

NATIONAL INDEX

OF

AGRICULTURAL

FIELD

EXPERIMENTS

VOL. 6 PART 3

MADHYA PRADESH

1960 — 65



ICAR

Published by
INSTITUTE OF AGRICULTURAL RESEARCH STATISTICS
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)
NEW DELHI-110012

FOREWORD

The I. C. A. R. has adopted the 'Co-ordinated approach' to crop improvement as its 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.

NEW DELHI,
January 1, 1973.

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

PREFACE

The present set of volumes form Part III in the series of compendia of Agricultural Field Experiments being published under the project of National Index of 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 1960-65 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, Jammu & 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 contains 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 only for one year, and also those conducted for more than one year but were continuing 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 charges of Shri T.P. Abraham, Assistant Statistical Adviser, now Joint Director, Central Statistical Organisation; Dr. B.N. Tyagi, Senior Statistician, Now Joint Director of Agriculture (Statistics), Uttar Pradesh and Shri M.G. Sardana, Senior Statistician, now Officer-on-Special Duty, Central Statistical Organisation. Shri O.P. Kathuria, Junior Statistician, now Statistician in Indian Agricultural Research Institute was also associated.

Preparation of material for inclusion in the third series of compendia volumes and their printing was carried out under the guidance of Shri K.S. Krishnan, Senior Statistician. Shri R.K. Khosla and Shri P.N. Soni, Junior Statisticians, were responsible for the actual working of the scheme till October 1973 and thereafter respectively.

The collection of data of experiments 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. 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. S/Shri P.P. Rao, M.P. Saxena, M.L. Sahni, A. K. Mukherjee, S. L. Garg, R.K. Jain, H.C. Jain, G.V.S R. Krishna, J.K. Kapoor, D.K. Gulati, D.P. Singh, Mahender Singh, Kuldip Singh and S.S. Kutaula, statistical staff of the Institute deserve mention for the careful and painstaking work in the analysis of data, combination of results of similar experiments and proof reading of the compendia volumes.

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.

D. SINGH

Director

Institute of Agricultural Research Statistics
(I. C. A. R.)

NEW DELHI,
June 1, 1974

**Regional Supervisors and Regional Staff of the National Index of
Field Experiments**

Sl. No.	Region & Headquarters	Statistical staff from the Institute of Agricultural Research Statistics	Regional Supervisor
1.	Andhra Pradesh (Hyderabad)	1. Shri C. H. Rao 2. Shri G. V. S. R. Krishna 3. Shri P. R. Yeri	1. Shri P. Govinda Rao, Head of the Agri. Res. Instt. 2. Shri S. Vittal Rao, H. Q. Dy. Director (Research)
2.	Assam (Shillong)	1. Shri A. Sinha 2. Shri K. D. Saha	1. Shri U. C. Borah, Research Officer (Stat.)
3.	Bihar (Sabour)	1. Shri R. K. Jain 2. Shri S. M. G. Saran	1. Shri G. P. Singh, Statistician
4.	Gujarat (Ahmedabad)	1. Shri S. P. Doshi	1. Dr. D. K. Desai, Dy. Director of Agriculture (Stat.) 2. Shri J. B. Trivedi, I/C. Dy. Director (Stat.) 3. Shri R. L. Shah, Dy. Director of Agriculture (Stat.)
5.	Kerala (Trivandrum)	—	1. Shri N. George John, Research Officer 2. Shri G. Rama Chandran Nair, Research Officer 3. Shri K. George, Research Officer
6.	Madhya Pradesh (Bhopal)	1. Shri Rama Rao Patil 2. Shri S. S. Kutaula	1. Shri A. G. Khare, Dy. Director of Agriculture (Stat.)
7.	Maharashtra (Poona)	1. Shri P. R. Yeri 2. Shri B. Ramakrishnan	1. Shri V. G. Sharma, Sr. Statistician 2. Shri G. C. Shaligram, Dy. Statistician 3. Shri D. T. Sawant, Asstt. Statistician
8.	Mysore (Bangalore)	1. Shri K. A. Balakrishnan 2. Shri P. T. N. Nambiar	1. Dr. N. P. Patil, Director of Research
9.	Orissa (Bhubaneswar)	1. Shri Rama Rao Patil	1. Shri B. Mishra, Dy. Director of Agri. (Hq.) 2. Shri A. Mishra, Chief Statistician

- | | | |
|---|---|--|
| 10. Punjab, Haryana*
Himachal
Pradesh, Jammu
& Kashmir
(Ludhiana) | 1. Shri B. L. Kaistha
2. Shri U. N. Dixit
3. Shri D. L. Manocha
4. Shri M. S. Batra
5. Shri D. P. Singh | 1. Shri P. S. Sahota,
Director of Crop Insurance
2. Shri Darshan Singh,
Asstt. Statistician
3. Shri M. S. Pannu,
Statistician, Department of
Agriculture
4. Dr. D. Raghavaram,
Prof. & Head, Dept. of
Maths. & Stat., P.A.U.,
Ludhiana |
| 11. Rajasthan
(Jaipur) | 1. Shri N. K. Ohri
2. Shri C. H. Rao | 1. Shri H. C. Kothari,
Dy. Director (Statistics),
Department of Agriculture |
| 12. Tamil Nadu
(Coimbatore) | 1. Shri P. Narayanan
2. Shri M. V. George | 1. Shri K. R. Nagaraja Rao,
Secretary, Research Council
2. Dr. K. Ramakrishnan,
Associate Dean
3. Dr. D. Daniel Sunderaraj,
Principal |
| 13. Uttar Pradesh
(Lucknow) | 1. Shri S. N. Bajpai
2. Shri M. P. Saksena
3. Shri G. N. Bahuguna
4. Shri O. P. Sharma
5. Shri R. Sharma
6. Shri C. B. Tiwari
7. Shri R. S. Singh
8. Shri A. C. Srivastava | 1. Dr. K. Kishen, Jt. Director
of Agriculture (Statistics)
2. Shri K. P. Avasthy,
Officer-on-Special Duty |
| 14. West Bengal
(Calcutta) | 1. Shri A. K. Mukherjee
2. Shri A. Sinha | 1. Shri S. N. Mukherjee,
Dy. Director of Agriculture
(Statistics) |
-

ABBREVIATIONS COMMON TO EXPERIMENTS ON ANNUAL AND PERENNIAL CROPS AND EXPERIMENTS ON CULTIVATOR'S 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	11. Mn.	—	Manipur
2. As.	—	Assam	12. Ms.	—	Mysore
3. Bh.	—	Bihar	13. N.L.	—	Nagaland
4. Gj.	—	Gujarat	14. Or.	—	Orissa
5. H.P.	—	Himachal Pradesh	15. Pb.	—	Punjab
6. Hr.	—	Haryana	16. Rj.	—	Rajasthan
7. J.K.	—	Jammu & Kashmir	17. T.N.	—	Tamil Nadu
8. K.	—	Kerala	18. Tr.	—	Tripura
9. M.P.	—	Madhya Pradesh	19. U.P.	—	Uttar Pradesh
10. Mh.	—	Maharashtra	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 numbers have 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. Agri. Res. Stn., Vyara for Agricultural Research Station, Vyara.

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

C. A. Z. R. I.	—	Central Arid Zone Research Institute.
C. P. C. R. I.	—	Central Plantation Crops Research Institute.
C. P. R. I.	—	Central Potato Research Institute.
C. R. R. I.	—	Central Rice Research Institute.
C. S. S. R. I.	—	Central Soil Salinity Research Institute.
C. T. C. R. I.	—	Central Tuber Crops Research Institute.
C. T. R. I.	—	Central Tobacco Research Institute.
C. T. R. L.	—	Cotton Technological Research Laboratory.
I. A. R. I.	—	Indian Agricultural Research Institute.
I. G. F. R. I.	—	Indian Grassland & Fodder Research Institute.
I. H. R.	—	Institute of Horticultural Research.
I. I. S. R.	—	Indian Institute of Sugarcane Research.
I. L. R. I.	—	Indian Lac Research Institute.
J. A. R. I.	—	Jute Agricultural Research Institute.
J. T. R. L.	—	Jute Technological Research Laboratory.
S. B. I.	—	Sugarcane Breeding Institute.

In case of the experiments conducted on cultivator's 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

Kg	=	Kilogram(s)	Dical. Phos.	=	Dicalcium Phosphate
Kg/ha.	=	Kilogram(s) per hectare	Zn. Sul.	=	Zinc Sulphate
N	=	Nitrogen	Cu. Sul.	=	Copper Sulphate
P	=	Phosphate	Mg. Sul.	=	Magnesium Sulphate
K	=	Potash	Mn. Sul.	=	Manganese Sulphate
Nitro. Phos.	=	Nitrogen Phosphate	Ammo. Molybdate	=	Ammonium Molybdate
Ammo. Phos.	=	Ammonium Phosphate	B.	=	Boron
A/S	=	Ammonium Sulphate	Fe. Sul.	=	Ferrous Sulphate
A/S/N	=	Ammonium Sulphate Nitrate	F. M.	=	Fish Manure
C/A/N	=	Calcium Ammonium Nitrate	G. N. C.	=	Groundnut Cake
A/N	=	Ammonium Nitrate	M. C.	=	Municipal Compost
A/C	=	Ammonium Chloride	T. C.	=	Town Compost
C/N	=	Chilean Nitrate	G. M.	=	Green Manure
Mur. Pot.	=	Muriate of Potash	G. L. M.	=	Green Leaf Manure
Pot. Sul.	=	Potassium Sulphate	F. Y. M.	=	Farm Yard Manure
Super.	=	Super Phosphate	C. M.	=	Cattle Manure

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 ; Confd.—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 ; Confd.—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 cultivator's 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. (v) 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 cultivator's 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.

GLOSSARY OF VERNACULAR NAMES OF CROPS

Sl. No.	Name of Crop	Botanical Name	Assamese	Bengali	Oriya	Telugu	Tamil	Malayalam	Kannada	Marathi	Gujarati	Hindi	Punjabi
1	Paddy	<i>Oryza sativa</i> L.	Dhan	Dhan	Dhano	Vadlu, Biyyamu	Nel	Nellu	Bhatta	Bhat	Dangar	Dhan, Chawal	Chaul, Dhan
2	Wheat	<i>Triticum sativum</i> Lamk, <i>Triticum aestivum</i> L.	Gaum ; Ghehu	Gam	Gaham	Godumalu	Kothumai	Gothambu	Godhi	Gahu	Ghahu	Gehon	Kanak
3	Barley	<i>Hordeum vulgare</i> L.	Ja'dhan	Joba	Jaba ; Barhi	Barley	Baarli arisi	Barley	Barley akki	Satu ; Jav	Jav	Jau	Jaun
4	Jowar	<i>Andropogon Sorghum</i>	—	Jowar	Juara	Jonna	Cholam	Cholam	Jola	Jowari Jondhla	Jowari Juar	Jowar ; Jaur	Jowar
5	Maize	<i>Zea mays</i> L.	Gom dhan	Bhutta	Macca	Makka- jonna	Makka- cholam	Cholam Makka- cholam	Musukina Jola	Makka	Makkai	Makka	Makki, Makayee
6	Kutki	<i>Panicum miliare</i> L.	—	—	Suan	Samalu	Samai	Sama	Same ; Save	Sava ; Halvi vari	Gajro Kuri	Kutki ; Shavan	Swank
7	Kodon	<i>Paspalum scrobiculatum</i> L.	—	Kodo	Kodua	Arikelu ; Arika	Varagu	Varaku	Harka	Kodra	Kodra	Kodon	Kodra
8	Bhadli	<i>Panicum pilosum</i> Dalz and Gibs.	—	—	—	—	—	—	—	Bhadli	Bhadli	—	—
9	Lakh	<i>Lathyrus sativus</i> L.	Khesari	Khesari	Khesari	Kesari Papper	Kaesari parupp	—	ka- no	Lakh	Lang	Chattri Mattri	—
10	Tur	<i>Cajanus cajan</i> Milsp. ; <i>Cajanus indicus</i> sprengl.	Arhar	Arahar	Harad	Kandulu	Thuvarai	Thuvaran Payaru	Thogari	Tur	Tuver	Arhar	Harhar, Arhar
11	Gram	<i>Cicer arietinum</i> L.	Butmah	Chola	Boot	Sanagalu	Kadalai, Sundal Kadalai	Kadala	Kadale	Harbara	Chana	Chana	Chhole ; Chana
12	Peas	<i>Pisum sativum</i> L.	Motor mah	Bara matar	Matar	Bataneelu	Pattani	Pattani	Batani	Matar	Vatana	Muttar	Mattar
13	Bhindi (Lady's finger)	<i>Hibiscus esculentus</i> ; <i>Abelmoschus esculentus</i> Moench	Bhendi	Dhenrosh	Vendi	Benda	Bendai kai	Venda	Bende kayi	Bhendi	Bhida ; Bhinda	Bhindi	Bhindi, Tori
14	Brinjal	<i>Solanum melongen</i> L.	Bengena	Begun	Baigan	Vankaya	Kathari kai	Vazhu- thana	Bandane Kayi	Vange	Vengan	Baingan	Bengan Bataun
15	Cauliflower	<i>Brassica oleracea</i> L. <i>Var botrytis</i> L.	Phool kabi	Ful kabi	Fula-kobi	Poogobi	Gospoovu	Cauli- flower	Hukosu	Phul kobi, Fulvar	Ful kobi, Fulvar	Phool Gobhy	Phul gobhi

GLOSSARY OF VERNACULAR NAMES OF CROPS Contd.

No.	Name of Crop	Botanical Name	Assamese	Bengali	Oriya	Telugu	Tamil	Malayalam	Kannada	Marathi	Gujarati	Hindi	Punjabi
6	Potato	<i>Solanum tuberosum</i> L.	Alooguti	Alu	Bilati Alu	Bangala- dumpa, Urilagadda	Uruzhai Kilangu	Haralu kijangu	Alu gedde	Batata	Aloo, Batata	Aaloo	Alu
7	Pumpkin	<i>Cucurbita pepo</i> ; <i>Cucurbita moschata</i> Duch	Kumura	Kumra	Bilati Kakharu (Scas)	Alugadda Seemagum- madi	Poosani	Mathanga	Kumbala kayi	Kashi bhopla	Kohla	Sita phal	Halwa ; Kadu
8	Radish	<i>Raphanus sativus</i> L.	Mula	Mula	Mula	Mullangi	Mullangi	Mullanki	Mullangi	Mula	Mulo	Mooli	Muli
9	Sugarcane	<i>Saccharum officinarum</i> L.	Kuhiar	Akh	—	Cheruku	Karumbu	Karimbu	Kabbu	Oos	Sherdi	Ganna ; Kamad ; Naishakar	Kamad ; Ganna ; Eakh
20	Cotton	<i>Gossypium spp.</i>	Kapah	Karpas ; Tula	Kapa	Pratti	Paruthi	Paruthi	Hatti	Kapus	Kapas	Kapas	Kapah
21	Tobacco	<i>Nicotiana tabacum</i> L.	Dhopat	Tamak	Uanpatra	Pogaku	Pugayilai	Pukayila	He ge Suppu	Tambaku	Tamaku	Tambaku	Tamaku Tambaku
22	Caster	<i>Ricinus communis</i> L.	Eri	Rehri	Jada	Amudalu	Amanakku	Avanakku	Haralu	Erandi	Diveli Erando	Rehri	Arind ; Harind ; Rind
23	Gingelly	<i>Sesamum indicum</i> L. <i>sesamum orientale</i> L.	Til	Til	Ras	Nuvvulu	Ellu	Ellu	Yellu	Til, Tilli	Tal	Til	Til
24	Groundnut	<i>Arachis hypogaea</i> L.	China Badam	Cheena- badam	China- badam	Nelashanga	Nila- kada lai	Nilak- kadala	Kadale kayi	Bhuimug	Bhoising ; Magafali	Mungphali	Mungfal
25	Linseed	<i>Linum usitissimum</i> L.	Tisi	Tishi	Peshi	Avise	Alivithai	Cheruch- ana vithu	Agase	Javas, Alsi	Alsi	A lsi	Alsi
26	Niger	<i>Guizotia abyssinica</i> Cass	Sorguja	Sarguza	Alashi	Verrinu- vvulu	Peyellu	—	Huchellu	Karale ; Khursani	Ramtal	Ramtil	Ram til
27	Ginger	<i>Zingiber officinale</i> Rosc	Ada	Ada	Ada	Allam	Inji	Inchi	Shunti ; Alla	Ale	Adu	Adrakh	Adrak
28	Onion	<i>Allium cepa</i> L.	Piyaz	Piaj	Peas, ulli	Ulli	Vengayam Erangagam	Ulli	Eerulli	Kanda	Dungli kando	Piaz	Ganda Payaz
29	Guava	<i>Psidium guajava</i> L.	Madhuri	Peyara	Pijuli	Jama	Koyya	Pera	Sebe	Peru	Jamphal	Amrood	Amrud

CONTENTS

	Page
FOREWORD	... (iii)
PREFACE	... (v)
LIST OF ABBREVIATIONS	... (ix)
GLOSSARY OF VERNACULAR NAMES OF CROPS	... (xiii)
MADHYA PRADESH STATE (Salient features of experimentation)	... (xvii)
PARTICULARS OF RESEARCH STATIONS AND SOIL ANALYSIS	... (xxxii)
EXPERIMENTAL DATA	
Paddy	... 1
Wheat	... 76
Barley	... 247
Jowar	... 248
Maize	... 274
Kutki	... 285
Kodon	... 286
Bhadli	... 289
Lakh	... 290
Tur	... 291
Gram	... 293
Peas	... 310
Bhindi	... 316
Erinjal	... 318
Cauliflower	... 320
Potato	... 321
Pumpkin	... 332
Raddish	... 332
Sugarcane	... 333
Cotton	... 351
Tobacco	... 407
Caster	... 410
Gingelly	... 410
Groundnut	... 413
Linseed	... 429
Niger	... 458
Ginger	... 461
Onion	... 465
Jowar Fodder	... 468
Citrus	... 469
Guava	... 470
Mixed cropping	... 471
Rotational type	... 476
Index (crop-wise and type-wise)	... 479

MADHYA PRADESH

(Salient features of experimentation)

The general information regarding the agro-climatic region, extent of irrigation, normal cropping pattern etc., of the state of Madhya Pradesh 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 658 experiments conducted during the period 1960-65 as against 644 experiments for the period 1954-59 and 453 for the period 1948-53. Besides, results of experiments conducted under the All India Co-ordinated Agronomic experiments schemes of I.C.A.R. are also included in the present compendium. The consolidated results of experiments conducted for more than one year and concluded during the period 1960-65, numbering 362 and forming 150 groups, have been presented with crop-wise and type-wise distribution in Table 1 below :

TABLE 1
Number of groups and experiments conducted during the period 1960-65
(Crop-wise and Type-wise)

Crop	Type											Total
	M	MV	C	CM	CMV	I	IM	D	X	R		
Paddy	16(38)	4(14)	3(8)	2(5)	—	—	—	1(3)	—	—	26(68)	
Wheat	17(42)	4(9)	10(27)	8(20)	—	3(6)	8(18)	1(2)	—	—	51(124)	
Jowar	5(12)	—	—	1(2)	—	—	—	—	—	—	6(14)	
Gram	6(13)	—	—	—	—	—	—	—	—	—	6(13)	
Sugarcane	1(2)	2(4)	—	—	1(2)	—	—	—	—	—	4(8)	
Lakh	1(2)	—	—	—	—	—	—	—	—	—	1(2)	
Tur	2(4)	—	—	—	—	—	—	—	—	—	2(4)	
Maize	2(4)	1(3)	—	—	1(2)	—	—	—	—	—	4(9)	
Kutki	1(3)	—	—	—	—	—	—	—	—	—	1(3)	
Kodon	2(5)	—	—	—	—	—	—	—	—	—	2(5)	
Peas	—	2(5)	—	—	—	—	—	—	—	—	2(5)	
Pofato	—	—	—	—	—	—	—	1(2)	—	—	1(2)	
Cotton	7(16)	3(10)	—	3(6)	—	—	—	3(6)	—	—	16(38)	
Castor	1(3)	—	—	—	—	—	—	—	—	—	1(3)	
G. Nut	1(2)	5(13)	—	1(2)	—	—	—	—	—	—	7(17)	
Linseed	9(22)	1(2)	—	—	—	—	—	—	—	—	10(24)	
Nigar	2(5)	—	—	—	—	—	—	—	—	—	2(5)	
Ginger	—	—	—	—	—	—	—	3(6)	—	—	3(6)	
Onion	1(2)	—	—	—	—	—	—	—	—	—	1(2)	
Jowar Fodder	—	—	—	1(2)	—	—	—	—	—	—	1(2)	
Mixed type	—	—	—	—	—	—	—	—	2(5)	—	2(5)	
Rotational type	—	—	—	—	—	—	—	—	—	1(3)	1(3)	
Total	74(175)	22(60)	13(35)	16(37)	2(4)	3(6)	8(18)	9(19)	2(5)	1(3)	150(362)	

N.B. Figures in the bracket indicate total number of experiments in the groups.

The results of experiments conducted for only one year during the period under report and also those of the experiments which were continued beyond 1965, numbering 296, have been presented. The distribution of all the experiments according to crop and type of treatments is furnished in table 2 below :

TABLE 2

Number of groups of experiments conducted during the period 1960-65.
(Crop-wise and Type-wise)

Type Crop	M	MV	C	CV	CM	CMV	I	IM	IMV	ICM	D	X	R	Total
Paddy	46	24	9	3	7	—	—	—	—	—	8	—	—	97
Wheat	77	20	53	—	37	—	11	25	4	—	7	—	—	236
Jowar	20	—	1	—	6	—	—	—	—	—	4	—	—	31
Maize	7	5	—	—	—	2	—	—	—	—	2	—	—	16
Kutki	3	—	—	—	—	—	—	—	—	—	—	—	—	3
Kodon	5	1	—	—	—	—	—	—	—	—	—	—	—	6
Bhodli	1	—	—	—	—	—	—	—	—	—	—	—	—	1
Lakh	2	—	—	—	—	—	—	—	—	—	—	—	—	2
Tur	5	—	—	—	—	—	—	—	—	—	—	—	—	5
Gram	22	3	5	—	—	—	—	—	—	—	—	—	—	30
Peas	—	10	—	—	—	—	—	—	—	—	—	—	—	10
Bhindi	1	—	—	—	—	—	—	—	—	—	2	—	—	3
Brinjal	1	1	—	—	—	—	—	—	—	—	1	—	—	3
Cauliflower	1	—	—	—	—	—	—	—	—	—	—	—	—	1
Potato	5	—	—	—	—	—	—	—	—	—	5	—	—	10
Pumpkin	—	—	—	—	—	—	—	—	—	—	1	—	—	1
Raddish	—	—	—	—	—	—	—	—	—	—	1	—	—	1
Sugarcane	6	9	—	2	3	2	—	—	1	1	1	—	—	25
Cotton	26	15	1	—	19	—	—	—	—	—	8	—	—	69
Caster	3	—	—	—	—	—	—	—	—	—	—	—	—	3
Gingelly	1	—	—	—	—	—	—	—	—	—	—	—	—	1
Groundnut	7	17	—	—	3	—	—	—	—	—	—	—	—	27
Linsced	29	6	2	—	—	—	—	2	—	—	—	—	—	39
Niger	6	—	—	—	—	—	—	—	—	—	—	—	—	6
Ginger	—	—	—	—	—	—	—	—	—	—	10	—	—	10
Onion	2	—	2	—	—	—	—	—	—	—	—	—	—	4
Jowar fodder	—	—	—	—	2	—	—	—	—	—	—	—	—	2
Citrus	—	—	—	—	—	—	—	—	—	—	1	—	—	1
Guava	2	—	—	—	—	—	—	—	—	—	—	—	—	2
Mixed type	—	—	—	—	—	—	—	—	—	—	—	10	—	10
Rotational	—	—	—	—	—	—	—	—	—	—	—	—	3	3
TOTAL	278	111	75	5	77	4	11	27	5	1	51	10	3	658

The principal crops of the State are paddy, wheat, *Jowar* and gram, Amongst the Cash crops sugarcane and cotton are the important crops grown in the state. Groundnut, Caster and linsced are important oilseed crops grown in some parts of the state. The salient features of experimentation on important crops are given below :

Paddy :—Paddy covered about 4176* thousand hectares i.e. 23.5 percent of the total cropped area. In all, 97 experiments were reported on this crop, of which 83 were conducted under irrigated conditions. 26 groups of experiments consisting of 68 experiments were concluded during the period under report. Important varieties of paddy used for experimentation were Cross 18 (16 experiments), Chhatri R-10 (10-experiments), N-22 (11 experiments), Cross 116 (6 experiments) and *Pandheri Luchai No 16* (6 experiments). The net plot size ranged from 2.4 m. × 1.5 m. to 18.3 m. × 4.3 m.

The experiments on this crop laid out in Randomised Block Design numbered 70, in Split-plot Design 25 and in Confounded Design 2. Eleven experiments in Randomised Block Design, 3 experiments in Split-plot and 2 experiments under Confounded designs were laid with 2 to 3 replications. 45 experiments with Randomised Block Design and 22 experiments with Split-plot Design had 4 to 6 replications. All the remaining 14 experiments conducted under Randomised Block Design had 8 replications. In purely manurial experiments or experiments having manures as one of the factors, the levels of N, P and K varied between 0 to 67.2, 0 to 44.8 and 0 to 59.7 Kg/ha. respectively. Levels of N and P, time and method of application of N, Micronutrients and Foliar spray of nutrients were some of the factors tried. Methods of planting, number of ploughings, types of plough, dates of sowing, seed rates, spacings and number of seedlings per hole were some of the cultural treatments tried. Efficacy of different weedicides for controlling weeds in paddy were also determined.

Wheat :—Wheat covered 2395* thousand hectares i.e. 13.5 percent of the total cropped area. 236 experiments were reported on this crop of which 140 were conducted under irrigated conditions and the remaining under rainfed conditions. 51 groups consisting of 124 experiments were concluded during the period under report. Practically all the varieties were used both under irrigated and under rain fed conditions. Hy—65 was the most popular variety used in 62 experiments under irrigated and 51 under rainfed conditions. Other varieties were C—281, Hy—11, NP—710 and C—591. The net plot size adopted ranged between 1.5 m. × 7.0 m. and 4.6 m. × 38.4 m.

Out of 236 experiments conducted on wheat 173 were laid out in Randomised Block Design and 51 in Split-plot and 12 under Confounded Design. 17 and 11 experiments in Randomised Block and Split-plot Design respectively had 2 to 3 replications. 151 experiments in R.B.D. and 40 in Split-plot Design and 6 in Confounded Design had replications ranging between 4 and 6.

About 32 percent of experiments were purely of manurial type while about 36 percent experiments were of manurial and varietal or cultural or irrigational type. About 23 percent of experiments were purely of cultural type. Only 7 experiments were tried to study the effect of application of weedicides and their doses. The levels of N and P tried in manurial type of experiments ranged between 0 and 134.4 Kg/ha. and that of K varied from 0 to 66.8 Kg/ha. Sources of N and P, time and method of application and foliar spray of nutrients were some of the factors studied under manurial type of experiments. Time of sowing, spacing, seed rate etc. were the cultural treatments tried.

Jowar :—Jowar covered an area of 2054* thousand hectares i.e. 12 percent of the total cropped area. There were only 31 experiments reported on this crop of which as many as 27 experiments were conducted under rainfed conditions. Six groups of experiments consisting of 14 experiments were concluded during the period under the report. The varieties mostly used for experimentation were Ujjain—8 and NJ—171. The net plot size varied between 3.7 m. × 2.7 m. and 7.9 m. × 9.1 m.

* Figures for Paddy and other crops taken from Indian Agricultural Statistics, Vol. I, of Directorate of Economics and Statistics, Ministry of Food and Agriculture, C.D. and Co-operation for 1964-65.

Twenty experiments were purely of manurial type, 6 of cultural cum manurial type 4 of D type and the remaining one of cultural type. The range of nutrients tried were 0 to 200 Kg/ha. for N and 0 to 67.2 Kg/ha. for P and K. Time and method of application of different nutrients were some of the factors tried under manurial experiments.

Twenty five experiments were tried in Randomised Block and 4 in Split-plot and 2 under Confounded designs. All the experiments laid out in R.B.D. had 3 to 5 replications. 3 Split-plot experiments had 8 replications, while the remaining one had 4 replications. The Confounded design were tried with 2 replications each.

Gram :—Gram covered an area of 1598* thousand hectares accounting for 9 percent of the total area under the crops. There were 30 experiments reported on this crop, all of which were conducted under rainfed conditions. Six groups consisting of 13 experiments were concluded during the period under report. The important varieties used for experimentation were Gwalior T-87, T-81, Ujjain-24, NP-58 and Adhartal II. The variation in the area of net plot size used for experimentation was from 6.4 m. × 3.7 m. to 20.1 m × 5.0 m.

Of the 30 experiments, 29 were laid out in Randomised Block Design and the remaining one in Split-plot Design. 28 experiments in Randomised Block Design had 4 to 6 replications and the remaining one had 3 replications. The one experiment with Split-plot Design had 6 replications.

About 75 percent of the experiments belonged to manurial type, 10 percent to manurial-cum-varietal and the remaining 15 percent to cultural type. The levels of N and P used ranged between 0 and 16.8 and 0 and 11.2 Kg/ha. respectively.

Sugarcane :—Sugarcane covered an area of 31* thousand hectares. 25 experiments were reported on this crop. All these experiments were conducted under irrigated conditions. Four groups consisting of 8 experiments were concluded during the period under report. The varieties used for experimentation were Co-421, Co-419 and G-2. The net plot size ranged from 5.1 m. × 1.1 m. to 9.9 m. × 9.9 m.

Seven experiments were laid out in Randomised Block Designs, 13 in Split-plot and 5 in Confounded design. Six experiments in Randomised Block Design were tried with 3 to 4 replications while the remaining one was with 6 replications. Eleven experiments under Split-plot had 2 to 4 replications while the remaining 2 experiments had 6 replications.

Six experiments were of purely manurial type while 16 experiments were of manurial and varietal or irrigational or cultural type. The levels of nutrients tried ranged between 0 and 280 Kg/ha. for N and 0 and 168 Kg/ha. for P.

Cotton :—Cotton, an important cash crop of the State, covered 905* thousand hectares i.e. 4.8 percent, of the total cropped area. Out of 69 experiments reported 38 experiments forming 16 groups have been concluded during the period under report. Except 7 experiments, all the experiments were conducted under rainfed conditions. Dhar-43, Indore 2, B-394, A-51-9 and Maljain were the varieties tried in experiments conducted under rainfed conditions. The net plot size adopted for experimentation varied from 3.6 m. × 3.6 m. and 12.2 m. × 5.5 m.

About 60 percent of the experiments were of manurial type or had manure as one of the factors. The source of N applied was either Urea or Am. Sulphate. The levels of N, P and K tried in these experiments ranged between 0 and 67.2 Kg/ha. Besides these, result of experiments with different cultural practices like spacing between Plants and rows, different seed rates, topping, etc. and of those to control pests and diseases have been included.

Groundnut :—Groundnut covered 463* thousand hectares i.e. 2.4 percent of the total cropped area. 17 experiments forming 7 groups have been concluded during the period

under report. Almost all the experiments were conducted under rainfed conditions. AK-I2-24 variety was used in these experiments. The net plot size adopted for experimentation ranged from 1.8 m. \times 4.9 m. to 7.3 m. \times 9.1 m.

All the experiments were laid out in Randomised Block Design only. 14 experiments had replications ranging between 1 and 3 while the remaining 13 had replications varying from 4 to 6. All the 27 experiments were of manurial type or had manure as one of the factors. N as Am. Sulphate and P as Super were applied in these experiments alone or in combination. The levels of N and P tried varied from 0 to 11.8 and 0 to 25.2 Kg/ha. respectively.

Linseed :—Linseed covered an area of 700+ thousand hectares i.e. 3.7 percent of the total cropped area. Out of 39 experiments, 24 experiments forming 10 groups were concluded during the period under report.

Almost all the experiments were conducted under rainfed conditions. No—55, E.B.—3, Hj—397, T 1/39; R—204, Z—97 were the important varieties tried. The net plot size used for experimentation varied from 5.5 m. \times 2.4 m. to 6.1 m. \times 15.2 m. Randomised Block Design was adopted for 33 experiments. The remaining 6 experiments were laid out in Split-plot Design. In most of these experiments the number of replications varied from 4 to 6.

Manurial experiments accounted for 75 percent, of the total number of experiments. Levels of N and P tried in these experiments varied from 0 to 25.2 and 0 to 22.4 Kg/ha. respectively.

PARTICULARS OF RESEARCH STATIONS AND SOIL ANALYSIS

1. Government Agricultural Research Station, Adhartal.

A. General Information :

(i) In Jabalpur taluka of Jabalpur district, 6.4 Km. from Jabalpur Rly. Stn. with Lat. 23° N /Long. 79°57' E./Alt. 400 M. Plain and levelled land. (ii) It represents rice—wheat tract. (iii) Established in 1912. (iv) The farm is having three sections (a) Adhartal : It is paddy growing area. A second crop in *Rabi* season after paddy is taken. (b) *Kharif*—Haveli tract : *Rabi* crops are grown in the area. (c) College estate : Mainly *Rabi* crops are grown. Some area having sandy soils is treated as *kharif* paddy area. (v) Research on different aspects of paddy and wheat crops.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
4.1	0.2	4.2	0.1	2.3	17.7	46.6	44.1	35.9	4.1	3.1	0.3	162.7

(Av. monthly rainfall in cm. ; based on the data for the period 1960—63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Irrigation available for paddy and wheat crops for about 40 ha. of the farm from Irrigation Department. (ii) No proper drainage system exists.

D. Soil type and Soil analysis :

(i) *Sahara* : It is light brown, 10 cm. deep. *Domatta* : It is brown and 15 cm. deep. *Kabar* : It is black and 23 cm. deep. (ii) Chemical analysis and (iii) Mechanical analysis—N.A.

E. No. of Experiments :

Paddy—15, Wheat—11, Peas—1, mixed cropping—3 ; Total=30.

2. Government Seed and Demonstration Farm, Amlaha.

A. General Information :

(i) In Ashta taluka of Sehore district, 24 Km. from Sehore Rly. Stn. with Lat. 23°N/ Long. 76°45' E/Alt. 457 M. (ii) It represents medium black cotton soil tract. (iii) Established in 1934. (iv) *Jowar* cotton and groundnut in *Kharif* and wheat and gram in *Rabi* season. (v) Mainly varietal trials on cotton to evolve suitable varieties are conducted.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
0.2	0.7	0.8	0.4	0.3	5.2	22.7	36.7	44.7	4.8	0.8	0.6	117.9

(Av. monthly rainfall in cm. ; based on the data for the period 1960—63).

C. Irrigation and Drainage Facilities :

(i) (a) Irrigation through wells. (b) Indegenous *moat* upto 1963 and oil engine pump set afterwards. (ii) No proper drainage system exists.

D. Soil type and Soil analysis :

(i) Black soil, clayey in structure upto 46 cm. to 91 cm. depth. (ii) Chemical analysis : pH. varies from 7.3 to 7.6 ; N from 72 to 132 Kg/ha., P₂O₅ from 11.7 to 43.0 Kg/ha. ;

available K_2O is medium; organic carbon from 0.32 to 0.59% and available soluble salts are normal. (iii) Mechanical analysis—N.A.

E. No. of Experiments :

Wheat—2, Cotton—2 ; Total=4.

3. Regional Research Station, Bagwai.

A. General Information :

(i) (a) Gwalior distt. (b) Dabra is the nearest Rly. Stn., well levelled area. (ii) Harsi tract of Northwest with extreme temperature in summer and winter. (iii) Established in 1940. (iv) Paddy, wheat and sugarcane. (v) Multiplication and varietal trials.

B. Normal Rainfall :

Details : N.A.

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Yes, since inception by canals. (ii) N.A.

D. Soil type and Soil analysis :

(i) Clayey loam, dark brown or black. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Paddy—3, Wheat—1, *Jowar*—2, Sugarcane—7 ; Total=13.

4. Govt. Agricultural Research Farm, Bahadary.

A. General Information :

(i) In Mandsaur District, Nearest Rly. Stn. Mandsaur (W.R.). General topography of the experimental area is good. (ii) It represents medium heavy soils tract. (iii) Established in 1958. (iv) *Moong*—Wheat, Maize—Wheat, *Jowar*—Wheat—Gram, Maize—Pea or gram. (v) Evolution of early high yielding sorghum varieties suitable for double cropping and to see the suitability of the varieties of Maize, *Jowar* and Wheat.

B. Normal Rainfall :

Average fortnightly rainfall is 78.6 m.m.

(The period on which the figure based is June to Oct., 1972).

C. Irrigation and Drainage Facilities :

(i) (a) In 27 ha., available since 1958. (b) By tank, river and wells. (ii) Drainage system needs to be improved.

D. Soil type and Soil analysis :

(i) Broad soil type—Light brown and black with the depth of 0.9 M. to 2.1 M. (ii) Chemical analysis : PH. is more than 7.8 i.e. to wards alkalinity. Rich in K_2O , but poor in N and P_2O_5 . (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Jowar—4, Maize—2, Groundnut—1 ; Total=7.

5. Government Agricultural Farm, Baroda.

A. General Information :

(i) In Sheopur taluka of Morena district, 22.5 Km. from Sheopur Kalan Rly. Stn. Paddy experimental area is levelled and that of groundnut is slopy. (ii) It represents *Jowar*—wheat

tract. (iii) Established in 1955. (iv) (a) G.M.—Wheat—gram. (b) Paddy—gram—paddy. (v) Manurial, cultural and irrigational trials on paddy, groundnut, wheat, gram and linseed etc.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1.0	—	1.6	—	0.3	5.4	18.9	44.1	10.3	2.9	0.4	—	84.9

(Av. monthly rainfall in cm. ; based on the data for the period 1960—63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Irrigation facilities are available from 1960. (ii) There exists a proper drainage system.

D. Soil type and Soil analysis :

(i) Clay loam of dark brown to drak grey colour to a depth of 15 cm. (ii) Chemical analysis and (iii) Mechanical analysis—N.A.

E. No. of Experiments :

Paddy—12, Wheat—17, Peas—4, Groundnut—4, Cotton—1, Linseed—5 ; Total=41.

6. Government Seed and Demonstration Farm, Betul.

A. General Information :

(i) In Betul district, 7 Km. from Betul Rly. Stn. with Lat. 21°54'42"/Long. 77°53'56"/Alt. 658 M. The land is slopy from East to West. The shape of the farm is irregular. It is situated on Itarsi—Nagpur Road. (ii) It represents Satpura tract. (iii) Established in 1915. (iv) Fallow—Wheat—G.M.—Sugarcane. (v) Varietal trials on wheat are conducted.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1.0	1.0	1.7	1.0	1.0	8.1	35.1	28.8	42.4	8.1	1.6	1.2	131.0

(Av. monthly rainfall in cm. ; based on the data for the period 1960—63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Irrigation is done by canal and wells. (ii) No proper drainage system exists.

D. Soil type and Soil analysis :

(i) Morand—II of black colour and of granular structure to a depth of 15 cm. to 64 cm. (ii) Chemical analysis : pH.—7.3 to 7.9 ; Conductivity—0.01 to 0.1 ; Organic Carbon—0.14 to 0.36 ; available N—65 to 182 Kg/ha. and available P₂O₅—10.8 to 49.3 Kh/ha. (iii) Mechanical analysis—N.A.

E. No. of Experiments :

Wheat—3 ; Total=3.

7. Government Agricultural Farm, Bhind.

A. General Information :

(i) In the district of Bhind, 1.6 Km. from Bhind Rly. Stn. with Lat. 26°34'N/Long. 78°48' E/Alt. 167 m. The fields are not levelled and it is difficult to irrigate all plots properly

(ii) It represents *Jowar*—Wheat tract. (iii) Established in 1959. (iv) Cropping pattern are *Bajra* and *Jowar* in *kharif* and wheat, gram and linseed in *Rabi*. (v) Manurial and varietal trials.

B. Normal Rainfall

January to	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
—		0.2	7.2	22.8	23.5	31.6	—	1.2	0.4	86.9

(Av. monthly rainfall in cm. ; based on the data for the period 1963—64).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Sewage water from 1959. (ii) No drainage system exists. Being a sandy loam soil of the farm, it is already well drained and drainage problem never arises.

D. Soil type and Soil analysis :

(i) Sandy loam to loam of yellowish brown colour. (ii) Chemical analysis : pH.—7.5 ; Conductivity—0.3 ; Organic Carbon—0.16 % ; available N—80.7 Kg/ha. and available P_2O_5 40.9 Kg/ha. (iii) Mechanical analysis —N.A.

E. No. of Experiments :

Paddy—4, Wheat—20, Potato—3, Groundnut—6, Sugarcane—1, Cotton—5, Linseed—1 ; Total=40.

8. Govt. Agricultural Research Farm, Bilaspur.

A. General Information :

(i) In Bilaspur distt., 8 Km. from Bilaspur Rly. Stn., with Lat.—22°04' 40"N/Long—82°09' 33"E/Alt.—270 m. It's slop is from East to West and from North to South. (ii) Rice tract. (Chhattisgarh tract). (iii) Established in 1918. (iv) Groundnut—Paddy ; Vegetable and Oilseed—Gram/Peas. (v) To conduct experiments on cereals, Sugarcane, Pulses and Oilseed, principally on paddy. (2) To produce the foundation stock of improved seeds.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
0.4	1.0	0.6	1.1	1.0	22.2	51.8	30.8	29.5	4.3	—	2.4	145.1

(Av. monthly rainfall in cm. ; based on the data for the period 1960—63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) : Mostly canal irrigation from Khotagat Tank near river. (ii) N.A.

D. Soil type and Soil analysis :

(i) Broad soil types—*Dorsa*, *Khanker*, *Musari* and *Bhatia* types of soil with grey, blackish Yellowish and reddish in colour and loam, clay loam, sandy loam and sandy in structure, respectively. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Paddy— ; Total=2.

9. Government Seed and Demonstration Farm, Biora.**A. General Information :**

(i) In Biora taluka of Raigarh district, 69 Km. from Shujalpur Rly. Stn. Slopy and undulating land. (ii) It represents cotton—*Jowar* tract. (iii) Established in 1942. (iv) Wheat followed by gram. (v) Agronomic experiments on wheat, *Jowar* etc.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
2.7	0.2	0.7	—	0.3	77.8	30.4	36.1	27.6	5.3	3.1	0.3	134.5

(Av. monthly rainfall in cm. ; based on the data for the period 1960—63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Irrigation facilities are available since 1956. (ii) No proper drainage system exists.

D. Soil type and Soil analysis :

(i) Black and yellow to a depth of 61 cm. to 91 cm. of Morand structure—II. (ii) Chemical analysis : PH.—7.3. (iii) Mechanical analysis—N.A.

E. No. of Experiments :

Wheat—5, *Jowar*—1, *Tur*—2 ; Total=8.

10. Government Agricultural Research Farm, Chhindwara.**A. General Information :**

(i) In Chhindwara district, 5 Km. from Chhindwara Rly. Stn. with Lat. 23°N/Long. 70°25'E/Alt. 668 M. The site of the farm is roughly rectangular. The land gradually slopes from North to South. There is a stream in the middle of the farm. The site is bounded by cultivated land of Chandangaon village in East and South and Chhindwara—Nagpur Road in the west. (ii) It represents Satpura plateau. (iii) Established in the year 1919. (iv) Cropping pattern is paddy—wheat—berseem ; groundnut—legumes—vegetable ; G.M.—wheat ; potato—Sugarcane and maize—wheat. (v) Multiplication of seeds and agronomical experiments on different crops.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
3.5	1.5	1.6	1.0	0.7	9.5	34.3	31.3	27.1	7.0	1.1	2.6	121.2

(Av. monthly rainfall in cm. ; based on the data for the period 1960—63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) 3 electric motors, one oil engine and one *rahat* fitted to well. (ii) One *nallah* in the middle of the farm works as a drainage in the rainy season.

