$</th>
<th>$N_2P_1$</th>
<th>$K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>-38</td>
<td>185</td>
<td>279</td>
<td>483</td>
<td>473</td>
<td>841</td>
<td>1015</td>
<td>671</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pod in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control mean=1858 Kg/ha., No. of trials=6

Crop: Groundnut (Kharif). Ref: Ph. 64(S.F.T.) for Sangrur, and Patiala.
District: Sangrur, Ludhiana, and Patiala.

Type: 'M'.

Object: To study the response curves of important cereal, cash, and oil seed crops to $N$ applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (v) N.A. (vi) Unirrigated. (vii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:
O = Control (no manure),
$N_1=15$ Kg/ha. of $N$,
$N_2=30$ Kg/ha. of $N$,
$P_1=20$ Kg/ha. of $P_2O_5$,
$N_1P_1=15$ Kg/ha. of $N+20$ Kg/ha. of $P_2O_5$,
$N_2P_1=30$ Kg/ha. of $N+20$ Kg/ha. of $P_2O_5$,
$N_2P_2=20$ Kg/ha. of $N+40$ Kg/ha. of $P_2O_5$ and
$N_2P_1K_1=30$ Kg/ha. of $N+40$ Kg/ha. of $P_2O_5+20$ Kg/ha. of $K_2O$.

3. DESIGN:
Same as in Type A1 conducted under irrigated condition on Groundnut crop on page No. 746.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of pod. (iv) (a) 1964 for Sangrur and Patiala; 1962 to 66 for Ludhiana (63 to 65 N.A.) (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

**Sangrur**
64 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$N_2P_2$</th>
<th>$N_2P_1$</th>
<th>$K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>-49</td>
<td>39</td>
<td>301</td>
<td>316</td>
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<td>309</td>
<td>474</td>
<td>173</td>
<td></td>
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</tr>
<tr>
<td>Pod in Kg/ha.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</table>

Control mean=657 Kg/ha., No. of trials=2

**Ludhiana**
61 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$N_2P_2$</th>
<th>$N_2P_1$</th>
<th>$K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of</td>
<td>28</td>
<td>438</td>
<td>431</td>
<td>429</td>
<td>631</td>
<td>645</td>
<td>798</td>
<td>198</td>
<td></td>
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</tr>
<tr>
<td>Pod in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

Control mean=1413 Kg/ha., No. of trials=11
Crop :- Groundnut (Kharif).

District :- Ludhianaa and Sangrur.

Object :- To study the response curves of important cereal, cash and oil seed crops applied to P singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manurial treatments:

O = Control (No manure),
N1 = 15 Kg/ha. of N,
P1 = 30 Kg/ha. of P2O5,
P2 = 60 Kg/ha. of P2O5,
N1P1 = 15 Kg/ha. of N + 30 Kg/ha. of P2O5,
N1P2 = 15 Kg/ha. of N + 60 Kg/ha. of P2O5,
N2P1 = 30 Kg/ha. of N + 60 Kg/ha. of P2O5 and
N2P2K3 = 30 Kg/ha. of N + 60 Kg/ha. of P2O5 + 60 Kg/ha. of K2O.

3. DESIGN:
Same as in type A2 conducted under irrigated condition on Groundnut crop on page No. 746.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of pod. (iv) (a) 1964 to 66 (65 N.A.) for Ludhiana and 1965 for Sangrur. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   Ludhiana
64(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N1</th>
<th>P1</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P3K3</th>
<th>S.E.</th>
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<tr>
<td>Av. response of Pod in Kg/ha.</td>
<td>174</td>
<td>390</td>
<td>839</td>
<td>405</td>
<td>807</td>
<td>839</td>
<td>1122</td>
<td>28.5</td>
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</table>

   Sangrur
65(S.F.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N1</th>
<th>P1</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P3</th>
<th>N1P3K3</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of Pod in Kg/ha.</td>
<td>285</td>
<td>110</td>
<td>560</td>
<td>635</td>
<td>755</td>
<td>985</td>
<td>860</td>
<td>189.4</td>
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</tbody>
</table>

Control mean=1810 Kg/ha.; No. of trials=6

Control mean=1440 Kg/ha.; No. of trials=2
Object: Type A 2: To study the response curves of important cereal, cash and oil seed crops applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manural treatments:
   U=Control (no manure)
   N1=15 Kg/ha. of N
   P1=20 Kg/ha. of P2O5
   P2=40 Kg/ha. of K2O
   N1P1=15 Kg/ha. of N+20 Kg/ha. of P2O5
   N1P2=15 Kg/ha. of N+40 Kg/ha. of P2O5
   N2P1=30 Kg/ha. of N+40 Kg/ha. of P2O5 and
   N1P2K2=30 Kg/ha. of N+40 Kg/ha. of P2O5+40 Kg/ha. of K2O

3. DESIGN:
   Same as in type A 1 conducted under irrigated conditions on Groundnut crop on page No. 746.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of pod. (iv) to (vii) N.A.

5. RESULTS:
   Ludhiana
   62(S.F.T.)
   Treatment N1 P1 P2 N1P1 N1P2 N2P2 N1P2K2 S.E.
   Av. response of Pod in Kg/ha. 401 351 494 530 573 696 889 205.3
   Control mean=1413 Kg/ha.; No. of trials=9

   Patiala
   64(S.F.T)
   Treatment N1 P1 P2 N1P1 N1P2 N2P2 N1P2K2 S.E.
   Av. response of Pod in Kg/ha. 593 494 948 1344 494 751 1976 694.6
   Control mean=2708 Kg/ha.; No. of trials=2

Crop: Groundnut (Kharif)
Reference: Pb. 62(S.F.T.) for Ludhiana and 64(S.F.T.) for Patiala.

Object: Type A 4: To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
   (i) to (ix) N.A. (vi) Irrigated. (viii) to (x) N.A.
3 manural treatments:
O=Control (no manure),
N<sub>1</sub>=15 Kg/ha. of N,
K<sub>1</sub>=20 Kg/ha. of K<sub>2</sub>O,
N<sub>2</sub>K<sub>1</sub>=15 Kg/ha. of N+30 Kg/ha. of K<sub>2</sub>O,
N<sub>1</sub>K<sub>2</sub>=30 Kg/ha. of N+60 Kg/ha. of K<sub>2</sub>O,
N<sub>1</sub>PK<sub>1</sub>=15 Kg/ha. of N+30 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

DESIGN:
Same as in type A1 conducted under irrigated condition on Groundnut crop on page No. 746.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of pod. (iv) (a) 1962 to 66 (62,63 and 65 N.A.) for Ludhiana and 1962 to 66 for Patiala (62,63 and 63 N.A.) (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

**Ludhiana**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of Pod in Kg/ha.</td>
<td>385</td>
<td>53</td>
<td>110</td>
<td>208</td>
<td>233</td>
<td>523</td>
<td>584</td>
</tr>
<tr>
<td>Control mean=1818 Kg/ha.; No. of trials=5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Patiala**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of Pod in Kg/ha.</td>
<td>385</td>
<td>444</td>
<td>474</td>
<td>316</td>
<td>1245</td>
<td>909</td>
<td>-197</td>
</tr>
<tr>
<td>Control mean=1739 Kg/ha.; No. of trials=2</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Crop:** Groundnut (*Kharif*).
**District:** Ludhiana.

*Ref:* Pf.62(S.F.T.).
*Type:* 'M'.

Object:—Type A<sub>1</sub> : To study the response curves of important cereal, cash and oil seed crops to K applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Un-irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manural treatments:
O=Control (no manure),
N<sub>1</sub>=15 Kg/ha. of N,
K<sub>1</sub>=20 Kg/ha. of K<sub>2</sub>O,
K<sub>2</sub>=60 Kg/ha. of K<sub>2</sub>O,
N<sub>1</sub>K<sub>1</sub>=15 Kg/ha. of N+20 Kg/ha. of K<sub>2</sub>O,
3. DESIGN:
Same as in type A1 conducted under irrigated condition on Groundnut crop on page No 749.

4. GENERAL:
(i) and (ii) N.A.  (iii) Yield of pod.  (iv) (a) 1962 to 66 (63 to 65 N.A.),  (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N2K2</th>
<th>N1P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>237</td>
<td>74</td>
<td>235</td>
<td>564</td>
<td>268</td>
<td>465</td>
<td>456</td>
</tr>
</tbody>
</table>

Control mean=1389 Kg/ha.; No. of trials=9

---

Crop: Groundnut (Kharif).

Site: Punjab Agri. University, Ludhiana.

Type: 'C'.

Object: —To study the effect of different spacings on the yield of Groundnut.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  (ii) Sandy loam.  (iii) 1.7.61; 4th week of June, 63.  (iv) (a) to (d) N.A.  (c) — (x) N.A.; 11.3 Kg/ha. of P2O5 as Super at sowing.  (vi) P.G. 1.  (vii) Irrigated.  (viii) and (ix) N.A.  (x) 3rd week of November.

2. TREATMENTS:
All combinations of (1) and (2).
(1) 2 spacings between rows: R1=46 and R1=69cm.
(2) 3 spacings between plants: S1=8, S2=15 and S3=23cm.

3. DESIGN:
(i) Fact. in R.B.D.  (ii) 6.  (b) N.A.  (iii) 10.  (iv) (a) 5.94em.x4.11m.; N.A.  (b) 5.49m.x2.74m.;1247 1 ha.  (v) 23cm. x 69cm.; N.A.  (vii) Yes.