D. Soil type and Soil analysis :

(i) *Sehra*, Morand and *kali* of black colour ; sandy and granular in structure. (ii) Chemical analysis :

	<i>Sehra</i>	Morand	<i>Kali</i>
N %	0.056	0.0399	0.0735
Available P ₂ O ₅ %	Nil	0.0026	0.0256
Available K ₂ O %	0.024	0.041	0.028

(iii) Mechanical analysis :	<i>Sehra</i>	<i>Morand</i>	<i>Kali</i>
Clay %	9.08	39.32	34.80
Fine silt %	6.40	13.31	15.40
Silt %	11.26	16.74	14.99
Fine sand %	24.30	11.00	11.38
Coarse sand %	46.18	9.01	12.35
Moisture %	0.74	6.12	5.07
Loss on ignition %	21.40	4.25	4.96
Calcium carbonate %	0.03	0.11	0.35

E. No. of Experiments :

Wheat—19, Maize—4, Kutki—3, Kodon—3, Gram—6, Potato—2, Gingilly—1, Sugar-cane—2, Niger—3, Ginger—10 ; Total=53.

11. Govt. Seed and Demonstration Farm, Damoh.

A. General Information :

(i) In Damoh taluka of Damoh distt., 3.5 Km. from Damoh Rly. Stn. with Lat.—23°50' N/Long.—79°26'50" E/Alt.—424 m. Slightly slopy area. (ii) It represents wheat tract. (iii) Established in 1918. (iv) Fallow—Wheat. (v) Mainly wheat varietal trials.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	
1.9	1.5	2.0	2.3	0.7	8.4	
July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
37.2	50.3	25.0	6.2	1.1	0.8	137.4

(Av. monthly rainfall in cm. ; based on the data for the period 1960—63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) No irrigation facilities. (ii) No proper drainage system.

D. Soil type and Soil analysis

(i) Broad soil types—Clay soil to a depth of 1.52 m. and black in colour. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Wheat—1 ; Total=1.

12. Agricultural Research Station, Dhar.

A. General Information :

(i) In Dhar distt., nearest Rly. Stn. is Mhow. It is semi—undulating area having slop 1 to 2 %. (ii) It represents *Malwa Pathar* tract. (iii) Established in 1957. (iv) Cropping pattern is *kharif* : *Jowar*, Maize, Soyabean ; *Rabi* : Wheat, Gram, Linseed. (v) N.A.

B. Normal Rainfall :

Total annual rainfall 108.7 cm. (Av. of 1969 to 71).

C. Irrigation and Drainage Facilities :

(i) (a) Irrigation facilities available since 1957. (b) Well irrigation through Electric pump. (ii) No proper drainage system.

D. Soil type and Soil analysis :

(i) Broad soil type-Black cotton soil with 91 cm. depth, clay loam in structure. (ii) Chemical analysis : pH.—7·5 to 7·8 ; Soluble salts—0·512 ; rich in Potash. (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Maize—1 ; Total=1.

13. Government seed and Demonstration Farm, Durg.**A. General Information :**

(i) District Durg, the farm is at a distance of 5 Km. from Durg Rly. Stn. The farm is having a gentle slope from West to East. (ii) Rice tract. (iii) Established in 1917. (iv) (1) Paddy after paddy. (2) Paddy followed by wheat and gram. (v) (1) To produce foundation seed for multiplication in development blocks. (2) To demonstrate improved method of cultivation.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	
0·5	1·5	1·8	1·3	—	1·0	
July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
35·4	30·0	25·8	9·2	2·1	0·1	121·7

(Av. monthly rainfall in cm. ; based on the data for the period 1949—63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Canal irrigation facilities exist. (ii) There are open drainage channels in paddy area.

D. Soil type and Soil analysis

(i) Marshy soil with sandy loam structure and yellowish in colour ; *Kankar* soil with sticky structure and black colour and *Dorsa* soil with black colour and slightly sticky structure. (ii) Chemical analysis and (iii) Mechanical analysis—N.A.

E. No. of experiments :

Paddy—2 ; Total=2.

14. Institute of Plant Industry, Indore.**A. General Information :**

(i) District Indore, the farm is situated at a distance of 4 km. from Indore Rly. Stn. It is situated on the *Malwa* plateau about 549 M. high above mean sea level. (ii) It represents black soil tract. (iii) The farm was established in 1924. (iv) (1) *Jowar*, cotton and wheat and (2) *Jowar*, Groundnut, cotton and wheat are the crops on which experiments are conducted. (v) Different types of studies on cotton, *Jowar*, groundnut, gram and linseed.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1·5	—	0·2	0·1	1·2	9·2	28·1	28·1	32·1	5·9	1·0	0·4	107·8

(Av. monthly rainfall in cm., based on the data for the period 1953-62).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Irrigation facility through wells is available. (ii) There is no proper drainage system.

D. Soil type and Soil analysis :

(i) Clayey soil, black in colour. (ii) Chemical analysis : Total N—0.073% ; total K_2O —0.82% ; total CaO—3.63% and total P_2O_5 —0.07%. Available P_2O_5 —0.013 and available K_2O —0.005 per 100 gms. of soil. Cation exchange capacity 64 ml/100 gms. of soil. pH. 8 to 8.5. (iii) Mechanical analysis : Sand 25.5%, silt 20.0% and clay 53.8%.

E. No. of Experiments :

Wheat-8, Jowar-5, Sugarcane-2, Cotton-21, Groundnut-2, Mixed cropping-2 ; Total=41.

15. Govt. Agricultural Farm, Jora.**1. General Information :**

(i) In Jora taluka of Morena Dist., 1 Km. from Jora—Alapur Rly. Stn. with Lat.-20° 21' N/Long-77° 49'E/Alt.-30 m. (ii) It represents Jowar-Wheat tract. (iii) Established in 1955. (iv) Bajra-Arhar ; Wheat-Gram. (v) Agronomical and manurial experiments on various crops under Chambal Project.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
0.2	0.3	0.2	—	0.3	2.1	17.8	33.4	12.1	4.1	0.4	—	70.9

(Av. monthly rainfall in cm. ; based on the data for the period 1960-63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) : Yes, irrigation by well, since 1955. (ii) No proper drainage system exists.

D. Soil type and Soil analysis :

(i) Broad soil type — Grayish to greyish-brown on the surface and yellowish-brown in the deeper. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Paddy—1, Wheat—19, Peas—5, Potato—2, Sugarcane—3, Groundnut—5, Cotton—6, Linseed —4 ; Total=45.

16. Government Agricultural Research Station, Jhabua.**A. General Information :**

(i) In the district of Jhabua, 17.6 km. from Meghnagar Rly. Stn. with Lat. 22°46'/Long. 74°34'/Alt. 457 M. Undulating sandy land. (ii) It represents cotton-jowar tract. (iii) Established in 1956. (iv) Cropping pattern is maize-gram ; and maize-castor ; paddy-gram ; paddy-peas ; groundnut-gram and cotton-fallow. (v) To conduct varietal and cultural trials on different crops sown in the area.

B. Normal Rainfall :

June	July	Aug.	Sept.	Oct.	Nov. to May	Total
6.2	21.9	25.4	11.0	5.2	—	69.7

(Av. monthly rainfall in cm. ; based on the data for the period 1963-64).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) No irrigation facilities. (ii) No proper drainage-system exists.

D. Soil type and Soil analysis :

(i) Sandy and undulating to a depth of 0 to 23 cm. and of grey and slight red colour. (ii) Chemical analysis : Total P_2O_5 0.65% ; N 0.08% ; available N 0.017% ; pH. value 7.5. (iii) Mechanical analysis : Sand 65 to 70% ; silt 13 to 15% and clay 15 to 20%.

E. No. of Experiments :

Paddy-2, *Jowar*-1, Maize-9, Bhadli-1, Gram-3, Groundnut-5, Caster-3, Niger-1 ;
Total=25.

17. Government Experimental Farm, Khandwa.**A. General Information :**

(i) In the district of Khandwa, the farm is situated at a distance of 5 km. from Khandwa Rly. Stn. Land is uniform. (ii) *Kharif* tract. (iii) Established in 1925. (iv) Cropping pattern is cotton—*jowar* and groundnut. (v) It was a multiplication farm prior to 1962. After that research on cotton and groundnut crops has been started.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
0.3	0.1	0.1	0.1	0.4	4.7	11.0	8.2	7.3	1.4	1.2	0.3	35.1

(Av. monthly rainfall in cm., based on the data for the period June 1959 to May 1966).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) : There is one *nala* and two wells for irrigation from 1933. (i.) There does not exist any proper drainage system.

D. Soil type and Soil analysis :

(i) Sandy loam to clay with *kankar* layer and free calcium up to a depth of 1.52 M. and of light black colour. (ii) Chemical analysis : pH-value 7.78 ; Carbon-0.31% ; N-158.0 Kg/ha. P₂O₅-69.6 Kg/ha. (iii) Mechanical analysis N.A.

E. No. of Experiments :

Jowar-5, Tur-1, Cotton-20, Groundnut-1 ; Total=27.

18. Regional Research Station, Khargone.**A. General Information :**

(i) In the district of Khargone (West Nimar), the farm is situated at a distance of 70 Km. from Sanawad Rly. Stn. 90 Km. from Khandwa Rly. Stn. and 1 Km. from Khargone bus stand. (ii) Type of tract is black cotton soil. (iii) Important crops grown are groundnut, cotton and *Jowar*. (iv) Breeding trials on different crops.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
0.4	1.0	0.1	1.0	1.2	8.3	16.7	25.8	16.1	4.7	1.2	0.6	77.1

(Av. monthly rainfall in cm. ; based on the data for the period 1960-63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) There does not exist any irrigation facility. (ii) There is no proper drainage system.

D. Soil type and Soil analysis :

(i) Black cotton soil. (ii) Chemical analysis and (iii) Mechanical analysis—N.A.

E. No. of Experiments :

Jowar-4, Tur-1, Cotton-12, Gram-2, Groundnut-2, Linseed-2, Mixed cropping -3
Total=26.

19. Agricultural Research Station, Kuthulia.**A. General Information :**

(i) In Hajur taluka of Rewa distt., about 5 Km. from Kuthulia bus stand and 56 Km. from Satna Rly. Stn. Mostly uniform and levelled area. (ii) Wheat and paddy tract. (iii) Established in 1952. (iv) Double cropping with irrigation mostly paddy and wheat. (v) Manurial, cultural and varietal trials.

B. Normal Rainfall :

Av. annual rainfall 504 m.m. (Av. of 8 years i.e. 1964—71).

C. Irrigation and Drainage Facilities :

(i) (a) Irrigation since last 10 years. (b) Perennial source of irrigation from river through Electric pump. (ii) Proper drainage system exists.

D. Soil type and Soil analysis :

(i) Broad soil types Sandy clay loam ; depth—3 m. ; brown and semi—black in colour. (ii) Chemical analysis ; pH.—7.7 ; CaCO_3 7.5 millhos/cm. ; E.C.—0.25 ; Org. Carbon—0.39 ; Available P_2O_5 and K_2O 368 and 63 Kg/ha. respectively. (iii) Mechanical analysis : Sand 19 % ; Silt—49 % ; Clay—32 %.

E. No. of Experiments :

Paddy—3, Wheat—6, Jowar—3, Kodon—3, Gram—3, Bhindi—2, Pumpkin—1, Sugarcane—1, Linseed—1, Niger—2 ; Total=25.

20. Government Agricultural Research Farm, Labhandi/Govt. Agri. Res. Station, Raipur.**A. General Information :**

(i) In the district of Raipur, 9 Km. from Raipur Rly. Stn. with Lat. $21^\circ 10'$ /Long. $81^\circ 35'$ /Alt. 295 cm. The slope of the land is from East to West and from South to North. (ii) It represents rice tract. (iii) Established in 1903. (iv) Paddy after paddy—wheat and pulses. (v) To conduct cultural and varietal trials on paddy in particular and other crops in general and multiplication of seeds.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June		
0.4	1.5	1.9	1.9	2.4	13.9		
July	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	
37.4	31.5	23.3	6.7	0.2	0.3	121.4	

(Av. monthly rainfall in cm. ; based, on the data for the period 1951—63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Tank is the source of irrigation which is fed by *Chheri khedi* tank under Public Works Department. (ii) There are open drainage channels specially for the paddy fields.

D. Soil type and Soil analysis :

(i) *Matasi*, *Karhar* and *Dorsa* with sandy loam, Clayey loam and loam structure and

yellowish, blackish and grey colour respectively.

(ii) Chemical analysis :	Matasi	Karhar	Dorsa
PH.	7.3	6.6	7.4
Soluble salts	0.1	0.25	0.10
Organic carbon	0.6	0.50	0.40
Available P ₂ O ₅ in Kg/ha.	13.4	24.2	31.4
Available K ₂ O in Kg/ha.	179.3	224.2	197.3

(iii) Mechanical analysis —N.A.

E. No. of Experiments :

Paddy —32, Lakh—2, Linseed—3, Rotational—3 ; Total=40.

21. Government Seed and Demonstration Farm, Mahagarh.

A. General Information :

(i) In the district of Mandsaur, 31 Km. from Pipliya Rly. Stn. (ii) It represents cotton-Jowar tract. (iii) Established in 1954. (iv) Cropping pattern : 24 ha. of the area under *rabi* crops-wheat, gram and linseed and 16 ha. under *Kharif* crops-Jowar, cotton, tur, moong, urad, maize and sugarcane. (v) It is a seed multiplication farm.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
0.1	—	0.2	0.4	0.6	1.0	24.3	32.9	25.6	0.2	2.1	0.2	88.2

(Av. monthly rainfall in cm., based on the data for the period 1960—63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) There are two wells and two pump sets. The wells are available since the inception of the farm. (ii) No proper drainage system exists.

D. Soil type and Soil analysis :

(i) Black cotton soil and light soil to a depth of 35 cm. to 61 cm. and of clay structure. (ii) Chemical analysis : PH. value—7.4 to 8.1, Conductivity—0.02 to 0.31, Organic Carbon 0.18 to 0.42 %, available N—90.1 to 211.8 Kg/ha. and available P₂O₅—2.56 to 34.50 Kg/ha. (iii) Mechanical analysis—N.A.

E. No. of Experiments :

Wheat—1 ; Total=1.

22. Govt. Seed Multiplication and Demonstration Farm/Central Agricultural Research Farm, Nabibagh.

A. General Information :

(i) In Sehore district, 7 Km. from Bhopal Rly. Stn. with Lat.-23° 17' N/Long-77° 24' E/Alt.-52 m. Fields are plain, (ii) It represents wheat tract. (iii) Established in 1920. (iv) Cropping pattern : Green manuring-Wheat-Gram-Wheat. (v) Programme of research : Wheat varietal trials, fodder research and weed control research.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1.8	1.3	0.6	0.2	0.7	6.5	30.4	40.9	32.3	4.9	0.8	0.3	120.7

(Av. monthly rainfall in cm. ; based on the data for the period 1960-63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Irrigation through wells for the last 23 years in an area of 12 ha. (ii) There exists a proper drainage system.

D. Soil type and Soil analysis :

(i) Black soil to a depth of 1.83 M. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Paddy-2, Wheat-15, Jowar-3, Gram-2, Potato-3, Linseed-4 ; Total=29.

23. Government Agricultural Farm, Nawgong.**A. General Information :**

(i) In the district of Chhatarpur, 31 Km. from Herapalpur Rly. Stn. with Lat.-25° 16' N/ Long.-72° 29' E/Alt.-288 M. The land is plain. (ii) It represents millet tract. (iii) Established in 1948. (iv) Double cropping pattern. (v) Varietal trials on different crops.

A. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
4.0	0.3	0.4	0.7	0.3	3.1	30.4	42.5	24.3	8.2	4.7	2.3	121.2

(Av. monthly rainfall in cm., based on the data for the period 1960-63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Irrigation is available through wells, since beginning. (ii) proper drainage system exists.

D. Soil type and Soil analysis :

(i) Sandy soil to a depth of 1.23 m. and of granular structure and blackish brown colour. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Wheat-1 ; Total=1.

24. Govt. Soil Conservation Research Station Phanda.**A. General Information :**

(i) In the district Sehore, the farm is at a distance of about 200 m. from Phanda Rly. Stn. The land is slopy. (ii) Type of tract is black cotton soil. (iii) Established in 1953. (iv) Cropping pattern is wheat—gram ; jowar-gram. (v) Research on soil conservation.

C. Irrigation and Drainage Facilities .

(i) (a) and (b) : There is one well for irrigation. (ii) No proper drainage system exists.

D. Soil type and Soil analysis :

(i) Very deep black in colour and granular in structure. (ii) Chemical analysis and (iii) Mechanical analysis :—N.A.

E. No. of Experiments :

Wheat-28, Jowar-1, Gram-5, Mixed-cropping-2 ; Total=36.

25. Govt. Farm, Silary Piparia.**A. General Information :**

(i) In Hoshangabad district, 1.6 Km. from Pipariya Rly. Stn. with Lat.—22° 45' N/ Long.—78° 13' E/ Alt.—334 M. Level land with gradual slope. (ii) It represents *Narmada* tract. (iii) Established in 1950. (iv) Double cropping pattern followed. (v) Varietal and manurial trials on different vegetable crops.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1.1	0.3	1.6	0.6	0.8	8.6	39.8	36.4	49.6	14.5	1.1	1.4	136.3

(Av. monthly rainfall in cm., based on the data for the period 1960-63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) : Irrigation by oil engine fitted in the wells since 1957. (ii) Only ground level drainage exist.

D. Soil type and Soil analysis :

(i) Sandy loam to a depth of 23 cm., brownish in colour and granular in structure. (ii) Chemical analysis : pH.—8.1 to 9.0, Conductivity—0.04 to 0.25 ; Organic Carbon—0.37 to 0.57% ; N—294 to 569 Kg/ha. and P₂O₅—108 to 258 Kg/ha. (iii) Mechanical analysis :—N.A.

B. Normal Rainfall :

Bhindi—1, Cauli flower—1 ; Total =2.

26. Government Experimental Farm, Powarkheda.**A. General Information :**

(i) In the district of Hoshangabad, 3 Km. from Powarkheda Rly. Stn., with Lat.—22° 45' N/ Long.—77° 40' E/ Alt.—359 M. The land is slopy having a gradient of 1 to 1.5%. (ii) It represents wheat tract (iii) Established in 1903. (iv) Cropping pattern is wheat gram. (v) (1) To evolve rust resistant wheat varieties. (2) To multiply nucleus seed (wheat) and (3) To take agronomical and mycological programme of research on wheat.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1.3	0.2	0.6	0.2	0.4	6.9	35.2	38.7	36.6	0.7	1.0	7.5	127.3

(Av. monthly rainfall in cm. ; based on the data for the period 1960-63).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) : There are 3 wells and one tube well. (ii) Surface drain system exists.

D. Soil type and Soil analysis :

(i) Morand No. 1 and morand No. 2 and maryar to a depth of more than 45 cm. and of black colour and silt clay, elay loam and clayey structure. (ii) Chemical analysis : pH-8.2 ; N and P—negligible, K₂O—0.02% ; Conductivity—0.07 and Organic Carbon—0.40%

(iii) Mechanical analysis :

	Morand 1	Morand 2	Maryar 3
	%	%	%
Coarse sand	0.18	5.75	3.44
Fine sand	8.26	4.55	9.88
Silt	17.12	22.52	15.23
Fine silt	24.07	21.22	16.48
Clay	43.10	35.11	41.55
Mixture	4.05	4.95	6.53
Calcium carbonate	0.72	0.13	0.57

E. No. of Experiments :

Wheat—41, Gram—2, Linseed—5 ; Total=48.

27. Govt. Seed and Demonstration Farm, Raisen.

A. General Information :

(i) District Raisen, nearest Rly. Stn., Sanchi (C. Rly.). The experimental area has 1 to 2 % slope. (ii) It represents Wheat tract. (iii) Established in 1944. (iv) Paddy—Wheat, Paddy-Gram, Soyabeen-Wheat-fallow, Wheat-fallow-gram. (v) Simple varietal, agronomical trials on wheat and gram.

B. Normal Rainfall :

Jan. to June	July	Aug.	Sept.	Oct.	Nov. and Dec.
N.A.	1 2	1 2	1 2	1 2	N.A.
	27.3 20.6	17.4 43.2	21.7 11.9	— —	

(Fortnightly rainfall in cm. ; based on the data for the year 1973).

C. Irrigation and Drainage Facilities :

(i) (a) For last 10 years. (b) 3 irrigation wells. (ii) No proper drainage system.

D. Soil type and Soil analysis :

(i) Broad soil type—Black cotton soil. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Wheat—2 ; Total=2.

28. State Mechanised Farm, Reora.

A. General Information :

(i) In the district of Satna, 11 Km. from Satna Rly. Stn. The land is plain. (ii) It represents wheat tract. (iii) Established in 1952. (iv) Paddy-wheat. (v) Agronomical trials on paddy, wheat, linseed and gram.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
—	—	1.2	1.8	—	13.0	21.1	44.7	23.7	2.2	—	—	107.7

(Av. monthly rainfall in cm., Period on which the data is based is not available).

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Lift irrigation, since the inception of the farm. (ii) Natural drainage.

D. Soil type and Soil analysis :

- (i) Red and black mixed to a depth of 0.45 m. to 3.05 m. and of granular structure. (ii) Chemical analysis : pH.—6.9 ; Conductivity—0.1 ; Organic Carbon—0.34 % ; N—171.5 Kg/ha. and P₂O₅—6.4 %. (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Paddy—6, Wheat—5, Tur—1, Gram—2, Linseed—3 ; Total—17.

29. Govt Agriculture college Farm, Rewa.**A. General Information :**

- (i) District Rewa, Nearest Rly. Stn., Satna, half of the area is levelled and half undulated. (ii) It represents Vindhya region tract. (iii) Year of establishment N.A. (iv) Paddy and Wheat ; Gram, Linseed. (v) Agronomical trials.

B. Normal Rainfall :

- (i) It receives about 78.6 cm. rainfall per annum.

G. Irrigation and Drainage Facilities :

- (i) (a) and (b) Yes, irrigation facilities are available. (ii) Proper drainage system exists.

D. Soil type and Soil analysis :

- (i) Mixed red and black Loam. (ii) Chemical analysis : pH—7.4 ; Organic Carbon—0.82 ; Av. N—282 Kg/ha. ; P₂O₅—18 Kg/ha. ; K₂O—470 Kg/ha. (iii) Mechanical analysis : Sand—48.2 % ; Silt—28.0 % ; clay—22.1 %.

E. No. of Experiments :

Paddy—3, Wheat—6, Brinjal—3, Raddish—1, Linseed—2, Onion—4, Jowar fodder—2, Citrus—1 Guava—2 ; Total—24.

30. Govt. Seed and Demonstration Farm, Sagar.**A. General Information :**

- (i) In the district of Sagar, 8 Km. from Sagar Rly. Stn. with Lat.—23°50' N/Long—75°45' E/Alt.—591 m. The land is almost levelled. (ii) It represents wheat tract. (iii) Established in 1919. (iv) Only one crop in *rabi* season is generally taken up. (v) Manurial and varietal trials on wheat and gram.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June		
2.5	—	—	—	—	8.4		
July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
37.3	81.3	33.0	—	—	4.1	166.6	

(Av. monthly rainfall in cm., based on the data for the period 1961—63).

C Irrigation and Drainage Facilities :

- (i) (a) and (b) Two oil engine pumps for lifting water for irrigation. (ii) There is no proper drainage system.

D. Soil type and Soil analysis :

(i) Black cotton soil of black colour to a depth of 38 to 91 cm. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Wheat—6, Linseed—1 ; Total=7.

31. Rafi Ahmad Kidwai Agricultural Research Instt. Sehore.**A. General Information :**

(i) in Sehore distt., nearest Rly. Stn. Sehore with Lat.—23°12' N/Long—77°05' E. The topography of the area is almost levelled. (ii) Wheat-gram tract. (iii) Established in 1956. (iv) (a) Sugarcane-Fallow ; (b) Sugarcane—Ratoon—Fallow ; (c) Green manure—Sugarcane. (v) Agronomical experiments :

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
0.4	0.4	—	0.1	—	2.9	13.1	16.3	17.9	2.0	0.4	0.2	53.7

(Av. monthly rainfall in cm., based on the data for the period 1960-63).

C. Irrigation and Drainage Facilities :

(i) Lift irrigation from a perennial nala since inception. (ii) Natural drainage.

D. Soil type and Soil analysis :

(i) Broad soil type—Black Cotton soil with a depth of 38 to 91 cm. and Black in colour. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

E. No. of Experiments :

Sugarcane—9 ; Total=9.

32. Govt. Agricultural Farm, Seoni.**A. General Information :**

(i) In the District of Seoni, very near from Seoni Rly. Stn. with Lat.—20° N/Long.—70° E/Alt.—608 M. The land is gradually sloping towards South and East. (ii) It represents Satpura Plateau (non—Haveli) tract. (iii) Established in 1918. (iv) Cropping pattern : Wheat, gram, Sugarcane ; Paddy—Wheat or berseem and G.M.—Wheat. (v) Research on fodder and fibre crops and multiplication and distribution of improved seeds.

B. Normal Rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1.9	0.3	0.6	0.5	0.7	7.4	13.2	10.8	8.2	1.5	1.9	8.2	55.2

(Av. monthly rainfall in cm., based on the data for the period 1953-63)

C. Irrigation and Drainage Facilities :

(i) (a) and (b) Irrigation is done by wells fitted with 3 electric motors and one oil engine. (ii) Partial drainage system exists.

EXPERIMENTAL DATA

Crop :- Paddy (Kharif).

Ref :- M.P. 64(50).

Site :- Govt. Agri. Res. Stn., Adhartal.

Type :- 'M'.

Object :-To see the effect of forms, levels, time and method of application of nitrogenous fertilizer on the growth, yield and quality of Paddy.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Paddy. (c) 22.4 Kg/ha. of N. (ii) Sandy loam. (iii) 23/24.6.64. (iv) (a) 2 ploughings and harrowings. (b) Transplanting. (c) — (d) 23 cm. × 23 cm. (e) N.A. (v) 20 C.L./ha. of F.Y.M. + 100 Kg/ha. of P_2O_5 as Super. (vi) R-17. (vii) Irrigated. (viii) 3 weedings (hand). (ix) 143 cm. (x) 21/22.10.64.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1), (2) and (3)

(1) 3 times of application of N : T_1 = Full dose at transplanting, T_2 = $\frac{1}{3}$ dose at transplanting + $\frac{1}{3}$ dose one month after transplanting and T_3 = $\frac{1}{3}$ dose at transplanting + $\frac{1}{3}$ dose at one month after transplanting + $\frac{1}{3}$ dose at 1 $\frac{1}{2}$ months after transplanting.

(2) 2 doses of N : N_1 = 21.4 and N_2 = 43.0 Kg/ha.

(3) 2 forms of N : F_1 = A/S and F_2 = Urea.

Sub-plot treatments :

2 methods of application of N : M_1 = Surface and M_2 = Sub-surface application.

3. DESIGN :

(i) Split-plot. (ii) (a) 12 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.8 m. × 3.7 m. (b) 5.6 m. × 3.2 m. (v) 10 cm. × 25 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) N.A. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

(i) 3703 Kg/ha. (ii) (a) 540.4 Kg/ha. (b) 415.7 Kg/ha. (iii) Main effects of N and M are highly significant. (iv) Av. yield of grain in Kg/ha.

	T_1	T_2	T_3	F_1	F_2	M_1	M_2	Mean
N_1	3546	3604	3443	3591	3471	3387	3675	3531
N_2	4126	3813	3686	4037	3723	3739	4011	3875
Mean	3836	3708	3564	3809	3597	3563	3843	3703
M_1	3671	3528	3491	3656	3470			
M_2	4001	3890	3638	3962	3724			
F_1	4020	3861	3547					
F_2	3652	3557	3583					

C.D. for N marginal means = 224.6 Kg/ha.

C.D. for M marginal means = 172.1 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 63 79), 64(49).

Site :- Govt. Agri. Res. Stn., Adhartal.

Type :- 'M'.

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

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Wheat for 63 ; N.A. for 64. (c) 33.6 Kg/ha. of N+33.6 Kg/ha. of P_2O_5 . (iii) Sandy loam. (iii) 15.6.63 ; 22.6.64/22.7.64. (iv) (a) 3 ploughings, 2 harrowings, puddings and levelling for 63 ; 6 ploughings for 64. (b) Broadcasting for 63 ; transplating for 64. (c) N.A. for 63 ; 33.6 Kg/ha. for 64. (d) Rows 23 cm. apart for 63 ; 23 cm. \times 23 cm. for 64. (e) 3 for 63 ; N.A. for 64. (v) 10 to 20 C.L. of F.Y.M. (vi) Chhatra (R -10). (vii) Irrigated. (viii) 3 weedings ; interculture and weeding. (ix) 102 cm ; N.A. (x) 21.11.63 ; 13.11.64.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 levels of N : $N_0=0$, $N_1=22.4$ and $N_2=44.8$ Kg/ha.

(2) 3 levels of P_2O_5 : $P_0=0$, $P_1=22.4$ and $P_2=44.8$ Kg/ha.

(3) 3 levels of $K_2O = K_0=0$, $K_1=22.4$ and $K_2=44.8$ Kg/ha.

Forms of fertilizers and methods of application—N.A.

3. DESIGN :

(i) 3^3 confd. (ii) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 8.2 m. \times 7.2 m. 7.8 m. \times 6.9 m. (b) 7.3 m. \times 6.4 m. ; 7.3 m. \times 6.4 m. (v) 46 cm. \times 38 cm. ; 25 cm. \times 25 cm. (vi) Yes. \odot

4. GENERAL :

(i) Good. (ii) Crop was slightly affected by paddy Blast caused by *Piricularia oryzae* (iii) Tiller counts and yield of grain. (iv) (a) 1963—64. (b) N.A. (c) Nil. (v) N.A. (vi) Nil. (vii) As error variances are heterogeneous and Treatments \times years interaction is absent, hence results of individual years have been presented under 5 Results.

5. RESULTS :

63(79)

(i) 2947 Kg/ha. (ii) 754.3 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant. (vi) Av. yield of grain in Kg/ha.

	P_0	P_1	P_2	K_0	K_1	K_2	Mean
N_0	1887	2216	2619	2143	2418	2161	2241
N_1	2949	3095	3187	2986	3150	3096	3077
N_2	3572	3389	3609	3370	3517	3682	3523
Mean	2803	2900	3138	2833	3028	2980	2947
K_0	2619	2931	2949				
K_1	2839	2839	3407				
K_2	2949	2931	3059				

C.D. for N or P marginal means=425.6 Kg/ha.

64(49)

(i) 2980 Kg/ha. (ii) 176.5 Kg/ha. (iii) Main effects of N and P are highly significant and that of K is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	K ₀	K ₁	K ₂	Mean
N ₀	2134	2580	2690	2318	2488	2597	2468
N ₁	2907	3084	3222	2953	3169	3089	3070
N ₂	3146	3484	3578	3345	3444	3420	3403
Mean	2729	3049	3163	2872	3034	3035	2980
K ₀	2617	2771	3228				
K ₁	2900	3148	3053				
K ₂	2667	3229	3208				

C.D. for N, P or K marginal means = 100.2 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 63(74), 64(48), 65(47).

Site :- Govt. Agri. Res. Stn., Adhartal.

Type :- 'M'.

Object :- To study the effect of different forms, levels, time and methods of application of nitrogenous fertilizers on the growth and yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clay loam (medium black). (iii) 3rd week of June. (iv) (a) to (c) N.A. (d) Rows 25 cm. apart. (e) N.A. (v) N.A. (vi) Chhatri (R-10). (vii) Irrigated. (viii) N.A. (ix) 126 cm ; 123 cm ; 96 cm. (x) 2nd week of Nov.

2. TREATMENTS:

Main-plot treatments :

All combinations of (1), (2) and (3)

(1) 2 forms of Nitrogen : F₁=A/S, F₂=Urea (C/A/N for 63).

(2) 2 levels of Nitrogen: N₁=20 and N₂=40 Kg/ha.

(3) 3 times of application of N: T₁=Full dose at transplanting, T₂= $\frac{1}{2}$ dose at transplanting + $\frac{1}{2}$ dose at one month after transplanting and T₃= $\frac{1}{3}$ dose at transplanting + $\frac{1}{3}$ dose at one month after transplanting + $\frac{1}{3}$ dose at 1 $\frac{1}{2}$ months after transplanting.

Sub-plot treatments :

2 methods of application of N : M₁=Surface application and M₂=Sub-surface application.

3. DESIGN :

(i) Split-plot. (ii) (a) 12 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-65. (b) N.A. (c) Nil. (v) to (vi) N.A. (vii) Neither the plot wise yield data nor the complete results were available.

5. RESULTS:

Yield of grain in Kg/ha.

Treatments	T ₁	T ₂	T ₃	Sig.	F ₁	F ₂	Sig.	N ₁	N ₂	Sig.
Years										
1963	2880	2965	2705	N.S.	2980	2720	**	2770	2930	N.S.
1964	3836	3709	3566	N.S.	3809	3598	N.S.	3531	3876	**
1965	1961	1780	1647	**	1832	1760	N.S.	1951	1641	**
Pooled										

S.E./main-plot	M ₁	M ₂	Sig.	G.M.	S.E./sub-plot
385.0	2720	2980	*	2850	364.4
522.1	3563	3844	**	3704	405.4
300.8	1721	1871	N.S.	1796	N.A.
			N.S.		

Crop :- Paddy (Kharif).

Ref :- M.P. 61(46).

Site :- Govt. Seed and Demons. Farm, Durg.

Type :- 'M'.

Object :— To find out the optimum dose of N and P for Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) Kanhar. (iii) N.A. (iv) (a) 2 ploughings by deshi plough. (b) Transplanting. (c) —. (d) 10 cm. × 10 cm. (e) 2. (v) Nil. (vi) *Luchai × Gurmatis*. (vii) Irrigated. (viii) 2 weedings. (ix) 120 cm. (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 4 levels of N as A/S : N₀=0, N₁=8.4, N₂=16.8 and N₃=25.2 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=16.8 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) and (b) 4.3 m. × 5.5 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain yield. (iv) (a) 1961 only. (b) and (c) —. (v) Reora. (vi) and (vii) Nil.

5. RESULTS :

(i) 4262 Kg/ha. (ii) 635.5 Kg/ha. (iii) Main effect of P alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	3584	4165	3875	3681	3826
P ₁	4068	4262	5425	5037	4698
Mean	3826	4213	4650	4359	4262

C.D. for P marginal means = 467.4 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 61(45).

Site :- Govt. Seed and Demons. Farm, Durg.

Type :- 'M'.

Object: — To find out the optimum dose of N and P for Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) *Dorsa*. (iii) N.A. (iv) (a) 2 ploughings by *dashi* plough. (b) Transplanting. (c) — (d) 10 cm. × 10 cm. (e) 2. (v) Nil. (vi) Luchai × Gurmatia. (vii) Irrigated. (viii) Weeding. (ix) 120 cm. (x) N.A.

2. TREATMENTS :

Same as in expt. No. 61(46) on page No. 4.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) 21.3 m. × 19.5 m. (iii) 4. (iv) (a) and (b) 10.7 m. × 4.9 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1961 only. (b) and (c) —. (v) Reora. (vi) and (vii) Nil.

5. RESULTS :

(i) 3234 Kg/ha. (ii) 379.0 Kg/ha. (iii) None of the effects is significant (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	2964	3138	3226	3051	3095
P ₁	3182	3313	3422	3574	3373
Mean	3073	3226	3324	3313	3234

Crop :- Paddy (Kharif).

Ref :- M.P. 60(25), 61(129).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'M'.

Object: — To study the response of different doses of N and P on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram for 60; N.A. for 61. (c) 25 C.L./ha. of compost for 60; N.A. for 61. (ii) Sandy loam. (iii) 20.6.60; 27.6.61. (iv) (a) 3 ploughings and *palewa*. (b) Drilling by *duffam*. (c) 22 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) 25 C.L./ha. of compost. (vi) N.A. for 60; Local for 61. (vii) Unirrigated. (viii) Weeding and interculture. (ix) 57 cm. for 60; N.A. for 61. (x) 5.10.60; 1.11.61.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 4 levels of N as A/S: N₀=0, N₁=8.4, N₂=16.8 and N₃=25.2 Kg/ha.

(2) 2 levels of P₂O₅ as Super: P₀=0 and P₁=16.8 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.7 m. × 3.1 m. (b) 9.1 m. × 2.4 m. (v) 76 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-61. (b) N.A. (c) Results of combined analysis have been presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled results

(i) 2328 Kg/ha. (ii) 645.7 Kg/ha. (based on 49 d.f. made up of pooled error and Treatments \times years interaction). (iii) Main effect of P is highly significant and that of N is significant. (iv) A.v. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	1612	2138	2099	2520	2092
P ₁	2425	2149	2660	3022	2564
Mean	2019	2143	2379	2771	2328

C.D. for P marginal means=324.4 Kg/ha.

C.D. for N marginal means=458.8 Kg/ha.

Individual results

Treatments	N ₀	N ₁	N ₂	Sig.	P ₀	P ₁	P ₂	Sig.	G.M.	S.E./plot	
Years											
1960	1975		2424	N.S.	1905	2017	2240	2635	N.S.	2199	659.6
1961	2210		2704	N.S.	2133	2270	2520	2907	N.S.	2457	732.3
Pooled	2092		2564	*	2019	2143	2379	2771	**	2328	645.7

Crop :- Paddy (Kharif).

Ref :- M.P. 62(81).

Site :- Agri. Res. Stn., Kuthulia.

Type :- 'M'.

Object :- To study the effect of N and P on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clayey and clayey loam. (iii) N.A. (iv) (a) 3 ploughings. (b) Line sowing. (c) 44 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil. (vi) N-22. (vii) Irrigated. (viii) 3 weedings. (ix) and (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 levels of N as A/S : N₀=0, N₁=8.4, N₂=16.8 and N₃=25.2 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4'3 m. \times 10'1 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (vi) (a) 1962 only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1450 Kg/ha. (ii) 97.2 Kg/ha. (iii) Main effects of N and P and interaction $N \times P$ are highly significant.
 (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	N_3	Mean
P_0	1436	1519	1574	1768	1574
P_1	1216	1491	1270	1326	1326
Mean	1326	1505	1422	1547	1450

C.D. for N marginal means = 101.1 Kg/ha.

C.D. for P marginal means = 71.5 Kg/ha.

C.D. for body of table = 142.9 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 63(35).

Site :- Agri. Res. Stn., Kuthulia.

Type :- 'M'.

Object :- To study the the effect of N and P alone and in combination on the yield of Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Wheat. (c) N A. (ii) Clayey and clayey loam. (iii) 30.7.63. (iv) (a) 3 ploughings.
 (b) Line sowing. (c) 44 Kg/ha. (d) 30 cm. \times 30 cm. (e) N.A. (v) Nil. (vi) N-22. (vii) Unirrigated.
 (viii) Nil. (ix) N.A. (x) 4.10.63.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 levels of N as A/S : $N_0=0$, $N_1=22.4$, $N_2=44.8$ and $N_3=67.2$ Kg/ha.

(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=44.8$ Kg/ha.

3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.7 m. \times 4.9 m. (b) 9 m. \times 4.3 m. (v) 76 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963 only. (b) and (c) -. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2783 Kg/ha. (ii) 217.8 Kg/ha. (iii) Main effect of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	N_3	Mean
P_0	1795	2417	3317	2896	2606
P_1	2409	2923	3520	2993	2961
Mean	2102	2670	3418	2944	2783

C.D. for N marginal means = 226.5 Kg/ha.

C.D. for P marginal means = 160.2 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 63(82).

Site :- Agri. Res. Stn., Kuthulia,

Type :- 'M'.

Object :- To study the comparative effect of green manures and fertilizers on the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clayey and clayey loam. (iii) 27.7.63. (iv) (a) 3 ploughings. (b) line sowing (c) 44 Kg/ha. (d) 30 cm. between lines (e) —. (v) N.A. (vi) N-22. (vii) Irrigated. (viii) to (ix) N.A. (x) 10.10.63.

2. TREATMENTS :

4 green manurial treatments : $G_1=48.4$ Q/ha of green leaves applied at puddling before sowing, G_2 —Sanai plants, $G_3=48.4$ Q/ha. of Ipomea leaves and $G_4=22.2$ Kg/ha. of $N+22.2$ Kg/ha. of P_2O_5 .

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) N.A. (b) 3.1 m. × 14.6 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) Nil. (iii) Grain yield. (iv) (a) 1963 only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 436 Kg/ha. (ii) 136.7 Kg/ha. (iii) Treatment differences are not significant. (vi) Av. yield of grain in Kg/ha.

Treatment	G_1	G_2	G_3	G_4
Av. yield	478	518	405	344

Crop :- Paddy (Kharif).

Ref :- M.P. 60(83), 61(49), 62(29).

Site :- Govt. Agri. Res. Fram, Labhandi.

Type :- 'M'.

Object :- To find out a suitable manurial schedule for Paddy crop in Matasi soils.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. for 60 and 61 ; As per treatments for 62. (ii) Matasi. (iii) Mid of August., 60 ; 19.8.61 ; 11.8.62. (iv) (a) 2 ploughing by *deshi* plough. (b) Transplanting. (c) 67.2 Kg/ha. (d) 10 cm. × 10 cm. (e) 1 to 2. (v) Nil. (vi) Cross-18. (vii) Irrigated. (viii) One hand weeding and rouging. (ix) 82 cm. ; 141 cm., 60cm. (x) Lastweek of Nov. N.A. ; 13.12.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 levels of N as A/S : $N_0=0$, $N_1=8.4$, $N_2=16.8$, and $N_3=25.2$ Kg/ha.

(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=16.8$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) 8. (b) N.A. (iii) 4. (iv) (a) 10.7 m. × 4.9 m. (b) 9.1 m. × 4.3 m. (v) 76 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(1) Good. (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1959-62. (b) Yes. (c) Nil. (v) Durg. (vi) Nil. (vii) Expt. no. 59(80) has also been taken into consideration while pooling. As error variances are heterogeneous and Treatments × years interaction is absent, results of individual years have been Presented under 5—Results.

5. RESULTS :

60(83)

(i) 2861 Kg/ha. (ii) 382.2 Kg/ha, (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	2514	2746	2804	3168	2808
P ₁	2703	2790	2935	3226	2913
Mean	2608	2768	2870	3197	2861

C.D. for N marginal means=397.5 Kg/ha.

61(49)

(i) 2063 Kg/ha. (ii) 215.3 Kg/ha. (iii) Main effect of N alone is highly significant (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	1816	1889	2107	2180	1998
P ₁	1831	1947	2339	2398	2129
Mean	1824	1918	2223	2289	2063

C.D. for N marginal means=223.8 Kg/ha.

62(29)

(i) 2092 Kg/ha. (ii) 475.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	1845	2005	2267	2267	2096
P ₁	1875	1947	2223	2310	2088
Mean	1860	1976	2245	2288	2092

Crop :- Paddy (Kharif).

Ref :- M.P. 60(84), 61(50), 62(30).

Site :- Govt. Agri. Res. Farm, Labhandi.

Type :- 'M'.

Object :- To find out a suitable manurial schedule for Paddy crop in Dorsa soils.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. for 60 and 61; As per treatments for 62. (ii) Dorsa. (iii) Mid of August, 60 12.8.61 ; 11.8.62. (iv) (a) 2 ploughings by *deshi* plough. (b) Transplanting. (c) 67.2 Kg/ha. (d) 10 cm. × 10 cm. (e) 1 to 2. (v) Nil. (vi) Cross-18. (vii) Irrigated. (viii) One hand weeding and rouging. (ix) 82 cm. ; 141 cm. ; 60 cm. (x) Last week of Nov. 60 ; N.A. ; 13.12.62.

2. TREATMENTS and 3 DESIGN :

Same as in expt. No. 60(83) 61(49), 62(29) on page 8.

4 GENERAL :

(i) Good. (i) N.A. (iii) Grain and straw yield. (iv) (a) 1959-62. (b) Yes. (c) Results of combined analysis are presented under 5. Results. (v) Durg. (vi) Nil. (vii) Expt. No. 59(81) has also been taken into consideration while pooling. Error variances are homogeneous and treatments \times years interaction is absent.

5. RESULTS:

Pooled results

(i) 2498 Kg/ha. (ii) 384.7 Kg/ha. (based on 119 d.f. made up of pooled error and Treatments \times years interaction). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	2261	2444	2694	2711	2527
P ₁	2190	2395	2564	2727	2469
Mean	2225	2420	2629	2719	2498

C.D. for N marginal means = 180.6 Kg/ha.

Individual results

Treatments	P ₀	P ₁	Sig.	N ₀	N ₁	N ₂	N ₃	Sig.	G.M.	S.E./plot
Years										
1959	2541	2575	N.S.	2236	2545	2840	2611	*	2558	419.6
1960	2575	2223	**	2172	2318	2514	2594	N.S.	2399	322.6
1961	2626	2608	N.S.	2216	2427	2695	3131	**	2617	338.9
1962	2361	2416	N.S.	2274	2325	2361	2594	N.S.	2388	368.3
Pooled	2527	2469	N.S.	2225	2420	2629	2719	**	2498	384.7

Crop :- Paddy (Kharif).

Ref :- M.P. 61(51), 62(31).

Site :- Govt. Agri. Res. Form, Labhandi.

Type :- 'M'.

Object :- To find out a suitable manurial chedule for Paddy crop in kankar soils.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. for 61; as per treatments for 62. (ii) *Kankar*. (iii) 19.8.61; 11.8.62. (iv) (a) 2 ploughings by *deshi* plough. (b) Transplanting. (c) 67.2 Kg/ha. (d) 10 cm. \times 10 cm. (e) 1 to 2. (v) Nil. (vi) Cross—18. (vii) Irrigated. (viii) One hand weeding and rouging. (ix) 141 cm; 60 cm. (x) N.A.; 13.12.62.

2. TREATMENTS and 3. DESIGN :

Same as in expt. No 60(83), 61(49), 62(29) on page 8.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1959—62 (Results of 1960—N.A.) (b) No. (c) Results of combined analysis are presented under 5. Results. (v) Durg. (vi) Nil. (vii) Expt No. 59(82) has also been taken into consideration while pooling. Error variances are homogeneous and Treatments \times years interaction is present.

5. RESULTS :

Pooled results

(i) 2537 Kg/ha. (ii) 654.8 Kg/ha. (based on 14 d.f. made up of Treatments \times years interaction). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	2328	2404	2836	2526	2523
P ₂	2458	2390	2544	2814	2551
Mean	2393	2397	2690	2670	2537

Individual results

Treatments Years	P ₀	P ₁	Sig.	N ₀	N ₁	N ₂	N ₃	Sig.	G.M.	S.E./plot
1959	2998	2888	N.S.	2804	2814	2950	2901	N.S.	2943	279.4
1961	2514	2130	*	2281	2478	2797	3132	**	2672	320.5
1962	1809	1769	N.S.	1889	1685	1744	1838	N.S.	1789	330.4
Pooled	2523	2551	N.S.	2393	2397	2690	2670	N.S.	2537	654.8

Crop :- Paddy (Kharif).

Ref :- M.P. 61(54), 62(34).

Site :- Govt. Agri. Res. Farm, Labhandi.

Type :- 'M'.

Object :- To find out suitable time of application of fertilizers to Paddy crop in Matasi soils.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. for 61 ; As per treatments for 62. (ii) Matasi. (ii) N A. ; 30.6.62.
(iv) (a) 2 ploughings by *deshi* plough and levelling. (b) Broadcasting. (c) 89.7 Kg/ha. (d) and (e) —
(v) Nil. (vi) Cross—18. (vii) Irrigated. (viii) *Biassi* operation and one hand weeding. (ix) 141 cm. ;
59 cm. (x) N.A. ; 12.12.62.

2. TREATMENTS :

5 manurial treatments : M₀=Control, M₁=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super applied as basal dressing, M₂= $\frac{1}{2}$ dose of M₁ applied as basal+ $\frac{1}{2}$ dose of M₁ applied as top dressing at *biassi*, M₃=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super top dressed at *biassi* and M₄=11.2 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super applied as basal+11.2 Kg/ha. of N as A/S top dressed at *biassi* operation.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 2. (iv) (a) 15.2 m. \times 4.3 m. (b) 13.7 m. \times 3.7 m. (v) 76 cm. \times 30 cm.
(vi) Yes :

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1961—62. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS:

Pooled results

(i) 2581 Kg/ha. (ii) 267.2 Kg/ha. (based on 12 d. f. made up of pooled error and (Treatments × years) interaction. (iii) Treatments differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂	M ₃	M ₄
Av. yield	2489	2576	2757	2543	2542

Individual results

Treatments	M ₀	M ₁	M ₂	M ₃	M ₄	Sig.	G.M.	S.E./plot
Years								
1961	1673	1989	2328	2057	2079	*	2025	113.9
1961	3306	3164	3187	3029	3006	N.S.	3138	275.6
Pooled	2489	2576	2757	2543	2542	N.S.	2581	267.2

Crop :- Paddy (Kharif).

Ref :- M.P. 61(56), 62(36),

Site :- Govt. Agri. Res. Farm, Labhandi.

Type :- 'M'.

Object :- To find out suitable time of application of fertilizers to Paddy crop in Kankar soils.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) N.A. for 61 ; as per treatments for 62. (ii) Kankar. (iii) N.A. ; 30.6.62. (i) (a) 2 ploughings by *deshi* plough and levelling. (b) Broadcasting. (c) 89.7 Kg/ha. (d) and (e) —. (v) Nil. (vi) Cross—18. (vii) Irrigated. (viii) *Biassi* operation and one hand weeding. (ix) 141 cm. ; 59 cm (x) N.A. ; 12.12.62.

2. TREATMENTS and 3. DESIGN:

Same as in expt. No. 61(54), 62(34) on page 11.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain and straw. (iv) 1961 62. (b) Yes. (c) Results of combined analysis have been 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) 2134 Kg/ha. (ii) 365.3 Kg/ha. (based on 12 d.f. made up of pooled error and Treatments × years interaction). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂	M ₃	M ₄
Av. yield	1729	2418	1797	2081	2645

C.D. = 562.8 Kg/ha.

Individual results

Treatments	M ₀	M ₁	M ₂	M ₃	M ₄	Sig.	G.M.	S.E./plot
Years								
1961	1673	2328	1786	2196	2758	N.S.	2148	527.5
1962	1786	2509	1808	1966	2532	N.S.	2120	292.5
Pooled	1729	2418	1797	2081	2645	*	2134	365.3

Crop :- Paddy (Kharif).

Ref :- M.P. 61(55), 62(35).

Site :- Govt. Agri. Res. Farm, Labhandi.

Type :- 'M'.

Object :- To find out suitable time of application of fertilizers to Paddy crop in *Dorsa* soil.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. for 61 ; as per treatments for 62. (ii) *Dorsa*. (iii) N.A. ; 30.6.62. (iv) (a) 2 ploughings by *deshi* plough and levelling. (b) Broadcasting. (c) 89.7 Kg/ha. (d) and (e) —. (v) Nil. (vi) Cross—18. (vii) Irrigated. (viii) *Biassi* operation and one hand weeding. (ix) 141 cm. ; 59 cm. (x) N.A. ; 12.12.62.

2. TREATMENTS and 3. DESIGN :

Same as in expt. No. 61(54), 62(34) on Page 11.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1961—62. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

(i) 1968 Kg/ha. (ii) 266.8 Kg/ha. (based on 12 d.f. made up of pooled error and Treatments \times years interaction). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂	M ₃	M ₄
Av. yield	1538	2328	1932	2023	2011

C.D.=411.8 Kg/ha.

Treatments	M ₀	M ₁	M ₂	M ₃	M ₄	Sig.	G.M.	S.E./plot
Years 1961	1424	2260	1876	2215	1966	*	1948	185.5
1962	1673	2396	1989	1831	2051	N.S.	1989	345.0
Pooled	1548	2328	1932	2023	2011	*	1968	266.8

Crop :- Paddy (Kharif).

Ref :- M.P. 61(57), 62(37).

Site :- Govt. Agri. Res. Farm, Labhandi.

Type :- 'M'.

Object :- To find out the effect of different combination of organic and inorganic manures on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) *Matasi*. (iii) N.A. ; 18.8.62. (iv) (a) 2 ploughings by *deshi* plough. (b) Transplanted. (c) 67.2 Kg/ha. (d) 10 cm. \times 10 cm. (e) 1 to 2. (v) Nil. (vi) Cross—18. (vii) Irrigated. (viii) Weeding by hand and rouging. (ix) 141 cm. ; 60 cm. (x) N.A. ; 12.12.62.

2. TREATMENTS :

6 manurial treatments : T_0 =Control (no manure), T_1 =44.8 Kg/ha. of N as compost, T_2 =2/3 dose of N as organic and $\frac{1}{3}$ dose of N as inorganic, T_3 = $\frac{1}{3}$ dose of N as organic, and $\frac{1}{3}$ dose of N as inorganic, T_4 = $\frac{1}{3}$ dose of N as organic and 2/3 dose of N inorganic and T_5 =44.8 Kg/ha. of N as A/S+35.8 Kg/ha of P_2O_5 as Super+59.7 Kg/ha. of K_2O as Mur. Pot.

In treatments T_1 to T_4 , the level of P_2O_5 and K_2O adjusted by adequate quantity of organic P_2O_5 and K_2O application, make up 35.8 Kg/ha. of P_2O_5 and 59.7 Kg/ha. of K_2O .

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 9.1 m. \times 11.0 m. (b) 7.3 m. \times 9.1 m. (v) 91 cm. \times 91 cm. (vi) Yes.

4. GENERAL :

(i) Good for 61 ; satisfactory for 62. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1961-62. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled results

(i) 2509 Kg/ha. (ii) 208.3 Kg/ha. (based on 35 d.f. made up of pooled error and Treatments \times years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T_0	T_1	T_2	T_3	T_4	T_5
Av. yield	2174	2420	2508	2632	2653	2670

C.D.=177.1 Kg/ha.

Individual results

Treatments	T_0	T_1	T_2	T_3	T_4	T_5	Sig	G.M.	S.E./plot
Years									
1961	2729	3153	3246	3433	3518	3416	**	3249	218.3
1962	1619	1687	1771	1831	1788	1924	N.S.	1770	157.9
Pooled	2174	2420	2508	2632	2653	2670	**	2509	208.3

Crop :- Paddy (*Kharif*).

Ref :- M.P. 60(82), 61(48), 62(28).

Site :- Govt. Agri. Res. Farm, Labhandi.

Type :- 'M'.

Object :- To study the effect of N and green manures on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) *Matasi*. (iii) 2.7.60 ; 27.6.61 ; 30.6.62. (iv) (a) 2 ploughings by *deshi* plough. (b) Broadcasting. (c) 89.7 Kg/ha. (d) and (e) —. (v) Nil. (vi) X-116. (vii) Irrigated. (viii) *Biassi* operation and one weeding. (ix) 82 cm. ; 141 cm. ; 59 cm. (x) 16.11.60 ; 14.11.61 ; 1.12.62.

2. TREATMENTS :

Main-plot treatments :

4 levels of G.M. : G_0 =Control, G_1 =50.2 Q/ha. of green leaves at ploughing before sowing, G_2 =22.4 Kg/ha. of *sannhemp* seed sown as mixed with Paddy and G_3 =11.2 Kg/ha. of *Dhaincha* seed sown as mixed with Paddy.

Sub-plot treatments :

2 levels of N as A/S : N_0 =0 and N_1 =5.6 Kg/ha.

N applied at *Biassi* operation.

3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 10.7 m. × 4.9 m. (b) 9.1 m. × 4.3 m. (v) 76 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory for 60, 62 ; poor for 61. (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1.59—62 (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) As sub-plot error variances are heterogeneous, results of individual years have been presented under 5. Results.

5. RESULTS :

60(82)

(i) 2732 Kg/ha. (ii) (a) 447.8 Kg/ha. (b) 129.4 Kg/ha. (iii) Main effect of G alone is significant. (iv) Av. yield of grain in Kg/ha.

	G ₀	G ₁	G ₂	G ₃	Mean
N ₀	2499	3051	2732	2519	2700
N ₁	2577	3110	2770	2596	2763
Mean	2538	3080	2751	2557	2732

C.D. for G marginal means = 389.5 Kg/ha.

61(48)

(i) 1641 Kg/ha. (ii) (a) 393.2 Kg/ha. (b) 225.7 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	G ₀	G ₁	G ₂	G ₃	Mean
N ₀	1395	1637	1356	1443	1458
N ₁	1715	2228	1618	1734	1824
Mean	1555	1933	1487	1589	1641

C.D. for N marginal means = 135.7 Kg/ha.

62(28)

(i) 2146 Kg/ha. (ii) (a) 45.9 Kg/ha. (b) 46.6 Kg/ha. (iii) None of the effects is significant. (vi) Av. yield of grain in Kg/ha.

	G ₀	G ₁	G ₂	G ₃	Mean
N ₀	2150	2325	1870	1889	2058
N ₁	2112	2364	2315	2141	2233
Mean	2131	2344	2092	2015	2146

Crop :- Paddy (Kharif).**Ref :- M.P. 61(60), 62(40).****Site :- Govt. Agri. Res. Stn., Labhandi.****Type :- 'M'.**Object :—To find out the effect of fertilizing Paddy on the succeeding Utera crop (*Lakh*).**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Paddy for 61 ; *Lakh* for 62. (c) N.A. for 61 ; as per treatments for 62. (ii) Dorsa. (iii) N.A. ; 17.8.62. (iv) (a) Ploughing and puddling. (b) Transplanted. (c) 56 Kg/ha. (d) 10 cm. × 10 cm. (e) 1. (v) Nil. (vi) Cross—4. (vii) Irrigated. (viii) One hand weeding. (ix) 141 cm. ; 60 cm. (x) N.A. 1.12.62.

2. TREATMENTS :

M_0 = Control (no manure), M_1 = 22.4 Kg/ha. of N at puddling + 22.4 Kg/ha. of N at tillering and M_2 = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P_2O_5 at puddling + 22.4 Kg/ha. of N at tillering.

N applied as A/S and P_2O_5 as Super.**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) 9.5 m. × 5.2 m. (b) 8.5 m. × 4.6 m. (v) 46 cm. × 30 cm. (vi) Yes.

4. GENERAL ;

(i) Satisfactory. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1961—62. (b) Yes. (c) Results of combined analysis presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results

(i) 2270 Kg/ha. (ii) 597.4 Kg/ha. (based on 2 d.f. made up of Treatments × years interaction) (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_0	M_1	M_2
Av. yield	1950	2277	2582

Individual results

Treatments	M_0	M_1	M_2	Sig.	G.M.	S.E./plot
Years						
1961	2201	2695	3131	**	2676	292.2
1962	1700	1860	2034	N.S.	1865	321.3
Pooled	1950	2277	2582	N.S.	2270	597.4

Crop :- Paddy (Kharif).**Ref :- M.P. 61(58), 62(38).****Site :- Govt. Agri. Res. Stn., Labhandi.****Type :- 'M'.**

Object :—To study the effect of super compost with that of ordinary compost.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) Matasi. (iii) 25.7.61 ; 29.8.62. (iv) (a) 2 ploughings by *deshi* plough (b) Transplanting. (c) 67.2 Kg/ha. (d) 10 cm. × 10 cm. (e) 1 to 2. (v) Nil. (vi) Cross—4. (vii) Irrigated. (viii) One hand weeding and rouging. (ix) 141 cm. ; 60 cm. (x) N.A. ; 12.12.62.

2. TREATMENTS :

3 manurial treatments : M_0 =Control (no manure), M_1 =126 Q/ha. of Super compost and M_2 =126 Q/ha. of ordinary compost + 7.2 Kg/ha. of P_2O_5 as Super.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) 6.4 m. × 14.6 m. for 61 ; 5.0 m. × 10.1 m. for 62. (b) 5.2 m. × 13.4 m. for 61 ; 4.1 m. × 8.8 m. for 62. (v) 61 cm. × 61 cm. for 61 ; 46 cm. × 61 cm. for 62. (vi) Yes.

4. GENERAL :

(i) Good for 61 ; poor for 62. (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1961-62. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As error variances are heterogeneous and Treatments × years interaction is absent, results of individual years have been presented under 5. Results.

5. RESULTS :

61(58)

(i) 3230 Kg/ha. (ii) 292.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_0	M_1	M_2
Av. yield	3019	3284	3386

62(38)

(i) 1361 Kg/ha. (ii) 169.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_0	M_1	M_2
Av. yield	1309	1496	1278

C.D.=181.5 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 61(105).

Site :- State Mechanised Farm, Reora.

Type :- 'M'.

Object :- To study the effect of organic manures and inorganic fertilizers on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram. (c) N.A. (ii) Black. (iii) 17.6.61. (iv) (a) 3 ploughings. (b) Broadcast. (c) 78 Kg/ha. (d) and (e) —. (v) Nil. (vi) N-22. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 25.10.61.

2. TREATMENTS :

6 manurial treatments : M_0 =Control, M_1 =44.8 Kg/ha. of N as F/C, M_2 =29.9 Kg/ha. of N as F/C+14.9 Kg/ha. of N as A/S+12.0 Kg/ha. of P_2O_5 as Super, M_3 =22.4 Kg/ha. of F/C+22.4 Kg/ha. of N as A/S+17.9 Kg/ha. of P_2O_5 as Super+29.8 Kg/ha. of K_2O as Mur. Pot., M_4 =14.9 Kg/ha. of N as F/C+29.8 Kg/ha. of N as A/S+23.8 Kg/ha. of P_2O_5 as Super+39.4 Kg/ha. of K_2O as Mur. Pot. and M_5 =44.8 Kg/ha. of N as A/S+35.8 Kg/ha. of P_2O_5 as Super+59.7 Kg/ha. of K_2O as Mur. Pot.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 11.0 m. × 9.2 m. (b) 9.1 m. × 7.3 m. (v) 95 cm. × 10 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1961-62 (Treatments modified in 62.) (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 326 Kg/ha. (ii) 163.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂	M ₃	M ₄	M ₅
Av. yield	222	290	277	427	260	478

Crop :- Paddy (Kharif).

Ref :- M.P. 62(66).

Site :- State Mechanised Farm, Reora.

Type :- 'M'.

Object :— To study the effect of organic manures and inorganic fertilizers on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram. (c) N.A. (ii) Medium black. (iii) 23.8.62. (iv) (a) 3 ploughings. (b) Broadcast. (c) 78 Kg/ha. (d) and (e) —. (v) Nil. (vi) N-22. (vii) Unirrigated. (viii) Two weedings. (ix) N.A. (x) 1st week of Oct. 62.

2. TREATMENTS :

6 manurial treatments M₀=Control, M₁=44.8 Kg/ha. of N as F/C, M₂=29.9 Kg/ha. of N as F/C+14.9 Kg/ha. of N as A/S+Supplement of 12.0 Kg/ha. of P₂O₅ as Super+29.9 Kg/ha. of K₂O as Mur. Pot., M₃=22.4 Kg/ha. of N as F/C+22.4 Kg/ha. of N as A/S+supplement of 23.8 Kg/ha. of P₂O₅ as Super+29.9 Kg/ha. of K₂O as Mur. Pot., M₄=14.9 Kg/ha. of N as F/C+29.9 Kg/ha. of N as A/S+39.9 Kg/ha. of K₂O as Mur. Pot. and M₅=44.8 Kg/ha. of N as A/S+Supplement of 35.8 Kg/ha. of P₂O₅ as Super+59.7 Kg/ha. of K₂O as Mur. Pot.

3. DESIGN and 4. GENERAL :

Same as for Expt. No. 61(105) on page 17.

5. RESULTS :

(i) 578 Kg/ha. (ii) 302.5 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂	M ₃	M ₄	M ₅
Av. yield	256	427	589	725	734	734

C.D.—455.8 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 60(144), 61(106).

Site :- State Mechanised Farm, Reora.

Type :- 'M'.

Object :— To study the effect of N and P on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram. (c) N.A. (ii) Medium black. (iii) 15.6.60 ; 17.6.61. (iv) (a) 3 ploughings. (b) Broadcast. (c) 78 Kg/ha. (d) and (e) —. (v) Nil. (vi) N-22. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 25.10.60 ; 27.10.61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 levels of N as A/S : $N_0=0$, $N_1=8.4$, $N_2=16.8$ and $N_3=25.2$ Kg/ha.

(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=16.8$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (b) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.7 m. \times 4.9 m. (b) 9.1 m. \times 4.3 m.
(v) 80 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) N.A. (iii) Yield of grain. (iv) (a) 1959-61. (b) No. (c) Nil. (v) Durg. (vi) Nil.
(vii) Expt. No. 59(146) was also taken into consideration for pooling the results. As error variances are heterogeneous and Treatments \times years interaction is absent, results of individual years have been presented under 5. Results.

5. RESULTS :

60(144)

(i) 231 Kg/ha. (ii) 55.7 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	N_3	Mean
P_0	184	195	287	243	227
P_1	178	238	232	292	235
Mean	181	216	259	268	231

C.D. for N marginal means = 57.8 Kg/ha.

61(106)

(i) 555 Kg/ha. (ii) 261.2 Kg/ha. (iii) Interaction $N \times P$ alone is significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	N_3	Mean
P_0	352	618	539	360	467
P_1	360	584	575	1050	642
Mean	356	601	557	705	555

C.D. for body of $N \times P$ table = 384.2 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 63(37), 64(84), 65(12).

Site :- Govt. Res. Farm, Waraseoni.

Type :- 'M'.

Object :- To compare the yield of transplanted Paddy by adopting different types of G.M. with standard dose of fertilizer.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 29.6.63/18.8.63 ; 17.6.64/23, 24.8.64 ; 7.6.65/13.8.65.
(iv) (a) 4 ploughings. (b) Transplanted. (c) 90 Kg/ha. (d) 8 cm. \times 8 cm. (e) 1 to 2. (v) Nil, (vi) *Pandhari* (*Luchai*-16). (vii) Irrigated. (viii) 1 hand weeding. (ix) 116.8 cm ; 125.7 cm. ; 72.4 cm. (x) N.A. ; 1.12.64 ; 5.12.65.

2. TREATMENTS :

4 manurial treatments : $M_1=50.2$ Q/ha. of green leaves applied at puddling before sowing, $M_2=89.6$ Kg/ha. of *sann hemp* applied at first shower, $M_3=44.8$ Kg/ha. of *Dhaincha* applied at first shower and $M_4=22.4$ Kg/ha. of N as A/S+22.4 Kg/ha. of P_2O_5 as Super.

22.4 Kg/ha. of P_2O_5 applied to treatments 1 to 3 at the time of burrying G.M. and 5.6 Kg/ha. of N was applied to treatments M_1 to M_4 at the time of burrying G.M. and 16.8 Kg/ha. of N at the time of transplanting Paddy.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) 4.3 m. \times 17.1 m. (b) 3.7 \times 15.2 m. (v) 30 cm. \times 91 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1963—65. (b) No. (c) Results of combined analysis are presented under 5 Results (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled results

(i) 1982 Kg/ha. (ii) 221.4 Kg/ha. (based on 69 d.f. made up of pooled error and Treatments \times years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_1	M_2	M_3	M_4
Av. yield	2140	1867	1958	1963

C.D.=127.7 Kg/ha.

Individual results

Treatments	M_1	M_2	M_3	M_4	Sig.	G.M.	S.E./plot
Years							
1960	1785	1460	1622	1602	N.S.	1617	231.0
1961	1879	1579	1669	1778	N.S.	1726	239.2
1962	2756	2561	2584	2508	N.S.	2602	206.2
Pooled	2140	1867	1958	1963	**	1982	221.4

Crop :- Paddy (*Kharif*).

Ref :- M.P. 63(38), 64(85), 65(90).

Site :- Govt. Res. Farm, Waraseoni

Type :- 'M'.

Object :- To study the effect of continuous manuring on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 16.8 Kg/ha. of N as A/S+16.8 Kg/ha. of P_2O_5 as Super. (ii) Sandy and clayey loam. (iii) 27.6.63/4, 5.8.63 ; 17.6.64/3.8.64 ; N.A/16.8.65. (iv) (a) 4 ploughings. (b) Transplanted. (c) 90 Kg/ha. (d) N.A. (e) 1 to 2. (v) Nil. (vi) *Pandhari* (*Luchai*-16). (vii) Irrigated. (viii) 1 hand weeding. (ix) 116.8 cm. ; 125.7 cm. 72.4 cm. (x) N.A. ; 4.12.64 ; 29.11.65.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 stages of application of F.Y.M. at 25 C.L./ha. : S_1 =1st year, S_2 =2nd year and S_3 =3rd year application.

(2) 10 manurial treatments : T_0 =Control (no manure), T_1 =22.4 Kg/ha. of P_2O_5 as Super, T_2 =22.4 Kg/ha. of N as A/S, $T_3=T_1+T_2$, T_4 =22.4 Kg/ha. of N as A/S/N, $T_5=T_1+T_4$, T_6 =22.4 Kg/ha. of N as Urea, $T_7=T_1+T_5$, T_8 =22.4 Kg/ha. of N as C/A/N and $T_9=T_1+T_7$.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 30. (b) 36.6 m. \times 36.6 m. (iii) 2. (iv) (a) 12.2 m. \times 3.7 m. (b) 10.7 m. \times 3.1 m. (v) 76 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

(i) Good, lodged in all plots which received Urea and A/S/N. (ii) Nil. (iii) Grain yield. (iv) (a) 1963-65. (b) Yes. (c) Results of combined analysis presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments \times years interaction is present.

5. RESULTS :

Pooled results

(i) 1912 Kg/ha. (ii) 559.1 Kg/ha. [based on 58 d.f. made up of Treatments \times years interaction]. (iii) Main effects of T and interaction $S \times T$ are highly significant. (iv) Av. yield of grain in Kg/ha.

	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	Mean
S_1	1721	1675	1680	1834	1490	1833	1803	2207	2074	1792	1811
S_2	1495	2156	1674	1690	1874	2166	1890	2397	1921	1823	1908
S_3	1721	2304	2294	2325	1911	1987	2023	1966	1731	1920	2018
Mean	1646	2045	1883	1949	1758	1995	1905	2190	1908	1845	1912

C.D. for T marginal means=373.3 Kg/ha.

C.D. for body of the table=646.6 Kg/ha.

Individual results

Treatments	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	Sig.
Years											
1963	1413	1818	1716	1531	1670	1680	1342	1885	1638	1669	N.S.
1964	1598	2299	2090	2346	2007	1920	2289	2412	1808	1977	*
1965	1926	2018	1844	1972	1598	2386	1556	2330	2575	1797	*
Pooled	1646	2045	1883	1949	1758	1995	1905	2190	1908	1845	**

S_1	S_2	S_3	Sig.	G.M.	S.E./plot
1524	1713	1672	N.S.	1636	439.2
2011	2000	2212	N.S.	2074	398.4
1819	1966	2317	*	2034	445.6
1811	1908	2018	N.S.	1912	559.1

Crop :- Paddy.**Ref :- M.P. 63, 64(M.A.E.).****Site :- M.A.E. Centre, Bagwai.****Type :- 'M'.**

Object :- Type V (a) : To study the effect of different methods of placement of N on the yield of Paddy.

1. BASAL CONDITIONS :(i) (a) to (c) N.A. (ii) Medium black. (iii) and (iv) N.A. (v) 33.6 Kg/ha. of P_2O_5 as Super. (vi) to (x) N.A.**2. TREATMENTS :**

All combinations of (1) and (2)+a control.

(1) 4 methods of placement : M_1 =Broadcast just before last puddling and incorporated in the soil (sub-surface application), M_2 =Broadcast at planting, M_3 =Broadcast - $\frac{1}{2}$ at planting and $\frac{1}{2}$ about a month after planting and M_4 =Application in the form of pellets about 3 weeks after planting.(2) 3 levels of N : N_1 =33.6, N_2 =50.4 and N_3 =67.2 Kg/ha.**3. DESIGN :**

(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963--64. (b) N.A. (c) Nil. (v) Reora and Raipur. (vi) N.A. (vii) Nil.

5. RESULTS :**1963**

(i) 1601 Kg/ha. (ii) N.A. (iii) Main effects of M and N are significant. (iv) Av. yield of grain in Kg/ha.

Control=825 Kg/ha.

Treatment	M_1	M_2	M_3	M_4	N_1	N_2	N_3
Mean yield	1541	1627	1510	1987	1374	1749	1878

1964

(i) 1542 Kg/ha. (ii) N.A. (iii) Main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

Control=1294 Kg/ha.

Treatment	M_1	M_2	M_3	M_4	N_1	N_2	N_3
Mean yield	1417	1458	1571	1807	1378	1587	1725

Crop :- Paddy.**Ref :- M.P. 60(M.A.E.).****Site :- M.A.E. Centre, Bagwai.****Type :- 'M'.**

Object :- Type VI : To study the effect of different sources and levels of P alone with their methods of application.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3)+a control in each block.

(1) 3 methods of application of P_2O_5 : M_1 =Broadcast at puddling time, M_2 =Dipping the seedlings in mud slush mixed with the fertilizer before transplanting and M_3 =Application of the fertilizer in the form of pellets.

(2) 3 sources of P_2O_5 : S_1 =Ammono. phos, S_2 =Super and S_3 =Dicalcium phos.

(3) 2 levels of P_2O_5 : P_1 =22.4 and P_2 =44.8 Kg/ha.

3. DESIGN :

(i) $3^2 \times 2$ confd. fact. (ii) (a) 7 plots/block ; 3 blocks/replication. (b) N.A. (iii) 4. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1959-60. (b) N.A. (c) Nil. (v) Raipur. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 1870 Kg/ha. (ii) 258 Kg/ha. (iii) Main effects of M and S and control Vs others are significant. (iv) Av. yield of grain in Kg/ha.

Control=1513 Kg/ha.

Treatment	M_1	M_2	M_3	S_1	S_2	S_3	P_1	P_2
Mean yield	1958	2006	1824	1852	2006	1929	1908	1951

C.D. for M or S marginal means=150 Kg/ha.

C.D. for Control Vs others =162 Kg/ha.

Crop :- Paddy (Kharif).

Site :- M.A.E. Centre, Bagwai.

Ref :- M.P. 63, 64(M.A.E.)

Type :- 'M'.

Object :- Type XI : To determine the effect of micro-nutrients on Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clay loam. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

15 micro-nutrient treatments : T_0 =Control (No fertilizer), T_1 =35 Kg/ha. of N+35 Kg/ha. of P_2O_5 +35 Kg/ha. of K_2O , T_2 = T_1 +Spartan at 395 Kg/ha., T_3 = T_1 +Manganese as Manganese Sul. at 60 Kg/ha., T_4 = T_1 +Zinc as Zinc Sul. at 30 Kg/ha., T_5 = T_1 +Cu as Copper Sul. at 30 Kg/ha., T_6 = T_1 +Boron as Borax at 17.5 Kg/ha., T_7 = T_1 +Molybdenum as Sodium Molybdate at 1.25 Kg/ha., T_8 = T_1 +Mn+Zn+Cu+B+Mo, T_9 = T_1 +Manganese as Manganese Sul. at 17.5 Kg/ha., T_{10} = T_1 +Zn as Zinc Sul. at 12.5 Kg/ha., T_{11} = T_1 +Cu as copper Sulphate at 12.5 Kg/ha., T_{12} = T_1 +Boron as Borax at 6.2 Kg/ha., T_{13} = T_1 +Molybdenum as Sodium Molybdate at 0.6 Kg/ha. and T_{14} = T_1 +Mn+Zn+Cu+B+Mo.

Treatments T_2 to T_8 applied as soil application and T_9 to T_{14} as foliar spray.

3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963 64. (b) N.A. (c) Nil. (v) Raipur. (vi) N.A. (vii) Nil.

5. RESULTS :

1963

(i) 1805 Kg/ha. (ii) 288.8 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	T ₅	T ₆	T ₇
Mean yield	932	1872	1888	1796	1536	2093	1986	1842
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	1666	1948	1811	2208	1643	1872	1986	

C.D.=412.4 Kg/ha.

1964

(i) 2426 Kg/ha (ii) 242.6 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	T ₅	T ₆	T ₇
Mean yield	2126	2064	2623	2649	2680	2649	2526	2279
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	2341	2495	2464	2464	2219	2526	2279	

C.D.=346.4 Kg/ha.

Crop :- Paddy.

Ref :- M.P. 64(M.A.E.).

Site :- M.A.E. Centre, Bagwai.

Type :- 'M'.

Object :- Type XII : To study the effect of foliar application of fertilizers on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and black (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

Main-plot treatments :

4 fertilizer treatments : F₁=44.8 Kg/ha. of N as A/S, F₂=22.4 Kg/ha. of P₂O₅ as Super, F₃=44.8 Kg/ha. of N+22.4 Kg/ha. of P₂O₅ and F₄=44.8 Kg/ha. of N+22.4 Kg/ha. of P₂O₅+22.4 Kg/ha. of K₂O.

Sub-plot treatments :

All combinations of (1) and (2)+2 extra treatments.

(1) 3 methods of application : M₁=Soil application, M₂=Foliar application and M₃=Soil application and foliar application.

(2) 2 levels of application : L₁= $\frac{1}{2}$ dose and L₂=Full dose.

Extra treatments : C₁=Water spray and C₂=Absolute control.

3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication : 8 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 grain. (iv) (a) to (c) No. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 1177 Kg/ha. (ii) (a) 343 Kg/ha. (b) 597 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain Kg/ha.

$C_0=1155$ and $C_1=1078$ Kg/ha.

	L_1M_1	L_2M_1	L_1M_2	L_2M_2	L_1M_3	L_2M_3	Mean
F_1	1201	1152	1171	1325	1325	1358	1255
F_2	1140	1017	1386	1232	1109	924	1135
F_3	1140	1294	1232	1171	1232	1171	1207
F_4	1109	1201	1232	1140	1201	1294	1196
Mean	1147	1166	1255	1217	1217	1186	1198

Crop :- Paddy (Rabi).

Ref :- M.P. 65(M.A.E.).

Site :- M.A.E. Centre, Kuthulia.

Type :- 'M'.

Object :— Type XI : To determine the effect of micro-nutrients on the yield of Paddy.

1. BASAL CONDITIONS :

(i) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Expt. No. 63, 64 (M.A.E.) conducted at Bagwai on page 23.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) 1965-66. (b) N.A. (c) Nil. (v) Powerkheda and Ujjain. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 1921 Kg/ha. (ii) 185.2 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	T_5	T_6	
Mean yield	1452	1915	2425	1906	2014	1734	1800	
	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}
	1894	1725	1933	1939	1912	2111	2193	1862

C.D. = 262 Kg/ha.

Crop :- Paddy (Rabi).
Site :- M.A.E. Centre, Powerkheda.

Ref :- M.P. 65(M.A.E.).
Type :- 'M'.

Object :— Type XI : To determine the effect of micro-nutrients on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Deep black. (iii) to (x) N.A.

2. TREATMENTS:

Same as in Expt. No. 63, 64 (M.A.E.) conducted as Bagwai on page 23.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Kuthulia and Ujjain. (vi) N.A. (vii) Nil.

5. RESULTS:

(i) 1956 Kg/ha. (ii) 190.9 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kgh a.

Treatment	T ₀	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇
Mean yield	1267	1913	2660	1964	1877	2060	2029	1999
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	2074	2036	1987	1838	1991	1753	1887	

C.D.=270 Kg/ha.

Crop :- Paddy.

Ref :- M.P. 62, 63(M.A.E.).

Site :- M.A.E. Centre, Raipur.

Type :- 'M'.

Object :- Type X : To study the effect of G.M. on the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Red yellow soil. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:

All combinations of (1), (2) and (3) with an extra treatment in each block.

(1) 3 G.M. treatments: G₀=0, G₁=G.M. raised in situ. without P₂O₅ and G₂=G.M. raised in siut. with 33.6 Kg/ha. of P₂O₅.

(2) 3 levels of N: N₀=0, N₁=16.8 and N₂=33.6 Kg/ha.

(3) 3 levels of P₂O₅: P₀=0, P₁=33.6 and P₂=67.2 Kg/ha.

Extra treatment: T=N.P.K. equivalent to those obtained from G.M.

3. DESIGN:

(i) 3³+1 confd. (ii) (a) 10 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 1/100 ha. (b) 1/125 ha. (v) and (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-63. (b) N.A. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil

5. RESULTS:

1962

(i) 1919 Kg/ha. (ii) and (iii) N.A. (iv) Av. grain yield in Kg/ha.

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂
Mean yield	1809	1895	2062	1904	1868	1995
	G ₀	G ₁	G ₂	T		
	1707	2009	2049	1889		

1963

(i) 2339 Kg/ha. (ii) and (iii) N.A. (iv) Av. grain yield in Kg/ha.

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂
Mean yield	2115	2249	2556	2255	2246	2322
	G ₀	G ₁	G ₂	T		
	2106	2329	2487	2625		

Crop :- Paddy.**Ref :- M.P. 62 to 65 (M.A.E.).****Site :- M.A.E. Centre, Raipur.****Type :- 'M'.**

Object :—Type V (a) : To study the effect of different methods of placement of N on the yield of Paddy.

1. BASAL CONDITIONS :(i) (a) to (c) N.A. (ii) Red loam. (iii) and (iv) N.A. (v) 33.6 Kg/ha. of P₂O₅ as Super. (vi) to (x) N.A.**2. TREATMENTS and 3. DESIGN :**

Same as in expt. no 63, 64(M.A.E.) conducted at Bagwai on page 22.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—65. (b) N.A. (c) Nil. (v) Bagwai and Reora. (vi) N.A. (vii) Nil.

5. RESULTS :**1962**

(i) 2196 Kg/ha. (ii) 376 Kg/ha. (iii) Control Vs. rest alone is significant. (iv) Av. yield of grain in Kg/ha.

Control=1800 Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄	N ₁	N ₂	N ₃
Av. yield	2144	2230	2189	2352	2189	2226	2270

C.D. for Control Vs. rest=397 Kg/ha.

1963

(i) 3227 Kg/ha. (ii) 362 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=2882 Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄	N ₁	N ₂	N ₃
Av. yield	3161	3183	3324	3355	3181	3237	3340

1964

(i) 3341 Kg/ha. (ii) 261 Kg/ha. (iii) Main effect of M and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=2625 Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄	N ₁	N ₂	N ₃
Av. yield	3218	3517	3492	3378	3336	3422	3446

C.D. for M marginal means=216 Kg/ha.

C.D. for control vs. rest =276 Kg/ha.

1965

(i) 825 Kg/ha. (ii) 268 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=911 Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄	N ₁	N ₂	N ₃
Av. yield	853	723	843	853	878	752	824

Crop :- Paddy.**Ref :- M.P. 60(M.A.E.).****Centre :- M.A.E. Centre, Raipur.****Type :- 'M'.**

Object :—Type VI : To study the effect of different sources and levels of P along with their methods of application.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red loam. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in expt. no. 60(M.A.E.) conducted at Bagwai on page 22.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1956—60. (b) N.A. (c) Nil. (v) Bagwai. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 3088 Kg/ha. (ii) 367 Kg/ha. (iii) Main effect of M and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=2841 Kg/ha.

Treatment	M ₁	M ₂	M ₃	S ₁	S ₂	S ₃	P ₁	P ₂
Av. yield	3292	3105	2990	3084	3162	3142	3031	3227

C.D. for M marginal means=213 Kg/ha.

C.D. for control vs. rest =346 Kg/ha.

Crop :- Paddy (Kharif).**Ref :- M.P. 64, 65(M.A.E.).****Site :- M.A.E. Centre, Raipur.****Type :- 'M'.**

Object :—Type XI : To determine the effect of micro-nutrients on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Expt. No. 63, 64 (M.A.E.) conducted at Bagwai on page 23.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—66. (b) N.A. (c) Nil. (v) Bagwai. (vi) N.A. (vii) Nil.

5. RESULTS :

1964

(i) 2568 Kg/ha. (ii) 385.2 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	T ₅	T ₆	T ₇
Mean yield	2256	2618	2519	2841	2782	2421	2762	2309
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	2447	2171	2835	2579	2821	2749	2408	

C.D.=550.0 Kg/ha.

1665

(i) 1397 Kg/ha. (ii) 447.0 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	1258	1397	1857	1229	1596	1412	1305	1029
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	1443	1535	1336	1029	1704	1596	1229	

Crop :- Paddy.

Ref :- M.P. 62 and 63(M.A.E.)

Site :- M A.E. Centre ; Reora

Type :- 'M'.

Object :- Type V (a) : To study the effect of different methods of placement of N on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Mixed red and black. (iii) to (iv) N.A. (v) 33.6 Kg/ha. of P₂O₅ as Super. (vi) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Expt No. 63, 64(M.A.E.) conducted as Bagwai on page 22.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—63. (b) N.A. (c) Nil. (v) Bagwai and Raipur. (vi) N.A. (vii) Nil.

5. RESULTS :

1962

(i) 1328 Kg/ha. (ii) N.A. (iii) Main effects of M and N are significant. (iv) Av. yield of grain in Kg/ha.

Control=640 Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄	N ₁	N ₂	N ₃
Mean yield	1490	1690	1349	1010	1208	1400	1550

1963

(i) 1037 Kg/ha. (ii) N.A. (iii) Main effect of M is significant. (iv) Av. yield of grain in Kg/ha.

Control=669 Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄	N ₁	N ₂	N ₃
Mean yield	1045	1280	1213	735	1144	1032	1032

Crop :- Paddy (Rabi).**Ref :- M.P. 63, 64(M.A.E).****Site :- M.A.E. Centre, Ujjain.****Type :- 'M'.**

Object :- Type XI : To determine the effect of micro-nutrients on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Expt. No. 63, 64(M.A.E.) conducted. at Bagwai on page 23.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-64. (b) N.A. (c) Nil. (v) Powerkheda and Kuthulia. (vi) N.A. (vii) Nil.

5. RESULTS :**1963**

(i) 1788 Kg/ha. (ii) 144.2 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	T ₅	T ₆	T ₇
Mean yield	1352	1974	1831	1926	1919	2254	1557	1854
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	1689	1644	1755	2010	1632	1679	1751	

C.D.=204 Kg/ha.

1964

(i) 1720 Kg/ha. (ii) 172.0 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	T ₅	T ₆	T ₇
Mean yield	1370	1853	1773	1884	1766	1795	1712	1391
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	1672	1697	1715	1823	1826	1740	1790	

C.D.=246 Kg/ha.

Crop :- Paddy.**60 (S.F.T.) for Balaghat and Shahdol ;****Site :- (District) Balaghat, Shahdol****60, 61 (S.F.T.) for Durg, Raipur, Satna and Chhatarpur.****Durg, Raipur, Satna and Chhatarpur.****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) As under results. (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 andNPK=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 a *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 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) 1960 only for Balaghat and Shahdol and 1960-61 for others. (b) and (c) No. (v) to (vii) N.A.