4. GENERAL:
(i) Normal.  (ii) N.A.  (iii) Yield of pod.  (iv) (a) 1961—63 (1962 N.A.)  (b) No. (c) Results of combined analysis have been presented under 5. Results.  (v) N.A.  (vi) Nil.  (vii) Error variances are heterogeneous and Treatment X Years interaction is present.

5. RESULTS:
Pooled results.
(i) 5595 Kg/ha.  (ii) 1181.2 Kg/ha. (based on 5 d.f. made up of Treatment X Years interaction).  (iii) None of the effects is significant.  (iv) Av. yield of pod in Kg/ha.
Object: - To study the effect of different spacings on the yield of Groundnut.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 25.6.61; 4th week of June.63. (iv) (a) to (d) N.A. (a) — (g) N.A.; 11-3 Kg/ha of K₂O at sowing for 63 (v) 50/90; C—50/1. (vi) Irrigated. (vii) and (ix) N.A. (x) 14 to 21.11.61; 3rd week of Nov., 63.

2. TREATMENTS

All combinations of (1) and (2)

(1) 2 spacings between rows: R₁=30cm. and R₂=46cm.

(2) 3 spacings between plants: S₁=8cm., S₂=15cm. and S₃=23cm.

3. DESIGN:

(i) Fact, in R.B.D. (ii) a 6. (b) N.A. (iii) 10/6 (iv) (a) 5'94m. x 3'65m.; N.A. (b) 5'49m. x 2'74m.; 1/247'1 ha. (v) 23cm. x 46cm.; N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of pod. (iv) (a) 1961-63/1962 N.A.) (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are heterogenous and Treatments x Years interaction is present.

5. RESULTS:

Pooled results

(i) 5413 Kg/ha. (ii) 6178 Kg/ha. (based on 5 d.f. made up of Treatments x Years interaction) (iii) Main effect of R is highly significant and that of S is significant. (iv) Avg. yield of pod. in Kg/ha.
Crop: Groundnut (Kharij).
Site: Punjab Agri. University, Ludhiana.
Type: 'G'.

Object: To study the effect of dates of sowing and time of harvesting on the yield of Groundnut.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam, (iii) As per treatments. (iv) (a) to (d) N.A. (e) — (v) N.A. (vi) PO.
   No. 1. (vii) Irrigated. (viii) 4 hoeings. (ix) N.A. (x) As per treatments.

2. TREATMENTS:
   Main-plot treatments:
   3 dates of sowing: D1=12.6.63; D2=19.6.63 and D3=26.6.63.
   Sub-plot treatments:
   3 times of harvesting: H1—at 115, H2—at 125 and H3—at 135 days after sowing.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replcation; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b)
   1/27.8 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of pod. (iv) (a) 1963-only. (b) and (c) — (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1809 Kg/ha. (ii) (a) 368.9 Kg/ha. (b) 276.2 Kg/ha. (iii) None of effects is significant. (iv) Av. yield
   of pod, in Kg/ha.
Crop Groundnut (Kharif).
Site: Punjab Agri. University, Ludhiana.

Object:—To study the effect of different spacings and methods of sowing on the yield of Groundnut.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 18.6.63. (iv) (a) 3 ploughings, (b) As per treatments. (c) N.A.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 methods of sowing: M1=Ridge sowing, M2=Flat sowing and M3=Flat sowing cum earthing up.
(2) 4 spacings: S1=30cm. x 15cm., S2=30cm. x 23cm., S3=46cm. x 15cm. and S4=46cm. x 23cm.

3. DESIGN:
(i) Fact. in R.B.D. (ii) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/494.2 ha. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of pod. (iv) (a) 1963-only. (b) and (c) — (v) to (vii) N.A.

5. RESULTS:
(i) 1224 Kg/ha. (ii) 2076 Kg/ha. (iii) Main effect of S and interaction of M x S are highly significant.
(iv) Av. yield of pod. in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>$S_3$</th>
<th>$S_4$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M_1$</td>
<td>1174</td>
<td>1557</td>
<td>803</td>
<td>1273</td>
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<td>$M_2$</td>
<td>1396</td>
<td>1557</td>
<td>1063</td>
<td>976</td>
<td>1248</td>
</tr>
<tr>
<td>$M_3$</td>
<td>1495</td>
<td>1223</td>
<td>1310</td>
<td>865</td>
<td>1223</td>
</tr>
</tbody>
</table>

Mean 1355 1446 1059 1038 1224

C.D. for S marginal means=172.3 Kg/ha.
C.D. for the body of M x S table=298.9 Kg/ha.
Crop :- Groundnut (Kharif).
Ref :- Pb. 61(31), 62(41), 63(204).
Site :- Oil seed Res., Stn, Samrala.
Type :- 'C'.

Object :- To study the effect of spacing on the yield of Groundnut.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Fallow, Groundnut N.A.; (c) Nil; G.M.; N.A. (ii) Sandy loam. (iii) 5.7 61; 15.7 62; 1st week of July, 63. (iv) (a) 4 to 5 ploughings, (b) Dibbling for 63; N.A. for others. (c) 74 Kg/ha. (d) As per treatments. (e) — (v) NE. (vi) 145/12-P for 63; C-145 for others. (vii) Unirrigated. (viii) Weeding and hoeing. (ix) N.A., N.A., 61-7cm. (x) Nov., 61; 15.11.62; Dec., 63.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 spacings between rows: \( R_1 = 23\text{cm.}\) and \( R_2 = 30\text{cm.}\)
   (2) 2 spacings between plants: \( s_1 = 15\text{cm.}\) and \( s_2 = 23\text{cm.}\)

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 4. (b) N.A. (iii) 8, (iv) (a) N.A. for 62; 14/63m. x 3/66m. for others. (b) 1/147.6 ha. for 62; 13/-2m. x 3/66m. for others. (v) N.A. for 62; 4/-cm. on either side along breadth for others. (vi) Yes.

4. GENERAL:
   (i) Satisfactory for 61 and 62 Normal for 63. (ii) Nil. (iii) Yield of pod. (iv) (a) 1961-63 (b) No. (c) Nil, (v) N.A. (vii) Nil. (viii) As the error variances are heterogeneous and Treatments X Years interaction is absent, the results of individual experiments have been presented under 5. Results.

5. RESULTS:

   61(31)
   (i) 2170 Kg/ha. (ii) 1045.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

   \[
   \begin{array}{ccc}
   & S_1 & S_2 & \text{Mean} \\
   \hline
   R_1 & 1992 & 2293 & 2142 \\
   R_2 & 2393 & 2204 & 2198 \\
   \hline
   \text{Mean} & 2092 & 2248 & 2170
   \end{array}
   \]

   62(41)
   (i) 2031 Kg/ha. (ii) 217.7 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of pod in Kg/ha.

   \[
   \begin{array}{ccc}
   & S_1 & S_2 & \text{Mean} \\
   \hline
   R_1 & 2182 & 1922 & 2052 \\
   R_2 & 2081 & 1938 & 2010 \\
   \hline
   \text{Mean} & 2132 & 1930 & 2031
   \end{array}
   \]

   C.D. for S marginal means = 159.9 Kg/ha.

   63(204)
   (i) 1292 Kg/ha. (ii) 133.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

   \[
   \begin{array}{ccc}
   & S_1 & S_2 & \text{Mean} \\
   \hline
   R_1 & 2182 & 1922 & 2052 \\
   R_2 & 2081 & 1938 & 2010 \\
   \hline
   \text{Mean} & 2132 & 1930 & 2031
   \end{array}
   \]

   C.D. for S marginal means = 159.9 Kg/ha.
Crop: Groundnut (Kharif).
Site: Punjab Agri. University, Ludhiana.
Object: To study the effect of different spacings and levels of N on the yield of Groundnut.

### BASAL CONDITIONS:
1. (a) to (c) N.A.
2. Sandy loam.
3. 28.6.50.
4. (a) to (c) N.A.
5. As per treatment.
6. P.G. No.
7. Irrigated.
8. (a) N.A.
9. 3rd week of Nov., 60.

### TREATMENTS:
1. All combinations of (1) and (2)
2. 2 levels of N as C/A/N: N₁ = 0 and N₂ = 28 Kg/ha.
3. 4 spacings between rows: S₁ = 23, S₂ = 30, S₃ = 38 and S₄ = 46cm.

### DESIGN:
1. Fact. in R.B.D.
2. (a) 9.
3. N.A.
4. (iv) 13 x 72m. x 3.66m.
5. 9'14m. x 2.74m.
6. 2.6m. x 46cm.
7. Yes.

### GENERAL:
1. Normal.
2. N.A.
3. Yield of pod.
4. (a) 1960-only.
5. (b) and (c) — (d) to (vii) N.A.

### RESULTS:
1. 1671 Kg/ha.
2. 152.1 Kg/ha.
3. None of the effects is significant.
4. Av. yield of pod in Kg/ha.

---

Crop: Groundnut (Kharif).
Site: Oil seed Res. Sta., Samrala.
Object: To study the effect of hoeings and weedings on the yield of the Groundnut crop in the presence and absence of Phosphoric acid.

<table>
<thead>
<tr>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>1640</td>
<td>1571</td>
<td>1768</td>
<td>1565</td>
</tr>
<tr>
<td>N₁</td>
<td>1768</td>
<td>1623</td>
<td>1791</td>
<td>1693</td>
</tr>
<tr>
<td>Mean</td>
<td>1704</td>
<td>1597</td>
<td>1780</td>
<td>1629</td>
</tr>
</tbody>
</table>

---

Crop: Groundnut (Kharif).
Site: Oil seed Res. Sta., Samrala.
Object: To study the effect of hoeings and weedings on the yield of the Groundnut crop in the presence and absence of Phosphoric acid.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 3.7.61. (iv) (a) 4 to 5 ploughings. (b) N.A. (c) 69 Kg/ha. (d) 30 cm. x 23 cm. (e) — (v) N.A. (vi) C-501. (vii) Un-irrigated. (viii) As per treatments. (ix) N.A. (x) 10.11.61.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 levels of $P_2O_5$: $P_0=0$ and $P_1=184.5$ Kg/ha.
   (2) 3 cultural treatments: $C_0=\text{No hoing and No weeding}$, $C_1=\text{1 hoing +1 weeding}$, $C_2=\text{2 hoings +2 weedings}$.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 14’63 m. x 2’44 m. (b) 13’72 m. x 2’44 m. (v) 46 cm. on either side along breadth. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Yield of pod. (iv) (a) 1961-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS:
   (i) 1035 Kg/ha. (ii) 150’2 Kg/ha. (iii) Main effect of C is highly significant. (iv) Av. yield of pod in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$C_0$</th>
<th>$C_1$</th>
<th>$C_2$</th>
<th>$C_3$</th>
<th>Mean</th>
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</thead>
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<td>$P_0$</td>
<td>897</td>
<td>953</td>
<td>1179</td>
<td>1130</td>
<td>1040</td>
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<td>$P_1$</td>
<td>1016</td>
<td>915</td>
<td>1233</td>
<td>1060</td>
<td>1031</td>
</tr>
</tbody>
</table>

Mean 956 934 1156 1095 1035

C.D. for C marginal means = 124.6 Kg/ha.

Crop: Groundnut (Kharif).
Site: Oil Seed Res. Stn., Samrala.
Ref: Pb. 61(32), 63(205).
Type: ‘GM’.

Object: —To study the effect of manures and different cultural practices on the yield of Groundnut.

1. BASAL CONDITIONS:
   (i) (a) to (e) N.A. (ii) Sandy loam. (iii) 16.7.61; 1st week of July, 63. (iv) (a) 3 to 5 ploughings and ploughing. (b) Dibbling. (c) 79 Kg/ha. (d) 23 cm. x 23 cm.; 30 cm. x 23 cm. (e) —. (f) N.A. (g) P.3. No. 1. (h) Un-irrigated. (vii) As per treatments. (ix) N.A. 61’7 cm. (x) Nov. and December, 61; December, 63.

2. TREATMENTS:
   All combinations (1) and (2)
   (1) 2 levels of $P_2O_5$: $P_0=0$ and $P_1=184.5$ Kg/ha.
   (2) 3 cultural treatments: $C_0=\text{No hoing and weeding}$, $C_1=\text{1 hoing +1 weeding}$ and $C_2=\text{2 hoings +2 weedings}$.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6; 8. (iv) (a) 14’63 m. x 2’44 m. (b) 13’72 m. x 2’44 m. (v) 46 cm. on either side along breadth. (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Yield of pod. (iv) (a) 1961-63 (62 N.A.). (b) N.A. (c) Results combined analysis have been presented under 3. Results. (vi) N.A. (vii) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is present.

5. RESULTS:
Pooled results
(i) 1206 Kg/ha. (ii) 290.2 Kg/ha. (based on 5 d.f. made up of Treatments x Years interaction). (iii) Main effect of P alone is highly significant. (iv) Av. yield of pod in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>F0</th>
<th>F1</th>
<th>Mean</th>
</tr>
</thead>
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<tr>
<td></td>
<td>892</td>
<td>1081</td>
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<td>1314</td>
<td>1349</td>
<td>1484</td>
</tr>
<tr>
<td>Mean</td>
<td>1103</td>
<td>1215</td>
<td>1300</td>
</tr>
</tbody>
</table>

C.D. for P marginal mean=162.7 Kg/ha.

Individual results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>F0</th>
<th>F1</th>
<th>Sig.</th>
<th>C0</th>
<th>C1</th>
<th>C2</th>
<th>Sig.</th>
<th>G.M.</th>
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</tr>
<tr>
<td>1961</td>
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<td>1126</td>
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<td>143.7</td>
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<td>1963</td>
<td>941</td>
<td>1394</td>
<td>**</td>
<td>1086</td>
<td>1140</td>
<td>1276</td>
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<td>1167</td>
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<td>1103</td>
<td>1215</td>
<td>1300</td>
<td>**</td>
<td>1206</td>
<td>290.2</td>
</tr>
</tbody>
</table>

Crop: Sesamum (Kharif).
Site: Oil seed Res. Sub-Sta., Gurdaspur.
Object: To study the effect of different levels of N on the yield of Sesamum.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) N.A. (iii) 24.7.66. (iv) (a) 1 ploughing with soil turning plough and 2 ploughings with Deshi plough. (b) Kera method. (c) 9 Kg/ha. (d) Rows 30cm. apart. (e) —. (v) N.A. (vi) Ph. Til No. 1. (vii) to (x) N.A. (a) 2.11.66.

2. TREATMENTS:
6 levels of N: N0=0, N1=22.4, N2=44.8, N3=67.2, N4=89.6 and N5=112.0 Kg/ha.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4.57m. x 8.84m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of seed. (iv) (a) 1964-only (b) No. (c) Nil. (v) to (vii) Nil.
5. RESULTS:

(ii) 72 Kg/ha. (ii) 27·4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of seed in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>75</td>
<td>67</td>
<td>79</td>
<td>97</td>
<td>55</td>
<td>37</td>
</tr>
</tbody>
</table>

**Crop:** Sesamum (Kharif).  
**Site:** Oil seed Res. Sta., Gurdaspur.  
**Object:** To study the effect of different spacings on the yield of Sesamum.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) N.A. (iii) 24.7.64. (iv) (a) 1 ploughing by soil turning and 2 ploughings by Dash plough. (b) Kreta method. (c) 9 Kg/ha. (d) As per treatments. (e) —. (v) N.A. (vi) As per treatments. (vii) to (x) N.A. (x) 2.11.64.

2. TREATMENTS:

4 spacings: S₁ = 30 cm. X 30 cm, S₂ = 25 cm. X 25 cm, S₃ = 20 cm. X 15 cm, and S₄ = 15 cm. X 15 cm. In S₁ and S₂, variety Pb Til No. 1 is taken and in S₃ and S₄ T.H. 52.

3. DESIGN:

(i) R.B.D. (ii) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/741 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of seed. (iv) (a) N.A. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(ii) 78 Kg/ha. (ii) 25·4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of seed in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>100</td>
<td>79</td>
<td>64</td>
<td>67</td>
</tr>
</tbody>
</table>

**Crop:** Sesamum (Kharif).  
**Site:** Oil seed Res. Sub-Sta., Gurdaspur.  
**Object:** To find out the optimum sowing date, proper spacing and adequate manurial dose for Sesamum.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) to (v) N.A. (vi) Pb. Tl No. 1. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:

Main-plot treatments:

4 dates of sowing: D₁ = 16th July, D₂ = 26th July, D₃ = 8th Aug. and D₄ = 20th Aug.

Sub-plot treatments:

All combinations of (1) and (2)

(i) 4 spacings: S₁ = 30 cm. X 15 cm., S₂ = 30 cm. X 22·5 cm, S₃ = 22·5 cm. X 15 cm., and S₄ = 22·5 cm. X 22·5 cm.
(2) 3 levels of N: N1 = 0, N2 = 33·6 and N3 = 67·2 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/replication, 12 sub-plots/main-plot. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Yield of seed, (iv) (a) 1965-only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Complete results in 2-way tables are not available. Hence only marginal means are given in results under 5. Results.

5. RESULTS:
   (i) 125·8 Kg/ha. (ii) (a) 42·7 Kg/ha. (b) 62·0 Kg/ha. (iii) Main effects of D and N are highly significant. (iv) Av. yield of seed in Kg/ha.

   Treatment  |  D1 | D2 | D3 | S1 | S2 | S3 | S4 | N2 | N3
   Marginal means: 289·6 111·5 95·0 11·5 125·7 124·8 133·5 127·6 101·4 134·6 144·7

   G.D. for D marginal means=65·9 Kg/ha.
   C.D. for N marginal means=21·70 Kg/ha.

---

Crop: Castor (Kharif).
Site: Oil seed Res. Stn., Faridkot.

Object: To study the effect of dates of sowing and spacing on the yield of Castor.

1. BASAL CONDITIONS:
   (i) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) to (c) N.A. (d) As per treatments.
   (e) N.A. (f) and (ii) N.A. (viii) to (a) N.A.

2. TREATMENTS:
   Main-plot treatments
   3 dates of sowing: D1=1st July, D2=1st August and D3=1st Sept.
   Sub-plot treatments
   4 spacings: S1=46cm., S2=61cm., S3=76cm. and S4=91cm.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/298·9 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of castor seed. (iv) (a) 1960-only. (b) and (c) No. (v) N.A. (vi) Nil.
   (vii) Since the error variances for sub-plot are heterogeneous, individual years results are presented under 5. Results.

5. RESULTS:
   60(54)
   (i) 629 Kg/ha. (ii) (a) 403·4 Kg/ha. (b) 181·5 Kg/ha. (iii) Main effect of D and interaction D×S are significant. (iv) Av. yield of castor in Kg/ha.
Crop: Mustard (Rabi).  
District: Ferozepur.

Object: Type B: To investigate the relative efficiency of different N fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) to (x) N.A.

2. TREATMENTS:

   7 manurial treatments:
   O = Control (no manure),
   N\(_1\) = 22.4 Kg/ha. of N as A/S,
   N\(_2\) = 44.8 Kg/ha. of N as A/S,
   N\(_3\) = 22.4 Kg/ha. of N as Urea,
   N\(_4\) = 44.8 Kg/ha. of N as Urea,
   N\(_5\) = 22.4 Kg/ha. of N as A/S/N and
   N\(_6\) = 44.8 Kg/ha. of N as A/S/N.