5. RESULTS:

District	Year	Soil class	No. of trials	Control mean Kg/ha.	Average response of grain in Kg/ha.								
					N.	P.	K.	S.E.	NP	NK	PK	NPK	S.E.
Balaghat	1960	Red	8	2910	60	60	120	59.0	10	10	-140	60	49.0
Durg	1960	Red	8	1310	320	290	180	59.0	—	-20	60	-10	30.0
	1961	Red	14	1880	260	160	90	162.0	-20	-30	-20	30	150.0
Raipur	1960	Red	11	2600	730	680	670	98.0	—	30	-150	90	150.0
	1961	Red	14	2000	450	270	260	67.0	-80	90	-10	-60	55.0
Shahdol	1960	Red	16	1450	320	190	80	44.0	-50	-140	-20	80	34.0
Satna	1960	Red & Black	16	1320	160	190	170	16.0	-90	-60	-40	90	18.0
	1961	„ „	4	840	380	210	180	128.0	-100	110	-10	30	93.0
Chhatarpur	1960	Red & Black	7	410	250	110	180	28.0	-20	60	30	100	36.0
	1961	„ „	8	1220	370	200	220	35.0	-110	-60	20	130	41.0

Crop :- Paddy.

Ref :- M.P. 60(S.F.T.) for Balaghat ; 60, 61(S.F.T.) for Durg, Raipur, Shahdol, Satna and Chhatarpur.

Site :- (District), Balaghat, Durg, Raipur, Shahdol, Satna and Chhatarpur.

Type :- 'M'.

Object :- Type B : To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

1. BASAL CONDITIONS :

(i) to (c) N.A. (ii) As under results. (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. $n_1'=22.4$ 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 and $n_2''=44.8$ Kg/ha. of N as A/S/N.

3. DESIGN :

Same as in type A on Paddy on page 30.

4. GENERAL :

(i) to (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 only for Balaghat, 1960-61 for others. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

District	Year	Soil class	No. of trials	Control mean in Kg/ha	Average response of grain in Kg/ha.						S.E. of response
					N_1	N_1'	N_1''	N_2	N_2'	N_2''	
Balaghat	1960	Red	8	2450	140	230	320	270	240	220	77.0
Durg	1960	Red	8	1740	450	300	350	733	710	760	109.0
	1961	Red	14	1780	340	120	120	500	280	260	112.0
Raipur	1960	Red	12	2780	510	010	600	650	1000	800	192.0
	1961	Red	14	1900	720	400	320	720	660	930	156.0
Shahdol	1960	Red	16	1380	510	410	440	860	460	650	54.0
	1961	Red	4	930	570	630	540	690	510	680	117.0
Satna	1960	Red & Black	10	1330	420	570	640	560	630	580	51.0
	1961	„ „	4	960	310	200	280	990	670	390	166.0
Chhatrapur	1960	Red & Black	11	530	280	250	200	370	310	240	89.0
	1961	„ „	12	1170	290	430	440	540	660	680	26.0

Crop :- Paddy (Kharif).

Ref :- M.P. 62(S.F.T.) for Chhatrapur, 62, 63(S.F.T.) for Sidhi, 63, 65 (S.F.T.) for Durg; 63(S.F.T.) for Raipur, Rewa and Satna and 63(S.F.T.) for Raigarh.

Site : (District) : Chhatrapur, Sidhi, Durg, Raipur, Rewa, Satna and Raigarh.

Type :- 'M'.

Object :— Type A_1 : To study the response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and black for Chhatrapur and Satna, and yellow for Sidhi. Rewa and Raigarh and Red for Durg and Raipur. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments:

O=Control (no manure).

 $N_1=35$ Kg/ha. of N. $N_2=70$ Kg/ha. of N. $P_1=35$ Kg/ha. of P_2O_5 . $N_1P_1=35$ Kg/ha. of N+35 Kg/ha. of P_2O_5 . $N_2P_1=70$ Kg/ha. of N+35 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:

(a) 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_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 an oilseed. All the three type—C experiments are conducted on a legume crop. 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_1 , A_2 and A_3 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-only for Chhatarpur; 1962-63 for Sidhi; 1963-65 (64 N.A.) for Durg; 1963-only for Raipur, Rewa, Satna and 1965-only for Raigarh. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

Chhatarpur

62(S.F.T.)

Treatment	N_1	N_2	P_1	N_1P_1	N_2P_1	N_2P_2	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	14	234	193	231	469	529	462	33.0

Control mean=1001 Kg/ha.; No of trials=7.

Sidhi

62(S.F.T.)

Treatment	N_1	N_2	P_1	N_1P_1	N_2P_1	N_2P_2	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	—	98	49	247	247	395	543	105.7

Control mean=345 Kg/ha.; No of trials=2.

63(S.F.T.)

Treatment	N_1	N_2	P_1	N_1P_1	N_2P_1	N_2P_2	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	44	192	44	261	192	420	612	70.5

Control mean=573 Kg/ha.; No. of trials=3.

Durg

63(S.F.T.)

Treatment	N_1	N_2	P_1	N_1P_1	N_2P_1	N_2P_2	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	456	527	193	490	582	669	802	104.3

Control mean=2733 Kg/ha.; No. of trials=12.

65(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	154	477	158	331	565	761	1042	73.6

Control mean=1280 Kg/ha. ; No. of trials=7.

Raipur

63(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	501	671	475	801	1038	852	1051	153.4

Control mean=2225 Kg/ha. ; No. of trials=7.

Rewa

63(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	79	105	131	191	158	573	560	83.4

Control mean=803 Kg/ha. ; No. of trials=3.

Satna

63(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	450	1223	757	711	742	1209	1677	69.8

Control mean=1950 Kg/ha. ; No. of trials=4.

Raigarh

65(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	493	813	490	990	1190	1486	2229	306.7

Control mean=2926 Kg/ha. ; No. of trials=6.

Crop :- Paddy (Kharif).

Ref :- M.P. 65(S.F.T.).

Site :- (District) : Bilaspur.

Type :- 'M'.

Object :- Type A₁ : To study the response curves of important cereal, cash and oilseed crops to Nitrogen applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and yellow. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type A₁ on Paddy (Kharif) unirrigated on page 32.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	417	639	380	727	817	1032	1195	84.6

Control mean=2875 Kg/ha. ; No. of trials=11.

Crop :- Paddy (Rabi).

Ref :- M.P. 64(S.F.T.)

Site :- (District) : Bilaspur, Durg, Raigarh, Raipur and Jabalpur.

Type :- 'M'.

Object :- Type A₁ : To study the response curves of important cereal, cash and oilseed crops to Nitrogen applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and yellow for Bilaspur and Raigarh, red for Durg and Raipur and medium black for Jabalpur. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type A₁ on Paddy (*Khariif*) unirrigated on page 32.

4. GENERAL :

(i) and (ii) N.P. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

Bilaspur

64(S.F.T)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	73	191	179	289	159	550	236	207.6

Control mean=2263 Kg/ha. ; No. of trials=11.

Durg

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.F.
Av. response of grain in Kg/ha.	158	336	92	474	612	856	1383	195.4

Control mean=1515 Kg/ha. ; No. of trials=3.

Raigarh

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	214	414	197	377	384	553	984	285.7

Control mean=1367 Kg/ha. ; No. of trials=3.

Raipur

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	245	548	292	507	678	873	1031	81.2

Control mean=1678 Kg/ha. ; No. of trials=8.

Jabalpur

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	160	344	347	562	824	989	1417	100.3

Control mean=2030 Kg/ha. ; No. of trials=12.

Crop :- Paddy (Rabi).

Ref :- M.P. 64(S.F.T.).

Site :- (District) Raipur, Jabalpur, Bilaspur, Durg and Raigarh.

Type :- 'M'.

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

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red for Raipur and Durg, medium black for Jabalpur, red and yellow for Bilaspur and Raigarh. (iii) 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.

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.

N₂P₂ = 70 Kg/ha. of N + 70 Kg/ha. of P₂O₅ and

N₂P₂K₂ = 70 Kg/ha. of N + 70 Kg/ha. of P₂O₅ + 70 Kg/ha. of K₂O.

3. DESIGN :

Same as in in Type A₁ on Paddy (Kharif) unirrigated on page 32 .

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :**Raipur**

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	207	186	455	576	814	955	1137	69.3

Control mean=1730 Kg/ha. ; No. of trials=4.

Jabalpur

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	428	348	604	564	704	999	1468	127.0

Control mean=1737 Kg/ha. ; No. of trials=11.

Bilaspur

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	347	302	651	421	697	702	913	115.0

Control mean=2069 Kg/ha. ; No. of trials=13.

Durg

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	197	125	421	513	698	612	1186	126.3

Control mean=1449 Kg/ha. ; No. of trials=3.

Raigarh

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	163	229	127	46	399	629	368	197.6

Control mean=1429 Kg/ha. ; No. of trials=3.

Crop :- Paddy (Kharif).

Ref :- M.P. 62(S.F.T.) for Chhatarpur ; 62, 63 (S.F.T.) for Sidhi ; 63, 65(S.F.T.) for Durg ; 63, 64, 65(S.F.T.) for Raipur ; 63(S.F.T.) for Rewa and Satna and 65(S.F.T.) for Raigarh.

Site :- (District) : Chhatarpur, Sidhi, Durg, Raipur, Rewa, Satna and Raigarh.

Type :- 'M'

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

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and black for Chhatarpur and Satna, red and yellow for Sidhi, Rewa and Raigarh, red for Durg and Raipur. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

Same as in Type A₂ on Paddy (Rabi) unirrigated on page 36.

3. DESIGN :

Same as in Type A₁ on Paddy (Kharif) unirrigated on page 32.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 only for Chhatarpur ; 1962-63 for Sidhi ; 1963-65 (64 N.A.) for Durg ; 1963-65 for Raipur ; 1963 for Rewa and Satna and 65 for Raigarh. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

Chhatarpur

62(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	290	224	258	380	426	482	595	45.8

Control mean=996 Kg/ha. ; No. of trials=6.

Sidhi

62(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	32	32	32	164	230	263	560	95.4

Control mean=395 Kg/ha. ; No. of trials=3.

63(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	128	-49	79	232	123	326	696	50.5

Control mean=513 Kg/ha. ; No. of trials=3.

Durg

63(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	468	464	333	588	626	709	774	76.7

Control mean=2637 Kg/ha. ; No. of trials=10.

65(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	263	244	379	484	640	837	1143	42.5

Control mean=1165 Kg/ha. ; No. of trials=6.

Raipur

63(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	616	330	728	689	892	1003	753	94.0

Control mean=2406 Kg/ha. ; No. of trials=5.

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	281	141	383	456	675	695	1454	507.8

Control mean=2123 Kg/ha. ; No. of trials=4.

65(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	43	223	229	30	197	65	373	82.3

Control mean=828 Kg/ha. ; No. of trials=4

Rewa

63(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	98	-19	13	164	210	415	520	43.4

Control mean=830 Kg/ha. ; No. of trials=3

Satna

63(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	634	790	620	800	842	1263	1667	208.9

Control mean=1653 Kg/ha. ; No. of trials=5

Raigarh

65(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	316	453	190	866	933	1189	1583	243.8

Control mean=2833 Kg/ha. ; No. of trials=6

Crop :- Paddy (Kharif).**Ref :- M.P. 65(S.F.T.).****Site :- (District) ; Bilaspur.****Type :- 'M'.**

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

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Red and yellow. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:

Same as in Type A₂ on Paddy (Rabi) unirrigated on page 36.

3. DESIGN:

Same as in Type A₁ on Paddy (Kharif) on page 32.

4. GENERAL:

(i) and (i) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS:

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	556	531	666	763	886	1223	1620	129.3

Control mean=3183 Kg/ha. ; No. of trials=8

Crop :- Paddy (Kharif).

Ref :- M.P. 65(S.F.T.) for Raigarh ; 62 (S.F.T.) for Chhatarpur ; 62, 63 (S.F.T.) for Satna ; 63(S.F.T.) for Rewa ; Sidhi and Raipur ; 63, 65 (S.F.T.) for Durg.

Site :- (District) : Raigrah; Chhatarpur, Satna, Rewa, Sidhi, Durg and Raipur.

Type :- 'M'.

Object :— Type A₁ : To study the response curves of important cereal, [cash and oilseed crops to Potash applied signly and in combination with other nutrients.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and yellow. (iii) 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=35 Kg/ha. of N+70 Kg/ha. of K₂O.

N₂K₁=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.

3. DESIGN :

Same as in Type A₁ on Paddy (Kharif) unirrigated on page 32.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1965 only for Raigarh ; 1962 only for Chhatarpur ; 1962-63 for Satna ; 1963 only for Rewa ; Sidhi and Raipur ; 1963-65 (64 N.A.) for Durg. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

Raigarh

65(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ K ₁ P ₁	S.E.
Av. response of grain in Kg/ha.	—32	—122	89	412	698	800	2044	438.1

Control mean=3132 Kg/ha. ; No. of trials=6.

Chhatarpur

62(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	415	290	276	431	442	505	597	38.0

Control mean=959 Kg/ha. ; No. of trials=5.

Satna

62(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	538	538	639	1314	1081	1129	1200	188.4

Control mean=2190 Kg/ha. ; No. of trials=3.

63(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	942	588	778	1462	1097	1486	1539	73.3

Control mean=1585 Kg/ha. ; No. of trials=4.

Rewa

63(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	-22	-105	-32	13	32	171	197	95.0

Control mean=929 Kg/ha. ; No. of trials=3.

Sidhi

63(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	113	93	202	296	331	326	429	60.2

Control mean=459 Kg/ha. ; No. of trials=4.

Durg

63(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	508	310	134	675	570	599	887	100.4

Control mean=2614 Kg/ha. ; No. of trials=11.

65(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	185	190	427	447	489	781	874	84.7

Control mean=1170 Kg/ha. ; No. of trials=6.

Raipur

63(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	371	298	283	468	695	934	761	120.6

Control mean=2525 Kg/ha. ; No. of trials=5.

Crop :: Paddy (Rabi).

Ref :- M.P. 64(S.F.T.).

Site :- (District) : Bilaspur, Durg, Raigarh, Raipur
and Jabalpur.

Type :- 'M'.

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

1. BASAL CONDITIONS :

(i) (a) to (c) N/A. (ii) Red and yellow for Bilaspur and Raigarh ; Red for Durg and Raipur and medium black for Jabalpur. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

Same as in Type A₂ on Paddy (*Kharif*) unirrigated on page 40.

3. DESIGN :

Same as in Type A₁ on paddy (*Kharif*) unirrigated on page 32.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Bilaspur

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	339	203	294	527	372	874	881	110.5

Control mean=2019 Kg/ha. ; No. of trials=14.

Durg

Treatment	N ₁	K ₁	K ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	133	247	350	504	593	859	1032	108.3

Control mean=1512 Kg/ha. ; No. of trials=4.

Raigarh

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	367	209	213	461	705	397	902	354.2

Control mean=1353 Kg/ha. ; No. of trials=3.

Raipur

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	201	298	519	603	565	915	957	83.3

Control mean=1743 Kg/ha. ; No. of trials=8.

Jabalpur

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	743	398	469	1197	1178	1297	1624	224.3

Control mean=1777 Kg/ha. ; No. of trials=9.

Crop :- Paddy (*Kharif*).

Ref :- M.P. 63(42), 64(20), 65(5).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'MV'.

Object :- To find out a suitable variety and optimum dose of fertilizer for Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 4, 5.7.63 ; 27, 28.7.64 ; 1, 2.8.65. (iv) (a) One ploughing and puddling. (b) By Japanese method of cultivation. (c) N.A. (d) 15 cm. × 15 cm. (e) 3. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 3 hand weedings. (ix) N.A. (x) 9.10.63 to 28.10.63 13.10.64 to 30.11.64 ; 12.10.65 to 29.11.65.

2. TREATMENTS :

Main-plot treatments :

16 varieties: V_1 =Lasoo-4, V_2 =Sel 1322, V_3 =A × SI-1, V_4 =N6 × SNo.-7, V_5 =G × SNo. 1-F9, V_6 =Sel. 1416, V_7 =G × SNo. 1-F10, V_8 =G × S.No. 5, V_9 =NP 130, V_{10} =N22, V_{11} =Patnai 23, V_{12} =Local 4-7, V_{13} =Local 4-12, V_{14} =Lal sal-16, V_{15} =Lal sal-17 and V_{16} =Lal sal-19.

Sub-plot treatments :

2 levels of fertilizers: M_1 =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P_2O_5 as Super and M_2 =67.2 Kg/ha of N+33.6 Kg/ha. of P_2O_5 as Super.

3. DESIGN :

(i) Split-plot. (ii) (a) 16 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.5 m × 3.7 m. (b) 4.7 m. × 3.2 m. (v) 38 cm. × 23 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1963-65. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As sub-plot error variances are heterogeneous, results of individual years have been presented under 5-Results.

5. RESULTS :

63(42)

(i) 2014 Kg/ha. (ii) (a) 403.9 Kg/ha. (b) 178.8 Kg/ha. (iii) Main effects of M and V and interaction M × V are all highly significant. (iv) Av. yield of grain in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}	V_{11}
N_1	1871	2185	1705	1490	1755	2036	1556	1854	1705	1358	2103
N_2	2103	3046	2401	2666	2334	2666	2334	2748	2765	2202	3179
Mean	1987	2615	2053	2078	2044	2351	1945	2301	2235	1780	2641

	V_{12}	V_{13}	V_{14}	V_{15}	V_{16}	Mean
	1391	1573	1242	1142	1208	1636
	1937	2185	1772	1954	1970	2391
	1664	1879	1507	1548	1589	2014

C.D. for V marginal means = 407.0 Kg/ha.

C.D. for M marginal mean = 63.6 Kg/ha.

C.D. for M means at the same level of V = 254.4 Kg/ha.

C.D. for V mean at the same level of M = 444.9 Kg/ha.

64(20)

(i) 2153 Kg/ha. (ii) (a) 566.6 Kg/ha. (b) 486.8 Kg/ha. (iii) Main effects of V and M are highly significant. (iv) Av. yield of grain in Kg/ha.

Mean	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	V ₇	V ₈	V ₉	V ₁₀
M ₁	1357	2095	1516	1177	1496	1875	1097	2115	1995	1536
M ₂	2175	2973	2135	2633	2035	2494	2654	3053	3032	2973
Mean	1766	2534	1826	1905	1765	2185	1875	2584	2594	2254

V ₁₁	V ₁₂	V ₁₃	V ₁₄	V ₁₅	V ₁₆	Mean
2554	1676	1796	1457	1357	2015	1692
3472	2514	2574	2195	2474	2235	2614
3013	2055	2185	1826	1915	2125	2153

C.D. for V marginal means=571.1 Kg/ha.

C.D. for M marginal means=173.3 Kg/ha.

65(5)

(i) 2064 Kg/ha. (ii) (a) 503.3 Kg/ha. (b) 602.6 Kg/ha. (iii) Main effects of V and M are highly significant (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	V ₇	V ₈	V ₉	V ₁₀
M ₁	1451	2226	1748	1501	1582	2045	1402	1913	1682	1336
M ₂	1979	3116	2424	2673	2392	2721	2540	2837	2952	2524
Mean	1715	2671	2086	2087	1987	2383	1971	2375	2317	1930

V ₁₁	V ₁₂	V ₁₃	V ₁₄	V ₁₅	V ₁₆	Mean
2177	1402	1517	1870	1171	1484	1657
3265	2144	2193	1880	2109	1792	2471
2721	1773	1850	1875	1640	1638	2064

C.D. for V marginal means=507.2 Kg/ha.

C.D. for M marginal means=214.4 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 62(11), 63(24), 64(21), 65(4).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'MV'.

Object :-To find out a suitable variety and optimum dose of fertilizer for Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow for 62; wheat for 63 and 64; grain for 65. (c) N.A. (ii) Sandy loam. (iii) 2, 4, 5.8.62; 26, 30 7.63; 3, 4.8.64; 25, 27.7.65. (iv) (a) Ploughings and *bakhering*. (b) Transplanting. (c) N.A. (d) 23 cm. x 15 cm. (e) 3. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 to 3 hand weedings. (ix) N.A. (x) 26, 28.11.62; 9.12.62; 20, 24.11.63; 27.11.64 and 1, 7.12.64; 19.10.65 and 29.11.65.

2. TREATMENTS:

All combinations of (1) and (2)

(i) 3 varieties: V_1 =Kali Moonch B-64-10, V_2 =Chhatri R-10 and V_3 =Patnai-23.

(2) 5 levels of manures: M_0 =Control, M_1 =22.4 Kg/ha. of N as A/S, M_2 =22.4 Kg/ha. of P_2O_5 as Super, M_3 = M_1+M_2 and M_4 =Twice of M_3 .

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 15. (b) N.A. (iii) 3 for 62 : 4 for others. (iv) (a) 7.5 m. \times 6.7 m. (b) 6.6 m. \times 5.8 m. for 62 ; for 64 ; 6.6 m. \times 6.1 m. for 63 ; 6.9 m. \times 6.1 m. for 65. (v) 46 cm. \times 46 cm. for 62, 64 ; 46 cm. \times 30 cm. for 63 ; 30 cm. \times 30 cm. for 65. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Attack of leaf Spot, Gandhi bug, spraying of Copper Sulphate for 63 ; Nil. for others. (iii) Grain and straw yield. (iv) (a) 1962-65. (b) No. (c) Results of combined analysis presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments \times years interaction is present.

5. RESULTS :

Pooled results

(i) 2347 Kg/ha. (ii) 880.2 Kg/ha. (based on 42 d.f. made up of Treatments \times years interaction. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M_0	M_1	M_2	M_3	M_4	Mean
V_1	2032	2214	2094	2594	3214	2430
V_2	1893	2122	1909	2535	2997	2291
V_3	1775	2168	2162	2537	2954	2319
Mean	1900	2168	2055	2555	3055	2347

C.D. for M marginal means=374.9 Kg/ha.

Individual results

Treatments	M_0	M_1	M_2	M_3	M_4	Sig.	V_1	V_2	V_3
Years									
1962	2469	2712	2254	2746	2885	N.S.	3065	2690	2085
1963	1350	1714	1568	1919	2415	**	1580	1682	2118
1964	2381	2507	2308	2952	3425	**	3006	2710	2428
1965	1542	1876	2141	2652	3452	**	2227	2183	2589
Pooled	1900	2168	2055	2555	3055	**	2430	2291	2319

Sig.	G.M.	S.E./plot
**	2613	677.2
**	1793	294.7
**	2715	476.7
*	2333	255.5
N.S.	2347	880.2

Crop :- Paddy (Kharif).

Ref :- M.P. 60(23), 61(4), 62(10), 63(25).

Site :- Govt. Agri. Farm. Baroda.

Type :- 'MV'.

Object :- To find out a suitable variety and optimum dose of Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. for 60 ; Fallow for 61 and 62 ; wheat for 63. (c) Nil for 60, 61, and 62 ; N.A. for 63.
 (ii) Mar No. 1. (iii) 7.7.60 ; 7.7.61 ; 26.7.62 ; N.A. (iv) (a) 3 to 4 bakherings. (b) Broadcasting.
 (c) 92 Kg/ha. (d) and (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unrrigated for 61 ; Irrigated for
 others. (viii) 2 hand weedings. (ix) N.A. (x) 6.10.60 and 5.11.60 ; 13, 16, 21, 24.10 61 ; 23.10.62, 12, 14,
 16.11.62 ; 9, 11.11.63.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 varieties : V_1 =Type No. 1, V_2 =N-22, V_3 =NP-130 and V_4 =Jhona-349.

(2) 3 levels of manures : M_0 =Control, M_1 =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P_2O_5 as Super
 and M_2 =Twice of M_1 .

3. DESIGN :

(i) Fact. in R.B. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 11.0 m. \times 9.1 m. for 60 ; 7.5 m. \times 6.7 m. for 61, 62,
 63. (b) 9.1 m. \times 7.3 m. for 60 ; 5.7 m. \times 4.9 m. for 61 ; 6.6 m. \times 5.8 m. for others. (v) 91 cm. \times 91 cm. for
 60, 61 ; 46 cm. \times 46 cm. for others. (vi) Yes.

4. GENERAL :

(i) Poor for 60, 61 ; normal for others. (ii) Attack of Gundhi bug, B.H.C. sprayed for 60, 61 ; leaf Spot
 and Gundhi bug for 62, 63 Copper Sulphate sprayed for 62, N.A. for 63. (iii) Yield of grain.
 (vi) (a) 1960-63. (b) No. (c) Results of combined analysis presented under 5.—Results. (v) Bhind and
 Jora. (vi) Nil. (vii) Error variances are heterogeneous and Treatments years interaction is present.

5. RESULTS :

Pooled results

(i) 752 Kg/ha. (ii) 327.4 Kg/ha. (based on 33 d.f. made up of Treatments \times years interaction). (iii) Main
 effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V_1	V_2	V_3	V_4	Mean
M_0	674	506	594	615	597
M_1	631	648	724	770	693
M_2	1028	805	1055	973	965
Mean	778	653	791	786	752

C.D. for M marginal means -118.1 Kg/ha.

Individual results :

Treatmnts	M_0	M_1	M_2	Sig.	V_1	V_2	V_3	V_4
Years								
1960	204	310	395	**	325	274	435	180
1961	218	349	558	**	369	297	423	410
1962	1494	1521	2058	**	1643	1619	1730	1771
1963	1473	594	850	**	774	422	577	783
Pooled	597	693	965	**	778	653	791	786

Sig.	G.M.	S.E./plot
**	303	118.0
N.S.	375	122.6
N.S.	1691	263.1
**	639	157.3
N.S.	752	327.4

Crop :- Paddy (Kharif).
Site :- Govt. Agri. Farm, Baroda.

Ref :- M.P. 62(120).
Type :- 'MV'.

Object :- To find out the suitable variety and optimum does of manure for Paddy.

1. BASAL CONDITIONS:

(i) (a) Wheat-Fallow-Paddy. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) to (v) N.A. (vi) As per treatments. (vii) to (x) N.A.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 4 varieties: $V_1=T_1$, $V_2=N-22$, $V_3=NP-3$ and $V_4=349$.

(2) 3 manurial treatments: $M_0=0$, $M_1=20$ Kg/ha. of N+20 Kg/ha. of P and $M_2=40$ Kg/ha. of N+40 Kg/ha. of P.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12. (b) N A. (iii) 3. (iv) (a) 6.6 m. \times 7.4 m. (b) 5.4 m. \times 6.5 m. (v) 60 cm. \times 45 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962 only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS:

(i) 2639 Kg/ha. (ii) 360.3 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V_1	V_2	V_3	V_4	Mean
M_0	2245	2393	2343	2683	2416
M_1	2445	2644	2598	2519	2552
M_2	2635	3321	3123	2714	2948
Mean	2442	2786	2688	2639	2639

C.D. for M marginal means = 305.1 Kg/ha.

Crop :- Paddy (Kharif).
Site :- Govt. Agri. Farm, Bhind.

Ref :- M.P. 60(22), 61(133), 62(7).
Type :- 'MV'.

Object :- To find out a suitable variety and optimum dose of manure for Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Vegetables for 60 ; Wheat for others. (c) Nil for 60 ; N.A. for others. (ii) Sandy loam. (iii) 2.8.60 ; 1.8.61 ; 29.7.62. (iv) (a) 2 ploughings and 2 *Bakhering*. (b) Broadcasting. (c) 89 Kg/ha. (d) and (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 1 to 3 weedings by khurpi. (ix) N.A. (x) 8 to 18.11.60 ; 17.11.61 ; 10.10.62, 9.11.62 and 20.11.62.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 4 varieties: $V_1=Type\ 1$, $V_2=N-22$, $V_3=NP-130$ and $V_4=Jhona-349$.

(2) 3 levels of manures: $M_0=Control$ (No manure), $M_1=22.4$ Rg/ha. of N as A/S+22.4 Kg/ha. of P_2O_5 as Super and $M_2=Twice$ of M_1 .

3. DESIGN:

- (i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 11'0 m. × 9'1 m. for 60 ; 7'5 m. × 6'8 m. for others. (b) 9'1 m. × 7'3 m. for 60 ; 6'6 m. × 6'2 m for others. (v) 91 cm. × 91 cm. for 60 ; 46 cm. × 30 cm. for others. (vi) Yes.

4. GENERAL:

- (i) Satisfactory. (ii) Mild attack of paddy Gundhi bug, controlled by dusting 5% Gamaxine for 60 ; N.A. for 61 ; Attack of varicornis, B.H.C. dusted for 62. (iii) Yield of grain. (iv) (a) 1960-62. (b) Yes. (c) Results of combined analysis presented under 5. Results. (v) Baroda and Jora. (vi) At sowing some seeds were eaten by birds for 60 ; Nil for others. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS:

Pooled results

- (i) 680 Kg/ha. (ii) 355.8 Kg/ha. (based on 121 d.f. made up of pooled error and Treatments × years interaction). (iii) Main effects of M, V and interaction M × V are all highly significant. (iv) Av yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	Mean
M ₀	172	367	378	394	328
M ₁	993	725	499	635	713
M ₂	948	509	985	1552	998
Mean	704	534	621	860	680

C.D. for M marginal means=143.7 Kg/ha.

C.D. for V marginal means=166.1 Kg/ha.

C.D. for body of table=287.5 Kg/ha.

Individual results

Treatment	M ₀	M ₁	M ₂	Sig.	V ₁	V ₂	V ₃	V ₄	Sig.	G.M.	S.E./plot.
Years											
1960	432	909	1252	**	984	541	938	995	*	864	432.4
1961	275	615	885	**	569	529	465	804	N.S.	592	313.4
1962	276	615	858	**	560	531	459	783	N.S.	583	324.5
Pooled	328	713	998	**	704	534	621	860	**	680	355.8

Crop :- Paddy (Kharif).

Ref :- M.P. 62(5)

Site :- Govt. Agri. Farm, Bhind.

Type :- 'MV'.

Object :— To find out a suitable variety and optimum dose of manures for Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Peas. (c) N.A. (ii) Sandy loam. (iii) 27, 28.8.62. (iv) (a) 2 ploughings by deshi plough. (b) Transplanting. (c) —. (d) 30 cm. × 23 cm. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) One weeding by Khurpi. (ix) N.A. (x) 20 to 22.11.62 and 4.12.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 varieties : V₁=Kali moonchh, V₂=Chhatri R 10 and V₃=Patnai—23.

(2) 4 levels of manures : M₀=Control (No manure), M₁=22.4 Kg/ha. of N, M₂=22.4 Kg/ha. of P₂O₅, M₃=22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅ and M₄=Twice of M₁.

3. DESIGN:

- (i) Fact. in R.B.D. (ii) (a) 15. (b) N.A. (iii) 4. (iv) (a) 6.7 m. × 7.5 m. (b) 6.1 m. × 6.6 m. (v) 30 cm. × 46 cm. (vi) Yes.

4. GENERAL:

- (i) Good. (ii) Attack of White ants. 10% B.H.C. dusted. (iii) Population of plants, no. of tillers, height, grains/ear head and yield of grain. (iv) (a) 1962 only. (b) —. (c) Nil. (v) Baroda and Jora. (vi) Nil. (vii) Variety V_3 failed completely and excluded from analysis.

5. RESULTS:

- (i) 632 Kg/ha. (ii) 348.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M_0	M_1	M_2	M_3	M_4	Mean
V_1	284	680	714	761	934	675
V_2	353	507	671	699	711	588
Mean	318	594	693	730	823	632

Crop :- Paddy (Kharif).

Ref :- M.P. 63(1).

Site :- Govt. Agri. Res. Farm, Bilaspur.

Type :- 'MV'.

Object :- To find out a most suitable variety and dose of fertilizer for Paddy.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) Paddy. (c) 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P_2O_5 as Super. (ii) Dorsa. (iii) 1.7.63/22.7.63. (iv) (a) 4 ploughings. (b) Transplanting. (c) 56 Kg/ha. (d) 15 cm. × 15 cm. (e) 2. (v) 44.8 Q/ha. of F.Y.M. (vi) As per treatments. (vii) Irrigated. (viii) Two hand weedings. (ix) 70 cm. (x) 28.10.63 to 1.11.63.

2. TREATMENTS:

Main-plot treatments:

- 2 levels of fertilizers : $M_1 = 22.4$ Kg/ha. of N as A/S + 22.4 Kg/ha. of P_2O_5 as Super and $M_2 = 67.2$ Kg/ha. of N as A/S + 33.6 Kg/ha. of P_2O_5 as Super.

Sub-plot treatments :

- 14 varieties : $V_1 =$ Gimbozu × Sufed dhan No. 2, $V_2 =$ Norin 6 × Sufed dhan No. 7, $V_3 =$ Norin 6 × R_2 No. 4, $V_4 =$ Gimbozu × Sufed dhan No. 1, $V_5 =$ Gimbozu × Sufed dhan No. 5, $V_6 =$ Zuiho × R_3 No. 2-3, $V_7 =$ Zuiho × R_3 No. 3-6, $V_8 =$ Fukoku × R_3 No. 1-1, $V_9 =$ Fukoku × R_3 No. 4-4, $V_{10} =$ Asahi × Sufed dhan No. 26, $V_{11} =$ Cross 34-32, $V_{12} =$ Cross 16-9, $V_{13} = R_2$ and $V_{14} = R_3$.

3. DESIGN:

- (i) Split-plot. (ii) (a) 2 main-plots/replication ; 14 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 3.7m. × 5.5 m. (b) 3.1 m. × 4.9 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL:

- (i) Lodging from 12.9.63 to 1-10-63. (ii) There was uniform attack of Jassids when the crop was about a month old after transplanting. It was controlled by dusting of 5% D.D.T. powder at 16.8 Kg/ha. later on a preventive spraying of Endrin 20 EC was done. (iii) Grain and straw yield. (iv) (a) 1963-only. (b) and (c) Nil. (v) Waraseoni. (vi) and (vii) Nil.

5. RESULTS :

(i) 1632 Kg/ha. (ii) (a) 1553.0 Kg/ha. (b) 440.0 Kg/ha. (iii) Main effect of V is significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	V ₇	V ₈	V ₉	V ₁₀	V ₁₁	V ₁₂	V ₁₃	V ₁₄	Mean
M ₁	1667	1438	1771	2263	1968	2014	1768	2269	1858	2270	2321	2081	2227	1555	1962
M ₂	1560	1549	1217	1237	1387	1256	1077	1061	858	1691	1161	1993	1304	884	1302
Mean	1613	1494	1494	1570	1678	1635	1423	1665	1358	1980	1741	2037	1765	1219	1632

C.D. for V marginal means=436.4 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 63(2).

Site :- Govt. Agri. Res. Farm, Bilaspur.

Type :- 'MV'.

Object :- To find out a most suitable variety and manurial dose for Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) 22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super. (ii) Sandy loam (Dorsa). (iii) 1.7.63/30.7.63. (iv) (a) 4 ploughings and levelling by *dhatari end kopper*. (b) Transplanting (c) 56 Kg/ha. (d) 15 cm. x 15 cm. (e) 2. (v) 44.8 Q/ha. of F.Y.M. (vi) As per treatments. (vii) Irrigated. (viii) One weeding. (ix) 70 cm. (x) 25.11.63.

2. TREATMENTS:

Main-plot treatments :

2 levels of fertilizers : M₁=22.4 Kg/ha. of N as A/S+24 Kg/ha. of P₂O₅ as Super and M₂=67.4 Kg/ha. of N as A/S+33.6 Kg/ha. of P₂O₅ as Super.

Sub-plot treatments :-

6 varieties : V₁=Cross 4, V₂=Safri-17, V₃=Cross B-1, V₄=Cross 10-9, V₅=Assam choori 49 and V₆=Zuiho x R 8A No. 57.

3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-Plots/replication ; 6 sub-plots/main-plot. (iii) 6. (iv) (a) 2.7 m. x 3.7 m. (b) 2.1 m. x 3.1 m. (v) 30 cm. x 30 cm. (vi) Yes.

4. GENERAL :

(i) Good, lodging was noticed in 3rd week of Oct. (ii) In early stages, the crop was attacked by Jassids and controlled by dusting of 5 % D.D.T. The attack of black Smut was also seen in all the plots. Spraying of Eadrin 20 E.C. was done before planting. (iii) Grain and straw yield. (iv) (a) 1963 only. (b) No. (c) Nil. (v) to (vii) Nil

5. RESULTS :

(i) 2956 Kg/ha. (ii) (a) 521.9 Kg/ha. (b) 670.3 Kg/ha. (iii) Main effect of V is highly significant and main effect of M is significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	Mean
M ₁	3132	3983	2740	2163	3703	3393	3186
M ₂	2535	3529	2529	1379	3357	3032	2727
Mean	2833	3756	2634	1771	3530	3212	2956

C.D. for M marginal means=316.2 Kg/ha.

C.D. for V marginal means=549.9 Kg/ha.

Crop :- Paddy Kharif).

Ref :- M.P. 61(1).

Site :- Govt. Agri. Farm, Jora.

Type :- 'MV'.

Object :-To find out a suitable variety and optimum dose of manures for Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Gram. (c) Nil. (ii) Sandy loam. (iii) 26.7.61. (iv) 3 ploughings. (b) Broadcast. (c) 89 Kg/ha. (d) and (e) —. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) and (ix) Nil. (x) 5.7.11.61.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 4 varieties : V₁=T₁, V₂=N-22, V₃=N.P. 130 and V₄=Jora-349.

(2) 3 levels of manures : M₀=Control (no manure), M₁=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super and M₂=Twice of M₁.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 6.7 m. × 7.5 m. (b) 6.1 m. × 6.6 m. (v) 30 cm. × 46 cm. (vi) Yes.

4. GENERAL:

(i) Good, lodging in some plots. (ii) Mild attack of Gundhi bug. (iii) No. of tillers and yield of grain. (iv) (a) 1960—only. (b) —. (c) Nil. (v) Baroda and Bind. (vi) and (vii) Nil.

5. RESULTS:

(i) 716 Kg/ha. (ii) 387.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	Mean
M ₀	707	403	722	1068	725
M ₁	657	332	728	606	581
M ₂	563	829	1213	764	842
Mean	642	521	888	813	716

Grop :- Paddy.**Ref :- M.P. 65(45).****Site :- Govt. Agri. Res. Stn., Labhandi.****Type :- 'MV'.**

Object :—To see the effect of different levels of fertilizers on the yield of different varieties of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) to (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :**Main-plot treatments :**

3 levels of fertilizers : $F_1=40$ Kg/ha. of N+20 Kg/ha. of P_2O_5 +20 Kg/ha. of K_2O , $F_2=2 \times F_1$ and $F_3=3 \times F_1$.

Sub-plot treatments :

8 varieties : V_1 =Cross B-2, V_2 =Cross B-11-2, V_3 =Cross 18, V_4 =Cross 16-19, V_5 =Cross 116, V_6 =Cross 51, V_7 =Safri 17 and V_8 =R-2 (Nungi).

3. DESIGN :

(i) Split-plot. (ii) (a) 3 Main-plots/replication ; 8 Sub-plots/main-plot. (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL :

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

5. RESULTS :

(i) 1287 Kg/ha. (ii) (a) 528.8 Kg/ha. (b) 369.9 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yeild of grain in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	Mean
F_1	983	995	1285	1272	2018	725	1913	1922	1389
F_2	1074	886	1365	844	1496	489	1887	1747	1224
F_3	978	998	989	1182	2197	530	1446	1671	1249
Mean	1012	960	1213	1099	1903	581	1748	1780	1287

C.D. for V marginal mean=301.8 Kg/ha.

Crop :- Paddy (Kharif).**Ref :- M.P. 63(39).****Site :- Govt. Res. Farm, Waraseoni.****Type :- 'MV'.**

Object :—To find out a suitable variety and optimum dose of manure for Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Linseed. (c) N.A. (ii) Sandy and clayey loam. (iii) 29.6.63/18.8.63. (iv) (a) 4 ploughing. (b) Transplanted. (c) 90 Kg/ha. (d) 15 cm.×15 cm. (e) 2 to 3. (v) Nil. (vi) As per treatments (vii) Irrigated. (viii) One hand weeding. (ix) 128 cm. (x) 3.1.64.

2. TREATMENTS :

Main-plot treatments :

2 levels of fertilizers : $M_1=22.4$ Kg/ha. of N as A/S+22.4 Kg/ha. of P_2O_5 as Super and $M_2=3 \times M_1$.

Sub-plot treatments :

6 varieties : V_1 =Safri-17, V_2 =Limboga \times Safedhan No. 10-19; V_3 =Zuiho \times R8-A No. 5-7, V_4 =Cross B-1, V_5 =Pandhari Luchai No. 16 and V_6 =Assam Churi-49.

N applied in two equal doses, one dose just before transplanting and the other one month after, P_2O_5 applied in one dose just before transplanting.

3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 5.5 m. \times 3.4 m. (b) 5.2 m. \times 3.1 m. (v) 15 cm. \times 15 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 805 Kg/ha. (ii) (a) 177.9 Kg/ha. (b) 366.5 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V_1	T_2	V_3	V_4	V_5	V_6	Mean
M_1	1095	414	774	638	499	1531	825
M_2	916	389	704	827	816	1055	784
Mean	1005	401	739	733	657	1293	805

C.D. for V marginal means=300.7 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 64(55).

Site :- Govt. Res. Farm, Waraseoni.

Type :- 'MV'.

Object :- To find out a suitable variety and optimum dose of manure for Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 15.6.64/30.7.64. (iv) (a) 3 to 4 ploughings. (b) Transplanting. (c) 90 Kg/ha. (d) 15 cm. \times 15 cm. (e) —. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 hand weedings. (ix) N.A. (x) 28.12.64.

2. TREATMENTS :

Main-plot treatments :

2 levels of manures : $M_1=22.0$ Kg/ha. of N as A/S+22.0 Kg/ha. of P_2O_5 as Super and $M_2=66.0$ Kg/ha. of N as A/S+33.0 Kg/ha. of P_2O_5 as Super.

Sub-plot treatments :

7 varieties : V_1 =Safri-17, V_2 =Gimbozax Safdhan No. 10-9, V_3 =Zuiho \times R.8.A. No. 5-7, V_4 =Cross B-1, V_5 =P.L. No. 16, V_6 =Assam Churi-49 and V_7 =Cross-4.

3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 7 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 2.7 m. \times 1.8 m. (b) 2.4 m. \times 1.5 m. (v) 15 cm. \times 15 cm. (xi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1964 only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2552 Kg/ha. (ii) (a) 781.7 Kg/ha. (b) 539.2 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	V ₇	Mean
M ₁	2727	2660	2166	2031	2921	3020	2332	2551
M ₂	2849	2265	2144	2220	2763	3177	2449	2552
Mean	2788	2462	2155	2125	2842	3098	2391	2552

C.D. for V marginal means=440.2 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 63(36).

Site :- Govt. Res. Farm, Waraseoni.

Type :- 'MV'.

Object :- To find out a suitable variety and optimum dose of manure for Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Paddy. (c) 61 C.L./ha. of F.Y.M. (ii) Sandy and clayey loam. (iii) 29.6.63/18.8.63. (iv) (a) 3 ploughings. (b) Transplanted. (c) 90 Kg/ha. (d) 15 cm. × 15 cm. (e) 2-3. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) One hand weeding. (ix) 116.8 cm. (x) 4.12.63.

2. TREATMENTS :

Main-plot treatments :

2 doses of fertilizers : M₁=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super and M₂=3 × M₁.

Sub-plot treatments :

10 varieties : V₁=Ashahi × Safedhan No. 1-1, V₂=Nonin 6 × Safe dhan No. 3. V₃=Zimboga × Safedhan No. 1 (F 9), V₄=Zimboga × Safe dhan No. 1 (FIO), V₅=Zimboga × Safedhan No. 5, V₆=Selection No. 14-16, V₇=R₂ × Nonin 36 No. 34-32, V₈=R₂, V₉=R₂ and V₁₀=Ashahi × R₂ No. 16-19.

3. DESIGN :

- (i) Split-plot. (ii) (a) 2 main-plots/replication ; 10 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.5 m. × 3.4 m. (b) 5.2 m. × 3.1 m. (v) 15 cm. × 15 cm. (vi) Yes.

4. GENERAL:

- (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1963 only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 893 Kg/ha. (ii) (a) 437.8 Kg/ha. (b) 330.1 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	V ₇	V ₈	V ₉	V ₁₀	Mean
M ₁	658	908	688	476	669	706	391	871	1167	1773	831
M ₂	1056	964	828	633	717	844	644	856	1205	1800	955
Mean	857	936	758	555	693	775	518	863	1186	1786	893

C.D. for V marginal means=331.4 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 64(54).

Site :- Govt. Res. Farm, Waraseoui.

Type :- 'MV'.

Object :- To find out a suitable dose of fertilizer for different varieties of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 15.6.64/31.7.64. (iv) (a) 2 ploughings. (b) Transplanting. (c) —. (d) 15 cm. × 15 cm. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 hand weedings. (ix) N.A. (x) 29.11.64.

2. TREATMENTS :

Main-plot treatments :

2 doses of fertilizers : $M_1=22\cdot0$ Kg/ha. of N as A/S+ $22\cdot0$ Kg/ha. of P_2O_5 as Super and $M_2=66\cdot0$ Kg/ha. of N as A/S+ $33\cdot0$ Kg/ha. of P_2O_5 as Super.

Sub-plot treatments :

12 varieties : $V_1=No\ 1-1$, $V_2=No.\ 7$, $V_3=No.\ 1$ (F-10), $V_4=No.\ 1$ (F-11), $V_5=No.\ 5$, $V_6=No.\ 14-16$, $V_7=No.\ 34-32$, $V_8=R-2$, $V_9=R-3$, $V_{10}=No.\ 16-19$; $V_{11}=Cross\ 4-2$ and $V_{12}=Ch.\ 4$.

3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 12 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 2.7 m. × 1.8 m. (b) 2.4 m. × 1.5 m. (v) 15 cm. × 15 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964 only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 2042 Kg/ha. (ii) (a) 711.8 Kg/ha. (b) 506.9 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}	V_{11}	V_{12}	Mean
M_1	2218	1685	2541	1672	2015	1537	2056	2299	2204	2838	2103	2878	2170
M_2	1604	1335	1436	1867	1820	1833	1517	2487	2042	2116	1732	3188	1915
Mean	1911	1510	1988	1769	1917	1685	1786	2393	2123	2477	1917	3033	2042

C.D. for V marginal means=506.2 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 65(44).

Site :- Govt. Agri. Res. Stn., Labhandi.

Type :- 'C'.

Object :- To see the effect of different methods of planting on the yield of Paddy.

1. BASAL CONDITIONS :

(I) (a) to (c) N.A. (ii) Sandy loam. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

4 methods of planting : $M_1=Drilling$, $M_2=Biasi$, $M_3=Broadcasting$ and $M_4=Transplanting$.

3. DESIGN :

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

4. GENERAL :

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

5. RESULTS:

(i) 2414 Kg/ha. (ii) 305.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄
Av. yield	2303	3101	2436	1816

C.D.=488.8 Kg/ha.

Crop :- Paddy.

Ref :- M.P. 60(85), 61(52), 62(32).

Site :- Govt. Agri. Res. Stn., Labhandi.

Type :- 'C'.

Object :-To find out the effect of different tillage operations on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) Matasi for 60; Dorsa for 61, 62. (iii) 4.7.60; 20.6.61; 29.6.62. (iv) (a) As per treatments. (b) Broadcasting. (c) 90 Kg/ha. (d) and (e) —. (v) Nil. (vi) Cross 116. (vii) Irrigated. (viii) 1 hand weeding and rogning. (ix) 82 cm.; 141 cm.; 60 cm. (x) 20.11.60; 13.11.61; 21.11.62.

2. TREATMENTS:

All combinations of (1) and (2)+one extra treatment

(1) 2 number of ploughings : F₁=1 and F₂=2 ploughings.

(2) 2 types of plough : T₁=Country plough and T₂=Light iron plough.

Above ploughings were done immediately after the harvest of previous Paddy crop. In all the above treatments, there was a common cultivation by country plough at the break of Monsoon and one after sowing for covering seed.

Extra treatment : E=No cultivation done immediately after the harvest of previous Paddy crop.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 8. (iv) (a) 18.3 m. × 4.3 m. (b) 18.3 m. × 4.3 m. for 60; 16.8 m. × 3.7 m. for others. (v) Nil for 60; 76 cm. × 30 cm. for others. (vi) Yes.

4. GENERAL :

(i) Good for 60, 62; not good for 61. (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1960-62. (b) No for 60, yes for others. (c) Nil. (v) Recora. (vi) Nil. (vii) As error variances are heterogeneous and Treatments × years interaction is absent, results of individual years have been presented under 5. Results.

5. RESULTS

60(85)

(i) 2367 Kg/ha. (ii) 380.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

E=2390 Kg/ha.

	F ₁	F ₂	Mean
T ₁	2238	2506	2372
T ₂	2245	2456	2350
Mean	2241	2481	2361

61(52)

(i) 1238 Kg/ha. (ii) 175.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

E=1221 Kg/ha.

	F ₁	F ₂	Mean
T ₁	1290	1253	1271
T ₂	1267	1160	1213
Mean	1278	1206	1242

62(32)

(i) 2188 Kg/ha. (ii) 221.2 Kg/ha. (iii) E vs. others is highly significant. (iv) Av. yield of grain in Kg/ha.

E=1942 Kg/ha.

	F ₁	F ₂	Mean
T ₁	2219	2372	2295
T ₂	2233	2178	2205
Mean	2226	2275	2250

C.D. for E vs. others=185.5 Kg/ha.

Crop :- Paddy (Kharif).**Ref :- M.P. 60(143), 61(151).****Site :- State Mechanised Farm, Reora.****Type :- 'C'.**

Object :- To study the relative performance of different tillage operations on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil for 60 ; Paddy-Gram for 61. (b) Paddy for 60 ; Gram for 61. (c) N.A. (ii) Medium black. (iii) 10.7.60 ; 27.7.61. (iv) (a) As per treatments. (b) Broadcasting. (c) 78 Kg/ha. (d) and (e) —. (v) Nil. (vi) N-22. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 27.10.60 ; 25.10.61.

2. TREATMENTS :

All combinations of (1) and (2)+one extra treatment

(1) 2 number of ploughings: F₁=1 and F₂=2 ploughings.(2) 2 types of plough: T₁=Deshi plough and T₂=Light iron plough.

Extra treatment: E=No ploughing.

The ploughings in the above treatments were done immediately after the harvest of paddy.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 8. (iv) (a) 18.3 m. × 4.3 m, (b) 16.8 m. × 3.7 m. for 60 ; 18.3 m. × 4.3 m. for 61. (v) 75 cm. × 28 cm. for 60 ; Nil for 61. (vi) Yes.

4. GENERAL :

(i) Good for 60 ; poor for 61. (ii) Nil for 60 ; N.A. for 61. (iii) Yield of grain. (iv) (a) 1960-61. (b) No. (c) Results of combined analysis presented under 5. Results. (v) Labhandi. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results

(i) 840 Kg/ha. (ii) 504.0 Kg/ha. [based on 4 d.f. made up of Treatments \times years interaction]. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

E=656 Kg/ha.

	T ₁	T ₂	Mean
F ₁	734	869	802
F ₂	850	1089	969
Mean	792	979	886

Individual results

Treatments	F ₁	F ₂	Sig.	T ₁	T ₂	Sig.	E	Sig.	G.M.	S.E./plot
Years										
1960	935	1254	**	928	1261	**	730	**	1021	69.1
1961	668	686	N.S.	657	697	N.S.	581	**	658	67.6
Pooled	802	969	N.S.	792	979	N.S.	656	N.S.	840	504.0

Crop :- Paddy (*Kharif*).

Ref :- M.P. 63(60), 64(36), 65(35).

Site :- Govt. Agri. College Farm, Rewa.

Type :- 'C'.

Object :- To find out the most suitable methods of sowing Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy-Berseem/Wheat. (b) Wheat for 63, 65, Berseem for 64. (c) N.A. (ii) Clay loam. (iii) 15.7.63 for M₁, M₂, M₃ and 1.8.63 for M₄, M₅, M₆ in 63, 2.7.64 for M₁, M₂, M₃, 13.7.64 for M₄, M₅ and M₆ in 64 and 26.7.65 for M₁, M₂, M₃ and 28.8.65 for M₄, M₅ in 65. (iv) (a) 4 ploughings by mould board plough followed by planting. (b) As per treatments. (c) 50 Kg/ha. in each treatment except in transplanting. (d) As per treatment. (e) 2 (in case of transplanting). (v) 56 Kg/ha. each of N and P₂O₅ as A/S and Super respectively for 63, 64; 50 Kg/ha. each of N and P₂O₅ as A/S and Super respectively for 65. (vi) T-1 for 63, 64 N-22 for 65. (vii) One to two irrigations as and when required. (ix) Two weedings done. (ix) 92.7 cm.; 79.0 cm.; 51.5 cm. (x) 10/11.10.63; 4/14.10.64; 9/19.11.65.

2. TREATMENTS :

6 methods of sowing : M₁=Biasi, M₂=Line sowing behind the plough (Rows 30 cm. apart), M₃=Broadcasting, M₄=Transplanting (15 cm \times 15 cm.), M₅=Lehi broadcast and M₆=Lehi in line (Rows 30 cm. apart).

N.B : Treatment M₆ was dropped in 65.

3. DESIGN :

(i) R.B.D. (ii) (a) 6 for 63, 64; 5 for 65. (b) 6.1 m. \times 27.4 m. for 63, 64; 32.3 m. \times 7.3 m. for 65 (iii) 4 for 63, 64; 6 for 65. (iv) (a) 6.1 m. \times 3.7 m. for 63, 64; 7.3 m. \times 5.5 m. for 65. (b) 5.5 m. \times 3.0 m. for 63, 64; 6.1 m. \times 4.9 m. for 65. (v) 30 cm. around the plot for 63, 64; 61 cm. on either side and 30 cm. at both ends for 65. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil for 63, 64 spraying of Cupramar to control blast disease for 65. (iii) Growth observations, yield of grain and straw. (iv) (a) 1963-65. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As error variances are heterogeneous and Treatments \times years interaction is absent, results of individual years have been presented under 5. Results, Expt. No. 65(35) was not considered for pooling because treatment M_4 was dropped.

5. RESULTS :

63(60)

(i) 2582 Kg/ha. (ii) 146.3 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_1	M_2	M_3	M_4	M_5	M_6
Av. yield	2259	3035	2332	3707	2213	1944

C.D. for 220.3 Kg/ha.

64(30)

(i) 2942 Kg/ha. (ii) 40.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_1	M_2	M_3	M_4	M_5	M_6
Av. yield	2583	3390	2715	3827	2624	2516

C.D. = 61.1 Kg/ha.

65(35)

(i) 1387 Kg/ha. (ii) 245 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_1	M_2	M_3	M_4	M_5
Av. yield	2216	1726	1548	863	583

C.D. = 295.1 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 60(191).

Site :- Govt. Agri. Res. Stn., Adhartal.

Type :- 'CV'.

Object :- To determine the optimum age of seedlings in early, medium and late varieties of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 1, 10, 20.7.60/18, 19.8.60. (iv) (a) 3 ploughings. (b) Transplanting. (c) —. (d) 23 cm. \times 23 cm. (e) —. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 hand weedings. (ix) and (x) N.A.

2. TREATMENTS :

Main-plot treatments :

3 varieties : Nungi (early), V_2 = China 45 (medium) and V_3 = Triple Burma (late).

Sub-plot treatments :

3 ages of seedlings : A_1 = 29, A_2 = 39 and A_3 = 49 days old seedlings.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) 7.3 m. \times 5.3 m. (v) 6.9 m. \times 4.8 m. (vi) 23 cm. \times 23 cm. (vii) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 2514 Kg/ha. (ii) (a) 354.4 Kg/ha. (b) 187.1 Kg/ha. (iii) Main effects of A and V are highly significant. (iv) Av. yield of grain in Kg/ha.

	A ₁	A ₂	A ₃	Mean
V ₁	2985	3039	2698	2907
V ₂	2382	2567	2197	2382
V ₃	2226	2288	2246	2253
Mean	2531	2631	2380	2514

C.D. for V marginal means=463.6 Kg/ha.

C.D. for A marginal means=192.2 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 60(192).

Site :- Govt. Agri. Res. Stn., Adhartal.

Type :- 'CV'.

Object :- To study the effect of number of seedlings on the growth and yield of early, medium and late varieties of Paddy.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Paddy. (c) 20 C.L./ha. of F. Y. M. + 224.2 Kg/ha. of A/S + 224.2 Kg/ha. of P₂O₅ as Super. (ii) Sandy loam. (iii) 11.7.60. (iv) (a) 2 ploughings. (b) Transplanting. (c) —. (d) Rows 23 cm. apart. (e) As per treatments. (v) 44.8 Kg/ha. of P₂O₅ as Super + 44.8 Kg/ha. of N as A/S. (vi) As per treatments. (vii) Irrigated. (viii) Hand weedings. (ix) 109.7 cm. (x) 25.10.60, 14.11.60 and 17.12.60.

2. TREATMENTS :

Main-plot treatments :

6 numbers of seedlings/hill. : S₁=2, S₂=3, S₃=4, S₄=5, S₅=6 and S₆=7 seedlings/hill.

Sub-plot treatments :

3 varieties : V₁=Nungi (No. 17, R-2)—early, V₂=Chhatri (R-10)—medium and V₃=Triple Burma—late.

3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication ; 3 sub-plots/main-plot. (iii) 3. (iv) (a) 1/148.3 ha. (b) 1/221.5 ha. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 3113 Kg/ha. (ii) (a) 1253 Kg/ha. (b) 297.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	Mean
V ₁	2874	2844	3336	3180	3301	3101	3106
V ₂	2968	3009	3027	2970	2906	3084	2994
V ₃	3551	3197	3242	3086	3175	3175	3238
Mean	3131	3017	3202	3079	3127	3120	3113

Crop :- Paddy (Kharif).**Mef :- M.P. 61(166).****Site :- Govt. Agri. Res. Stn., Adhartal.****Type :- 'CV'.**

Object:—To see the effect of spacings, and number of seedlings/hill on the growth and yield of Paddy varieties.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 24.6.61. (iv) (a) 2 ploughings, levelling and harrowing. (b) Transplanting. (c) — (d) and (e) As per treatment. (v) 44.8 Kg/ha. of N as A/S+44.8 Kg/ha. of P_2O_5 as Super. (vi) As per treatments. (vii) Irrigated. (viii) Hand weeding. (ix) 134.6 cm. (x) 4.12.61 and 6.12.61.

2. TREATMENTS :**Main-plot treatments :**

3 spacings : $S_1=23\text{ cm.} \times 23\text{ cm.}$, $S_2=25\text{ cm.} \times 25\text{ cm.}$ and $S_3=23\text{ cm.} \times 15\text{ cm.}$

Sub-plot treatments :

3 number of seedlings/hill : $H_1=3$, $H_2=5$ and $H_3=7$ seedlings.

Sub-Sub-plot treatments :

2 varieties : $V_1=$ Assam churi and $V_2=$ Triple Burma.

3. DESIGN :

(i) Split-Plot. (ii) (a) 3 main-Plots/replication ; 3 sub-plots/main-plot ; 2 sub-sub-plots/sub-plot. (iii) 10.7 m. \times 4.6 m. (iv) (a) 1/202.6 ha. (b) 1/237.2 ha. ; 1/239.7 ha. ; 1/229.8 ha. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) and (c) — (v) to (vii) Nil.

5. RESULTS :

(i) 4203 Kg/ha. (ii) (a) 376.6 Kg/ha. (b) 382.5 Kg/ha. (c) 463.4 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	H_1	H_2	H_3	V_1	V_2	Mean
S_1	4214	4060	4192	4318	3993	4155
S_2	4586	4343	4039	4593	4053	4323
S_3	4176	4154	4065	4468	3795	4132
Mean	4325	4186	4099	4459	3947	4203
V_1	4615	4456	4307			
V_2	4035	3916	3891			

C.D. for V marginal means = 224.1 Kg/ha.

Crop :- Paddy (Kharif).**Ref :- M.P. 63(78), 65(52).****Site :- Govt. Agri. Res. Stn., Adhartal.****Type :- 'CM'.**

Object:—To study the effect of variable plant population, N and P levels on the growth and yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 22.6.63 ; Middle of June, 65. (iv) (a) 3 ploughings and 2 harrowings. (b) Transplanting. (c) — (d) Rows 25 cm. apart. (e) As per treatments. (v) 22.5 Kg/ha of N as A/S+22.5 Kg/ha. of P_2O_5 as Super for 63 ; 40 Kg/ha. of N as A/S+45 Kg/ha. of P_2O_5 as Super for 65. (vi) Chhatri (R-10). (vii) Irrigated. (viii) 3 weedings. (ix) 83 cm. ; 81.5 cm. (x) 27.11.63 ; middle of November, 65.

2. TREATMENTS:

Main-plot treatments:

3 Number of seedling/hill : $S_1=2$, $S_2=4$ and $S_3=6$ seedlings/hill.

Sub-plot treatments:

All combinations of (1) and (2)

(1) 2 levels of N as A/S : $N_1=28$ and $N_2=56$ Kg/ha.

(2) 2 levels of P_2O_5 as Super. : $P_1=22.5$ and $P_2=45$ Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 25 sq. m. (b) 20.3 sq. m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Tiller counts and Grain yield. (iv) (a) 1963—65 (Expt. failed in 1964). (b) N.A. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Main-plot and sub-plot error variances are homogeneous and main and sub-plot Treatments \times years interaction is absent.

5. RESULTS:

Pooled results :

(i) 1898 Kg/ha. (ii) (a) 267.5 Kg/ha. (based on 22 d.f. made up of pooled error and Treatments \times years interaction). (b) 244.8 Kg/ha. (based on 97 d.f. made up of pooled error and Treatments \times years interaction). (iii) Main-effect of S and N are highly significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	N_1	N_2	Mean
P_1	1777	1958	1980	1793	2017	1905
P_2	1809	1864	2003	1735	2049	1892
Mean	1793	1911	1991	1764	2033	1898
N_1	1685	1757	1849			
N_2	1901	2065	2133			

C.D. for S marginal means=113.2 Kg/ha.

C.D. for N marginal means=81.1 Kg/h.

Individual results :

Treatments	S_1	S_2	S_3	Sig.	N_1	N_2	Sig.
Years							
1963	2388*	2474	2512	N.S.	2276	2640	N.S.
1965	1198	1348	1471	*	1252	1426	**
Pooled	1793	1911	1991	**	1764	2033	**

P_1	P_2	Sig.	G.M.	S.E./Main plot	S.E./sub plot
2472	2444	N.S.	2458	215.1	249.6
1338	1340	N.S.	1339	312.6	239.0
1905	1892	N.S.	1898	267.5	244.8

Crop :- Paddy (Kharif).**Ref :- M.P. 60(190).****Site :- Govt. Agri. Res. Stn., Adhartal.****Tyde :- 'CM'.**

Object :— To study the effect of spacings and levels of fertilizers on the yield of Paddy

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 1.7.60./24.7.60. (iv) (a) 2 ploughings and puddling. (b) Transplanting. (c) — (d) As per treatments. (e) N.A. (v) N.A. (vi) Tribie Burna cross (late). (vii) Irrigated. (viii) Hand weeding. (ix) N.A. (x) 5.12.60.

2. TREATMENTS :**Main-plot treatments :**

6 levels of fertility : M_0 = Control, M_1 = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P_2O_5 , M_2 = $2 \times M_1$, M_3 = $3 \times M_1$, M_4 = 44.8 Kg/ha. of N + 67.2 Kg/ha. of P_2O_5 and M_5 = 67.2 Kg/ha. of N + 100.9 Kg/ha. of P_2O_5 .

Sub-plot treatments :

5 spacings : S_1 = 23 cm. \times 10 cm., S_2 = 23 cm. \times 15 cm., S_3 = 23 cm. \times 23 cm., S_4 = 23 cm. \times 30 cm. and S_5 = 46 cm. \times 10 cm.

3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication ; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (v) (a) 6.4 m. \times 5.5 m. (b) Varying for different treatments. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 only. (b) and (c) — (v) to (vii) Nil.

5. RESULTS :

(i) 2762 Kg/ha. (ii) (a) 344.0 Kg/ha. (b) 179.8 Kg/ha. (iii) Main effects of S, M and interaction $S \times M$ are significant. (iv) Av. yield of grain in Kg/ha,

	M_0	M_1	M_2	M_3	M_4	M_5	Mean
S_1	1896	2266	2687	2836	2863	2834	2564
S_2	2495	2877	3168	3024	3396	3401	3060
S_3	2030	2653	2931	2735	3020	2713	2680
S_4	2098	2490	3224	3206	3498	3176	2949
S_5	1802	2480	2773	2540	3030	2738	2561
Mean	2064	2553	2957	2868	3161	2972	2762

C.D. for M marginal means = 231.8 Kg/ha.

C.D. for S marginal means = 103.6 Kg/ha.

C.D. for S means at the same level of M = 253.7 Kg/ha.

C.D. for M means at the same level of S = 324.0 Kg/ha.

Crop :- Paddy (Kharif).**Ref :- M.P. 65(43).****Site :- Govt. Agri. Res. Stn., Labhandi.****Type :- 'CM'.**

Object :— To study the effect of different levels of fertility, spacing and seedlings per hole on the yield of Paddy.

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) N.A. (v) N.A. (vi) Nusahi. (viii) Irrigated. (viii) As per treatments. (ix) to (x) N.A.

2. TREATMENTS:

Main-plot treatments:

All combinations of (1) and (2)

(1) 3 levels of fertility : $M_1=40$ Kg/ha. of N+20 Kg/ha. of P_2O_5 +20 Kg/ha. of K_2O , $M_2=60$ Kg/ha of N+30 Kg/ha. of P_2O_5 +30 Kg/ha. of K_2O and $M_3=80$ Kg/ha. of N+40 Kg/ha. of P_2O_5 +40 Kg/ha. of K_2O .

(2) 2 inter-cultural operation : $I_1=$ By rotary hoe and $I_2=$ Hand weeding.

Sub-plot treatments :

All combinations of (1) and (2)+a control :

(1) 3 spacings : $S_1=15$ cm. \times 15 cm., $S_2=23$ cm. \times 15 cm. and $S_3=23$ cm. \times 23 cm.

(2) 3 number of seedlings/hill : $H_1=2$, $H_2=3$ and $H_3=4$.

3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication ; 10 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL :

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

5. RESULTS :

(i) 389 Kg/ha. (ii) (a) 314.8 Kg/ha. (b) 194.7 Kg/ha. (iii) Main effect of I alone is significant. (iv) Av. yield of grain in Kg/ha.

Main-plot treatments under 'control' in sub-plot.

	M_1	M_2	M_3	Mean
I_1	415	467	852	578
I_2	602	553	561	572
Mean	508	510	706	575

	M_1	M_2	M_3	S_1	S_2	S_3	H_1	H_2	H_3	Mean
I_1	244	300	343	362	284	240	242	292	352	296
I_2	490	411	421	429	474	418	414	474	435	441
Mean	367	356	382	396	379	329	328	383	393	368
H_1	400	265	316	355	315	312				
H_2	361	365	423	404	380	365				
H_3	339	437	406	428	443	310				
S_1	384	376	427							
S_2	364	384	389							
S_3	351	306	329							

C.D. for I marginal means=91.2 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P.60(81), 61(47), 62(27).

Site :- Govt. Agri. Res. Stn., Labhandi.

Type :- 'CM'.

Object :- To determine the relative merits of ordinary and improved *Biassi* operations.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) N.A. for 60. 61 ; as per treatments for 62. (ii) *Matasi*. (iii) 4.7.60 ; N.A. ; 28.6.62. (iv) (a) 2 ploughings by desi plough. (b) Broadcasting. (c) 90 Kg/ha. (d) and (e) — (v) Nil. (vi) Cross-16. (vii) Irrigated. (viii) As per treatments. (ix) 82 cm. ; 141 cm. ; 60 cm. (x) 18.11.60 ; 14.11.61 ; 20.11.62.

2. TREATMENTS :

4 manurial-cum-cultural treatments : M_0 = Control ordinary *Biassi* (i) 90 Kg/ha. of untreated seed, (ii) Nn *Challai*, (iii) No burying of weeds and (iv) 22.4 Kg/ha. of N as A/S after *biassi* operation, M_1 = (i) 50.2 Q/ha. of green leaves + 5.6 Kg/ha. of N as A/S before sowing and one ploughing for incorporation of leaf in the soil, (ii) 22.4 Kg/ha. of P_2O_5 as Super + 11.2 Kg/ha. of N as A/S to be given just before sowing, (iii) Treating Paddy seed with saline water and Agrosan G.N. and sowing the seeds at 90 Kg/ha., (iv) *Biassi* operations, (v) *Challai* after one week, (vi) 11.2 Kg/ha. of N after *Challai* and (vii) Weeding and burying of weeds in the field, M_2 = (i) Ploughing + 22.4 Kg/ha. of P_2O_5 as Super + 11.2 Kg/ha. of N as A/S, (ii) Sowing of 90 Kg/ha. of treated seed mixed with 18 Kg/ha. of *sann* seed G.M., (iii) *Biassi* operations, (iv) *Challai* after one week ; (v) 11.2 Kg/ha. of N as A/S and (vi) Weeding and burying of weeds in field and M_3 = Same as in M_2 except that 11 Kg/ha. of *dhaincha* seed was used in place of *sann* seed.

3. DESIGN :

(i) R.B.D (ii) (a) 4. (b) N.A. (iii) 8 for 60 ; 6 for others. (iv) (a) 4.9 m. \times 10.7 m. for 60 ; 5.5 m. \times 18.2 m. for others. (b) 4.3 m. \times 9.1 m. for 60 ; 4.9 m. \times 16.8 m. for others. (v) 30 cm. \times 76 cm. for 60. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil for 60 ; N.A. for others. (iii) Grain and straw yield. (iv) (a) 1960—62. (b) No. for 60, yes for 61 and 62. (c) Results of combined analysis presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled results :

(i) 2357 Kg/ha. (ii) 331.0 Kg/ha. (based on 57 d.f. made up of pooled error and Treatments \times years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_0	M_1	M_2	M_3
Av. yield	2138	2537	2323	2432

C.D. = 209.7 Kg/ha.

Individual results

Treatments	M_0	M_1	M_2	M_3	Sig.	G.M.	S.E./plot
Years							
1960	2034	2485	2209	2325	*	2263	253.9
1961	2145	2732	2571	2626	*	2519	308.5
1962	2270	2413	2228	2381	N.S.	2323	447.5
Pooled	2138	2537	2323	2432	**	2357	331.0

Crop :- Paddy.**Ref :- M.P. 57, 60(M.A.E.).****Site :- M.A.E. Centre, Bagwai.****Type :- 'CM'.**

Object :- Type IV : To study the effect of phosphatic manures on legumes and their residual effect on succeeding Paddy manured with N.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS :**Main-plot treatments :**

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

(1) 2 previous legumes : L_1 =Gram and L_2 =Pea.(2) 3 levels of P_2O_5 : $P_0=0$, $P_1=44.8$ and $P_2=89.7$ Kg/ha.**Sub-plot treatments :**3 levels of N as A/S applied to Paddy : $N_0=0$, $N_1=16.8$ and $N_2=33.6$ Kg/ha.**3. DESIGN :**

(i) Split-plot. (ii) (a) 7 main-plots/block ; 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) 1957-60 (N.A. for 58 and 59). (b) N.A. (c) Pooled results given under 5. Results. (v) Raipur and Reora. (vi) N.A. (vii) Nil.

5. RESULTS :**Pooled results**

(i) 1201 Kg/ha. (ii) (a) 231 Kg/ha. (b) 207 Kg/ha. (iii) Main effects of L P and N are significant. (iv) Av. yield of grain in Kg/ha.

	L_0P_0	L_1P_0	L_1P_1	L_1P_2	L_2P_0	L_2P_1	L_2P_2	Mean
N_0	1066	964	973	1010	826	1162	1001	1000
N_1	1020	1218	1218	1388	1028	1194	1324	1199
N_2	1226	1208	1365	1508	1148	1688	1678	1403
Mean	1104	1130	1185	1302	1001	1348	1334	1201

C.D. for L P marginal means=237 Kg/ha.

C.D. for N marginal means =131 Kg/ha.

Crop :- Paddy.**Ref :- M.P. 60, 61(M.A.E.).****Site :- M.A.E. Centre, Bagwai.****Type :- 'CM'.**

Object :- Type VII : To study the effect of manures and cultural practices on Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1), (2) and (3)

(1) 3 dates of planting: $D_1=15$ days before normal, $D_2=$ Normal and $D_3=15$ days after normal.(2) 3 spacings: $S_1=15$ cm. \times 15 cm., $S_2=20$ cm. \times 20 cm. and $S_3=25$ cm. \times 25 cm.(3) 3 rates of planting: $R_1=2$; $R_2=4$ and $R_3=6$ seedlings/hole.

Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of N as A/S: $N_0=0$ and $N_1=44.8$ Kg/ha.(2) 2 levels of P_2O_5 as Super: $P_0=0$ and $P_1=44.8$ Kg/ha.

3. DESIGN :

(i) Split-plot Confd. (ii) (a) 3 blocks/replication; 9 main-plots/block and 4 sub-plots/main-plot. (b) N.A.

(iii) 1. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1956 -61. (b) N.A. (c) Nil. (v) Raipur and Reora.

(vi) N.A. (vii) Nil.

5. RESULTS :

60(M.A.E.)

(i) 1958 Kg/ha. (ii) (a) and (b) N.A. (iii) Main effects of D, S, N and P are significant. (iv) Av. yield of grain in Kg/ha

Treatment	D_1	D_2	D_3	S_1	S_2	S_3	
Mean yield	2177	2103	1596	2112	2109	1654	
	R_1	R_2	R_3	N_0	N_1	P_0	P_1
	1977	2001	1896	1859	2057	1883	2033

C.D. for D or S means=314 Kg/ha.

C.D. for N or P means=124 Kg/ha.

61(M.A.E.)

(i) 1789 Kg/ha. (ii) (a) and (b) N.A. (iii) Main effects of D, S, R, N and P are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	D_1	D_2	D_3	S_1	S_2	S_3	
Mean yield	2000	1870	1500	1740	1937	1690	
	R_1	R_2	R_3	N_0	N_1	P_0	P_1
	1336	1940	2093	1254	2324	1662	1916

C.D. for D, S or R means=213 Kg/ha.

C.D. for N or P means =150 Kg/ha.

Crop :- Paddy.**Site :- M.A.E. Centre, Raipur.****Ref :- M.P. 58 to 63(M.A.E.).****Type :- 'CM'.**

Object :- Type VI: To study the effect of phosphatic manures on legumes and their residual effect on succeeding Paddy manured with N.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red loam. (iii) to (x) N.A.

2. TREATMENTS :

Main-plot treatments :

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

(1) 2 previous legumes : $L_1 = \text{Moong}$ and $L_2 = \text{Lakh}$.

(2) 3 levels of P_2O_5 as Super : $P_0 = 0$, $P_1 = 44.8$ and $P_2 = 89.7$ Kg/ha.

Sub-plot treatments :

3 levels of N as A/S applied to Paddy : $N_0 = 0$, $N_1 = 16.8$ and $N_2 = 33.6$ 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. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1958—63(N.A. for 60). (b) N.A. (c) Pooled result given under 5. Results. (v) Bagwai and Reora. (vi) N.A. (vii) Nil.

5. RESULTS :

Pooled results

(i) 2182 Kg/ha. (ii) (a) 199 Kg/ha. (b) 155 Kg/ha. (iii) Main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

	L_0P_0	L_1P_0	L_1P_1	L_1P_2	L_2P_0	L_2P_1	L_2P_2	Mean
N_0	1871	1950	1924	1829	1958	2023	1980	1934
N_1	2241	2131	2188	2231	2346	2202	2250	2227
N_2	2308	2323	2403	2495	2285	2472	2408	2385
Mean	2140	2135	2172	2185	2196	2232	2213	2182

C.D. for N marginal means=98 Kg/ha.

Crop :- Paddy.

Ref :- M.P. 60, 61(M.A.E.).

Site :- M.A.E. Centre, Raipur.

Type :- 'CM'.

Object :—Type VII : To study the effect of manures and cultural practices on Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red loam. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A. •

2. TREATMENTS :

Main-plot treatments :

All combinations of (1), (2) and (3)

(i) 3 dates of planting : $D_1 = 15$ days before normal, $D_2 = \text{Normal}$ and $D_3 = 15$ days after normal.

(2) 3 spacings : $S_1 = 15 \text{ cm.} \times 15 \text{ cm.}$, $S_2 = 20 \text{ cm.} \times 20 \text{ cm.}$ and $S_3 = 25 \text{ cm.} \times 25 \text{ cm.}$

(3) 3 rates of planting : $R_1 = 2$, $R_2 = 4$ and $R_3 = 6$ seedlings/ha.

Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of N as A/S : $N_0 = 0$ and $N_1 = 44.8$ Kg/ha.

(2) 2 levels of P_2O_5 as Super : $P_0 = 0$ and $P_1 = 44.8$ Kg/ha.

3. DESIGN :

(i) Split-plot confd. (ii) (a) 3 blocks/replication ; 9 main-plots/block and 4 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1956-61. (b) N.A. (c) Nil. (v) Bagwai and Reora. (vi) N.A. (vii) Nil.

5. RESULTS :

60(M.A.E.)

(i) 2589 Kg/ha. (ii) (a) 423 Kg/ha. (b) 276 Kg/ha. (iii) Main effects of D, S and N are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	D ₁	D ₂	D ₃	S ₁	S ₂	S ₃	
Mean yield	2970	2527	2270	2886	2500	2381	
	R ₁	R ₂	R ₃	N ₀	N ₁	P ₀	P ₁
	2684	2508	2575	2401	2777	2541	2637

C.D. for D or S means=245 Kg/ha.

C.D. for N means =130 Kg/ha.

61(M.A.E.)

(i) 3250 Kg/ha. (ii) (a) 420 Kg/ha. (b) 285 Kg/ha. (iii) Main effects of D, R and N are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	D ₁	D ₂	D ₃	S ₁	S ₂	S ₃	
Mean yield	3351	3554	2845	3278	3203	3269	
	R ₁	R ₂	R ₃	N ₀	N ₁	P ₀	P ₁
	3081	3351	3318	3016	3484	3200	3300

C.D. for D or R means=242 Kg/ha.

C.D. for N means=134 Kg/ha.

Crop :- Paddy.

Ref :- M.P. 62 to 64(M.A.E.).

Crop :- M.A.E. Centre, Reora.

Type :- 'CM'.

Object:—Type IV : To study the effect of phosphatic manures on legumes, and their residual effect on succeeding Paddy manured with N.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Mixed red and black. (iii) to (x) N.A.

2. TREATMENTS :

main-plot treatments :

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

(1) 2 previous legumes : L₁=Gram and L₂=Lentil.

(2) 3 levels of P₂O₅ as Super : P₀=0, P₁=44.8 and P₂=89.7 Kg/ha.

Sub-plot treatments :

3 levels of N as A/S applied to Paddy : 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) and (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-64. (b) N.A. (c) Pooled results given under 5. Results. (v) Bagwai and Raipur. (vi) N.A. (vii) Nil.

5. RESULTS :

Pooled results

- (i) 1425 Kg/ha. (ii) (a) 124 Kg/ha. (b) 144 Kg/ha. (iii) Main effects of L, P and N are significant.
 (iv) Av. yield of grain in Kg/ha.

	L ₀ P ₀	L ₁ P ₀	L ₁ P ₁	L ₁ P ₂	L ₂ P ₀	L ₂ P ₁	L ₂ P ₂	Mean
N ₀	867	982	1253	1401	1000	1225	1288	1145
N ₁	1577	1140	1508	1648	1170	1576	1653	1467
N ₂	2239	1299	1478	1941	1292	1579	1807	1662
Mean	1561	1141	1413	1663	1154	1460	1582	1425

C.D. for L P marginal means=127 Kg/ha.

C.D. for N marginal means =91 Kg/ha.

Crop :- Paddy.**Ref :- M.P. 61 and 64(M.A.E.).****Site :- M.A.E. Centre, Reora.****Type :- 'CM'.**

Object :—Type VII : To study the effect of manures and cultural practices on Paddy.

1. BASAL CONDITIONS :

- (i) (a) to (c) N.A. (ii) Mixed red and black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1), (2) and (3)

- (1) 3 dates of planting: D
- ₁
- =15 days before normal, D
- ₂
- =Normal and D
- ₃
- =15 days after normal.

- (2) 3 spacings: S
- ₁
- =15 cm. × 15 cm., S
- ₂
- =20 cm. × 20 cm. and S
- ₃
- =25 cm. × 25 cm.

- (3) 3 rates of plantings: R
- ₁
- =2, R
- ₂
- =4 and R
- ₃
- =6 seedlings per hole.

Sub-plot treatments :

All combinations of (1) and (2)

- (1) 2 levels of N as A/S: N
- ₀
- =0 and N
- ₁
- =44.8 Kg/ha.

- (2) 2 levels of P
- ₂
- O
- ₅
- as Super: P
- ₀
- =0 and P
- ₁
- =44.8 Kg/ha.

3. DESIGN :

- (i) Split-plot confd. (ii) (a) 3 blocks/replication; 9 main-plots/block and 4 sub-plots/main-plot. (b) N.A.
-
- (iii) 3. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

- (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1958—64 (60, 62 and 63 N.A.) (b) N.A. (c) Nil. (v) Raipur and Bagwai. (vi) N.A. (vii) Nil.

5. RESULTS :

61(M.A.E.)

- (i) 1137 Kg/ha. (ii) (a) and (b) N.A. (iii) Main effects of D alone is significant. (iv) Av. yield of grain in Kg/ha.

Treatment	D ₁	D ₂	D ₃	S ₁	S ₂	S ₃	
Mean yield	1466	1466	479	1134	1217	1060	
	R ₁	R ₂	R ₃	N ₀	N ₁	P ₀	P ₁
	1153	1128	1130	1123	1151	1101	1173

C.D. for D means = 157 Kg/ha.

64(M.A.E.)

(i) 834 Kg/ha. (ii) (a) and (b) N.A. (iii) Main effects of D alone is significant. (iv) Av. yield of grain in Kg/ha.

Treatment	D ₁	D ₂	D ₃	S ₁	S ₂	S ₃	
Mean yield	1376	712	414	894	894	714	
	R ₁	R ₂	R ₃	N ₀	N ₁	P ₀	P ₁
	766	818	918	778	890	822	846

C.D. for D means = 544 Kg/ha.

Crop :- Paddy.

Ref :- M.P. 63, 64, (M.A.E.)

Site :- M.A.E. Centre, Bagwai.

Type :- 'CMV'.

Object :—Type XIII: To study the effect of N, P and K levels and dates of sowing on different varieties of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) and (iv) N.A. (v) 6000 Kg/ha. of F.Y.M. (vi) As per treatments. (vii) to (x) N.A.

2. TREATMENTS :

Main-plot treatments:

All combinations of (1), (2) and (3)

(1) 3 dates of planting: D₁=2 weeks before normal date of planting, D₂=Normal date of planting and D₃=2 weeks after normal dates of planting.

(2) 3 varieties: V₁=NP -130, V₂=Sel No. 1446 and V₃=Sel No. 1322.

(3) 3 levels of N: N₀=0, N₁=50 and N₂=100 Kg/ha.

Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of P₂O₅: P₀=0 and P₁=70 Kg/ha.

(2) 2 levels of K₂O: K₀=0 and K₁=50 Kg/ha.

3. DESIGN :

(i) Split-plot confd. (ii) (a) 3 blocks/replication ; 9 main-plots/block ; 4 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-66 (65 N.A.) (b) N.A. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS :

63(M.A.E.)

(i) 1945 Kg/ha. (ii) (a) 220 Kg/ha. (b) 225 Kg/ha. (iii) Main effect of V, D, N, P and K are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	V ₁	V ₂	V ₃	D ₁	D ₂	D ₃	N ₀	N ₁	N ₂
Mean yield	1907	2324	1604	2217	2291	1327	1255	2053	2527
	P ₀	P ₁	K ₀	K ₁					
	1865	2024	1992	1898					

C.D. for V or D, or N means = 127 Kg/ha.

C.D. for P or K means = 106 Kg/ha.

64(M.A.E.)

- (i) 1235 Kg/ha. (ii) (a) 382 Kg/ha. (b) 234 Kg/ha. (iii) Main effects of V, D and N are significant.
(iv) Av. yield of grain in Kg/ha.

Treatment	V ₁	V ₂	V ₃	D ₁	D ₂	D ₃	N ₀	N ₁	N ₂
Mean yield	986	1189	1530	1612	1198	895	828	1325	1552
	P ₀	P ₁	K ₀	K ₁					
	1200	1270	1203	1267					

C.D. for V or D or N means = 220 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 61(168).

Site :- Govt. Agri. Res. Stn., Adhartal.

Type :- 'D'.

Object :- To study the efficiency of different methods of weed control on the yield and quality of Paddy crop.

1. BASAL CONDITIONS :

- (i) (a) N.A. (b) Paddy. (c) 49.4 C.L./ha. of F.Y.M. + 224.2 Kg/ha. of A/S + 224.2 Kg/ha. of Super.
(ii) Sandy loam (iii) 8.7 6l. (iv) (a) 2 ploughing and levelling. (b) Transplanting. (c) —. (d) Rows 23 cm. apart. (e) 3. (v) 44.8 Kg/ha. of P₂O₅ as Super + 44.8 Kg/ha. of N as A/S, (vi) Chhatri (medium).
(vii) Irrigated. (viii) 2 hand weedings. (ix) 182.4 cm. (x) 19, 20.11.61.

2. TREATMENTS :

10 weedicidal treatments: T₀ = Control (no weeding), T₁ = 2, 4—D at 0.56 Kg/ha., T₂ = 2, 4—D at 1.12 Kg/ha., T₃ = 2, 4—D at 1.68 Kg/ha., T₄ = 2% solution of copper chloride, T₅ = 5% solution of sulphuric acid, T₆ = 4% solution of copper sulphate, T₇ = One application of Touchi gurma, T₈ = Two applications of Touchi gurma and T₉ = Three hand weedings.

3. DESIGN :

- (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 10.7 m. × 3.7 m. (b) 10.7 m. × 2.7 m. (v) 46 cm. on either side along breadth. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

- (i) 3747 Kg/ha. (ii) 101.0 Kg/ha. (iii) Treatments differences are 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	T ₈	T ₉
Av. yield	3106	3766	3892	3783	3768	3677	3751	3882	3946	3897

C.D. = 117.5 Kg/ha.

Crop :- Paddy (Kharif).**Ref :- M.P. 62(135).****Site :- Govt. Agri. Res. Stn., Adhartal.****Type :- 'D'.****Object :—**To study the efficiency of different methods of weed control in Paddy crop.**1. BASAL CONDITIONS :**

- (i) (a) N.A. (b) Paddy. (c) 49.4 C.L./ha. of F.Y.M.+224.2 Kg/ha. of A/S+224.2 Kg/ha. of Super.
 (ii) Sandy loam. (iii) June, 62. (iv) (a) 3 ploughings, levelling and harrowing. (b) Transplanting.
 (c) —. (d) Rows 23 cm. apart. (e) 3. (v) 44.8 Kg/ha. of N+44.8 Kg/ha. of P₂O₅. (vi) *Chhatri* (R-10).
 (vii) Irrigated. (viii) As per treatments. (ix) N.A. (x) 12.11.62.