3. DESIGN:

   (i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the thana is changed once in two years with in the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on Kharif cereal, 6 on a Rabi cereal, 6 on Cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on

### Table 1: Yields of Castor (Kg/ha.)

<table>
<thead>
<tr>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>910</td>
<td>718</td>
<td>695</td>
<td>1294</td>
</tr>
<tr>
<td>D2</td>
<td>790</td>
<td>1336</td>
<td>1278</td>
<td>1124</td>
</tr>
<tr>
<td>D3</td>
<td>681</td>
<td>593</td>
<td>851</td>
<td>694</td>
</tr>
<tr>
<td>Mean</td>
<td>784</td>
<td>816</td>
<td>941</td>
<td>1037</td>
</tr>
</tbody>
</table>

C.D. for D marginal means = 35.7 Kg/ha.
C.D. for S means at the same level of D = 26.3 Kg/ha.
C.D. for D means at the same level of S = 416.9 Kg/ha.

### Table 2: Yields of Castor (Kg/ha.)

(i) 897 Kg/ha.  (ii) (a) 350.4 Kg/ha.  (b) 6310 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of castor in Kg/ha.
crops other than the legumes. The three trials on legumes are of type C. Residual effects of Phosphate application are studied on Type C trials in two out of the 4 zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of seed. (iv) (a) 1961-only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

\[
\begin{array}{|l|c|c|c|c|c|c|}
\hline
\text{District} & \text{No. of trials} & \text{Control mean in Kg/ha.} & N_1 & N_2 & N_3 & S.E. \\
\hline
\text{Ferozepur} & 2 & 740 & 300 & 410 & 320 & 540 & 350 & 640 & 138.0 \\
\hline
\end{array}
\]

Crop :- Mustard (Rabi).

Ref :- Ph. 65(S.F.T.) for Patiala, Ludhiana and 64(S.F.T) for Ferozepur.

District :- Patiala, Ludhiana and Ferozepur.

Type :- 'M'.

Object :- Type A1: To study the response curves of important cereal, cash and oil seed crops to N applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:
(i) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
8 manural treatments.
0=Control(no manure),
N_1=35 Kg/ha. of N,
N_2=70 Kg/ha. of N,
P_1=25 Kg/ha. of P_2O_5,
N_1P_1=35 Kg/ha. of N+25 Kg/ha. of P_2O_5,
N_2P_1=70 Kg/ha. of N+25 Kg/ha. of P_2O_5,
N_3P_2=70 Kg/ha. of N+50 Kg/ha. of P_2O_5 and
N_2P_1K_2=70 Kg/ha. of N+50 Kg/ha. of P_2O_5+25 Kg/ha. of K_2O.

3. DESIGN:
(i) and (ii) A selected district is divided into four agriculturally homogeneous zones based on climate, soil cropping pattern etc., in each zone one block is selected at random. A block normally consists of a group of 50-800 villages, in each block 36 experiments are conducted in a year of which 11 are of type A_1, 11 of type A_2, 11 of type A_3 and 3 are of type C. The eleven experiments under type A_1, A_2 and A_3 are distributed as 3 on a Kharif cereal, 3 on a Rabi cereal, 3 on a cash crop and 2 on oil seed crop. All the three type-C experiments are conducted on a legume crop and for the purpose of conducting the A_1, A_2 and A_3 experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A_a, A_b and A_c are laid out. For conducting these experiments, the three villages are randomly selected in each block. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of seed. (iv) (a) 1965 for Patiala, Ludhiana and 1964 for Ferozepur. (d) and (c) N.A. (v) to (vii) N.A.
5. RESULTS:

Patiala

65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₁P₂</th>
<th>N₂P₂</th>
<th>N₁P₂K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>550</td>
<td>450</td>
<td>60</td>
<td>450</td>
<td>630</td>
<td>580</td>
<td>660</td>
<td>139</td>
<td>9</td>
</tr>
</tbody>
</table>

Control mean=1100 Kg/ha.; No. of trials=2

Ludhiana

65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₁P₂</th>
<th>N₂P₂</th>
<th>N₁P₂K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>532</td>
<td>517</td>
<td>401</td>
<td>564</td>
<td>629</td>
<td>1049</td>
<td>1044</td>
<td>98</td>
<td>0</td>
</tr>
</tbody>
</table>

Control mean=3906 Kg/ha.; No. of trials=8

Ferozepur

64 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₁P₂</th>
<th>N₂P₂</th>
<th>N₁P₂K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>438</td>
<td>606</td>
<td>97</td>
<td>607</td>
<td>734</td>
<td>812</td>
<td>992</td>
<td>52</td>
<td>5</td>
</tr>
</tbody>
</table>

Control mean=975 Kg/ha.; No. of trials=2

Crop :- Mustard (Rabi).

Ref :- Ph. 65 (S.F.T) for Patiala and Ferozepur.

District :- Patiala and Ferozepur.

Type :- 'M'.

Object :- Type A₂ : To study the response curves of important cereal, cash and oilseed crops to P applied singly and in combination with other nutrients.

1. BASAL CONDITIONS:

(i) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments:

O=Control (no manure),
N₁=35 Kg/ha. of N,
P₁=25 Kg/ha. of P₂O₅,
P₂=50 Kg/ha. of P₂O₅,
N₁P₁=35 Kg/ha. of N+25 Kg/ha. of P₂O₅,
N₁P₂=35 Kg/ha. of N+50 Kg/ha. of P₂O₅,
N₂P₁=70 Kg/ha. of N+50 Kg/ha. of P₂O₅ and
N₂P₂=70 Kg/ha. of N+50 Kg/ha. of P₂O₅+50 Kg/ha. of K₂O.

3. DESIGN:

Same as in type A₁ conducted on mustard crop on page No. 764.

4. GENERAL:

(i) and (ii) N.A.  (iii) Yield of seed.  (iv) (a) 1465-only.  (b) and (c) N.A.  (v) to (vi) N.A.
5. RESULTS:

Patiala
65(S.P.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₁P₃</th>
<th>N₁P₄</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>250</td>
<td>465</td>
<td>380</td>
<td>395</td>
<td>440</td>
<td>800</td>
<td>810</td>
<td>89-5</td>
</tr>
</tbody>
</table>

Control mean=900 Kg/ha; No. of trials=2

Ferozepur
62(S.P.F.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₁P₃</th>
<th>N₁P₄</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of yield in Kg/ha.</td>
<td>453</td>
<td>95</td>
<td>192</td>
<td>598</td>
<td>649</td>
<td>790</td>
<td>1015</td>
<td>38-7</td>
</tr>
</tbody>
</table>

Control mean=843 Kg/ha; No. of trials=2

Crop:- Toria (Rabi).

Site: Oil seed Res. Stn., Ferozepur.

Object — To study the effect of different methods of placement on the yield of Toria.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Loam. (iii) Oct., 60. (iv) (a) 5 to 6 ploughings. (b) to (e) N.A. (v) T.S.F. (vi) Irrigated. (vii) Thinning and hoeings. (viii) N.A. (a) Dec. to Feb., 61.

2. TREATMENTS:

6 methods of A/S application at 28 Kg/ha. : N₀ = Control (No manure), N₁ = Full dose drilled at sowing, N₂ = Full dose broadcast at sowing, N₃ = Full dose with first sowing, N₄ = Half dose broadcast at sowing and half dose with first irrigation and N₅ = Half dose drilled at sowing and half dose with first irrigation.

3. DESIGN:

(i) R.B.D. (ii) 6. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 1/266·8 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of Toria. (iv) 1962-only. (b) No. (c) Nil. (v) to (vi) N.A.

5. RESULTS:

(i) 1621 Kg/ha. (ii) 110·1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of Toria

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>N₄</th>
<th>N₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1438</td>
<td>1673</td>
<td>1746</td>
<td>1697</td>
<td>1596</td>
<td>1577</td>
</tr>
</tbody>
</table>

C.D.=145·2 Kg/ha.
Crop: Toria (Rabi).

Site: Oilseed Res. Sta., Kapurthala.

Object: To study the effect of different levels of N on the yield of Toria.

1. BASAL CONDITIONS:
   (i) (a) 60 cm. (b) N.A. (c) Clay loam. (d) October. (e) 5 to 7 ploughings. (f) to (x) N.A.
   (xi) Improved selection; N.A. (xii) Irrigated. (xiii) and (xv) N.A. (x) Dec. to Feb., 64; March, 65.

2. TREATMENTS
   6 levels of N as CA(N: N, =0, N, =22.4, N, =44.8, N, =67.2, N, =89.6 and N, =112.0 kg/ha. N applied at sowing.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 46. (iv) (a) N.A. (b) 1197.6 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of Toria. (iv) (a) 1963-64. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatments × Years interaction is present.