2. TREATMENTS :

10 weedicidal treatments: T₀=Control (no treatments), T₁=2, 4-D at 0.56 Kg/ha., T₂=2, 4-D at 1.12 Kg/ha., T₃=2, 4-D at 1.68 Kg/ha., T₄=2, 4-D at 2.24 Kg/ha., T₅=2% Cupric chloride, T₆=One application of Touchigurma, T₇=2 applications of Touchigurma T₈=1 hand weeding and T₉=2 hand weedings.

3. DESIGN :

- (i) R.B.D. (ii) (a) 10. (b) 20.7 m. × 17.1 m. (iii) 6. (iv) (a) N.A. (b) 8.2 m. × 3.7 m. (v) N.A. (vi) Yes.

4. GENERAL :

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

5. RESULTS :

- (i) 1448 Kg/ha. (ii) 460.4 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	T ₈	T ₉
Av. yield	1076	1462	1466	1501	1647	1445	1428	1502	1417	1540

Crop :- Paddy.**Ref :- M.P. 64(51).****Site :- Govt. Agri. Res. Stn., Adhartal.****Type :- 'D'.****Object :—**To study the effect of different doses and times of application of Herbicides on the growth and yield of Paddy.**1. BASAL CONDITIONS :**

- (i) (a) to (c) N.A. (ii) Sehra soil (sandy loam). (iii) 13.6.64/23.7.64. (iv) (a) N.A. (b) Transplanting.
 (c) —. (d) 23 cm. × 23 cm. (e) 3. (v) N.A. (vi) *Chhatri*. (vii) Irrigated. (viii) and (ix) N.A.
 (x) 16.11.64.

2. TREATMENTS :**Main-plot treatments :**

All combinations of (1) and (2),

(1) 3 herbicides : W₁=2, 4-D, W₂=Tropotox and W₃=Spontox.(2) 3 doses of herbicides : D₁=0.56, D₂=1.11 and D₃=1.67 Kg/ha.**Sub-plot treatments :**3 times of application : T₁=25, T₂=35 and T₃=45 days after transplanting.**3. DESIGN :**

- (i) Split-plot. (ii) (a) 9 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A.
 (b) 2.7 m. × 5.5 m. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only. (b) and (c) — (v) and (vi) Nil. (vii) Complete results not available.

5. RESULTS :

(i) 2786 Kg/ha. (ii) (a) 460.2 Kg/ha. (b) 451.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Treatment	W ₁	W ₂	W ₃	D ₁	D ₂	D ₃	T ₁	T ₂	T ₃
Av. yield	2842	2809	2707	2806	2873	2680	2782	2816	2759

Crop :- Paddy (Kharif).

Ref :- M.P. 60(181), 61(148), 62(104)

Site :- Reg. Res. Stn., Bagwai.

Type :- 'D'.

Object :—To study the effect of weedicides on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil for 61 ; N.A. for others. (b) Paddy for 61 ; N.A. for others. (c) N.A. (ii) Clayey loam. (iii) 30.7.60 ; 13.8.61 ; 19.8.62. (iv) (a) Ploughing. (b) Transplanting. (c) 22 Kg/ha. (d) 23 cm. between lines. (e) 1 to 2. (v) 22.4 Kg/ha. of N + 22.4 Kg/ha. of P₂O₅. (vi) N 22 for 60 ; N.P —130 for 61 and 62. (vii) Irrigated. (viii) 2 puddlings by spade. (ix) and (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2) + two extra treatments.

(1) 4 types of weedicides : W₁=Fenoxone, W₂=Dicotox, W₃=Headoal and W₄=M.C.P.A.

(2) 3 doses of weedicides : D₁=0.6, D₂=1.1 and D₃=1.7 Kg/ha of acid equivalent.

Two extra treatments : E₀=Control and E₁=Local cultural method of weeding

3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 5. (iv) (a) 4.9 m. × 8.5 m. for 60 ; 5.5 m. × 4.6 m. for others. (b) 3.7 m. × 7.3 m. for 60 ; 4.6 m. × 3.7 m. for others. (v) 61 cm. × 61 cm. for 60 ; 46 cm. × 46 cm. for others. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1960—62. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) Nabibagh. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS :

Pooled results

(i) 1703 Kg/ha. (ii) 439.1 Kg/ha. (based on 182 d.f. made up of pooled error and Treatments × years interaction). (iii) Only between extra treatments is highly significant. (iv) Av. yield of grain in Kg/ha.

E₀=1455 Kg/ha., E₁=1956 Kg/ha.

	W ₁	W ₂	W ₃	W ₄	Mean
D ₁	1908	1733	1790	1783	1803
D ₂	1640	1494	1622	1754	1627
D ₃	1663	1704	1826	1524	1679
Mean	1737	1644	1746	1687	1703

C.D. for Extra treatment means=317.4 Kg/ha.

Individual results

Treatments	D ₁	D ₂	D ₃	Sig.	W ₁	W ₂	W ₃	W ₄	Sig.	E ₀	E ₁	Sig.
Years												
1960	1454	1166	1378	N.S.	1263	1335	1234	1498	N.S.	1256	1939	**
1961	2415	2304	2275	N.S.	2412	2271	2475	2168	N.S.	2055	2475	N.S.
1962	1542	1412	1385	N.S.	1535	1326	1530	1394	N.S.	1053	1453	N.S.
Pooled	1803	1627	1679	N.S.	1737	1644	1746	1687	N.S.	1455	1956	**

G.M.	S.E./plot
1371	396.8
2322	501.3
1418	401.2
1703	439.1

Crop :- Paddy (Kharif).

Ref :- M.P. 61(143).

**Site :- Govt. Seed Multiplication and Demons. Farm,
Nabibagh.**

Type :- 'D'.

Object :- To study the effect of weedicides on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)+2 extra treatments

(1) 4 types of weedicides : W₁=Dicotox, W₂=M.C.P.A., W₃=Ferdoxone and W₄=Amine s lt.

(2) 3 doses of weedicides : D₁=0.6, D₂=1.1 and D₃=1.7 Kg/ha.

2 extra treatments : E₀=Control (no treatment) and E₁=Local cultural method of weeding.

3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 4.0 m. × 3.1 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—only. (b) and (c) —. (v) Bagwai. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 482 Kg/ha. (ii) 66.2 Kg/ha. (iii) Main effects of W and D, weedicides Vs. E₁ and E₀ Vs. of others are all highly significant. (iv) Av. yield of grain in Kg/ha.

E₀=398 Kg/ha. and E₁=637 Kg/ha.

	W ₁	W ₂	W ₃	W ₄	Mean
D ₁	479	398	447	389	428
D ₂	538	472	488	430	482
D ₃	561	496	521	488	517
Mean	526	455	485	436	476

C.D. for D marginal means=42.0 Kg/ha.

C.D. for W marginal means=48.6 Kg/ha.

C.D. for E₀ Vs. others =61.9 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- M.P. 61(142).

**Site :- Govt. Seed Multiplication and Demons. Farm,
Nabibagh.**

Type :- 'D'.

Object :-—To study the effect of pre-emergence and post-emergence application of weedicide on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS :

10 weedicide treatments: W_0 = Control, W_1 = Pre-emergence application of weedicide-once, W_2 = Post-emergence application of weedicide-once, W_3 = Post-emergence application of weedicide-twice, N_4 = Pre-emergence application + post-emergence application once, W_5 = Pre-emergence application + local method of weeding, W_6 = Post-emergence application + local method of weeding, W_7 = Pre-emergence application + post-emergence application + local method of weeding, W_8 = Local method of weeding and W_9 = Cultural method.

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 7.6 cm. × 2.7 cm. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—contd. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 557 Kg/ha. (ii) 174.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	W_0	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8	W_9
Av. yield	365	373	484	498	493	670	680	685	666	656

Crop :- Wheat (Rabi).

Ref :- M.P. 60(196), 61(165), 62(133), 63(76).

**Site :- Govt. Agri. Res. Stn.,
Adhartal**

Type :- 'M'.

Object :-—To study the effect of different forms of nitrogenous fertilizers with different methods of application on Wheat under rain-fed conditions.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clay—Loam (Medium—black). (iii) Middle of November. (iv) (a) and (b) N.A. (c) 100 to 112 Kg/ha. (d) Rows 30 cm. apart. (e) —. (v) N.A. (vi) Hy - 65. (vii) Unirrigated. (viii) N.A. (ix) 78 cm. ; 83 cm. ; 82 cm. ; N.A. (x) March—April.

2. TREATMENTS :

All combinations of (1) and (2) + 5 extra treatments.

(1) 4 forms of fertilizers : F_1 = A/S, F_2 = A/S/N, F_3 = Urea and F_4 = C/A/N.

(2) 2 methods of application : M_1 = Fertilizer drilled with seed and M_2 = Fertilizer drilled separately.

5 Extra treatment : T_0 = Control (No Fertilizers), T_1 = A/S/N + Soil drilled with seed, T_2 = Urea + Soil drilled with seed, T_3 = Urea alone drilled with seed and T_4 = Super alone drilled with seed.

3. DESIGN :

(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) to (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (ii) Yield of grain. (iv) (a) 1960-63. (b) N.A. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Neither the plot-wise yield data, nor the complete results are available. The experiments have been combined by considering the Treatments \times years interaction as the error for testing the treatments.

5. RESULTS :

Pooled results

(i) 697 Kg/ha. (ii) 98.7 (based on 36 d.f. made up of Treatments \times years interaction). (iii) Main effect of M and "between extra treatments" are significant. (iv) Av. yield of grain in Kg/ha.

Extra treatments: $T_0=546$, $T_1=760$, $T_2=746$, $T_3=769$ and $T_4=557$ Kg/ha.

	F ₁	F ₂	F ₃	F ₄	Mean
M ₁	754	764	821	675	754
M ₂	636	659	685	690	668
Mean	695	712	753	682	711

C.D. for M marginal means = 34.9 Kg/ha.

C.D. for extra treatments means = 49.4 Kg/ha.

Individual results

Treatments	M ₁	M ₂	Sig.	F ₁	F ₂	F ₃	F ₄	Sig.
Years								
1960	758	719	N.A.	700	769	820	663	N.A.
1961	863	845	N.A.	803	889	930	794	N.A.
1962	676	593	N.A.	675	643	598	621	N.A.
1963	718	514	N.A.	603	546	663	651	N.A.
Pooled	754	668	*	695	712	753	682	N.S.

Treatments	T ₀	T ₁	T ₂	T ₃	T ₄	Sig.	G.M.	S.E./plot
Years								
1960	604	644	833	810	850	N.A.	750	N.A.
1961	698	887	921	957	655	N.A.	842	N.A.
1962	526	815	781	606	378	N.A.	629	N.A.
1963	356	595	450	702	346	N.A.	567	N.A.
Pooled	546	760	746	769	557	*	697	98.7

Crop :- Wheat (Rabi).

Ref :- M.P. 60(19), 61(10).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'M'.

Object :- To find out the most suitable stage of burying G.M. crops with and without P and its after effect on the yield of succeeding Wheat crop.

1. BASAL CONDITIONS :

- (i) (a) G.M. crop—Wheat. (b) and (c) As per treatments. (ii) Mar. No. 1. (iii) 27.10.60 ; 4 11.61.
 (iv) (a) 2 *bakherings* and one ploughing. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A.
 (v) Nil (vi) N.A. ; NP-710. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) N.A. ; 29.3.62 to 1.4.62.

2. TREATMENTS :

Main-plot treatments :

2 stages of burying G.M. crops : $B_1=5$ weeks after sowing and $B_2=7$ weeks after sowing.

Sub plot treatments :

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

(1) 4 G.M. crops : G_1 =Fallow, G_2 =Cowpea, G_3 =*Sannhemp* and G_4 =*Dhaincha*.

(2) 2 levels of P_2O_5 applied to G.M. crops : $P_0=0$ and $P_1=44.8$ Kg/ha.

Control : No G.M. crop+44.8 Kg/ha. of N+44.8 Kg/ha. of P_2O_5 .

3. DESIGN :

- (i) Split-plot. (ii) (a) 2 main-plots/replication ; 9 sub-plots/main-plot (b) N.A. (iii) 4. (iv) (a) 9 2 m. \times 5.5 m. ; 11.1 m. \times 4.6 m. (b) 7.5 m \times 4.3 m. ; 10.2 m. \times 4.0 m. (v) 88 cm. \times 61 cm. (vi) Yes.

4. GENERAL :

- (i) Normal. (ii) Nil ; Attack of white bugs. (iii) Grain yield. (iv) (a) 1960—61. (b) No. (c) Nil
 (v) Jora and Bhand. (vi) Nil. (vii) As the sub-plot error variances are heterogenous, results of individual years have been presented under 5. Results.

5. RESULTS :

60(19)

- (i) 1135 Kg/ha. (ii) (a) 101.0 Kg/ha. (b) 73.5 Kg/ha. (iii) Only control vs others is highly significant.
 Av. yield of grain in Kg/ha.

Control=1450 Kg/ha.

	G_1	G_2	G_3	G_4	P_0	P_1	Mean
B_1	1157	1213	1037	1089	1053	1195	1124
B_2	1163	991	961	1147	1051	1079	1065
Mean	1160	1102	999	1118	1052	1137	1095
P_0	1110	1120	934	1046			
P_1	1210	1084	1064	1190			

C.D. for control vs others=55.4 Kg/ha.

61(10)

- (i) 1009 Kg/ha. (ii) (a) 91.3 Kg/ha. (b) 135.9 Kg/ha. (iii) Main effect of P is highly significant and control vs others is significant. (iv) Av. yield of grain in Kg/ha.

Control=1266 Kg/ha.

	G_1	G_2	G_3	G_4	P_0	P_1	Mean
B_1	1090	862	859	1053	925	1007	966
B_2	926	1128	952	947	853	1123	988
Mean	1008	995	905	1000	889	1065	977
P_0	870	913	908	866			
P_1	1146	1078	902	1134			

C.D. for P marginal means=68.4 Kg/ha.

C.D. for control vs others =102.6 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(15), 61(21), 62(22), 63(28),
64(12), 65(5).

Site :- Govt. Agri. Farm, Bhind.

Type :- 'M'.

Object :- To find out the optimum date of burying different G.M. crops with and without P and their effect on the yield of succeeding wheat crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) wheat. (c) N.A. (ii) Sandy loam. (iii) 27.10.60; 15, 16.11.61; 21.10.62; 4.11.63; 20, 21.10.64; 7.11.65. (iv) (a) Ploughings and *bakherings*. (b) Line sowing with *Nari*. (c) 89.6 Kg/ha. (d) 30 cm. between lines. (e) — (v) Nil. (vi) C—281 for 63; NP—710 for 65; N.A. for others. (vii) Irrigated. (viii) 3 Weedings. (ix) 7.0 cm. for 60 and N.A. for others. (x) 1.4.61; 10.4.62; N.A.; 27/30.3.64; 1, 3, 5 and 6.4.65; 25.3 to 1.4.66.

2. TREATMENTS :

Main-plot treatments :

2 stages of burying G.M. crops : $T_1=5$ weeks after sowing and $T_2=7$ weeks after sowing.

Sub-plot treatments :

All combinations of (1) and (2)+a control.

(1) 4 G.M. crops : $G_0=Fallow$, $G_1=Cowpea$, $G_2=Sannhemp$ and $G_3=Dhaincha$.

(2) 2 levels of P_2O_5 as Super : $P_0=0$, and $P_1=44.8$ Kg/ha.

Control : 44.8 Kg/ha. of N+44.8 Kg/ha. of P_2O_5 .

3. DESIGN :

(i) Split-plot. (ii) (a) 2 main plots/replication; 9 sub-plots/main-plot. (b) N.A. (iii) 4 (iv) (a) 7.9 m. × 6.7 m. for 60; 11.0 m. × 4.6 m. for others. (b) 6.7 m. × 5.5 m. for 60; 10.1 m. × 4.0 m. for others. (v) 61 cm. × 61 cm. for 60; 45 cm. × 23 cm. for others. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—contd. (b) Yes. (c) Nil. (v) Jora and Baroda. (vi) Nil. (vii) As the experiment is continued beyond 1965, results of individual years have been presented under 5. Results.

5. RESULTS :

60(15)

(i) 1252 Kg/ha. (ii) (a) 65.3 Kg/ha. (b) 104.9 Kg/ha. (iii) Control Vs. others only is significant. (iv) Av. yield of grain in Kg/ha.

Control=993 Kg/ha.

	G_0	G_1	G_2	G_3	P_0	P_1	Mean
T_1	1262	1356	1206	1139	1151	1331	1241
T_2	1394	1376	1410	1133	1245	1411	1328
Mean	1328	1366	1308	1136	1198	1371	1284
P_0	1308	1292	1210	982			
P_1	1348	1440	1406	1290			

C.D. for Control Vs. others=59.0 Kg/ha.

61(21)

(i) 1617 Kg/ha. (ii) (a) 129.3 Kg/ha. (b) 214.8 Kg/ha. (iii) Main effect of P and control Vs. others are significant. (iv) Av. yield of grain in Kg/ha.

Control=1206 Kg/ha.

	G ₀	G ₁	G ₂	G ₃	P ₀	P ₁	Mean
T ₁	1458	1893	1885	1369	1653	1649	1651
T ₂	1790	1618	1624	1709	1438	1933	1685
Mean	1624	1756	1755	1539	1546	1791	1668
P ₀	1466	1599	1821	1296			
P ₁	1782	1912	1688	1782			

C.D. for Control Vs. others=121.0 Kg/ha.

C.D. for P marginal means=108.2 Kg/ha.

62(22)

(i) 2229 Kg/ha. (ii) (a) 528.6 Kg/ha. (b) 627.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=2229 Kg/ha.

	G ₀	G ₁	G ₂	G ₃	P ₀	P ₁	Mean
T ₁	2822	2256	2233	2347	2554	2275	2415
T ₂	2314	2205	1986	1667	2007	2079	2043
Mean	2568	2231	2110	2007	2281	2177	2229
P ₀	2491	2510	2092	2030			
P ₁	2645	1952	2127	1984			

63(28)

(i) 1817 Kg/ha. (ii) (a) 1158.4 Kg/ha. (b) 876.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=1906 Kg/ha.

	G ₀	G ₁	G ₂	G ₃	P ₀	P ₁	Mean
T ₁	1847	2024	2073	1411	1830	1847	1838
T ₂	1903	1664	1810	1711	1694	1850	1772
Mean	1875	1844	1942	1561	1762	1849	1805
P ₀	1791	1767	1937	1553			
P ₁	1959	1921	1946	1569			

64(12)

(i) 896 Kg/ha. (ii) (a) 211.5 Kg/ha. (b) 125.9 Kg/ha. (iii) Main effects of G, P, control Vs. others. and interaction G×T are all highly significant. (iv) Av. yield of grain in Kg/ha.

Control=1468 Kg/ha.

	G ₀	G ₁	G ₂	G ₃	P ₀	P ₁	Mean
T ₁	694	829	821	1085	751	963	857
T ₂	618	852	927	773	677	907	792
Mean	656	841	874	929	714	935	825
P ₀	580	725	745	807			
P ₁	732	956	1003	1051			

C.D. for G marginal means =89.7 Kg/ha.
 C.D. for P marginal means =63.5 Kg/ha.
 C.D. for Control Vs. others =70.9 Kg/ha.
 C.D. for T means at the same level of G=194.6 Kg/ha.
 C.D. for G means at the same level of T=126.7 Kg/ha.

65(5)

(i) 2753 Kg/ha. (ii) (a) 350.8 Kg/ha. (b) 532.5 Kg/ha. (iii) Control Vs. others alone is significant. (iv) Av. yield of grain in Kg/ha.

Control=3200 Kg/ha.

	G ₀	G ₁	G ₂	G ₃	P ₀	P ₁	Mean
T ₁	2625	2597	2684	2896	2729	2671	2700
T ₂	2593	2709	2805	2662	2623	2761	2692
Mean	2608	2653	2745	2779	2676	2716	2696
P ₀	2566	2609	2759	2771			
P ₁	2652	2697	2731	2787			

C.D. for control Vs. others=300.1 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 63(27).****Site :- Govt. Agri. Farm, Bhind.****Type :- 'M'.**

Object :- To study the effect of different G.M. crops on the yield of succeeding Wheat crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) As per treatments. (c) N.A. (ii) Sandy loam. (iii) 14.11.63. (iv) (a) 2 *bakherings*. (b) Line sowing by *Nari* plough. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) —. (v) 33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of P₂O₅ as Super. (vi) NP-710. (vii) Irrigated. (viii) 3 weedings. (ix) N.A. (x) 26.3.64.

2. TREATMENTS :

4 G.M. crops: G₀=Fallow, G₁=Cowpca, G₂=Moong and G₃=Groundnut.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.1 m. × 4.6 m. (b) 10.2 m. × 3.9 m. (v) 45 cm. × 35 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1963—only. (b) and (c) —. (v) Jora. (vi) and (vii) Nil.

5. RESULTS :

(i) 2629 Kg/ha. (ii) 513.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	G ₀	G ₁	G ₂	G ₃
Av. yield	2560	2363	2665	2929

Crop :- Wheat (Rabi).

Ref :- M.P. 60(96), 61(75), 62(46).

Site :- Govt. Agri. Res. Farm, Chhindwara. Type :- 'M'.

Object :—To find out the best dose of manure for rain-fed Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow for 60 and *Sannhemp* (G.M.) for others. (c) Nil. (ii) Medium soil. (iii) 28.10.60 ; 16.11.61 ; 23.10.62. (iv) (a) One ploughing and two *bakherings*. (b) Drilled with *Nari*. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) 25 C.L./ha. of F.Y.M. (vi) Hy—11 for 61(75) and Hy—65 for others. (vii) Unirrigated. (viii) Nil. (ix) 8 cm. ; 13 cm. ; 15 cm. (x) 10.3.61 ; 26.3.62 ; 14.3.63.

2. TREATMENTS ;

4 doses of manure : M₀ = Control (no manure), M₁ = 8.4 Kg/ha. of N + 8.4 Kg/ha. of P₂O₅, M₂ = 2 M₁ and M₃ = 3 M₁.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) and (b) 10.1 m. × 5.0 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—62. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results

(i) 1091 Kg/ha. (ii) 856.1 Kg/ha. (based on 6 d.f. made up of Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂	M ₃
Av. yield	857	1087	1182	1239

Individual results

Treatments	M ₀	M ₁	M ₂	M ₃	Sig.	G.M.	S.E./plot
Years							
1960	1001	1016	897	941	N.S.	964	233.4
1961	777	1270	1539	1599	**	1296	126.6
1962	794	975	1110	1176	**	1014	116.0
Pooled	857	1087	1182	1239	N.S.	1091	856.1

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(97), 61(74).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'M'.

Object :- To find out the suitable dose of fertilizer for Wheat raised under irrigated conditions.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) Maize; *Moong* (G.M.) (c) 22.4 Kg/ha. of N as A/S + 16.8 Kg/ha. of P₂O₅ as Super; N.A.
 (ii) Medium soil. (iii) 1.11.60; 1.11.61. (iv) (a) One ploughing and 2 to 3 *bakherings*. (b) Drilled with *Nari*. (c) 90 Kg/ha. (d) 23 cm. × 8 cm. (e) —. (v) 25 C.L./ha. of F.Y.M. (vi) Hy-65; Hy-11.
 (vii) Irrigated. (viii) Nil. (ix) 3 cm.; 13 cm. (x) 9.3.61; 28.3.62.

2. TREATMENTS:

4 manurial treatments: M₀=Control, M₁=22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅, M₂=2×M₁ and M₃=3×M₁.

3. DESIGN:

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) and (b) 10.1 m. × 5.0 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1958-61. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Experiments No. 58(58) and 59(101) have also been considered for pooling. Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS:

Pooled results

- (i) 2168 Kg/ha. (ii) 608.9 Kg/ha. (based on 9 d.f. made up of Treatments × years interaction. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂	M ₃
Av. yield	1582	2069	2351	2671

C.D. = 397.5 Kg/ha.

Individual results.

Treatments	M ₀	M ₁	M ₂	M ₃	Sig.	.M.	S.E./plot
Years							
1960	1734	1928	2137	2735	**	2133	205.8
1961	1308	1741	1905	1920	**	1718	270.3
Pooled	1582	2069	2351	2671	**	2168	608.9

Crop :- Wheat (*Rabi*).

Ref :- M.P. 61(83), 62(50).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'M'.

Object :- To study the effect of different manures on the yield of Wheat.

BASAL CONDITIONS:

- (i) (a) Nil. (b) *Moong* (G.M.). (c) Nil. (ii) *Sehra*. (iii) 5.11.61; 20.10.62. (iv) (a) One ploughing and 3 *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. × 8 cm. (e) —. (v) 37 C.L./ha. of F.Y.M.; 25 C.L./ha. of F.Y.M. (vi) Hy-11; Hy-65. (vii) Irrigated. (viii) Nil. (ix) 14 cm.; 15 cm. (x) 4.4.62; 19.3.63.

2. TREATMENTS

6 manurial treatments: M_0 =Control (no manure), M_1 =44.8 Kg/ha. of N as compost, M_2 =29.9 Kg/ha. of N as Compost+14.9 Kg/ha. of N as A/S+12.0 Kg/ha. of P_2O_5 as Super +29.9 Kg/ha. of K_2O as Mur. Pot. M_3 =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of N as Compost+17.9 Kg/ha. of P_2O_5 as Super+29.9 Kg/ha. of K_2O as Mur. Pot., M_4 =14.9 Kg/ha. of N as Compost+29.9 Kg/ha. of N as A/S+23.9 Kg/ha. of P_2O_5 as Super+39.9 Kg/ha. of K_2O as Mur. Pot. and M_5 =44.8 Kg/ha. of N as Compost+25.9 Kg/ha. of P_2O_5 as Super+59.7 Kg/ha. of K_2O as Mur. Pot.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 9.1 m. × 7.3 m. (v) Nil. (vi) Yes.

3. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1961-62. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS:

Pooled results

(i) 1004 Kg/ha. (ii) 356.7 Kg/ha. (based on 35 d.f. made up of pooled error and Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_0	M_1	M_2	M_3	M_4	M_5
Av. yield	946	1065	755	1017	1306	936

Individual results

Treatments	M_0	M_1	M_2	M_3	M_4	M_5	Sig.	G.M.	S.E./plot
Years									
1961	712	949	627	1051	1102	949	N.S.	898	356.5
1962	1181	1181	882	983	1510	923	N.S.	1110	371.0
Pooled	946	1065	755	1017	1306	936	N.S.	1004	356.7

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(104).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'M'.

Object :- To find out the most suitable form of nitrogenous fertilizer for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Moong* (G.M.). (c) Nil. (ii) *Sehra* soil. (iii) 8.11.60. (iv) (a) One ploughing and 3 *bakhrings*. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. × 8 cm. (e) —. (v) 25 C.L./ha. of F.Y.M. (vi) Hy-11. (vii) Irrigated. (viii) Nil. (ix) 2 cm. (x) 21.3.61.

2. TREATMENTS :

5 sources of 22.4 Kg/ha. of N : S_0 =Nil (control), S_1 =A/S, S_2 =A/S/N, S_3 =Urea and S_4 =C/A/N. 22.4 Kg/ha. of P_2O_5 was given as a common dose to all the treatments except control. Fertilizers drilled with seed except Urea which was broadcast 48 hours before sowing.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 2. (iv) (a) and (b) 6.1 m. × 16.8 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 682 Kg/ha. (ii) 64.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S ₀	S ₁	S ₂	S ₃	S ₄
Av. yield	521	778	621	710	778

Crop :- Wheat (Rabi).

Ref :- M.P. 60(111).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- M².

Object :-To find out the best green manure crop with and with out for wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) As per treatments. (c) Nil. (ii) Heavy. (iii) 29.10.60. (iv) (a) One ploughing. (b) 3 *backherings*, Drilling with *Nari*. (c) 90 Kg/ha. (d) 23 cm. × 8 cm. (e) N.A. (v) 25 C.L./ha. of F.Y.M. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) 8 cm. (x) 10.3.61.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 5 G.M. crops : G₀=N₀ G.M., G₁=*Moong*, G₂=*Tarota*, G₃=*Urid* and G₄=*Gwar*.

(2) 2 levels of P₂O₅ applied to G.M. crops : P₀=0 and P₁=22.4 Kg/ha.

G.M. crops sown on 30.6.60.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) and (b) 12.2 m. × 3.1 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1959—60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1605 Kg/ha. (ii) 289.0 Kg/ha. (iii) Main effects of G and interaction G × P are significant. (iv) Av. yield of grain in Kg/ha.

	G ₀	G ₁	G ₂	G ₃	G ₄	Mean
P ₀	1037	1861	1434	1861	1587	1556
P ₁	1739	1617	1465	1739	1709	1654
Mean	1388	1739	1449	1800	1648	1605

C.D. for G marginal means = 296.5 Kg/ha.

C.D. for body of table = 417.9 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 61(120).****Site :- Instt. of Plant Industry, Indore.****Type :- 'M'.**

Object :—To study the effect of different nitrogenous fertilizers with and without P on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black Cotton-soil. (iii) 1.12.61. (iv) (a) 3 ploughings and 2 *bakharings*. (b) Drilling (c) 67 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil. (vi) Hy—65. (vii) Unirrigated. (viii) 2 Weedings. (ix) N.A. (x) 9.4.62.

2. TREATMENTS :

All combinations of (1), (2) and (3)+control (2 plots).

(1) 2 levels of N : $N_1=11.2$ and $N_2=22.4$ Kg/ha.(2) 3 sources of N : $S_1=A/S$, $S_2=Urea$ and $S_3=A/S/N$.(3) 2 levels of P_2O_5 as Super : $P_1=11.2$ and $P_2=22.4$ Kg/ha.**3. DESIGN :**

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 4.3 m. × 12.2 m. (b) 3.6 m. × 10.7 m. (v) 36cm. × 76 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 623 Kg/ha. (ii) 82.6 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

Control=598 Kg/h.

	N_1	N_2	P_1	P_2	Mean
S_1	613	671	643	641	642
S_2	573	629	615	587	601
S_3	620	655	626	649	638
Mean	602	652	628	626	627
P_1	596	659			
P_2	608	645			

C.D. for N marginal means=48.2 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 60(118).****Site :- Instt. of Plant Industry, Indore.****Type :- 'M'.**

Object :—To find out the suitable time of application of G.M. and fertilizers for higher yield of Wheat under rainfed conditions.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) As per treatments. (ii) Black Cotton. (iii) 17.10.60. (iv) (a) 2 ploughings and 2 *bakharings*. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. × 8 cm. (e) —. (v) Nil. (vi) Hy—65. (vii) Unirrigated. (viii) Nil. (ix) 1 cm. (x) 1.3.61.

2. TREATMENTS:

All combinations of (1) and (2)+3 extra treatments.

(1) 5 times of application of sunnhemp (G.M.): G_0 =No green manures (Fallow), G_1 =Every year, G_2 =Once in 3 years, G_3 =In alternate year, and G_4 =In 1st & 2nd year and no G.M. in 3rd year.

(2) 3 Levels of P_2O_5 as Super: $P_0=0$, $P_1=44.8$ and $P_2=89.7$ Kg/ha.

3 extra treatments: $M_1=22.4$ Kg/ha. of N+22.4 Kg/ha. of P_2O_5 , $M_2=22.4$ Kg/ha. of N+44.8 Kg/ha. of P_2O_5 and $M_3=22.4$ Kg/ha. of N+89.7 Kg/ha. of P_2O_5 .

3. DESIGN:

(i) R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) (a) 12.2 m. \times 6.4 m. (b) 10.7 m. \times 5.0 m. (v) 76 cm. \times 71 cm. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959-61. (b) Yes. (c) Nil. (v) to (vi) Nil. (vii) In this year, treatments G_1 and G_2 are identical and treatments G_1 and G_3 are identical.

5. RESULTS:

(i) 562 Kg/ha. (ii) 92.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	G_0	G_1	G_2	Mean
P_0	512	532	543	532
P_1	561	569	554	561
P_2	558	610	571	584
Mean	544	570	556	559

$M_1=539$ Kg/ha., $M_2=593$ Kg/ha. and $M_3=590$ Kg/ha.

Crop :- Wheat (Rabi).

Ref. :- M.P. 61(88).

Site :- Instt. of Plant Industry, Indore.

Type :- 'M'.

Object :- To find out the suitable time of application of G.M. fertilizers for higher yield of wheat under irrigated conditions.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) As per treatments. (ii) Black Cotton. (iii) 16.11.61. (iv) (a) One ploughing and 1 harrowing. (b) Drilling. (c) 73 Kg/ha. (d) 35 cm. \times 13 cm. (e) N.A. (v) 33.6 Kg/ha. of P_2O_5 as Super. (vi) Hy-65. (vii) Irrigated. (viii) 2 weedings. (ix) 5 cm. (x) 27.3.62.

2. TREATMENTS:

All combinations of (1) and (2)+3 extra treatments:

(1) 5 times of application of *Sunn hemp* (G.M.): G_0 =Fallow (No G.M.), G_1 =Every year, G_2 =Once in 3 years, G_3 =In alternate year and G_4 =In 1st and 2nd year and no G.M. in 3rd year.

(2) 3 levels of P_2O_5 as Super: $P_0=0$, $P_1=44.8$ and $P_2=89.7$ Kg/ha.

3 Extra treatments: $M_1=22.4$ Kg/ha. of N+22.4 Kg/ha. of P_2O_5 , $M_2=22.4$ Kg/ha. of N+44.8 Kg/ha. of P_2O_5 and $M_3=22.4$ Kg/ha. of N+89.7 Kg/ha. of P_2O_5 .

3. DESIGN:

(i) R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) (a) 12.2 m. \times 6.4 m. (b) 10.7 m. \times 5.0 m. (v) 76 cm. \times 71 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory (ii) Nil. (iii) Yield of grain. (iv) (a) 1959—61. (b) Yes (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 918 Kg/ha. (ii) 128.3 Kg/ha. (iii) Main effect of G alone is significant. (iv) Av. yield of grain in Kg/ha.

$M_1=947$ Kg/ha., $M_2=1010$ Kg/ha. and $M_3=1010$ Kg/ha.

	G ₀	G ₁	G ₂	G ₃	G ₄	Mean
P ₀	886	813	973	812	811	859
P ₁	935	905	1029	918	854	928
P ₂	885	940	1074	867	881	929
Mean	902	886	1025	866	849	905

C.D. for G marginal means=105.2 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(8), 61(7), 62(21), 63(19), 64(15).

Site :- Govt. Agri. Farm, Jora. **Type :-** 'M'.

Object :- To find out the effect of different stages of burying G.M crops with and without Super on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) As per treatments. (ii) Sandy loam. (iii) 2/3.11.60 ; 9.12.61 ; 1.12.62 ; 9.11.63 ; 1.11.64. (iv) (a) 2—4 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Rows 30 cm. apart. (e) —. (v) Nil. (vi) N.A. for 60 ; N.P.—710 for 61 and C—281 for others (vii) Irrigated. (viii) Nil for 60 and 61 ; 1—2 weedings for others. (ix) N.A. ; 1.5 cm. ; 38 cm ; Nil ; N.A. (x) 31.3.61 ; 13.4.62 ; 2.4.63 ; 29.3.64 ; 24.3.65.

2. TREATMENTS :

Main-plot treatments :

2 stages of burying G.M. Crops : $T_1=5$ weeks after sowing and $T_2=7$ weeks after sowing.

Sub-plot treatments :

All combinations of (1) and (2)+an extra treatment (E).

(1) 4 G.M. Crops : $G_1=$ Sannhemp, $G_2=$ Dhaincha, $G_3=$ Cowpea and $G_4=$ Fallow (No G.M. Crop).

(2) 2 levels of P_2O_5 as Super applied to G.M. Crops : $P_0=0$ and $P_1=44.8$ Kg/ha.

Extra treatment : (E)=44.8 Kg/ha. of N as A/S+44.8 Kg/ha. of P_2O_5 as Super, (without any G.M. Crop).

3 DESIGN :

(i) Split-plot. (ii) 2 main-plots/replication and 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.9 m. × 6.7 m. for 60 ; 11.1 m. × 4.6 m. for others. (b) 6.7 m. × 5.5 m. for 60 ; 10.2 m. × 4.0 m. for others. (v) 60 cm. × 60 cm. for 60 ; 45 cm. × 30 cm. for others. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Cut-worms controlled by dusting B.H.C. for 62, Nil for others. (iii) Growth observations and yield of grain. (iv) (a) 1960—64. (b) No. (c) Nil. (v) Baroda. (vi) Nil. (vii) As sub-plot error variances are heterogeneous, results of individual years have been presented under 5. Results.

5. RESULTS:

60(8)

(i) 1764 Kg/ha. (ii) (a) 58.4 Kg/ha. (b) 114.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

E=1892 Kg/ha.

	G ₁	G ₂	G ₃	G ₄	P ₀	P ₁	Mean
T ₁	1761	1682	1835	1917	1874	1724	1799
T ₂	1766	1619	1861	1543	1710	1684	1697
Mean	1763	1651	1848	1730	1792	1704	1748
P ₀	1967	1698	1823	1781			
P ₁	1659	1603	1873	1679			

61(7)

(i) 813 Kg/ha. (ii) (a) 250.8 Kg/ha. (b) 255.7 Kg/ha. (iii) Only extra treatment vs. others is significant. (iv) Av. yield of grain in Kg/ha.

E=1270 Kg/ha.

	G ₁	G ₂	G ₃	G ₄	P ₀	P ₁	Mean
T ₁	631	688	788	832	767	703	735
T ₂	839	746	820	708	753	804	778
Mean	735	717	804	770	760	753	756
P ₀	777	727	826	710			
P ₁	693	707	782	830			

C.D. for extra treatment vs. others=204.1 Kg/ha.

62(21)

(i) 1496 Kg/ha. (ii) (a) 100.5 Kg/ha. (b) 310.5 Kg/ha. (iii) Only the main effect of T is highly significant. (iv) Av. yield of grain in Kg/ha.

E=1496 Kg/ha.

	G ₁	G ₂	G ₃	G ₄	P ₀	P ₁	Mean
T ₁	1448	1514	1476	1178	1428	1380	1404
T ₂	1725	1688	1719	1218	1543	1632	1588
Mean	1587	1601	1598	1198	1486	1506	1496
P ₀	1551	1542	1663	1187			
P ₁	1622	1660	1532	1209			

C.D. for T marginal means=79.9 Kg/ha.

63(19)

- (i) 2796 Kg/ha. (ii) (a) 620.9 Kg/ha. (b) 497.9 Kg./ha. (iii) Only the main effect of P is highly significant. (iv) Av. yield of grain in Kg/ha.

E=2763 Kg/ha.

	G ₁	G ₂	G ₃	G ₄	P ₀	P ₁	Mean
T ₁	2492	2454	2993	2545	2486	2756	2621
T ₂	3028	3066	3115	2703	2712	3244	2978
Mean	2760	2760	3054	2624	2599	3000	2800
P ₀	2686	2514	2839	2357			
P ₁	2834	3006	3269	2891			

C.D. for P marginal means=250.2 Kg/ha.

64(15)

- (i) 3271 Kg/ha. (ii) (a) 162.1 Kg/ha. (b) 516.9 Kg/ha. (iii) Interaction G × P alone is significant. (iv) Av. yield of grain in Kg/ha.

E=3469 Kg/ha.

	G ₁	G ₂	G ₃	G ₄	P ₀	P ₁	Mean
T ₁	3070	3093	3370	3231	3215	3167	3191
T ₂	3460	3401	3324	3027	3075	3531	3303
Mean	3265	3247	3347	3129	3145	3349	3247
P ₀	2906	3151	3215	3308			
P ₁	3624	3343	3479	2950			

C.D. for body of G × P table=519.5 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 63(34).

Site :- Agri. Res. Stn., Kuthulia.

Type :- 'M'.

Object : -To study the effect of different nitrogenous fertilizers alone and in combination with P on the yield of Wheat.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) Paddy. (c) N.A. (ii) Clayey and clayey loam. (iii) 26.10.63. (iv) (a) 4 ploughings. (b) Line sowing. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) —. (v) Nil. (vi) Hy-65. (vii) Un-irrigated. (viii) Nil. (ix) N.A. (x) 26.4.64.

2. TREATMENTS:

All combinations of (1), (2) and (3)+2 extra treatments.

(1) 2 levels of N: $N_1=11.2$ and $N_2=22.4$ Kg/ha.

(2) 3 sources of N: $S_1=A/S$, $S_2=C/A/N$ and $S_3=Urea$.

(3) 2 levels of P_2O_5 as Super: $P_1=11.2$ and $P_2=22.4$ Kg/ha.

2 extra treatments: $E_1=11.2$ and $E_2=22.4$ Kg/ha. of P_2O_5 as Super.

3. DESIGN:

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) and (b) $4.9 \text{ m.} \times 10.7 \text{ m.}$ (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—only. (b) and (c) —. (v) N.A. (vi) No. (vii) Nil.

5. RESULTS:

(i) 1023 Kg/ha. (ii) 121.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

$E=989$ Kg/ha., $E_2=941$ Kg/ha.

	S_1	S_2	S_3	P_1	P_2	Mean
N_1	1038	970	1340	1039	992	1016
N_2	1100	1050	1003	1091	1010	1051
Mean	1069	1010	1021	1065	1001	1033
P_1	1119	1044	1032			
P_2	1018	975	1010			

Crop :- Wheat (Rabi).

Ref :- M.P. 63(32).

Site :- Agri. Res. Stn., Kuthulia.

Type :- 'M'.

Object :-To find out the effect of N and P applied in combination on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clayey and clayey loam. (iii) 28.10.63. (iv) (a) 4 ploughings. (b) Line sowing. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) —. (v) Nil. (vi) Hy—65. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 28.4.64

2. TREATMENTS:

4 manurial treatments: M_0 =No manure, $M_1=11.2$ Kg/ha. of N as A/S+11.2 Kg/ha. of P_2O_5 as Super, $M_2=2 \times M_1$ and $M_3=3 \times M_1$.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) $13.7 \text{ m.} \times 4.6 \text{ m.}$ (b) $13.1 \text{ m.} \times 4.0 \text{ m.}$ (v) $30 \text{ cm.} \times 30 \text{ cm.}$ (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS:

(i) 875 Kg/ha. (ii) 152.3 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂	M ₃
Av. yield	733	832	1035	900

C.D.=187.4 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(72), 61(41).

Site :- Central Agri. Res. Farm, Nabibagh.

Type :- 'M'.

Object :—To study the effect of G.M. crops with and without P on the yield of succeeding Wheat crop.

1. BASAL CONDITIONS :

(i) (a) G.M.-Wheat. (b) and (c) As per treatments. (ii) Medium black. (iii) 24.10.60 ; 27.11.61. (iv) (a) *Bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) C-591. (vii) Un-irrigated. (viii) Nil. (ix) N.A. (x) 29.3.61 ; 24.4.62.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 4 G.M. crops :- G₁=Early *moong*, G₂=*Sann hemp*, G₃=*Dhanich* and G₄=*Cowpea*

(2) 2 levels of P₂O₅ as Super applied to G.M. crops. P₀=0 and P₁=44.8 Kg/ha.

3. DESIGN :

(1) Fact. in R.B.D. (ii) (a) 8 (b) N.A. (iii) 4. (iv) (a) 16.8 m. × 6.1 m. (b) 16.8 m. × 6.1 m. for 60 15.4 m. × 4.9 m. for 61 (v) Nil for 60 ; 61 cm. × 61 cm. for the other. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-61 (Modified in 1962). (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) As the error variances are heterogeneous and Treatments × years interaction is absent, results of individual years have been presented under 5—Results.

5. RESULTS :

60(72)

(i) 1069 Kg/ha. (ii) 238.6 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of grain in Kg/ha.

	G ₁	G ₂	G ₃	G ₄	Mean
P ₀	956	1047	878	1011	973
P ₁	1065	1207	1200	1189	1165
Mean	1011	11	1039	1100	1069

C.D. for P marginal means=175.3 Kg/ha.