5. RESULTS:
   Pooled results
   (ii) 937 Kg/ha. (iii) 337 Kg/ha. (based on 5 d.f. made up of Treatments × Years interaction) (iii) Treatment differences are not significant. (iv) Av. yield of Toria in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N,</th>
<th>N,</th>
<th>N,</th>
<th>N,</th>
<th>N,</th>
<th>N,</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>648</td>
<td>824</td>
<td>1000</td>
<td>1092</td>
<td>1086</td>
<td>1014</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>N,</th>
<th>N,</th>
<th>N,</th>
<th>N,</th>
<th>N,</th>
<th>N,</th>
<th>Sig.</th>
<th>G, Mean</th>
<th>S.E/plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963</td>
<td>450</td>
<td>467</td>
<td>501</td>
<td>516</td>
<td>670</td>
<td>731</td>
<td>**</td>
<td>555</td>
<td>74-0</td>
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<tr>
<td>1964</td>
<td>781</td>
<td>1066</td>
<td>1333</td>
<td>1410</td>
<td>1364</td>
<td>1093</td>
<td>**</td>
<td>1193</td>
<td>138-4</td>
</tr>
<tr>
<td>Pooled</td>
<td>648</td>
<td>824</td>
<td>1000</td>
<td>1092</td>
<td>1086</td>
<td>1014</td>
<td>N.S.</td>
<td>937</td>
<td>331-8</td>
</tr>
</tbody>
</table>

Crop: Grass.

Site: Soil conservation Res. cum. demonstration and Training Centre, Chandigarh.

Object: To study the effect of fertilizers on Forage production of Natural grass lands.

1. BASAL CONDITIONS:
2. TREATMENTS:

6 material treatments: \( F_0 \) = Control, \( F_1 = 22.5 \) Kg/ha. of \( N \) as A/S, \( F_2 = 22.5 \) Kg/ha. of \( K_2O \) as Super, \( F_3 = 22.5 \) Kg/ha. of \( K_2O \) as Mur, \( F_4 = F_1 + F_3 \) and \( F_5 = F_1 + F_2 + F_3 \).

3. DESIGN:

(i) R.D. (ii) 6 (b) N.A. (iii) 14. (iv) 1/300ha. (b) — (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Weight of dry grass. (iv) 1960-63. (v) to (vii) Nil.

5. RESULTS:

\[ \text{Crop: Grass.} \]
\[ \text{Ref: Pb, 62(141), 63(163).} \]
\[ \text{Site: Soil Cons. Res. Cns. Demons. and Trg. Centre, Chandigarh.} \]
\[ \text{Type: 'M'.} \]

Object: — To study the effect of fertilizers on forage production.

1. BASAL CONDITIONS:


2. TREATMENTS:

All combinations of (1) and (2) + extra treatment.

(1) 4 levels of \( N \) as A/S: \( N_1 = 0, N_2 = 112, N_3 = 168 \) and \( N_4 = 224 \) Kg/ha.

(2) 2 levels of \( P_2O_5 \) as Super: \( P_0 = 0 \), and \( P_1 = 112 \) Kg/ha.

Extra treatment: \( E_1 = 224 \) Kg/ha. of \( N + 112 \) Kg/ha. of \( P_2O_5 + 28 \) Kg/ha. of \( K_2O \) as Mur. Pot. Fertilizer applied by broadcast at the early monsoon showers.
3. DESIGN:
(i) R.B.D. (ii) a. 9. (b) N.A. (iii) a. (iv) a. 1/346 ha. (b) — (v) Nil. (vi) Yes.

4. GENERAL:
(i) G.o.d. (ii) Nil. (iii) Yield of dry grass. (iv) 1962-63. (v) to (vii) Nil.

5. RESULTS:

62 (141)
(i) 23.2 Q/ha. (ii) 3.26 Q/ha. (iii) Main effect of N and extra vs. others are highly significant. (iv) Av. yield of dry fodder in Q/ha.

\[ E_1 = 30.1 \text{ Q/ha.} \]

<table>
<thead>
<tr>
<th>N</th>
<th>N_1</th>
<th>N_2</th>
<th>N_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P_0</td>
<td>15.7</td>
<td>19.3</td>
<td>24.4</td>
<td>26.5</td>
</tr>
<tr>
<td>P_1</td>
<td>20.0</td>
<td>23.2</td>
<td>23.9</td>
<td>25.8</td>
</tr>
</tbody>
</table>

Mean: 17.8 21.3 24.2 26.2 22.4

C.D for extra vs. others = 3.56 Q/ha.

63 (163)
(i) 21.42 Q/ha. (ii) 9.61 Q/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of dry fodder in Q/ha.

\[ E_1 = 20.9 \text{ Q/ha.} \]

<table>
<thead>
<tr>
<th>N</th>
<th>N_1</th>
<th>N_2</th>
<th>N_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P_0</td>
<td>17.1</td>
<td>20.7</td>
<td>24.6</td>
<td>20.9</td>
</tr>
<tr>
<td>P_1</td>
<td>16.9</td>
<td>21.8</td>
<td>21.1</td>
<td>29.2</td>
</tr>
</tbody>
</table>

Mean: 17.0 21.2 22.8 25.1 21.5

C.D. for N marginal means = 5.79 Q/ha.

**Crop**: Grass.
**Ref**: Ph. 60(76), 61(75), 62(143).
**Type**: "M".

Object: To study the effect of fertilizers on forage production of natural Grass.

1. BASAL CONDITIONS:

2. TREATMENTS:
6 manurial treatments: F_0 = Control, F_1 = 22.4 kg/ha. of N at A/S, F_2 = 22.4 kg/ha. of P_2O_5 as super, F_3 = 22.4 kg/ha. of K_2O as Mar. Pot. F_4 = F_1 + F_3 and F_5 = F_1 + F_2 + F_3.

Fertilizers were broadcasted with early monsoon showers.
3. DESIGN:
(i) R.B.D. (ii) 6. (b) N.A. (iii) 4. (iv) (a) 1/500 ha. (b) — (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of dry grass. (iv) 1960-64. (v) to (viii) Nil.

5. RESULTS:

\[
\begin{array}{ccccccc}
\text{Treatment} & F_0 & F_1 & F_2 & F_3 & F_4 & F_5 \\
\text{Av. yield} & 115.9 & 121.9 & 111.9 & 94.8 & 165.7 & 129.9 \\
\hline
\end{array}
\]

C.D. = 31.0 Q/ha.

\[
\begin{array}{ccccccc}
\text{Treatment} & F_0 & F_1 & F_2 & F_3 & F_4 & F_5 \\
\text{Av. yield} & 125.9 & 164.2 & 126.0 & 130.3 & 148.4 & 158.0 \\
\hline
\end{array}
\]

C.D. = 27.8 Q/ha.

\[
\begin{array}{ccccccc}
\text{Treatment} & F_0 & F_1 & F_2 & F_3 & F_4 & F_5 \\
\text{Av. yield} & 81.0 & 94.2 & 82.9 & 85.8 & 90.2 & 93.2 \\
\hline
\end{array}
\]

C.D. = 5.5 Q/ha.

\[
\begin{array}{ccccccc}
\text{Treatment} & F_0 & F_1 & F_2 & F_3 & F_4 & F_5 \\
\text{Av. yield} & 58.5 & 68.9 & 56.8 & 60.2 & 56.5 & 71.4 \\
\hline
\end{array}
\]

C.D. = 14.6 Q/ha.

Crop :- Grass.
Ref. :- Pb. 63(167), 64(155).
Type :- 'M'.
Object :- To study the effect of fertilizers on forage production.

1. BASAL CONDITIONS:
(i) Culturable land. (ii) N.A. (iii) Slip planting. (iv) Dholu. (v) July 62, 30cm x 30cm. (vi) 1 year.
2. TREATMENTS:

All combinations of (1) and (2)

(1) 2 levels of N as A/S: N₀=0, N₁=28 Kg/ha.

(2) 3 levels of P₂O₅ as Super: P₀=0, P₁=28 and P₂=56 Kg/ha.

Fertilisers applied, with the early monsoon showers by broadcast.

3. DESIGN:

(i) Fact. in R.B.D.  (ii) 6. (b) N.A.  (iii) 4. (iv) (a) 1.146 ha.  (b) — (v) Nil.  (vi) Yes.

4. GENERAL:

(i) Normal,  (ii) Nil.  (iii) Yield of dry grass.  (iv) 1963·64.  (v) to (vii) Nil.

5. RESULTS:

63(167)

(i) 5·0 Q/ha.  (ii) 7·51 Q/ha.  (iii) Main effect of N alone is highly significant.  (iv) Av. yield of grass in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>43·6</td>
<td>45·9</td>
<td>42·4</td>
<td>43·9</td>
</tr>
<tr>
<td>N₁</td>
<td>56·9</td>
<td>58·1</td>
<td>59·2</td>
<td>58·1</td>
</tr>
<tr>
<td>Mean</td>
<td>50·2</td>
<td>52·0</td>
<td>50·8</td>
<td>51·0</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=6·53 Q/ha.

64(158)

(i) 81·6 Q/ha.  (ii) 12·90 Q/ha.  (iii) Main effect of N alone is significant.  (iv) Av. yield of grass in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>70·6</td>
<td>82·2</td>
<td>67·9</td>
<td>73·6</td>
</tr>
<tr>
<td>N₁</td>
<td>91·8</td>
<td>90·6</td>
<td>86·3</td>
<td>89·6</td>
</tr>
<tr>
<td>Mean</td>
<td>81·2</td>
<td>86·4</td>
<td>77·1</td>
<td>81·6</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=11·22 Q/ha.

Crop :- Grass.
Ref :- Ph. 61(77), 62(145), 63(166), 64(156).
Site :- Soil Cons. Res. Cam Demons. & Trg.
Centre, Chandigarh.
Type :- 'M'.

Object :- To study the effect of manure on the yield of grass.

1. BASAL CONDITIONS:

(i) Village common land.  (ii) Deep alluvial.  (iii) Strip planting.  (iv) July 60, 30 cm x 30 cm.
2. TREATMENTS:

All combinations of (1) and (2)+extra treatments.

(1) 3 levels of N as Ca(NO$_3$)$_2$: $N_0=0$, $N_1=22.4$ and $N_2=44.8$ Kg/ha.
(2) 3 levels of P$_2$O$_5$ as Super: $P_0=0$, $P_1=22.4$ and $P_2=44.8$ Kg/ha.

Extra treatment: $E_1=22.4$ Kg/ha. of N+22.4 Kg/ha. of P$_2$O$_5$+22.4 Kg/ha. of K$_2$O as Mur. Pot.

$E_2=44.8$ Kg/ha. of N+44.8 Kg/ha. of P$_2$O$_5$+44.8 Kg/ha. of K$_2$O as Mur. Pot.

Fertilisers applied with the early showers of monsoon.

3. DESIGN:

(i) R.B.D. (ii) (a) II. (b) N.A. (iii) 4. (iv) (a) 1/150ha. (b) — (v) Nil: (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grass. (iv) 1951-64. (v) and (vi) Nil. (viil) Green wt of grass is taken in 61.

5. RESULTS:

61(77)

(i) 14.5Q/ha. (ii) 6.84 Q/ha. (iii) Interaction N×P and extra vs. others are highly significant. (iv) Av. yield of grass in Q/ha.

\[
\begin{array}{c|ccc|c}
 & N_0 & N_1 & N_2 & \text{Mean} \\
 \hline
P_0 & 38.6 & 55.7 & 54.6 & 49.7 \\
P_1 & 49.5 & 42.5 & 45.3 & 45.8 \\
P_2 & 46.8 & 43.9 & 41.5 & 44.1 \\
\hline
\text{Mean} & 45.0 & 47.4 & 47.1 & 46.5
\end{array}
\]

C.D. for the body of N×P table=9.9 Q/ha.

C.D. for extra vs. others=5.50 Q/ha.

62(145)

(i) 6.1 Q/ha. (ii) 1.23 Q/ha. (iii) None of the effect is significant. (iv) Av. yield of grass in Q/ha.

\[
\begin{array}{c|ccc|c}
 & N_0 & N_1 & N_2 & \text{Mean} \\
 \hline
P_0 & 4.3 & 6.0 & 6.5 & 5.6 \\
P_1 & 4.9 & 5.4 & 7.1 & 5.8 \\
P_2 & 5.1 & 6.9 & 7.2 & 6.4 \\
\hline
\text{Mean} & 4.7 & 6.1 & 7.0 & 5.9
\end{array}
\]

C.D. for N marginal means=1.45 Q/ha.

63(166)

(i) 11.8 Q/ha. (ii) 2.69 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of grass in Q/ha.
Crop: Grass.  Ref: Pb. 60(75), 61(74), 62(140), 63(162).
Centre, Chandigarh.  Type: 'C'.
Object: To study the effect of structural treatment on the yield of Grass.

1. BASAL CONDITIONS:

2. TREATMENTS:
   4 structural treatments: T1 = Control, T2 = Contour furrowed, T3 = Contour ridges, and T4 = Basin histing.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 1/400 ha. (b) — (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of dry grass. (iv) 1960-63. (v) (a) and (b) Nil. (vi) and (vii) Nil.
3. RESULTS:

60(75)

(i) 4'4'2 Q/ha. (ii) 6'10 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grass in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>37'7</td>
<td>41'2</td>
<td>55'6</td>
<td>42'2</td>
</tr>
</tbody>
</table>

61(74)

(i) 8'4'5 Q/ha. (ii) 9'9'4 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grass in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>77'8</td>
<td>87'7</td>
<td>90'6</td>
<td>81'9</td>
</tr>
</tbody>
</table>

62(140)

(i) 51'4 Q/ha. (ii) 3'8'Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grass in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>46'2</td>
<td>53'5</td>
<td>53'7</td>
<td>52'1</td>
</tr>
</tbody>
</table>

63(162)

(i) 11'9 Q/ha. (ii) 1'9'6 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grass in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>10'8</td>
<td>12'5</td>
<td>12'7</td>
<td>11'6</td>
</tr>
</tbody>
</table>

Crop: Sweet lime.

Site: Govt. Fruit Res. Stn., Attari.

Object: To see the effect of A/S alone and in combination with green manuring.

1. BASAL CONDITIONS:

(i) and (ii) N.A. (iii) By budding. (iv) N.A. for 60; citrus auranti folia swing for 61 and 62. (v) 1941, 3'4'9m.X3'4'9m. (vi) 6 to 12 months. (vii) 6'7 Kg/ha. of super+45 Kg/ha. of F.Y.M. (tree, 67 Kg/ha. of super before sowing of Guara and Senji. (viii) N.A. 3 hoeings and 2 weedings for 61 and 62. (ix) As per treatments; Nil for 61 and 62. (x) Irrigated. (xi) and (xii) N.A.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 2 levels of N as A/S: N_1=0, and N_2=2'2 Kg/tree.

(2) 3 intercroppings: C_1=N_0 crop, C_2=Guara as summer G.M, and C_3=Senji as winter G.M.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 6. (b) — (iii) 5. (iv) (a) — (b) 3. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) N of fruits/tree. (iv) 1951-62. (v) and (vi) N.A. (vii) and (viii) Nil.

5. RESULTS:

60(3)

(i) 57 fruits/tree (ii) 41'7 fruits/tree. (iii) Main effect of C alone is significant. (iv) Av. no. of fruits/tree.
Crop :- Sweet Orange.
Site :- Fruit Res. Stn., Bahadurgarh.
Object :- To study the comparative effect of different concentrations of Zn So₄ on chlorosis of Citrus.

1. BASAL CONDITIONS:
(i) N.A. (ii) Sandy loam. (iii) Budding. (iv) Tafa. (v) N.A., square method with 7'6 m. spacing.
(vi) year (vii) 0-06 Kg/tree, of N as C/N per year age of tree in two doses in Nov., 63 and March, 64 (viii) and (ix) N.A. (x) Irrigated. (xi) N.A. (xii) Fruiting not yet started.

2. TREATMENTS:
T₀=Control (water spray), T₁=0.3% of Zinc sul. (1'36 Kg. of ZnSO₄+0.68 Kg of hydrate lime 100 gallon of water), T₂=2T₁ and T₃=3T₁.
Note :- 1st spraying in Oct. 73 and 2nd in April 74,
3. DESIGN:
(i) R.B.D. (ii) (a) 4, (b) N.A. (iii) 5, (iv) (a) 4 twigs of a plant. (b) — (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Percentage improvement in chlorosis. (iv) 1963. (v) and (vi) Nil. (vii) and (viii) Nil.

5. RESULTS:
(i) 55.8% (ii) 9.35% (iii) Treatment differences are highly significant. (iv) Av. percentage improvement in chlorosis:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av.% improvement</td>
<td>12.8</td>
<td>20.4</td>
<td>63.0</td>
<td>67.4</td>
</tr>
<tr>
<td>C.D. = 12.88%</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Crop: Sweet Orange.  Ref.: Pb. 60(1), 61(2), 62(2).
District: Govt. Res. Stn., Attari.  Type: 'MV'.

Object: — To determine the effect of N on the yield of different varieties of sweet Orange.

1. BASAL CONDITIONS:
(i) and (ii) N.A. (iii) Budding. (iv) As per treatments (v) 1931, 5.69 m x 3.49 m. (vi) N.A. (vii) 234.5Kg of F.Y.M; Nil. (viii) and (ix) N.A. (x) Irrigated. (xi) and (xii) N.A.

2. TREATMENTS:
Main-plot treatments:
4 sources of 1.36 Kg. of N/tree: M₀ = Control (no manure), M₁ = F.Y.M.; M₂ = A/S and M₃ = A/S + F.Y.M.
Sub-plot treatments:
5 varieties: V₁ = Pineapple, V₂ = Common, V₃ = Havestak, V₄ = Blood red and V₅ = valericia late (N as A/S applied in 3 parts while F.Y.M., one time)

3. DESIGN:
(i) Split-plot, (ii) 4 main-plots/replication, 5 sub-plots/main-plot. (b), (iii) 5, (iv) (a) — (b) 4. (v) N.A. (vi) Yes

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield/tree. (iv) 1930-32. (v) to (vii) Nil. (viii) Nil, Dose-regulated with due regard to the age of tree and N contents of the manure and fertilizer. Dose made constant after the age of 14th year of the trees, N-3 in/tree.

5. RESULTS:
60(1)
(i) 141 fruits/tree. (ii) (a) 86.4 fruits/tree (b) 74.1 fruits/tree. (iii) Main effect of M is highly significant and that of V is significant. (iv) Av. yield of fruits/tree (in number).
### Table 1

<table>
<thead>
<tr>
<th></th>
<th>$M_0$</th>
<th>$M_1$</th>
<th>$M_2$</th>
<th>$M_3$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_1$</td>
<td>116</td>
<td>136</td>
<td>172</td>
<td>225</td>
<td>163</td>
</tr>
<tr>
<td>$V_2$</td>
<td>108</td>
<td>92</td>
<td>130</td>
<td>192</td>
<td>130</td>
</tr>
<tr>
<td>$V_3$</td>
<td>110</td>
<td>199</td>
<td>156</td>
<td>231</td>
<td>174</td>
</tr>
<tr>
<td>$V_4$</td>
<td>115</td>
<td>96</td>
<td>141</td>
<td>203</td>
<td>139</td>
</tr>
<tr>
<td>$V_5$</td>
<td>68</td>
<td>130</td>
<td>92</td>
<td>132</td>
<td>110</td>
</tr>
<tr>
<td>Mean</td>
<td>103</td>
<td>135</td>
<td>138</td>
<td>197</td>
<td>143</td>
</tr>
</tbody>
</table>

C.D. for $M$ marginal means = 48 fruits/tree
C.D. for $V$ marginal means = 41 fruits/tree

### Table 2

(i) 161 fruits/tree  
(ii) (a) 75 fruits/tree  
(b) 66 fruits/tree  
(iii) Main effects of $M$ and $V$ both are highly significant.  
(iv) Av. yield of sweet orange (in number).