61(41)

(i) 1057 Kg/ha. (ii) 93.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	G ₁	G ₂	G ₃	G ₄	Mean
P ₀	1072	1095	1095	1032	1068
P ₁	1082	1072	986	1045	1046
Mean	1077	1073	1040	1039	1057

Crop :- Wheat (Rabi).

Ref. :- M.P. 62(23).

Site :- Central Agri, Res. Farm, Nabibagh.

Type :- 'M'.

Object :-To study the effect of G.M. Crops with and without P on the yield of succeeding wheat Crop.

1. BASAL CONDITIONS:

(i) (a) G.M. Crops—Wheat. (b) and (c) As per treatments. (ii) Medium black. (iii) 4.11.62. (iv) (a) Two *bakherings*. (b) Drilled behind the *deshi* plough. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) C—281. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 2.4.63.

2. TREATMENTS:

All combinations of (1) and (2).

(1) 5 G.M. Crops :- G₀=No G.M. Crop (control), G₁=*moong*, G₂=*Ipomea*, G₃=*Cowpea* and G₄=*Sannhemp*.

(2) 2 levels of P₂O₅ as super applied to G.M. crops : P₀=₀ and P₁=22.4 Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) and (b) 4.6 m. × 12.2 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1962 only (Conducted in 1960 and 1961 in modified form. (b) No. (c) Nil (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1070 Kg/ha. (ii) 227.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain is Kg/ha.

	G ₀	G ₁	G ₂	G ₃	G ₄	Mean
P ₀	1220	1063	1188	1040	951	1092
P ₁	933	1018	1130	1072	1085	1048
Mean	1077	1041	1159	1056	1018	1070

Crop :- Wheat (Rabi).

Ref :- M.P. 60(73).

Site :- Central Agri. Res. Farm, Nabibagh.

Type :- 'M'.

Object :-To find out the effect of different methods of applying G.M. with and without P and its comparison with compost prepared with and without P.

1. BASAL CONDITIONS:

- (i) (a) G.M. crop—Wheat. (b) *Sannhemp* (G.M.). (c) As per treatments. (ii) Medium black. (iii) 25.10.60.
 (iv) (a) 3 *bakherings*. (b) Drilling with plough. (c) 90 Kg/ha- (d) 30 cm. between rows. (e) N.A.
 (v) Nil. (vi) C-591. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 1.4.61.

2. TREATMENTS :

All combinations of (1) and (2)+4 extra treatments.

- (1) 3 methods of burying *sannhemp* : N_1 =Burying by ploughing in the field, M_2 =Cut and removed for composting and M_3 =Cut and allowed to remain in the field as cover.

- (2) 3 sources of P_2O_5 at 33.6 Kg/ha. : S_0 =Nil, S_1 =Super and S_2 =B/M.

4 extra treatments: E_0 =Control, E_1 =33.6 Kg/ha. of N as Compost, E_2 =33.6 Kg/ha. of N as Compost & Super added to Compost to make up 33.6 Kg/ha. of P_2O_5 and E_3 =33.6 Kg/ha. of N as Compost+B/M added to Compost to make up 33.6 Kg/ha. of P_2O_5 .

3. DESIGN:

- (i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) 10.1 m.×3.4 m. (b) 10.1 m.×2.5 m. (v) 42 cm. on either side. (vi) Yes.

4. GENERAL:

- (i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1959-60. (b) Yes. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

- (i) 1586 Kg/ha. (ii) 295.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

E_0 =1468 Kg/ha., E_1 =1646 Kg/ha., E_2 =1577 Kg/ha. and E_3 =1670 Kg/ha.

	S_0	S_1	S_2	Mean
M_1	1488	1507	1497	1497
M_2	1572	1502	1557	1544
M_3	1478	2002	1656	1712
Mean	1513	1670	1570	1584

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(134), 61(95).

Site :- Govt. Soil. Cons. Res. Stn., Phanda.

Type :- 'M'.

Object :- To find out a suitable G.M. crop for obtaining higher yield of Wheat.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) As per treatments. (c) N.A. (ii) Black Cotton. (iii) 8.10.60; 11.11.61. (iv) (a) One ploughing and 4 *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm.×8 cm. (e) N.A. (v) Nil. (vi) Hy-65 (vii) Unirrigated (viii) Nil. (ix) 2 cm.; 5 cm. (x) 19.2.61; 14.4.62.

2. TREATMENTS

6 G.M. : G_0 =Control (no G.M.) G_1 =*Sannhemp*, G_2 =Cowpea, G_3 =Moong, G_4 =5604 Kg/ha. of *Palas* leaves, and G_5 =5604 Kg/ha. *Ipomea* leaves.

3. DESIGN:

- (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 11.3 m.×6.3 m. (b) 10.1 m.×5.0 m. (v) 61 cm.×61 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain-yield. (iv) (a) 1959-61 (Modified in 1960). (b) Yes. (c) Results of combined analysis have been presented under 5—Results. (v) and (vi) Nil. (vii) Error variances are homogenous and Treatments \times years interaction is present,

5. RESULTS:

Pooled results.

(i) 817 Kg/h. (ii) 137.4 Kg/ha. [based on 5 d.f. made up of Treatments \times years interaction]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	G ₀	G ₁	G ₂	G ₃	G ₄	G ₅
Av. yield	732	856	876	863	812	764

Individual results :

Treatments	G ₀	G ₁	G ₂	G ₃	G ₄	G ₅	Sig.	G.M.	S.E./plot
Years									
1960	623	612	667	650	576	567	*	616	39.1
1961	841	1100	1086	1075	1049	960	**	1019	65.5
Pooled	732	856	876	863	812	764	N.S.	817	137.4

Crop :- Wheat (Rabi).

Ref :- M.P. 60(132).

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'M.'

Object :- To find out a suitable combination of N and P for Wheat.

1. BASAL CONDITIONS

(i) (a) Nil. (b) and (c) N.A. (ii) Black Cotton soil. (iii) 8.10.60. (iv) (a) One ploughing and 4 *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. \times 8 cm. (e) N.A. (v) Nil. (vi) Hy—65. (vii) Unirrigated. (viii) Nil. (ix) 2 cm. (x) 17.2.61.

2. TREATMENTS :

3 manurial treatments : M₀ = Control, M₁ = 56.0 Kg/ha. of N as A/S + 67.2 Kg/ha. of P₂O₅ as Super and M₂ = 2 \times M₁.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 11.3 m. \times 6.3 m. (b) 10.1 m. \times 5.0 m. (v) 61 cm. \times 61 cm. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) Nil. (iii) Grain yield. (iv) (a) 1959-60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 486 Kg/ha. (ii) 32.7 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatments	M ₀	M ₁	M ₂
Av. yield	427	486	544

C.D. = 42.1 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 61(97), 62(53), 63(4).****Site :- Govt. Soil Cons. Res. Stn., Phanda.****Type :- 'M'.**

Object :—To find out a suitable combination of N and P for obtaining higher yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil ; *Moong*—Wheat ; Nil. (b) N.A., *Moong* ; N.A. (c) N.A. (ii) Black Cotton soil. (iii) 25.11.61 ; 16.10.62 ; 13.10.63. (iv) (a) One ploughing and 4 *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. × 8 cm. (e) N.A. (v) Nil. (vi) Hy—65. (vii) Unirrigated. (viii) Nil. (ix) 5 cm. ; 1 cm. ; 9 cm. (x) 10.4.62 23.2.63 ; 10.3.64.

2. TREATMENTS :

3 manurial treatments: M_0 =Control, M_1 =11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of P_2O_5 as Super and M_2 =2 × M_1 .

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 11.3 m. × 6.3 m. (b) 10 I m. × 5.0 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1961-63. (b) No. (c) Results of combined analysis have been presented under 5—Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS :

Pooled results.

(i) 738 Kg/ha. (ii) 193.1 Kg/ha. [based on 34 d.f. made up of pooled error and Treatments × years interaction]. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_0	M_1	M_2
Av. yield	671	704	838

C.D.=130.8 Kg/ha.

Individual results

Treatment	M_0	M_1	M_2	Sig.	G.M.	S.E./plot
Years						
1961	847	916	1183	*	982	183.9
1962	626	774	758	N.S.	719	202.7
1963	539	422	573	N.A.	511	164.1
Pooled	671	704	838	N.S.	738	193.1

Crop :- Wheat (Rabi).**Ref :- M.P. 62(55), 63(6).****Site :- Govt. Soil Cons. Res. Stn., Phanda.****Type :- 'M'.**

Object :—To find out the suitable dose and time of application of F.Y.M. for obtaining better yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Soybean—Wheat ; Nil. (b) Soybean : N.A. (c) N.A. (ii) Black cotton soil. (iii) 19.10.62 ; 11, 12.10.63. (iv) (a) 3 *bakherings* ; one ploughing and 4 *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. × 8 cm. (e) N.A. (v) Nil. (vi) Hy—65. (vii) Unirrigated (viii) Nil. (ix) 1 cm. ; 9 cm. (x) 24.2.63 ; 10.3.64.

2. TREATMENTS :

All combinations of (1) and (2)+a control.

(1) 2 levels of F.Y.M. : $F_1=12$ and $F_2=25$ C.L./ha.

(2) 2 Times of application of F.Y.M. : $T_1=$ Every year and $T_2=$ Alternate year.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 11.3 m. \times 4.6 m. (b) 10.1 m. \times 3.4 m. (v) 61 cm. \times 61 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil ; Attack of ants and rats. (iii) Grain yield. (iv) (a) 1962—63. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) In 62(55), treatments F_1T_1 and F_1T_2 are identical and treatments F_2T_1 and F_2T_2 are identical.

5. RESULTS :

62(55)

(i) 614 Kg/ha. (ii) 145.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	Control	F_1T_1	F_2T_1
Av. yield	1334	1267	1312

63(6)

(i) 614 Kg/ha. (b) 98.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=630 Kg/ha.

	T_1	T_2	Mean
F_1	598	614	606
F_2	593	637	615
Mean	595	625	610

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(141), 61(102).

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'M'.

Object :- To find out a suitable dose and time of application of F.Y.M. for Wheat for higher yield.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 7.10.60 ; 15.11.61. (iv) (a) One ploughing and 4 bakherings. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. \times 8 cm. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Unrigated. (viii) Nil. (ix) 3 cm. ; 5 cm. (x) 18.2.61 ; 10.4.62.

2. TREATMENTS :

7 manurial treatments : $F_0=$ Control (2 plots) ; $F_1=12.5$ C.L./ha. of F.Y.M. applied every year ; $F_2=25.0$ C.L./ha. of F.Y.M. applied every year ; $F_3=12.5$ C.L./ha. of F.Y.M. applied in alternate year, starting from 1960 ; $F_4=12.5$ C.L./ha. of F.Y.M. applied in alternate years, starting from 1961 ; $F_5=25$ C.L./ha. of F.Y.M. applied in alternate years, starting from 1960 and $F_6=25$ C.L./ha. of F.Y.M. applied in alternate years starting from 1961.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 11.3 m. × 4.6 m. (b) 10.1 m. × 3.4 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Poor in 1960 and satisfactory in 1962. (ii) Nil. (iii) Yield of grain (iv) (a) 1960 61. (b) Yes. (c) Nil (v) and (vi) Nil. (vii) In 1960, treatments F_0 , F_4 and F_6 are identical, F_1 and F_3 are identical and F_2 and F_5 are identical.

5. RESULTS :

60(141)

(i) 396 Kg/ha. (ii) 76.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	F_0	F_1	F_2
Av. yield	384	412	404

61(102)

(i) 798 Kg/ha. (ii) 148.7 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	F_0	F_1	F_2	F_3	F_4	F_5	F_6
Av. yield	634	756	904	815	778	889	971

C.D. for control vs. any other treatment mean = 188.8 Kg/ha.

C.D. for treatment means excluding control = 218.0 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(54), 61(31), 62(112).

Site :- Govt. Exptl. Farm, Powerkheda.

Type :- 'M'.

Object :- To study the effect of G.M. crops with and without high doses of P on the yield of Wheat crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) As per treatments. (ii) *Morand*; *Morand*; Loamy to clayey black. (iii) 29.10.60; 8.11.61; 7.11.62. (iv) (a) Cross *bakherings*. (b) Line sowing. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Hy—11. (vii) Unirrigated. (viii) Nil. (ix) 6 cm.; 28 cm.; N.A. (x) 13.3.61; 30.3.62; 3.4.63.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 G.M. crops: G_1 = *Moong* (early), G_2 = *Sann hemp*, G_3 = *Dhaincha* and G_4 = *cowpea*.

(2) 2 levels of P_2O_5 as Super: P_0 = 0 and P_1 = 44.8 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 6.1 m. × 16.8 m. for 60, 61; 6.1 m. × 15.5 m. for 62. (b) 5.5 m. × 14.8 m. for 60, 61; 5.5 m. × 14.8 m. for 62. (v) 30 cm. × 99 cm. for 60, 61; 38 cm. × 38 cm. for 62. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1960—62. (b) No. (c) Results of combined analysis are presented under 5 Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS :

Pooled results

(1) 986 Kg/ha. (ii) 151.8 Kg/ha. (based on 77 d.f. made up of pooled error and Treatments \times years interaction). (iii) Main effect of G is highly significant and interaction G \times P is significant. (iv) Av yield of grain in Kg/ha.

	G ₁	G ₂	G ₃	G ₄	Mean
P ₀	1056	987	971	862	969
P ₁	1186	927	886	1010	1002
Mean	1121	957	929	936	986

C.D. for G marginal means = 123.6 Kg/ha.

C.D. for body of table = 123.6 Kg/ha.

Individual results

Treatments	G ₁	G ₂	G ₃	G ₄	Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
Years										
1960	1169	999	968	1026	*	1024	1057	N.S.	1040	151.1
1961	1025	918	849	807	N.S.	884	916	N.S.	900	162.1
1962	1169	953	969	976	N.S.	999	1034	N.S.	1017	175.0
Pooled	1121	957	929	936	**	969	1002	N.S.	986	151.8

Crop :- Wheat (Rabi).

Ref :- 60(49), 61(36).

Site :- Govt. Expt. Farm, Powerkheda.

Type 'M'.

Object :- To compare the green manuring value of palas leaves with other G.M. crops with and without P.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) As per treatments. (ii) Morand. (iii) 28.10.60 ; 17.11.61. (iv) (a) *Cross bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) - (v) Nil. (vi) Hy-11. (vii) Unirrigated. (viii) Nil. (ix) 6.0 cm. ; 28 cm. (x) 29.3.62 ; 13.3.61.

2. TREATMENTS :

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

(i) 4 G.M. crops : G₁ = *Sannhemp*, G₂ = *Dhaincha*, G₃ = *Tarota* and G₄ = *Palas* leaves.

(2) 2 levels of P₂O₅ as Super applied to G.M. crops : P₀ = 0 and P₁ = 11.2 Kg/ha.

G.M. crops were buried on 24.8.60 ; 5.7.61.

3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 5.0 m. \times 10.1 m. (b) 4.3 m. \times 9.5 m. (v) 38 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1958-61 (modified in 1959). (b) Yes. (c) Result of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Experiment No. 59(52) has also been considered for pooled analysis. Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled results

(1) 811 Kg/ha. (ii) 138.8 Kg/ha. (based on 87 d.f. made up of pooled error and Treatments \times years interaction). (iii) Only 'control vs. others' is significant. (iv) Av. yield of grain in Kg/ha.

Control=730 Kg/ha.

	G ₁	G ₂	G ₃	G ₄	Mean
P ₀	847	789	830	785	812
P ₁	915	819	786	797	837
Mean	881	819	808	791	825

C.D. for control Vs. others=60.9 Kg/ha.

Individual results

Treatments	G ₁	G ₂	G ₃	G ₄	Sig.	P ₀	P ₁	Sig.	Control	Sig.
Years										
1960	731	761	737	724	N.S.	724	753	N.S.	668	N.S.
1961	742	712	654	651	N.S.	665	715	N.S.	628	N.S.
Pooled	881	819	808	791	N.S.	812	837	N.S.	730	*

G.M.	S.E./plot
730	171.0
683	129.9
811	138.8

Crop :- Wheat (*Rabi*).

Ref. :- M.P. 61(35), 62(114).

Site :- Govt. Exptl. Farm, Powerkheda.

Type :- 'M'.

Object :- To find out the effect of N, applied through different sources, in combination with different levels of P on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Morand; Loamy to clayey black. (iii) 30.11.61.; 2.7.11.62.
 (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) -(v) Nil.
 (vi) Hy-11 (vii) Unirrigated. (viii) Nil. (ix) 28 cm; N:A (x) 3.4.62; 23.4.63.

2. TREATMENTS :

All combinations of (1), (2) and (3) + Control (2 plots).

(1) 3 sources of N: S₁=A/S, S₂=Urea and S₃=A/N.(2) 2 levels of N: N₁=11.2 and N₂=22.4 Kg/ha.(3) 2 levels of P₂O₅: P₁=11.2 and P₂=22.4 Kg/ha.

3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 12.2 m. \times 3.7 m. (b) 10.7 m. \times 3.1 m. (v) 76 cm. \times 30 cm.
 (vi) Yes.

4. GENERAL

(i) Satisfactory. (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1961-62. (b) N.A. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled results

(i) 888 Kg/ha. (ii) 158.9 Kg/ha. (based on 88 d.f. made up of pooled error and Treatments \times years interaction). (iii) Main effects of N and S and control Vs others are highly significant. Interactions N \times S and S \times P are significant. (iv) Av. yield of grain in Kg/ha.

Control = 364 Kg/ha.

	S ₁	S ₂	S ₃	P ₁	P ₂	Mean
N ₁	860	1042	855	902	935	919
N ₂	1090	1118	888	1048	1017	1032
Mean	975	1080	871	975	976	975
P ₁	958	1028	938			
P ₂	992	1130	804			

C.D. for N marginal means = 64.5 Kg/ha.

C.D. for S marginal means = 79.0 Kg/ha.

C.D. for control Vs others = 85.3 Kg/ha.

C.D. for body of N \times S or S \times P tables = 111.7 Kg/ha.

Individual results

Treatments	N ₁	N ₂	Sig.	S ₁	S ₂	S ₃	Sig.	P ₁	P ₂	Sig.
Years										
1961	780	886	*	830	943	726	**	796	870	N.S.
1962	1057	1179	**	1121	1216	1017	**	1154	1082	N.S.
Pooled	919	1032	**	975	1080	871	**	975	976	N.S.

Control	Sig.	G.M.	S.E./plot
229	**	747	137.1
499	**	1030	162.9
364	**	888	158.9

Crop :- Wheat (Rabi).

Ref. :- M.P. 63(50).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'M'.

Object :- To find out the suitable time of application of nitrogenous fertilizers. for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat (c) N.A. (ii) (a) Loamy to clayey black. (iii) 25.10.63. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha (d) 30 cm. between lines. (e) — (v) 33.6 Kg/ha. of P_2O_5 as super. (vi) Hy—65. (vii) Irrigated. (viii) Nil (ix) N.A. (x) 6.4.64.

2. TREATMENTS :

Main plot treatments :

3 sources of N : $S_1=A/S$, $S_2=A/S/N$ and $S_3=Urea$.

Sub plot treatments :

2 doses of N : $N_1=33.6$ and $N_2=67.2$ Kg/ha.

Sub-Sub plot treatments :

8 times of application of N : $T_1=Full$ dose at sowing, $T_2=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 1st irrigation, $T_3=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 2nd irrigation, $T_4=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 3rd irrigation, $T_5=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 1st irrigation + $\frac{1}{2}$ at 2nd irrigation, $T_6=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 1st irrigation + $\frac{1}{2}$ at 3rd irrigation, $T_7=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 1st irrigation + $\frac{1}{2}$ at 2nd irrigation and $T_8=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 1st irrigation + $\frac{1}{2}$ at 3rd irrigation.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 2 sub-plots/main-plot, 8 sub-sub plots/sub-plot. (b) N.A. (iii) 2. (iv) (a) 2.4 m × 12.8m. (b) 1.8 m × 11.9 m. (v) 30 cms × 46 cms (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain yield. (iv) (a) 1963-64 (Treatments modified in 1964). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2701 Kg/ha. (ii) (a) 335.4 Kg/ha. (b) 574.4 Kg/ha. (c) 257.4 Kg/ha. (iii) Main effects of S, N and T and interaction $N \times T$ are significant. (iv) Av. yield of grain in Kg/ha.

	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	N_1	N_2	Mean
S_1	2005	1847	1778	1721	1449	1770	1734	1747	2050	2633	2342
S_2	2418	2015	1980	1888	2129	1916	1929	1990	2334	3087	2710
S_3	2215	2582	2292	2438	2518	2166	1926	2179	2859	3246	3053
Mean	2213	2148	2017	2016	2032	1951	1863	1972	2414	2988	2701
N_1	2056	1772	1847	1784	1736	1921	1759	1613			
N_2	2370	2524	2187	2248	2328	1981	1967	2331			

C.D. for S marginal means = 360.6 Kg/ha.

C.D. for N marginal means = 372.9 Kg/ha.

C.D. for T marginal means = 212.2 Kg/ha.

C.D. for T marginal means at the same level of $N=300.2$ Kg/ha.

C.D. for N marginal means at the same level of $T=455.1$ Kg/ha.

Crop :- Wheat (*Rabi*).

Site :- Govt. Exptl. Farm, Powarkheda.

Ref. :- M.P. 64(28).

Type :- 'M'.

Object :—To find out the suitable time of application of nitrogenous fertilizer for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) (a) Loamy to clayey black. (iii) 6/7.11.64. (iv) (a) Gross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cms. between lines. (e) — (v) 33 Kg/ha. of P_2O_5 as Super. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 25.3.65.

2. TREATMENTS :

Main plot treatments

All combinations of (1) and (2).

(1) 4 sources of N : $S_1=A/S$, $S_2=A/S/N$, $S_3=C/A/N$ and $S_4=Urea$.

(2) 2 levels of N : $N_1=33.0$ and $N_2=67.0$ Kg/ha.

Sub plot treatments

8 times of application of N : $T_1=Full$ dose at sowing, $T_2=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 1st irrigation, $T_3=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 2nd irrigation, $T_4=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 3rd irrigation, $T_5=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 1st irrigation + $\frac{1}{2}$ at 2nd irrigation, $T_6=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 2nd irrigation + $\frac{1}{2}$ at 3rd irrigation $T_7=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 1st irrigation + $\frac{1}{2}$ at 2nd irrigation and $T_8=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 1st irrigation + $\frac{1}{2}$ at 3rd irrigation.

3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/Replication, 8 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 11.0 m × 3.1 m (b) 10.4 m × 2.4 m. (v) 80 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1963-64 (modified 64). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2253 Kg/ha. (ii) (a) 375.8 Kg/ha. (b) 168.1 Kg/ha. (iii) Main effects of N and T alone are highly significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	S_4	N_1	N_2	Mean
T_1	2519	2581	2172	2180	2187	2539	2363
T_2	2336	2337	2101	1959	1955	2411	2183
T_3	2381	2315	2121	2200	2097	2411	2254
T_4	2324	2006	2115	1969	1995	2211	2103
T_5	2281	2260	2193	2312	2148	2376	2262
T_6	2437	2227	2177	2272	2126	2430	2278
T_7	2504	2328	2369	2169	2178	2506	2342
T_8	2203	2254	2251	2250	2167	2313	2240
Mean	2373	2288	2187	2164	2107	2399	2253
N_1	2191	2117	2040	2079			
N_2	2555	2459	2334	2249			

C.D. for N marginal means = 157.0 Kg/ha.

C.D. for T marginal means = 119.1 Kg/ha.

Crop :- Wheat (Rabi).

Site :- Govt. Exptl. Farm, Powarkheda.

Ref. :- M.P. 63(48).

Type :- 'M'.

Object :- To study the effect of methods of application of nitrogenous fertilizer on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Loamy to clayey black. (iii) 13.11.63. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) —. (v) 33.6 Kg/ha. of P_2O_5 (vi) Hy 65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 9.4.64.

2. TREATMENTS :

Main plot treatments :

4 sources of N at 33.6 Kg/ha. : $S_1=A/S$, $S_2=A/S/N$, $S_3=C/A/N$ and $S_4=Urea$.

Sub-plot treatments :

4 methods of placement of nitrogenous fertilizers. M_1 =Mixed with seed and sown, M_2 =Placed below the seed, M_3 =Placed one side of seed row and M_4 =Broadcast.

3. DESIGN :

(i) Split=plot. (ii) (a) 4 main plots/replication, 4 sub-plots/main plot. (b) N.A. (iii) 4. (iv) (a) 8.0m×5.0 m. (b) 7.0 m×4.0 m. (v) 50 cm×50 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1963-only. (b) and (c)—. (v) to (vii) Nil.

5. RESULTS :

(i) 1846 Kg/ha. (ii) (a) 321.1 Kg/ha. (b) 196.2 Kg/ha (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	S_4	Mean
M_1	1845	1916	2007	1757	1881
M_2	1848	1811	1784	1969	1853
M_3	1831	1898	1857	1876	1866
M_4	1629	1830	1818	1865	1785
Mean	1788	1864	1867	1867	1846

Crop :- Wheat (*Rabi*).

Ref :- M.P. 63(46).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'M'.

Object :-To study the effect of methods of placement of phosphatic fertilizer on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Loamy to clayey black. (iii) 30.10.63. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) Nil. (v) 33.6 Kg/ha. of N. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 15.4.64.

2. TREATMENTS :

4 methods of placement of P_2O_5 as Super : P_1 =Below the seed, P_2 =On one side of the seed row, P_3 =On both sides of the seed row and P_4 =Broadcast.

Dose of P_2O_5 =N.A.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 12.2 m.×4.3 m. (b) 10.4 m.×3.1 m. (v) 91 cm.×61 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1963 only. (b) and (c) — (v) to (vii) Nil.

5. RESULTS :

(i) 2390 Kg/ha. (ii) 218.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	P ₁	P ₂	P ₃	P ₄
Av. yield	2515	2323	2395	2329

Crop :- Wheat (Rabi).

Ref :- M.P. 65(51).

Site :- Govt. Exptl. Farm, Powerkheda.

Type :- 'M'.

Object :—To study the efficiency of different nitrogenous fertilizers on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Fallow—Wheat. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 5.11.65. (iv) (a) 3 *bakherings*. (b) Line sowing by local *Nari*. (c) 100 Kg/ha. (d) 25 cm. (e) — (v) 67 Kg/ha. of P₂O₅ as Super. (vi) Hy—65. (vii) Irrigated. (viii) N.A. (ix) 37.1 cm. (x) 6.3.66.

2. TREATMENTS :

4 sources of N at 67 Kg/ha.: S₁=A/S, S₂=A/S/N, S₃=C/A/N, S₄=Nitro Phos. and S₅=Urea.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) to (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—only. (b) and (c) — (v) No. (vi) and (vii) Nil.

5. RESULTS :

(i) 2874 Kg/ha. (ii) N.A. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S ₁	S ₂	S ₃	S ₄	S ₅
Av. yield	2956	3001	2910	2895	2610

Crop :- Wheat (Rabi).

Ref :- M.P. 61(34).

Site :- Govt. Exptl. Farm, Powerkheda.

Type :- 'M'.

Object :—To find out a suitable combination of organic and inorganic manures for Wheat under rain-fed conditions.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Morand. (iii) 21.11.61. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari* (c) 90 Kg/ha. (d) 30 cm. between rows. (e) — (v) Nil. (vi) Hy—65. (vii) Unirrigated. (viii) Nil. (ix) 28 cm. (x) 2.4.62.

2. TREATMENTS:

6 manurial treatments at 44.8 Kg/ha. of N: T₀=Control (no manure), T₁=Full dose of N as compost, T₂=2/3 dose of N as organic manure and 1/3 dose of N as inorganic manure, T₃=1/2 dose of N as organic manure and 1/2 dose of N as inorganic manure, T₄=1/3 dose of N as organic manure and 2/3 dose of N as inorganic manure and T₅=Full dose of N as A/S+35.8 Kg/ha. of P₂O₅ as Super+59.7 Kg/ha. of K₂O as Mur. Pot.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) — (iii) 4. (iv) (a) 9.1 m.×11.0 m. (b) 7.3 m.×9.1 m. (v) 91 cm.×91 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1506 Kg/ha. (ii) 159.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T ₀	T ₁	T ₂	T ₃	T ₄	T ₅
Av. yield	888	1186	1479	1594	1739	2152

C.D.=240.9 Kg/ha.

Crop :-Wheat (Rabi).

Ref :- M.P. 62(111).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'M'.

Object :-To find out a suitable combination of organic and inorganic manure for Wheat under irrigated condition.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Loamy to clayey black. (iii) 23.10.62. (iv) (a) Cross *bakhering*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) Nil. (vi) Hy—65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 24.3.63.

2. TREATMENTS and 3. DESIGN :

Same as in Expt. No. 61(34) on page 105.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) grain yield. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1511 Kg/ha. (ii) 165.0 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T ₀	T ₁	T ₂	T ₃	T ₄	T ₅
Av. yield	893	1190	1483	1599	1744	2156

C.D.=248.6 Kg/ha.

Crop :- Wheat (Rabi).**Ref. :- M.P. 63(51).****Site :- Govt. Exptl. Farm, Powarkheda.****Type :- 'M'.**

Object :—To study the effect of micronutrients with and without N.P. and K on the yield of wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Loamy to clayey black. (iii) 12.11.63. (iv) (a) Cross *bakherings*. (b) Line sowing. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) Hy—65 (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 28/29.3.64.

2. TREATMENTS :**Main plot treatments :**

2 levels of fertilizer : F_0 = No fertilizer and F_1 = 33.6 Kg/ha. of N + 33.6 Kg/ha. of P_2O_5 + 22.4 Kg/ha. of K_2O .

Sub plot treatments :

7 micronutrients : M_0 = Control (No micronutrients), M_1 = 11.2 Kg/ha. of Mn as $MnSO_4$, M_2 = 11.2 Kg/ha. of B as Borax, M_3 = 1.1 Kg/ha. of M_0 as Sodium M_0 lybdate, M_4 = 11.2 Kg/ha. of Cu as $CuSO_4$, M_5 = 11.2 Kg/ha. of Zn as $ZnSO_4$ and M_6 = $M_1 + M_2 + M_3 + M_4 + M_5$.

Sub-Sub-plot treatments :

2 methods of application of micronutrients : T_1 = Soil application and T_2 = Foliar application.

3. DESIGN :

(i) Split plot. (ii) (a) 2 main-plots/Replication, 7 sub-plots/main-plot, 2 sub-sub plots/Sub plot. (b) N.A. (iii) 3. (iv) (a) 12.2 m × 4.3 m. (b) 10.4 m × 3.1 m. (v) 91 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1963—Contd. (Modified in 1964). (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1815 Kg/ha. (ii) (a) 316.5 Kg/ha. (b) 186.7 Kg/ha. (c) 248.4 Kg/ha. (iii) Main effects of F and M alone are significant. (iv) Av. yield of grain in Kg/ha.

	M_0	M_1	M_2	M_3	M_4	M_5	M_6	T_1	T_2	Mean
F_0	1829	1771	1577	1541	1742	1644	1429	1670	1624	1647
F_1	2054	1930	1890	2095	2068	1890	1950	1957	2008	1982
Mean	1942	1851	1734	1818	1905	1767	1690	1814	1816	1815
T_1	1926	1766	1769	1867	1903	1767	1699			
T_2	1958	1935	1698	1769	1907	1767	1680			

C.D. for F marginal means = 297.1 Kg/ha.

C.D. for M marginal means = 157.3 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 64(29), 65(50).****Site :- Govt. Exptl. Farm, Powarkheda.****Type :- 'M'.**

Object :—To study the effect of micro-nutrients, applied by different methods, on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Loamy to clayey black ; clay loam. (iii) 31.10.64 ; 2.11.65 (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari* (c) 90-100 Kg/ha. (d) rows 25-30 cm. apart. (e) —. (v) Nil. (vi) N.P. 824 ; Hy-65. (vii) Irrigated. (viii) Nil ; Spray of 2,4-D after 30 days of sowing. (ix) N.A. ; 37.1 cm. (x) 24.3.65 ; 15.3.66.

2. TREATMENTS :

13 micronutrients treatments: T_0 =Control (N_0 fertilizer or micronutrients) T_1 =Only fertilizer applied, T_2 =Spartin. $T_3=11.2$ Kg/ha. of Cu. as soil application, $T_4=11.2$ Kg/ha. of Cu. as foliar application, $T_5=11.2$ Kg/ha. of Zn. as Soil application, $T_6=11.2$ Kg/ha. of Zn. as foliar application, $T_7=11.2$ Kg/ha. of Mn. as Soil application, $T_8=11.2$ Kg/ha. of Mn. as foliar application, $T_9=11.2$ Kg/ha. of B as soil application, $T_{10}=11.2$ Kg/ha. of B as foliar application, $T_{11}=1.1$ Kg/ha. of M_0 as soil application, and $T_{12}=1.1$ Kg/ha. of M_0 as foliar application.

Fertilizer combination at 67 Kg/ha. of N+33.5 Kg/ha. of P_2O_5 +22 Kg/ha. of K_2O applied to all treatments except T_0 . Cu, Zn, Mn, B and Mo applied as Cu SO_4 , Zn SO_4 , Mn SO_4 , Borax and Sodium Molybdate. Soil application done at sowing and foliar application at boot stage.

3. DESIGN :

(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) 12.2 m×4.3 m ; N.A. (b) 10.4 m×3.1m ; N.A. (v) 91 cm.×61 cm ; N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—contd. (Expt. modified in 1964). (b) No. (c) Nil. (v) and (vi) Nil. (vii) As the expt. is continuing beyond 1965, results of individual years have been presented under 5—Results.

5. RESULTS :

64(29)

(i) 2438 Kg/ha. (ii) 145.1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T_0	T_1	T_2	T_3	T_4	T_5	T_6
Av. yield	1716	2592	2473	2633	2535	2269	2400
	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	
	2465	2609	2553	2255	2595	2602	

C.D.=208.0 Kg/ha.

65(50)

(i) 2160 Kg/ha. (ii) 209.9 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
Av. yield	1505	2324	2307	2306	2177	2145	2128
	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	
	2225	2261	2237	2213	2094	2161	

Crop :- Wheat (*Rabi*).

Site :- State Mechanised Farm, Reora.

Ref. :- M.P. 61(108).

Type :- 'M'.

Object :- To study the effect of different green manures with and without P on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Medium black. (iii) 20.10.61. (iv) (a) 6 ploughings (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) —. (v) Nil. (vi) Hy -65. (vii) Unirrigated. (viii) Nil. (xi) N.A. (x) 7.4.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 G.M. : G_1 =Urid, G_2 =Sannhemp, G_3 =Dhaincha and G_4 =Ipomea leaves.

(2) 2 levels of P_2O_5 as super : P_0 =0 and P_1 =44.8 Kg/ha.

3. DESIGN :

(i) Fact in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4 (iv) (a) and (b) 12.1 m×8.5 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good (ii) Nil. (iii) Yield of grain weight. (iv) (a) 1961 only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1357 Kg/ha. (ii) 224.0 Kg/ha (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	G_1	G_2	G_3	G_4	Mean
P_0	1331	1503	1257	1323	1354
P_1	1457	1395	1219	1369	1360
Mean	1394	1449	1238	1346	1357

Crop :- Wheat (Rabi).

Ref :- M.P. 61(107), 62(67).

Site :- State Mechanised Farm, Reora.

Type :- 'M'.

Object :—To study the effect of G.M. on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) Nov., 1961 ; 20.10.62. (iv) (a) 3 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) Hy—65. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 7.4.62. ; 3 rd week of March, 63.

2. TREATMENTS :

4 manurial treatments : M_0 =No manure, M_1 =Moong (G.M.), M_2 =Sann hemp, M_3 =11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of P_2O_5 as Super.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) and (b) 11.9 m.×8.5 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Satisfactory, Poor. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—62. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) As the error variances are heterogeneous and Treatments×years interaction is absent, the results of individual years have been presented under 5.—Results.

M ₁	M ₂	Sig.	C.D.	G.M.	S.E./plot
860	1030	*	119.1	945	215.7
1570	1520	N.S.	—	1550	331.0

Crop :- Wheat (Rabi).

Ref :- M.P. 60(158).

Site :- Govt. Seed and Demons. Farm, Sagar.

Type :- 'M'.

Object :—To find out the optimum dose of N and P for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black soil with *kankar*. (iii) 28.11.60. (iv) (a) 3 *bakherings* and one ploughing. (b) Sown by *Nari* (c) 67 Kg/ha. (d) 30 cm. between rows. (e) - (v) 10 C.L./ha. of F.Y.M. (vi) Hy-65. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 4.4.61.

2. TREATMENTS :

5 levels of manures: M₀=No manure (control), M₁=11.2 Kg/ha. of N, M₂=11.2 Kg/ha. of P₂O₅+ 11.2 Kg/ha. of N, M₃=16.8 Kg/ha. of P₂O₅ and M₄=16.8 Kg/ha. of N+16.8 Kg/ha. of P₂O₅.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 2. (iv) (a) and (b) 6.1 m. × 15.2 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1960—only. (b) and (c) - (v) to (vii) Nil.

5. RESULTS :

(i) 942 Kg/ha. (ii) 151.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂	M ₃	M ₄
Av. yield	552	869	1086	1025	1177

Crop :- Wheat (Rabi).

Ref :- M.P. 61(113).

Site :- Govt. Seed and Demons. Farm, Sagar.

Type :- 'M'.

Object :—To study the effect of N and P on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black soil with *kankar*. (iii) 9.12.61. (iv) (a) 3 *bakherings* and 1 ploughing. (b) Sown by *Nari*. (c) 67 Kg/ha. (d) 30 cm. × 8 cm. (e) - (v) Nil. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 18.4.62.

2. TREATMENTS :

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

(1) 3 levels of N as A/S : N₁=16.8, N₂=33.6 and N₃=50.4 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₁=16.8 and P₂=33.6 Kg/ha.

Each treatment including the control was repeated twice in a block.

3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 3.7 m. × 12.2 m. (b) 3.1 m. × 10.7 m. (v) 30 cm. × 76 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1961—only. (b) and (c) — (v) to (vii) Nil.

5 RESULTS :

(i) 585 Kg/ha. (ii) 51.6 Kg/ha. (iii) Main effect of N and Control vs. others are highly significant. Main effect of P is significant. (iv) Av. yield of grain in Kg/ha.

Control=375 Kg/ha.

	N ₁	N ₂	N ₃	Mean
P ₁	545	617	650	604
P ₂	574	621	712	636
Mean	559	619	681	620

C.D. for N marginal means = 36.9 Kg/ha.

C.D. for P marginal means = 30.1 Kg/ha.

C.D. for control vs. others = 39.8 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(92), 61(70).

Site :- Govt. Agri. Farm, Seoni.

Type :- 'M'.

Object :- To find out the effect of different G.M. on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) As per treatments. (c) Nil. (ii) *Morand I.* (iii) 3.11.60 ; 24.11.61. (iv) (a) 5 *bakherings*. (b) Drilling. (c) 78 Kg/ha. (d) 23 cm. × 23 cm. (e) N.A. (v) 25 Kg/ha. of F.Y.M. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 28.3.61 ; 18.4.62.

2. TREATMENTS :

4 manurial treatments : T₀=Control, T₁=*Moong* (G.M.), T₂=*Sann hemp* and T₃=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 10.7 m. × 5.3 m. (b) 10.1 m. × 5.0 m. (v) 30 cm. × 15 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-61. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) As the error variances are heterogeneous and Treatment × Years interaction is absent, results of individual years have been presented under 5—Results.

5. RESULTS :

60(92)

(i) 1741 Kg/ha. (ii) 153.3 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T ₀	T ₁	T ₂	T ₃
Av. yield	1603	1635	1887	1838

C.D.=188.6 Kg/ha.

61(70)

(i) 1616 Kg/ha. (ii) 264.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T ₀	T ₁	T ₂	T ₃
Av. yield	1483	1443	1626	1912

C.D. = 324.9 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(91).

Site :- Govt. Agri. Farm, Seoni.

Type :- 'M'.

Object :- To find out a suitable source of N for Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Wheat. (c) 7.4 Q/ha. of G.N.C. (ii) Morand I. (iii) 8.11.60. (iv) (a) 5 bakherings. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. x 23 cm. (e) —. (v) 25 C.L./ha. of F.Y.M. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 2.4.61.

2. TREATMENTS:

4 sources of N at 22.4 Kg/ha. : S₀ = No manure (control), S₁ = A/S, S₂ = A/N and S₃ = Urea. 22.4 Kg/ha. of P₂O₅ as Super was also applied to all the treatments except S₀.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 10.7 m. x 5.3 m. (b) 10.1 m. x 5.0 m. (v) 30 cm. x 15 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS:

(i) 1744 Kg/ha. (ii) 208.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S ₀	S ₁	S ₂	S ₃
Av. yield	1771	1886	1571	1750

Crop :- Wheat (Rabi).

Ref :- M.P. 60(39).

Site :- Govt. Agri. Farm, Vidisha.

Type :- 'M'.

Object :- To find out the suitable manurial schedule for Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Heavy clay. (iii) 1.11.60. (iv) (a) 1 bakhering. (b) Line sowing. (c) 90 Kg/ha. (d) N.A. (e) —. (v) Nil. (vi) N.P. 718 (Mid-early). (vii) Unirrigated. (viii) Nil. (ix) 9 cm. (x) 18.3.61.

2. TREATMENTS:

All combinations of (1) and (2):

1. 3 levels N as A/S: $N_0=0$, $N_1=22.4$ and $N_2=44.8$ Kg/ha.
2. 3 levels of P_2O_5 as Super: $P_0=0$, $P_1=28.0$ and $P_2=56.0$ Kg/ha.

Manures were applied just before sowing.

3. DESIGN :

(i) Fact. in R.B.D. (ii) 9. (iii) 6. (iv) (a) 4.3 m. \times 11.9 m. (b) 3.7 m. \times 10.1 m. (v) 30 cm. \times 91 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Height of plant, no. of tillers/plant, no. and length of ear head, no. of grains/plant, grain weight/plant and yield of grain. (iv) (a) 1957-60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1111 Kg/ha. (ii) 118.3 Kg/ha. (iii) Main effect of N is highly significant and interaction $N \times P$ is significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	907	1110	1323	1113
P_1	812	1248	1369	1143
P_2	663	1192	1380	1078
Mean	794	1183	1357	1111

C.D. for N marginal means = 79.6 Kg/ha.

C.D. for body of table = 138.0 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 61(23).

Site :- Govt. Agri. Farm, Vidisha.

Type :- 'M'.

Object :- To find out the suitable source of N with and without P for Wheat under rainfed conditions.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Heavy clay. (iii) 10.12 61. (iv) (a) *Bakharing*. (b) Line sowing. (c) 90 Kg/ha. (d) N.A. (e) —. (v) Nil. (vi) N P. 718. (vii) Unirrigated. (viii) Nil. (ix) 17 cm. (x) 16.4.62.

2. TREATMENTS :

All combinations of (1) and (2):

- (1) 5 sources of N at 22.4 Kg/ha. : $S_0=No$ N, $S_1=A/S$, $S_2=Urea$, $S_3=C/A/N$ and $S_4=A/S/N$.
- (2) 2 levels of P_2O_5 as Super: $P_0=0$, $P_1=22.4$ Kg/ha.

3. DESIGN:

(i) Fact in R.B.D (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 5.5 m. \times 9.1 m. (b) 4.9 m \times 7.9 m. (v) 30 cm. \times 61 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Final height of plant, earbearing tillers/plant, no. of grains/plant and yield of grain. (iv) (a) 1961—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1020 Kg/ha. (ii) 113.2 Kg/ha. (iii) Main effects of S and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	S ₀	S ₁	S ₂	S ₃	S ₄	Mean
P ₀	626	1158	804	1037	1020	929
P ₁	714	1406	866	1361	1206	1111
Mean	670	1282	835	1199	1113	1020

C.D. for S marginal means=93.2 Kg/ha.