<table>
<thead>
<tr>
<th></th>
<th>$M_0$</th>
<th>$M_1$</th>
<th>$M_2$</th>
<th>$M_3$</th>
<th>Mean</th>
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<tbody>
<tr>
<td>$V_1$</td>
<td>77</td>
<td>117</td>
<td>155</td>
<td>248</td>
<td>149</td>
</tr>
<tr>
<td>$V_2$</td>
<td>88</td>
<td>82</td>
<td>149</td>
<td>216</td>
<td>134</td>
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<tr>
<td>$V_3$</td>
<td>139</td>
<td>233</td>
<td>237</td>
<td>302</td>
<td>223</td>
</tr>
<tr>
<td>$V_4$</td>
<td>101</td>
<td>96</td>
<td>203</td>
<td>236</td>
<td>159</td>
</tr>
<tr>
<td>$V_5$</td>
<td>91</td>
<td>121</td>
<td>93</td>
<td>256</td>
<td>140</td>
</tr>
<tr>
<td>Mean</td>
<td>99</td>
<td>126</td>
<td>167</td>
<td>232</td>
<td>161</td>
</tr>
</tbody>
</table>

C.D. for $M$ marginal means = 41 fruits/tree
C.D. for $V$ marginal means = 37 fruits/tree

### Table 3

(i) 212 fruits/tree  
(ii) (a) 100 fruits/tree  
(b) 108 fruits/tree  
(iii) Main effect of Sjapone is highly significant.  
(iv) Av. yield of fruits (in number).

<table>
<thead>
<tr>
<th></th>
<th>$M_0$</th>
<th>$M_1$</th>
<th>$M_2$</th>
<th>$M_3$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_1$</td>
<td>97</td>
<td>103</td>
<td>303</td>
<td>357</td>
<td>216</td>
</tr>
<tr>
<td>$V_2$</td>
<td>97</td>
<td>131</td>
<td>216</td>
<td>293</td>
<td>162</td>
</tr>
<tr>
<td>$V_3$</td>
<td>121</td>
<td>154</td>
<td>249</td>
<td>459</td>
<td>246</td>
</tr>
<tr>
<td>$V_4$</td>
<td>128</td>
<td>158</td>
<td>272</td>
<td>293</td>
<td>213</td>
</tr>
<tr>
<td>$V_5$</td>
<td>105</td>
<td>181</td>
<td>259</td>
<td>352</td>
<td>224</td>
</tr>
<tr>
<td>Mean</td>
<td>110</td>
<td>146</td>
<td>260</td>
<td>333</td>
<td>212</td>
</tr>
</tbody>
</table>
Crop: Sweet Orange.
Site: Fruit Res. Stn., Bahadurgarh.

Object: To study the effect of intercropping on the chlorosis of citrus.

1. BASAL CONDITIONS:
   (i) N.A.  (ii) Sandy loam.  (iii) Budding.  (iv) Jaffa.
   (v) Initial observation recorded in Oct., 63; square method with 7.62m. of spacing.
   (vi) 0.06Kg/tree of N as Ca(NO)3 per year age of tree in two doses in Nov. and March.
   (vii) N.A.  (viii) As per treatments (ix) Irrigated.  (x) N.A.  (xi) Fruiting not yet started.

2. TREATMENTS:
   6 interclosings.  T2=Control (no intercropping), T1=Senjil, T3=Guava, T4=Berseem, T5=Gram and T6=Chillies.

3. DESIGN:
   (i) R.B.D.  (ii) 6.  (b) N.A.  (iii) 6.  (iv) (a) and (b)1/3.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (viii) Two twigs on each plant were selected at random for to bring observation.

5. RESULTS:
   (i) 34.6%  (ii) 9.52%  (iii) Treatment differences are highly significant.  (iv) Av. percentage increase in
   chlorosis.

   Treatment  T2  T1  T3  T4  T5
   Av. % increase 42.7 33.2 29.8 38.8 33.0 30.0
   C.D. =1.130%
5. RESULTS:

(i) 65.31% improvement. (ii) 18.52% improvement. (iii) Treatment differences are highly significant. (iv) Av. percentage improvement in chlorosis.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Improvement</td>
<td>11.00</td>
<td>89.25</td>
<td>81.00</td>
<td>80.00</td>
</tr>
</tbody>
</table>

(i) 27.62% improvement. (ii) 15.81% improvement. (iii) Treatment differences are not significant. (iv) Av. percentage improvement in chlorosis.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Improvement</td>
<td>9.50</td>
<td>39.00</td>
<td>24.00</td>
<td>38.00</td>
</tr>
</tbody>
</table>

Crop : Grape Fruit.  
Site : Govt. Fruit Res. Stn., Attari.  
Object : To see the effect of N alone and in combination with P and K on the yield of the fruit of different varieties.

1. BASAL CONDITIONS:
   (i) and (ii) N.A. (iii) Budding. (iv) As per treatments. (v) 1941(year of planting) 5.49m. x 5.49m. (vi) N.A. (vii) 45.4 Kg/tree of F.Y.M. (viii) to (a) N.A.

2. TREATMENTS:
   Main-plot treatments:
   4 manurial treatments : M_1 = A/S, M_2 = A/S+Super, M_3 = A/S+Mur. pot., and M_4 = A/S+Mur. pot. (Actual doses—N.A.)

   Sub-plot treatments:
   4 varieties : V_1 = Buncan, V_2 = Marsh seed less, V_3 = Poona budded and V_4 = Foster.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/replication and 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 8. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) No. of fruits/tree. (iv) 196142(61 N.A.) (v) and (vi) N.A. (vii) and (viii) Nil.

5. RESULTS:

(i) 78 fruits/tree. (ii) (a) 55.5 fruits/tree. (b) 59.0 fruits/tree. (iii) Main effect of V alone is highly significant. (iv) Av. no. of fruits/tree.
Crop :- Wheat and Gram (Rabi).
Site :- Agri. Res. Stn., Ferozepur.

Object :- To study the mixed cropping of Wheat and Gram.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 30.10.61; 7.11.62. (iv) (a) and (b) N.A. (c) Wheat 74 Kg/ha.;
   gram desi 42 Kg/ha. and gram kabli 9 Kg/ha. (d) and (e) N.A. (f) N.A. (v) Wheat : C.273, Gram desi : C-104 Gram kabli : Pb. 7. (vii) Irrigated; unirrigated. for 62. (viii) and (ix) N.A. (x) 12.4.62; Ist week of May, 63

2. TREATMENTS:
7 mixtures of different crops :- M1 = Gram kabli alone, M2 = Gram desi alone, M3 = Wheat alone, M4 = Wheat and gram kabli in alternate rows, M5 = Wheat and gram desi in alternate rows, M6 = Wheat and gram kabli mixture in all rows and M7 = Wheat and gram desi mixture in all rows.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Satisfactory; unsatisfactory for Wheat. (ii) Nil; N.A. (iii) Mixed yield of Wheat and gram grains.
   (iv) (a) 1961-62. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A.
   (vi) Nil; Heavy rains. (vii) Error variances are homogeneous and Treatments x Years Interaction is absent.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>Mean</th>
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<tr>
<td>Mean</td>
<td>109</td>
<td>80</td>
<td>64</td>
<td>58</td>
<td>78</td>
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</tbody>
</table>

C.D. for V marginal means = 42.0 fruits/tree

42(49)

(i) 144 fruits/tree. (ii) (a) 94 fruits/tree. (b) 77 fruits/tree. (iii) Interaction M x V is highly significant only
(iv) Av. no. of fruits/tree.

<table>
<thead>
<tr>
<th></th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>Mean</th>
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<td>199</td>
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<td>151</td>
<td>122</td>
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<td>144</td>
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C.D. for V means at the same level of M = 11.94 fruits/tree

C.D. for M means at the same level of V = 13.58 fruits/tree.

Ref :- Pb. 61(22), 62(40).
Type :- 'X'.

Object :- To study the mixed cropping of Wheat and Gram.
5. RESULTS:

Pooled results

(i) 1651 kg/ha. (ii) 1552.9 kg/ha. (based on 42 d.f. made up of Treatments x Years interaction and pooled error). (iii) Treatments differences are not significant. (iv) Av. yield of mixture in kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
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<td>1686</td>
<td>1393</td>
<td>1917</td>
<td>1597</td>
<td>1681</td>
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Individual results:

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<th>M₄</th>
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<td>1822</td>
<td>1044</td>
<td>1596</td>
<td>1146</td>
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<td>Year 1962</td>
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<td>1551</td>
<td>1742</td>
<td>2138</td>
<td>2048</td>
<td>1921</td>
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<tr>
<td>Pooled</td>
<td>1810</td>
<td>1470</td>
<td>1686</td>
<td>1393</td>
<td>1917</td>
<td>1597</td>
<td>1681</td>
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Crop: Wheat & Gram. Ref: Pb. 63(48), 64(31), 65(85).
Type: - 'X'

Object: - To study the effect of mixed cropping of desi and kabuli Gram with Wheat.

1. BASAL CONDITIONS:

(ii) Clay loam. (iii) 12.10.63; 21.11.64 and 20.11.65. (iv) (a) to (e) N.A. (v) N.A. for 63 and N.A. for others. (vi) Wheat C-273, Gram C-104 and Ph-7. (vii) Irrigated. (viii) and (ix) N.A. (x) 1st week of April, 64 and N.A. for others.

2. TREATMENTS:

Mixtures of different crops: M₁ = Wheat alone, M₂ = Gram alone, M₃ = Ph gram alone, M₄ = Wheat and gram in alternate rows in north south direction, M₅ = Wheat and Ph gram in rows in north south direction, M₆ = Wheat and gram in all rows in East-West direction. M₇ = Wheat and Ph gram in all rows in East-West direction, M₈ = Wheat and gram mixture in all rows, M₉ = Wheat and Ph gram mixture in all rows.

3. DESIGN:

(i) R.B.D. (ii) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal for 63 and 65; Satisfactory for 64. (ii) N.A. for 63 and N.A. for others. (iii) Yield of mixture of Wheat and gram grains. (iv) N.A. in 65. (v) N.A. (vi) N.A. (vii) Error variances are homogeneous and Treatments x Years interaction is present.

5. RESULTS:

Pooled results

(i) 1103 Kg/ha. (ii) 434.6 Kg/ha. (based on 6 d.f. made up of interaction of Treatments x Years). (iii) Treatment differences are not significant. (iv) Av. yield of mixture of Wheat and Gram grains in Kg/ha.
Crop :- Wheat-Barley-Gram (Rabi).
Site :- Agri. Res. Stn., Ferozepur.

Object :- To study the effect of Mixed cropping of Wheat-Barley and Gram.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) Nov., 62 (iv) (a) to (c) N.A. (v) N.A. (vi) Wheat—C-273, Gram —S-26, Barley—C-164. (vii) Un-irrigated. (viii) and (ix) N.A. (x) 1st week of May, 63.

2. TREATMENTS :
   7 mixtures of different crops : M1—Gram alone, M2—Wheat alone, M3—Barley, M4—Wheat and Gram in all rows, M5—Gram and Barley in all rows, M6—Wheat and Gram mixture in all rows and M7—Gram and Barley mixture in all rows.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain of mixture of Wheat, Barley and Gram. (iv) (a) and (b) No, (c) Nil. (v) N.A. (vi) and (vii) Nil.

RESULTS:
(i) 2178 Kg/ha. (ii) 273.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of mixture in Kg/ha.

Crop :- Wheat, Gram and Barley (Rabi).
Site :- Agri. Res. Stn., Ferozepur.

Object :- To study the mixed cropping of Wheat, Gram and Barley.

---
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) N.A.; Oct; 64. (iv) (a) to (e) N.A. (v) Nil for 63 and N.A. for 64. (vi) Wheat=C. 273. Barley=C. 138 and Gram=S-26. (vii) Unirrigated. (viii) and (ix) N.A. (x) End of April.

2. TREATMENTS:
   9 mixtures of different crops: M1=Wheat alone, M2=Barley alone, M3=Gram alone, M4=Wheat and gram in all rows in N-S direction, M5=Barley and gram in all rows in N-S direction. M6=Barley and gram in all rows in E-W direction, M7=Wheat and gram mixed in all rows and M8=Barley and gram mixed in all rows.

3. DESIGN:
   (i) R.B.D. (ii) 9. (b) N.A. (iii) 4;3. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil for 63 and N.A. for 64. (iii) Yield of gram of mixed crops. (iv) (a) 1963 to 64. (b) N.A. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments x Years interaction is absent.

5. RESULTS:
   Pooled results
   (i) 1418 Kg/ha. (ii) 396.4 Kg/ha. (based on 48 d.f, made up of Treatments x Years interaction and pooled error) (iii) Treatment differences are not significant. (iv) Av. yield of mixture of gram and Barley in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M7</th>
<th>M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1452</td>
<td>1171</td>
<td>1442</td>
<td>1368</td>
<td>1391</td>
<td>1597</td>
<td>1570</td>
<td>1508</td>
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</tbody>
</table>

   Crop => Bajra, Guar and Moth (Kharif).
   Site => Agri. Res. Sta., Ferozepur.

   Object => To study the effect of taking Guar and Moth with Bajra on the yield of Bajra under unirrigated condition.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Clay loam. (iii) 15.7.63. (iv) (a) to (e) N.A. (v) N.A. (vi) T—55. (vii) Unirrigated. (viii) End (ix) N.A. (x) 10.10.63.

2 TREATMENTS:
   5 treatments: T1=Bajra and Guar mixture in the same rows, T2=Bajra and Guar in nature rows, T3=Bajra and Moth in alternative rows, T4=Bajra and Moth mixture in same rows and T5=Bajra alone

3. DESIGN:
   (i) R.B.D. (ii) 5. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.
Cropl: Cotton & Groundnut.


Ref: Pb. 62(218).

Type: \textit{X}.

Object: To study the effect of taking Groundnut with Cotton on the yield of Cotton.

BASAL CONDITIONS:

1. (i) Normal. (ii) Nil. (iii) Yield of kapas (iv) (a) 1962-only, (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Yield of kapas is available only.

RESULTS:

(i) 806 Kg/ha. (ii) 132'1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of kapas in Kg/ha.

Design:

(j) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1/395 ha. (v) N.A. (vi) Yes.

GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of kapas, (iv) (a) 1962-only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Yield of kapas is available only.

RESULTS:

(i) 806 Kg/ha. (ii) 132'1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of kapas in Kg/ha.

Crop: Groundnut and Cotton (Kharif).

Site: Punjab Agri. University, Ludhiana.

Ref: Pb. 63(103).

Type 'X'.

Object: To study the effect of taking Castor with Groundnut on the yield Groundnut.
1. BASAL CONDITIONS:
(i) to (c) N.A.  (ii) Sandy loam.  (iii) 18.6.63.  (iv) 5 ploughings. (b) to (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) Nov. and Dec., 63.

2. TREATMENTS:
6 mixed crops :- M1 = Groundnut alone, M2 = Groundnut and Castor at 90cm. apart, M3 = 2 rows of groundnut and 1 row of Castor, M4 = 4 rows of Groundnut and one row of Castor, M5 = 6 rows of Groundnut and 1 row of Castor and M6 = 11 rows of Groundnut and 1 row of Castor.

3. DESIGN:
(i) R.B.D. (ii) 6. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of groundnut pods. (iv) (a) 1965-only. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Yield of groundnut is available only.

5. RESULTS:
(i) 2585 Kg/ha. (ii) 379.0 Kg/ha. (iii) Treatment differencese are not significant. (iv) Av. yield of Groundnut pods in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2802</td>
<td>2569</td>
<td>2327</td>
<td>2619</td>
<td>2652</td>
<td>2744</td>
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</table>

Crop :- Groundnut and Castor (Khargil).  
Site :- Punjab Agri University, Ludhiana.  
Type :- 'X'.

Object :- To find out the suitability of grown Castor as a mixed crop with Groundnut.

1. BASAL CONDITIONS:
(i) to (c) N.A.  (ii) Sandy loam.  (iii) to (vi) N.A.  (vii) Irrigated.  (viii) to (x) N.A.

2. TREATMENTS:
6 mixtures of different crops :- M1 = Groundnut alone, M2 = Castor alone, M3 = 2 rows of Groundnut and 1 row of Castor, M4 = 9 rows of Groundnut and 2 rows of Castor and M5 = 17 rows of Castor.

3. DESIGN
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain and seed and its monetary culture. (iv) (a) 1965-only. (b) and (c) No. (v) to (vii) Nil.

5. RESULTS:
(i) 1759 Kg/ha. (ii) 1759 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. value of net tare return in Rs/ha.
Object — To study the effect of taking Castor and Arhar with Groundnut.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 2:7:63. (iv) (a) 3 ploughings and 3 sodaghas. (b) Dibbling. (c) 78 Kg/ha. (d) As per treatments. (e) I. (v) Nil. (vi) P.G. No. I. (vii) Unirrigated. (viii) 2 weedicings. (ix) 61.7 cm. (x) Dec. 63.

2. TREATMENTS:
   8 treatments: T1 = Groundnut pure with 30cm. x 23cm. spacing. T2 = Castor pure with 91cm. x 46cm. spacing. T3 = Groundnut and Castor rows 90cm. apart. T4 = Groundnut and Castor rows 180cm. apart. T5 = Groundnut and Castor rows 270cm. apart. T6 = Groundnut and Arhar rows 90cm. apart. T7 = Groundnut and Arhar rows 180cm. apart and T8 = Groundnut and Arhar rows 270cm. apart.

3. DESIGN:
   (i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 17.37m. x 2.74m. (b) 16.46m. x 2.74m. (v) 46cm. on both sides of width. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of Groundnut pods. (iv) (a) 1963-only. (b) Nil. (v) Nil. (vi) N.A. (vii) Yield of groundnut is available only.

5. RESULTS:
   (i) 1307 Kg/ha. (ii) 189-2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. groundnut pod yield in Kq/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
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<td>1296</td>
<td>1545</td>
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<td>C.D. = 281.0 Kg/ha</td>
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</table>

Object — To find out the suitability of growing Castor as a mixed crop with Groundnut.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.
2. TREATMENTS and 4. GENERAL

Same as in exp. no. 65(200) Conducted at Ludhiana and presented on page no.-785.

5. RESULTS:

(i) 1666 Rs/ha.  (ii) 208·3 Rs/ha.  (iii) Treatment differences are highly significant  (iv) Av. value of monetary return in Rs/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$M_1$</th>
<th>$M_2$</th>
<th>$M_3$</th>
<th>$M_4$</th>
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C.D. = 321·0 Rs/ha.
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