C.D. for P marginal means=58.9 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 62(78).

Site :- Govt. Agri. Farm, Vidisha.

Type :- 'M'.

Object :- To study the effect of N through different sources with and without P on the yield of Wheat under irrigated conditions.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Heavy clayey. (iii) 13.11.62. (iv) (a) 3 ploughings. (b) Drilling. (c) 67 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil. (vi) N.P. 718. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 20 to 23.3.63.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 5 sources of N at 22.4 Kg/ha : S₀=Control (No N), S₁=A/S, S₂=Urea, S₃=C/A/N and S₄=A/S/N.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=22.4 Kg./ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 5.5 m. × 9.1 m. (b) 4.9 m. × 7.9 m. (v) 30 cm × 61 cm. (vi) Yes.

4. GENERAL:

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

5. RESULTS:

(i) 1079 Kg/ha. (ii) 135.9 Kg/ha. (iii) Main effects of S and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	S ₀	S ₁	S ₂	S ₃	S ₄	Mean
P ₀	899	1157	1038	904	1089	1017
P ₁	960	1337	1140	1116	1159	1142
Mean	929	1247	1089	1010	1124	1079

C.D. for S marginal means=111.8 Kg/ha.

C.D. for P marginal means= 70.7 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 62(83).****Site :- Govt. Agri. Farm, Vidisha.****Type :- 'M'.**

Object :—To study the effect of G.M. on the yield of succeeding Wheat crop.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Heavy clayey. (iii) 2.11.62. (iv) (a) 2 ploughings and 3 *bakhering*.
 (b) Line sowing. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil. (vi) C. 281. (vii) Unirrigated.
 (viii) and (ix) N.A. (x) 18.3.63.

2. TREATMENTS :

All combinations of (1), (2) and (3)

- (1) 2 G.M. crops : $G_1 = \text{Dhaincha}$ and $G_2 = \text{Sanai}$.
 (2) levels of N as A/S : $N_0 = 0$ and $N_1 = 22.4$ Kg/ha.
 (3) 3 levels of P_2O_5 as Super : $P_0 = 0$, $P_1 = 22.4$ and $P_2 = 44.8$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 4.3 m. \times 12.2 m. (b) 3.7 m. \times 10.7 m.
 (v) 30 cm. \times 76 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1219 Kg/ha. (ii) 121.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P_0	P_1	P_2	N_0	N_1	Mean
G_1	1243	1284	1224	1238	1262	1250
G_2	1162	1179	1227	1144	1234	1189
Mean	1203	1231	1225	1191	1248	1219
N_0	1134	1255	1185			
N_1	1272	1207	1265			

Crop :- Wheat (Rabi).**Ref :- M.P. 63, 64(M.A.E.).****Site :- M.A.E. Centre, Bagwai.****Type :- 'M'.**

Object :—Type V (a) : To study the effect of different methods of placement of N on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) and (iv) N.A. (v) 33.6 Kg/ha. of P_2O_5 as Super. (vi) N.A.
 (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)+a control.

- (1) 3 methods of placement : $M_1 = \text{Broadcast at sowing}$, $M_2 = \text{Drilled 6.4 cm. below the seed}$ and
 $M_3 = \text{Side band placement at about 5 cm. to 7.6 cm. on either side}$,
 (2) 3 levels of N : $N_1 = 33.6$, $N_2 = 50.4$ and $N_3 = 67.2$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) N.A. (v) and (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-64. (b) N.A. (c) Nil. (v) Obedullaganj, Powerkheda, Reora and Ujjain. (vi) N.A. (vii) Nil.

5. RESULTS :

1963

(i) 1839 Kg/ha. (ii) 291 Kg/ha. (iii) Main effect of M and control $\frac{1}{3}$ s. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=1442 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	1875	1946	1827	1607	1929	2110

C.D. for M means=244 Kg/ha.

C.D. for Control $\frac{1}{3}$ s. rest=315 Kg/ha.

1964

(i) 666 Kg/ha. (ii) 249 Kg/ha. (iii) None of the effects is significant (iv) Av. yield of grain in Kg/ha.

Control=530 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	665	743	636	581	716	747

Crop :- Wheat (Rabi).**Site :- M.A.E. Centre, Bagwai.****Ref :- M.P. 60(M.A.E.).****Type :- 'M'.**

Object :- Type VI : To study the effect of different sources and levels of P along with their methods of application.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3) with a control.

(1) 2 sources of P₂O₅ : S₁= Ammo. phos. and S₂= Super.

(2) 2 levels of P₂O₅ : P₁=22.4 and P₂=44.8 Kg/ha.

(3) 3 methods of application : M₁=Broadcasting, M₂=6 cm. below seed and M₃=Band placement.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1958-60. (b) N.A. (c) Nil. (v) Reora. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 2700 Kg/ha. (ii) 338 Kg/ha. (iii) Control $\frac{1}{3}$ s. rest alone is significant. (iv) Av. yield of grain in Kg/ha.

Control=1854 Kg/ha.

Treatment	M ₁	M ₂	M ₃	S ₁	S ₂	P ₁	P ₂
Mean yield	2852	2750	2712	2884	2659	2647	2896

C.D. for control *Vs* rest=419 Kg/ha.

Crop :- Wheat (Rabi).**Ref. :- M.P. 60, 61(M.A.E.).****Site :- M.A.E. Centre, Bagwai.****Type :- 'M'.**

Object :—Type IX : To compare Nitrophosphate by ODDA and PEC processes at different levels and different methods of application.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3)+4 extra treatments in each block.

(1) 3 sources of P₂O₅; S₁=Super; S₂=ODDA (20,20,0) and S₃=PEC (16,14,0).(2) 3 methods of application: M₁=Broadcast before final cultivation, M₂=Placement at 6.3 cm. below seed and M₃=Band placement.(3) 3 levels of fertilizers: L₁=13.4 Kg/ha. of N+11.8 Kg/ha. of P₂O₅, L₂=26.9 Kg/ha. of N+23.5 Kg/ha. of P₂O₅ and L₃=53.8 Kg/ha. of N+47.1 Kg/ha. of P₂O₅.Extra treatments: N₀=0, N₁=13.4, N₂=26.9 and N₃=53.8 Kg/ha of N.**3. DESIGN :**(i) 3³ Confd. t-4. (ii) (a) 13 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) N.A. (v) and (vi) Yes.**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—61. (b) N.A. (c) Nil. (v) Obedullaganj, Powerkheda and Ujjain. (vi) N.A. (vii) Nil.

5. RESULTS :

1960

(i) 1626 Kg/ha. (ii) 281 Kg/ha. (iii) Main effects of S and L, "extra treatments *Vs* rest" are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S ₁	S ₂	S ₃	M ₁	M ₂	M ₃	L ₁	L ₂	L ₃
Mean yield	1746	1915	1522	1724	1706	1752	1509	1626	2047
			N ₀	N ₁	N ₂	N ₃			
			1236	1236	1577	1549			

C.D. for S or L means=200 Kg/ha.

C.D. for extra treatments *Vs* rest=147 Kg/ha.

1961

(i) 872 Kg/ha. (ii) 159 Kg/ha (iii) Main effects of S, M and L, within extra treatments and "extra treatments *Vs* rest" are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S ₁	S ₂	S ₃	M ₁	M ₂	M ₃	L ₁	L ₂	L ₃
Mean yield	1039	925	873	821	996	1021	830	922	1085
	N ₀	N ₁	N ₂	N ₃					
	553	664	821	784					

C.D. for S or M or L means = 113 Kg/ha.

C.D. for extra treatments means = 196 Kg/ha.

C.D. for extra treatments vs. rest = 83 Kg/ha.

Crop :- Wheat (Rabi).

Ref. :- M.P. 62, 63, 64(M.A.E.)

Site :- M.A.E. Centre, Bagwai.

Type :- 'M'.

Object :- Type X : To study the effect of G.M. on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3) with an extra treatment in each block.

(1) 3 G.M. treatments : G₀=0, G₁=G.M. raised in *situ* without P₂O₅ and G₂=G.M. raised in *situ* with 33.6 Kg/ha. of P₂O₅.

(2) 3 levels of N : N₀=0, N₁=16.8 and N₂=33.6 Kg/ha.

(3) 3 levels of P₂O₅ : P₀=0, P₁=33.6 and P₂=67.2 Kg/ha.

Extra treatment T=NPK equivalent to those obtained from G.M.

3. DESIGN :

(i) 3³+1 confd. (ii) (a) 10 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 1/100 ha. (b) 1/125 ha. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-64. (b) N.A. (c) Nil. (v) Obedullaganj. (vi) N.A. (vii) Nil.

5. RESULTS :

62(M.A.E.)

(i) 1164 Kg/ha. (ii) 135 Kg/ha. (iii) Main effect of N, P. and G and T vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

T=1876 Kg/ha.

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	G ₀	G ₁	G ₂
Mean yield	798	1172	1286	966	1145	1143	964	1126	1166

C.D. for N, P or G means=92 Kg/ha.

C.D. for T vs. rest = 119 Kg/ha.

1963

(i) 296 Kg/ha. (ii) 137.4 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

T=351 Kg/ha.

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	G ₀	G ₁	G ₂
Mean yield	215	304	351	252	285	334	290	273	308

C.D. for N means=94 Kg/ha.

1964

(i) 810 Kg/ha. (ii) 397 Kg/ha. (iii) Main effects of N and P are significant (iv) Av yield of grain in Kg/ha.

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	G ₀	G ₁	G ₂
Mean yield	532	824	1007	639	784	940	877	714	772

C.D. for N or P means=209 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 64(M.A.E.)

Site :- M.A.E. Centre, Bagwai.

Type :- 'M'.

Object: —Type XI : To determine the effect of micro-nutrients on Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

15 micro-nutrient treatments : T₀=Control (no fertilizer), T₁=35 Kg/ha. of N+35 Kg/ha. of P₂O₅+35 Kg/ha. of K₂O, T₂=T₁+Spartan 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 1.3 Kg/ha., T₈=T₁+Mn.+Zn.+Cu.+Bo.+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 0.6 Kg/ha. and T₁₄=T₁+Mn.+Zn.+Cu.+Bo.+Mo.

Treatments T₂ to T₈ by soil application and T₉ to T₁₄ by foliar spray.

3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) to (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Reora. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 563 Kg/ha. (ii) 95.7 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	T ₅	T ₆	T ₇
Mean yield	209	603	603	573	570	564	675	553
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	553	592	633	489	619	650	553	

C.D.=136 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 63, 64(M.A.E.)

Site :- M.A.E Centre, Bagwai.

Type :- 'M'.

Object : Type XII : To study the foliar application of fertilizers on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

Main-plot treatments :

4 fertilizer treatments : $F_1=44.8$ Kg/ha. of N as A/S, $F_2=22.4$ Kg/ha. of P_2O_5 as Super, $F_3=44.8$ Kg/ha. of N+22.4 Kg/ha. of P_2O_5 and $F_4=44.8$ Kg/ha. of N+22.4 Kg/ha. of P_2O_5 +22.4 Kg/ha. of K_2O .

Sub-plot treatments :

All combinations of (1) and (2)+2 extra treatments.

(1) 3 methods of application : M_1 =Soil application, M_2 =Foliar application and M_3 =Soil application and foliar application.(2) 2 levels of application : $L_1=\frac{1}{2}$ dose and L_2 =Full dose.Extra treatments : C_1 =Water spray and C_2 =Absolute control.

3. DESIGN :

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

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-64. (b) N.A. (c) Nil. (v) Powerkheda and Ujjain (vi) N.A. (vii) Nil.

5. RESULTS :

1963

(i) 786 Kg/ha. (ii) (a) 562 Kg/ha. (b) 159 Kg/ha. (iii) Main effect of LM is significant. (iv) Av. yield of grain in Kg/ha.

 $C_1=711$ and $C_2=724$ Kg/ha.

	L_1M_1	L_2M_1	L_1M_2	L_2M_2	L_1M_3	L_2M_3	Mean
F_1	759	793	819	953	683	858	811
F_2	870	617	710	742	749	754	740
F_3	815	987	676	953	902	933	878
F_4	862	902	635	682	824	930	806
Mean	826	825	710	833	789	869	809

C.D. for LM marginal means=112 Kg/ha.

1964

(i) 388 Kg/ha. (ii) (a) 465 Kg/ha. (b) 170 Kg/ha. (iii) Main effects of F and LM are significant. (iv) Av. yield of grain in Kg/ha.

 $C_1=255$ and $C_2=206$ Kg/ha.

	L_1M_1	L_2M_1	L_1M_2	L_2M_2	L_1M_3	L_2M_3	Mean
F_1	345	548	252	388	388	523	407
F_2	320	271	283	375	302	560	352
F_3	493	887	228	274	382	517	463
F_4	721	758	363	252	499	647	540
Mean	469	616	281	322	392	562	441

C.D. for F marginal means=263 Kg/ha.

C.D. for LM marginal means=120 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 65(M.A.E.)****Site :- M.A.E., Centre, Kuthulia.****Type :- 'M'.**

Object:—Type V (a): To study the effect of different methods of placement of N on the yield of Wheat

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Mixed red and black. (iii) and (iv) N.A. (v) 33.6 Kg/ha. of P_2O_5 as Super. (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN:

Same as in Type V (a) on Wheat conducted at Bagwai on Page 116.

4. GENERAL:

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

5. RESULTS:

(i) 2239 Kg/ha. (ii) N.A. (iii) Main effect of M is significant. (iv) Av. yield of grain in Kg/ha.

Control=1368 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	2436	2276	2295	2354	2400	2252

Crop :- Wheat (Rabi).**Ref :- M.P. 60, 61(M.A.E.).****Site :- M.A.E. Centre, Obedullaganj.****Type :- 'M'.**

Object:—Type V: To study the effect of different times of application of N on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black. (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.

(1) 2 levels of N: N₁=22.4 and N₂=44.8 Kg/ha.

(2) 3 sources of N: S₁=A/S, S₂=A/N and S₃=Urea.

(3) 3 times of application: T₁=At sowing, T₂=At first irrigation and T₃=½ at sowing+½ at first irrigation.

3. DESIGN:

(i) 3²×2+3 confd. (ii) (a) 7 plots/block; 3 blocks/replication. (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1956—61. (b) N.A. (c) Nil. (v) Powerkheda. (vi) and (vii) Nil.

5. RESULTS:

1960

(i) 1239 Kg/ha. (ii) 238 Kg/ha. (iii) Main effect of N and control *Vs.* rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=950 Kg/ha.

Treatment :	T ₁	T ₂	T ₃	S ₁	S ₂	S ₃	N ₁	N ₂
Mean yield :	1734	1651	1679	1642	1762	1660	1181	2195

C.D. for N means=113 Kg/ha.

C.D. for control Vs. rest=149 Kg/ha.

1961

(i) 1543 Kg/ha. (ii) 293.9 Kg/ha. (iii) Main effect of N and control Vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=1000 Kg/ha.

Treatment	T ₁	T ₂	T ₃	S ₁	S ₂	S ₃	N ₁	N ₂
Mean yield	1630	1570	1700	1720	1620	1559	1560	1706

C.D. for N means=139 Kg/ha.

C.D. for control Vs. rest=184 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 63, 65(M.A.E.).****Site :- M.A.E. Centre, Obedulaganj.****Type :- 'M'.**

Object:—Type V (a) : To study the effect of different methods of placement of N on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) and (c) N.A. (ii) Deep black. (iii) and (iv) N.A. (v) 33.6 Kg/ha. of P₂O₅ as Super. (vi) Nil. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS: and 3. DESIGN :

Same as in Type V (a) on wheat conducted at Bagwai on Page 116.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—65 (1964 N.A.) (b) N.A. (c) Nil. (v) Bagwai, Kuthulia, Powerkheda, Reora and Ujjain. (vi) N.A. (vii) Nil.

5. RESULTS :

1963

(i) 1442 Kg/ha. (ii) 308 Kg/ha. (iii) Main effect of N and control Vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=1019 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	1327	1673	1467	1411	1382	1672

C.D. for N means=258 Kg/ha.

C.D. for control Vs. rest=333 Kg/ha.

1965

(i) 1693 Kg/ha. (ii) 114 Kg/ha. (iii) Main effect of M and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=1514 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	1672	1817	1650	1725	1721	1693

C.D. for M means=96 Kg/ha.

C.D. for the control Vs. rest=123 Kg/ha.

Crop :- Wheat (Rabi).**Ref. :- M.P. 64(M.A.E.).****Site :- M.A.E. Centre, Obedulaganj.****Type :- 'M'.**

Object :—Type V (a): To study the effect of different methods of placement of N on the yield of Wheat.

1. BASAL CONDITIONS :(i) (a) to (c) N.A. (ii) Deep black. (iii) and (iv) N.A. (v) 33.6 Kg/ha. of P₂O₅ as Super. (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.**2. TREATMENTS:**

All combinations of (1) and (2)+a control.

(1) 3 methods of placement : M₁=Broadcast at sowing, M₂=Drilled 6.4 cm. below the seed and M₃=Side band placed at about 5 cm. to 7.6 cm. on either side.(2) 3 levels of N : N₁=33.6, N₂=50.4 and N₃=67.2 Kg/ha.**3. DESIGN:**

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) and (b) N.A. (v) and. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Reora. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 1140 Kg/ha. (ii) 184 Kg/ha. (iii) Main effect of M and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=853 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	1046	1253	1217	1088	1200	1227

C.D. for M means=154 Kg/ha.

C.D. for control vs. rest=199 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 60 to 62(M.A.E.)****Site :- M.A.E. Centre, Obedulaganj.****Type :- 'M'.**

Object :—Type IX: To compare Nitrophosphate by ODDA and PEC processes at different levels and different methods of application.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3)+4 extra treatments.

(1) 3 forms of Super : S_1 =Single Super, S_2 =ODDA (20, 20, 0) and S_3 =PEC(16, 14, 0).

(2) 3 methods of application : M_1 =Broadcast before final cultivation ; M_2 =Placement at 6.3 cm. below the seed and M_3 =Band placement.

(3) 3 levels of fertilizers : L_1 =13.4 Kg/ha. of N+11.8 Kg/ha. of P_2O_5 , L_2 = $2 \times L_1$ and L_3 = $4 \times L_1$.

4 extra treatments : N_0 =0, N_1 =13.4, N_2 =26.9 and N_3 =53.8 Kg/ha. of N.

3. DESIGN :

(i) 3^3 confd+4. (ii) (a) 13 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—62. (b) N.A. (c) Nil. (v) Bagwai, Powerkheda and Ujjain. (vi) Nil. (vii) Nil.

5. RESULTS :

1960

(i) 1238 Kg/ha. (ii) 328 Kg/ha. (iii) Main effect of M and L and extra treatments vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S_1	S_2	S_3	M_1	M_2	M_3	L_1	L_2	L_3
Av. yield	1380	1318	1205	1110	1362	1429	1168	1285	1451
	N_0	N_1	N_2	N_3					
	904	1116	1144	1217					

C.D. for M or L means =233 Kg/ha.
C.D. for extra treatments vs. rest =171 Kg/ha.

1961

(i) 1615 Kg/ha. (ii) 188 Kg/ha. (iii) Main effect of M and L within extra treatments and extra treatments vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S_1	S_2	S_3	M_1	M_2	M_3	L_1
Av. yield	1740	1775	1782	1679	1834	1784	1507
	L_2	L_3	N_0	N_1	N_2	N_3	
	1735	2055	1026	1149	1380	1549	

C.D. for M or L means =134 Kg/ha.
C.D. for extra treatment means =231 Kg/ha.
C.D. for extra treatments vs. rest =98 Kg/ha.

1962

(i) 1719 Kg/ha. (ii) 244 Kg/ha. (iii) Main effect of S, M and L, within extra treatments and the extra treatments vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S_1	S_2	S_3	M_1	M_2	M_3	L_1
Av. yield	1686	1826	2010	1523	2000	2000	1493
	L_2	L_3	N_0	N_1	N_2	N_3	
	1970	2060	1070	1320	1610	1780	

C.D. for S, M or L means =174 Kg/ha.
C.D. for extra treatment means =301 Kg/ha.
G.D. for extra treatment vs. others =128 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 62(M.A.E.).****Site :- M.A.E. Centre, Obedullaganj.****Type :- 'M'.**

Object :—Type X : To study the effect of G.M. on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Deep black. (iii) to (vi) N.A. (vii) Irrigated (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type X on Wheat conducted at Bagwai on page 119.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Bagwai. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 1493 Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of grain in Kg/ha.

T=1580 Kg/ha.

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	G ₀	G ₁	G ₂
Mean yield	1290	1620	1540	1039	1640	1770	1296	1445	1209

Crop :- Wheat (Rabi).**Ref :- M.P. 63, 64(M.A.E.).****Site :- M.A.E. Centre, Obedullaganj.****Type :- 'M'.**

Object :—Type X : To study the effect of G.M. on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Deep black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3) with an extra treatment in each block.

(1) 3 G.M. treatments : G₀=0, G₁=G.M. raised in *situ* without P₂O₅ and G₂=G.M. raised in *situ* with 33.6 Kg/ha. of P₂O₅.(2) 3 level of N : N₀=0, N₁=16.8 and N₂=33.6 Kg/ha.(3) 3 levels of P₂O₅ : P₀=0, P₁=33.6 and P₂=67.2 Kg/ha.

Extra treatment T=NPK equivalent to those obtained from G.M

3. DESIGN :(i) 3³+1 confd. (ii) (a) 10 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 1/100 ha. (b) 1/125 ha. (v) and (vi) Yes.**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963—64. (b) N.A. (c) Nil. (v) Reora. (vi) N.A. (vii) Nil.

5. RESULTS :**1963**

(i) 1077 Kg/ha. (ii) and (iii) N A. (iv) Av. yield of grain in Kg/ha.

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	G ₀	G ₁	G ₂	T
Mean yield	1009	1053	1005	1060	1041	1066	821	1032	1314	1265

1964

(i) 1165 Kg/ha. (ii) 238 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	G ₀	G ₁	G ₂	T
Mean yield	1033	1207	1281	1131	1219	1171	1126	1180	1215	1081

C.D. for N means = 162 Kg/ha.

Crop :- wheat (Rabi).

Ref :- M.P. 63(M.A.E.)

Site :- M.A.E. Centre, Obedullaganj.

Type :- 'M'.

Object :-Type XI : To study the effect of micro-nutrients on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Deep black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN:

Same as in Type XI on Wheat conducted at Bagwai on page 120.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS:

(i) 2279 Kg/ha. (ii) 798.9 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
Mean yield	1989	2128	2764	2393	2285	3342	2285	2795
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	2239	2532	1983	1390	2045	2186	1832	

Crop :- Wheat (Rabi).

Ref :- M.P. 64 (M.A.E.).

Site :- M.A.E. Centre, Obedullaganj.

Type :- 'M'.

Object :-Type XI : To study the effect of micro nutrients on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type XI on Wheat conducted at Bagwai on page 120.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Ujjain. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 1224 Kg/ha. (ii) 216.3 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
Mean yield	1041	1264	973	1375	1140	1128	1338	1474
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	1221	1363	1209	1313	1103	1202	1221	

Crop :- Wheat (Rabi).

Ref :- M.P. 65 (M.A.E.).

Site :- M.A.E. Centre ; Obdullaganj.

Type :- 'M'.

Object :—Type XII ; To study the effect of foliar application of fertilisers on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Deep black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type XII on Wheat conducted at Bagwai on page 120.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Powerkheda. (vi) N.A. (vii) Nil.

5. RESULTS:

(i) 1685 Kg/ha. (ii) (a) 500 Kg/ha. (b) 345 Kg/ha. (iii) Main effects of F and LM are significant. (iv) Av. yield of grain in Kg/ha.

$C_0=1502$ and $C_1=1569$ Kg/ha.

	L ₁ M ₁	L ₂ M ₁	L ₁ M ₂	L ₂ M ₂	L ₁ M ₃	L ₂ M ₃	Mean
F ₁	1507	1870	1382	1576	1476	1787	1600
F ₂	1474	1660	1450	1636	1772	1675	1611
F ₃	1937	2049	1354	2086	1333	2024	1797
F ₄	1913	2192	1901	1755	2033	1809	1934
Mean	1708	1943	1522	1763	1653	1824	1735

C.D. for F marginal means =283 Kg/ha.

C.D. for LM marginal means=243 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60 and 61 (M.A.E.).

Site :- M.A.E. Centre, Powerkheda.

Type :- 'M'.

Object :—Type V : To study the effect of different times of application of N on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Deep black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3)+a control in each block.

(1) 2 levels of N: $N_1=22.4$ and $N_2=44.8$ Kg/ha.

(2) 3 sources of N: $S_1=A/S$, $S_2=A/S/N$ and $S_3=Urea$.

(3) 3 times of application: $T_1=At$ sowing, $T_2=At$ first irrigation and $T_3=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at first irrigation.

3. DESIGN :

(i) $3^2 \times 2 + 3$ confd. (ii) (a) 7 plots/block; 3 blocks/replication. (b) N.A. (iii) 4. (iv) (a), (b) and (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) Obedullaganj. (vi) and (vii) Nil.

5. RESULTS :

1960

(i) 1401 Kg/ha. (ii) 172 Kg/ha. (iii) Main effects of T and N and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control = 987 Kg/ha.

Treatment	T_1	T_2	T_3	S_1	S_2	S_3	N_1	N_2
Mean yield	1540	1384	1485	1476	1430	1503	1365	1577

C.D. for T means = 92 Kg/ha.

C.D. for N means = 81 Kg/ha.

C.D. for control vs. rest = 108 Kg/ha.

1961

(i) 1381 Kg/ha. (ii) 238 Kg/ha. (iii) Main effect of N and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control = 850 Kg/ha.

Treatment	T_1	T_2	T_3	S_1	S_2	S_3	N_1	N_2
Mean yield	1500	1400	1510	1430	1430	1550	1260	1680

C.D. for N means = 113 Kg/ha.

C.D. for control vs. rest = 149 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 62 to 65 (M.A.E.).

Site :- M.A.E. Centre, Powerkheda.

Type :- 'M'.

Object :- Type V (a) : To study the effect of different methods of placement of N on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Deep black. (iii) and (iv) N.A. (v) 33.6 Kg/ha of P_2O_5 as Super. (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type V (a) on Wheat conducted at Bagwai on page 116.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-65. (b) N.A. (c) Nil. (v) Bagwai, Kuthulia, Obedullaganj, Reora and Ujjain. (vi) N.A. (vii) Nil.

5 RESULTS :

1962

(i) 1450 Kg/ha. (ii) 245 Kg/ha. (iii) Control vs. rest only is significant. (iv) Av. yield of grain in Kg/ha.

Control=650 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	1566	1543	1508	1456	1563	1599

C.D. for control vs. rest=265 Kg/ha.

1963

(i) 1367 Kg/ha. (ii) 88 Kg/ha. (iii) Main effects of M and N and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=940 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	1372	1487	1382	1363	1381	1497

C.D. for M or N means=74 Kg/ha.

C.D. for control vs. rest=95 Kg/ha.

1964

(i) 1455 Kg/ha. (ii) 294 Kg/ha. (iii) Main effect of N and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=825 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	1441	1622	1513	1306	1542	1728

C.D. for N means =246 Kg/ha

C.D. for control vs. rest=318 Kg/ha.

1965

(i) 1548 Kg/ha. (ii) 159 Kg/ha. (iii) Control vs. rest alone is significant. (iv) Av. yield of grain in Kg/ha.

Control=1175 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	1596	1593	1578	1525	1587	1656

C.D. for control vs. rest=172 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 60, 61(M.A.E).****Site :- M.A.E. Centre, Powerkheda.****Type :- 'M'.**

Object :—Type IX: To compare Nitrophosphate by ODDA and PEC at different levels and different methods of application.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (iii) Deep black. (iii) to (x) N.A.

2. TREATMENTS :

Same as in Type IX on Wheat conducted at Bagwai on page 118.

3. DESIGN :

(i) 3³ Confd+4. (ii) (a) 13 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-61. (b) N.A. (c) Nil. (v) Obedullaganj, Bagwai and Ujjain. (vi) N.A. (vii) Nil.

5. RESULTS :

1960

(i) 1395 Kg/ha. (ii) 162 Kg/ha. (iii) Main effects of M and L, within extra treatments and extra treatments vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S ₁	S ₂	S ₃	M ₁	M ₂	M ₃	L ₁	L ₂	L ₃
Av. yield	1731	1454	1325	1454	1537	1519	1328	1445	1737
	N ₀	N ₁	N ₂	N ₃					
	941	1181	1208	128					

C.D. for M or L means = 115 Kg/ha.

C.D. for extra treatment means = 199 Kg/ha.

C.D. for extra treatments vs. rest = 85 Kg/ha.

1961

(i) 1472 Kg/ha. (ii) 128 Kg/ha. (iii) Main effects of S, M and L, within extra treatments and extra treatments vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S ₁	S ₂	S ₃	M ₁	M ₂	M ₃	L ₁	L ₂	L ₃
Av. yield	1733	1614	1432	1549	1651	1580	1208	1488	2084
	N ₀	N ₁	N ₂	N ₃					
	729	1162	1328	1577					

C.D. for S, M or L means = 91 Kg/ha.

C.D. for extra treatment means = 157 Kg/ha.

C.D. for extra treatments vs. rest = 68 Kg/ha.

Crop :- Wheat (Rabi).

Ref. :- M.P. 63 to 65 (M.A.E.).

Site :- M.A.E. Centre, Powerkheda.

Type :- M³.

Object :- Type XII : To study the effect of foliar application of fertilizers on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type XII on wheat conducted at Bagwai on page 120.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-65. (b) N.A. (c) Nil. (v) Bagwai, Obedullaganj and Ujjain. (vi) N.A. (vii) Nil.

5. RESULTS :

1963

(i) 1078 Kg/ha. (ii) (a) 226 Kg/ha. (b) 148 Kg/ha. (iii) Main effect of F and LM are significant. (iv) Av. yield of grain in Kg/ha.

$C_0=883$ and $C_1=851$ Kg/ha.

	L_1M_1	L_2M_1	L_1M_2	L_2M_2	L_1M_3	L_2M_3	Mean
F_1	1153	1412	1016	1094	1078	1238	1173
F_2	964	854	876	993	866	859	902
F_3	1352	1423	940	1150	1220	1479	1261
F_4	1354	1557	1013	1046	1206	1363	1257
Mean	1206	1312	961	1071	1092	1246	1148

C.D. for F marginal means=128 Kg/ha.

C.D. for LM marginal means=104 Kg/ha.

1964

(i) 1096 Kg/ha. (ii) (a) 251 Kg/ha. (b) 155 Kg/ha. (iii) Main effects of F and LM are significant. (iv) Av. yield of grain in Kg/ha.

$C_0=893$ and $C_1=876$ Kg/ha.

Mean	L_1M_2	L_2M_1	L_1M_2	L_2M_2	L_1M_3	L_2M_3	Mean
F_1	1231	1253	941	1019	1233	1211	1149
F_2	804	908	905	886	871	874	875
F_3	1250	1673	984	1023	1234	1588	1292
F_4	1283	1743	1050	1102	1303	1612	1349
Mean	1142	1394	970	1008	1161	1321	1166

C.D. for F marginal means=142 Kg/ha.

C.D. for LM marginal means=109 Kg/ha.

1965

(i) 1683 Kg/ha. (ii) (a) 612 Kg/ha. (b) 227 Kg/ha. (iii) Main effects of F and LM are significant. (iv) Av. yield of grain in Kg/ha.

$C_0=1407$ and $C_1=1461$ Kg/ha.

	L_1M_1	L_2M_1	L_1M_2	L_2M_2	L_1M_3	L_2M_3	Mean
F_1	1642	1765	1535	1684	1544	1822	1666
F_2	1407	1549	1478	1533	1646	1788	1567
F_3	1924	2316	1623	1836	1951	2487	2023
F_4	1842	2223	1487	1627	1637	2042	1810
Mean	1704	1963	1531	1670	1694	2035	1766

C.D. for F marginal means=346 Kg/ha.

C.D. for LM marginal means=160 Kg/ha.

Crop :- Wheat (Rabi).**Ref. :- M.P. 63(M.A.E.).****Site :- M.A.E. Centre, Reora.****Type :- 'M'.**

Object :- Type V(a) : To study the effect of different methods of placement of N on the yield of Wheat.

1. BASAL CONDITIONS :(i) (a) to (c) N.A. (ii) Mixed red and black. (iii) and (iv) N.A. (v) 33.6 Kg/ha. of P_2O_5 as Super. (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.**2. TREATMENTS and 3. DESIGN :**

Same as in Type V (a) on Wheat conducted at Bagwai on page 116.

3. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Bagwai, Obedullaganj, Powerkheda and Ujjain. (vi) N.A. (vii) Nil.

5. RESULTS :(i) 576 Kg/ha. (ii) 117 Kg/ha. (iii) Main effect of N and the control *Vs.* rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=377 Kg/ha

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	609	606	579	595	670	527

C.D. for N means=98 Kg/ha.

C.D. for control *Vs.* rest=127 Kg/ha.**Crop :- Wheat (Rabi).****Ref :- M.P. 64(M.A.E.)****Site :- M.A.E. Centre, Reora.****Type :- 'M'.**

Object:—Type V (a) : To study the effect of different methods of placement of N on the yield of Wheat.

1. BASAL CONDITIONS :(i) (a) to (c) N.A. (ii) Mixed red and black. (iii) to (iv) N.A. (v) 33.6 Kg/ha. of P_2O_5 as Super. (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.**2. TREATMENTS and 3. DESIGN :**

Same as in Type V (a) on Wheat conducted at Obedullaganj on page 123.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Obedullaganj. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 316 Kg/ha. (ii) 163 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=209 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	296	378	310	307	354	321

Crop :- Wheat (Rabi).
Site :- M.A.E. Centre, Reora.

Ref :- M.P. 60(M.A.E.)
Type :- 'M'.

Object :-Type VI : To study the effect of different sources and levels of P along with their method of application.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Mixed red and black. (iii) to (vi) N.A. (vii) Irrigated. (iii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3) with a control.

(1) 2 sources of P_2O_5 : S_1 =Ammo. Phos and S_2 =Super.

(2) 2 levels of P_2O_5 : P_1 =22.4 and P_2 =44.8 Kg/ha.

(3) 3 methods of application : M_1 =Broadcasting, M_2 =6 cm. below seed and M_3 =Band placement.

3. DESIGN :

(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1959—60. (b) N.A. (c) Nil. (v) Bagwai. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 830 Kg/ha. (ii) 279 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=729 Kg/ha.

Treatment	M_1	M_2	M_3	S_1	S_2	P_1	P_2
Mean yield	779	920	815	847	830	813	864

Crop :- Wheat (Rabi).
Site :- M.A.E. Centre, Reora.

Ref :- M.P. 62, 64(M.A.E.)
Type :- 'M'.

Object :- Type X : To study the effect of G.M. on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Mixed red and black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type X conducted on Wheat at Obedullaganj on page 126

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—64 (1963 N.A.). (b) N.A. (c) Nil. (v) Obedullaganj. (vi) N.A. (vii) Nil.

5. RESULTS :

1962

(i) 967 Kg/ha. (ii) 92 Kg/ha. (iii) Main effects of N, P and G and T vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	N_0	N_1	N_2	P_0	P_1	P_2	G_0	G_1	G_2	T
Mean yield	836	933	1048	749	992	1076	821	917	1079	1248

C.D. for N or P or G means=63 Kg/ha.

1964

(i) 866 Kg/ha. (ii) 189 Kg/ha (iii) Main effects of N and P and T vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	G ₀	G ₁	G ₂	T
Mean yield	666	840	918	656	855	913	781	806	837	1384

C.D. for N or P means=129 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 64(M.A.E.)

Site :- M.A.E. Centre, Reora.

Type :- 'M'.

Object :—Type XI : To study the effect of micro-nutrients on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Mixed red and black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type XI on Wheat conducted at Bagwai on page 120.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Bagwai. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 1622 Kg/ha. (ii) 216.3 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	T ₅	T ₆	T ₇
Mean yield	949	1599	1902	1686	1661	1811	1593	1400
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	1506	1727	1767	1642	1723	1817	1553	

C.D.=306 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 61(M.A.E.).

Site :- M.A.E. Centre, Ujjain.

Type :- 'M'.

Object :—Type V :—To study the effect of different times of application of N on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3)+a control in each block.

(1) 2 levels of N : N₁=22.4 and N₂=44.8 Kg/ha.

(2) 3 sources of N : S₁=A/S, S₂=A/N and S₃=Urea.

(3) 3 times of application : T₁=At sowing, T₂=At first irrigation and T₃= $\frac{1}{2}$ at sowing+ $\frac{1}{2}$ at first irrigation.

3. DESIGN :

(i) $3^2 \times 2 + 3$ confd. (ii) 7 plots, block : 3 blocks/replication. (b) N.A. (iii) 4 (iv) (a), (b) and (v) N.A. (vi) Yes.

4 GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) 1956-61. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

1960

(i) 788 Kg/ha. (ii) 117 Kg/ha. (iii) Main effect of T and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=646 Kg/ha.

Treatment	T ₁	T ₂	T ₃	S ₁	S ₂	S ₃	N ₁	N ₂
Mean yield	886	729	821	840	784	812	804	820

C.D. for N means = 55 Kg/ha.

C.D. for control vs rest = 73 Kg/ha.

1961

(i) 705 Kg/ha. (ii) 381 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=640 Kg/ha.

Treatment	T ₁	T ₂	T ₃	S ₁	S ₂	S ₃	N ₁	N ₂
Mean yield	770	600	780	720	720	708	700	732

Crop :- Wheat (Rabi).**Ref :- M.P. 63, 64 (M.A.E.).****Site :- M.A.E Centre ; Ujjain.****Type 'M'.**

Object :- Type V (a) : To study the effect of different methods of placement of N on the yield of Wheat

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (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 and 3. DESIGN :

Same as in Type V (a) on Wheat conducted at Bagwai on page 116.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-64. (b) N.A. (c) Nil. (v) Bagwai, Obedullagarj, Powerkheda and Reora. (vi) N.A. (vii) Nil.

5. RESULTS :

1963

(i) 1718 Kg/ha. (ii) 156 Kg/ha. (iii) Main effects of M and N and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=1393 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	1627	1749	1885	1489	1697	2075

C.D. for M or N means = 131 Kg/ha.

C.D. for control vs. rest = 169 Kg/ha.

1964

(i) 1791 Kg/ha. (ii) 284 Kg/ha. (iii) Main effect of M and control vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Control=1425 Kg/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	1970	1631	1895	1752	1870	1874

C.D. for M means =238 Kg/ha.

C.D. for control vs. rest =307 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 65 (M.A.E.).

Site :- M.A.E. Centre, Ujjain.

Type :- 'M'.

Object:—Type V (a): To study the effect of different methods of placement of N on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) and (iv) N.A. (v) 33.6 Kg/ha. of P₂O₅ as Super. (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type V (a) on Wheat conducted at Obedullaganj on page 123.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c). (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 122 Kg/ha. (ii) 76 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=134 Kf/ha.

Treatment	M ₁	M ₂	M ₃	N ₁	N ₂	N ₃
Mean yield	101	133	128	101	133	128

Crop :- Wheat (Rabi).

Ref :- M.P. 60, 61 (M.A.E.).

Site :- M.A.E. Centre ; Ujjain.

Type :- 'M'.

Object:—Type IX : To compare Nitrophosphate by ODDA and PEC at different levels and different methods of application.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS :

Same as in Type IX on Wheat conducted at Bagwai on page 118.

3. DESIGN

(i) 3³ confd+4. (ii) (a) 13 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-61. (b) N.A. (c) Nil. (v) Obedullaganj, Bagwai and Powerkheda. (vi) N.A. (vii) Nil.

5. RESULTS :

1960

(i) 86 Kg/ha. (ii) 89 Kg/ha. (iii) Main effect of M, within extra treatments and extra treatments vs. rest are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S ₁	S ₂	S ₃	M ₁	M ₂	M ₃	L ₁	L ₂	L ₃	N ₀	N ₁	N ₂	N ₃
Mean yield	881	853	821	858	812	885	825	844	885	830	867	955	872

C.D. for M means = 63Kg/ha.

C.D. for extra treatment means=109Kg/ha.

C.D. for extra treatments vs. rest= 47Kg/ha.

1961

(i) 273 Kg/ha. (ii) 62 Kg/ha. (iii) Main effect of M and within extra treatments are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S ₁	S ₂	S ₃	M ₁	M ₂	M ₃	L ₁	L ₂	L ₃	N ₀	N ₁	N ₂	N ₃
Mean yield	281	277	263	258	309	254	291	281	249	272	226	323	863

C.D. for M means =44 Kg/ha.

C.D. for extra treatment means=76 Kg/ha.

First residual

1961

(i) 350 Kg/ha. (ii) 83 Kg/ha. (iii) None of the effects is significant (iv) Av. yield of grain in Kg/ha.

Treatment	S ₁	S ₂	S ₃	M ₁	M ₂	M ₃	L ₁	L ₂	L ₃	N ₀	N ₁	N ₂	N ₃
Mean yield	364	360	337	341	360	360	369	337	355	341	332	346	346

First residual

1962

(i) 854 Kg/ha. (ii) 137 Kg/ha. (iii) Main effect of L alone is significant. (iv) Av. yield of grain in Kg/ha

Treatment	S ₁	S ₂	S ₃	M ₁	M ₂	M ₃	L ₁	L ₂	L ₃	N ₀	N ₁	N ₂	N ₃
Mean yield	870	853	898	888	857	876	810	930	911	927	816	896	776

C.D. for L means=97 Kg/ha.

Crop :-Wheat (Rabi).

Ref :- M.P. 65(M.A.E.).

Site :- M.A.E. Centre, Ujjain.

Type :- 'M'.

Object :-Type XI :-To study the effect of micro-nutrients on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type XI on Wheat conducted at Bagwai on page 120.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) to (c) No. (vi) Obedullaganj. (vi) N.A. (vii) Nil.

5. RESULTS:

(i) 388 Kg/ha. (ii) 933 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	T ₅	T ₆	T ₇
Mean yield	304	432	586	417	364	367	311	375
	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	
	360	444	292	376	358	365	462	

C.D.=132 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :-M.P. 63, 64(M..A.E.).

Site :- M.A.E. Centre, Ujjain.

Type :- 'M'.

Object :-Type XII :-To study the effect of foliar application of fertilizers on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type No. XII on Wheat conducted Bagwai on page 120.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-64. (b) N.A. (c) Nil. (v) Bagwai and Powerkheda. (vi) N.A. (vii) Nil.

5. RESULTS :

1963

(i) 1575 Kg/ha. (ii) (a) 164 Kg/ha. (b) 185 Kg/ha. (iii) Main effects of F and LM are an significant. (iv) Av. yield of grain in Kg/ha.

C₀=1375 and C₁=1358 Kg/ha.

	L ₁ M ₁	L ₂ M ₁	L ₁ M ₂	L ₂ M ₂	L ₁ M ₃	L ₂ M ₃	Mean
F ₁	1444	1822	1259	1480	1284	1569	1476
F ₂	1590	1970	1283	1538	1384	1682	1575
F ₃	1647	2024	1440	1594	1596	1823	1687
F ₄	1798	2136	1709	1662	1743	1996	1841
Mean	1620	1988	1424	1569	1502	1768	1645

C.D. for F marginal means = 93 Kg/ha.

C.D. for LM marginal means = 130 Kg/ha.

1964

(i) 1299 Kg/ha. (ii) (a) 476 Kg/ha. (b) 213 Kg/ha. (iii) Main effect of F is significant. (iv) Av. yield of grain in Kg/ha.

$C_0=1191$ and $C_1=1203$ Kg/ha.

	L_1M_1	L_2M_1	L_1M_2	L_2M_2	L_1M_3	L_2M_3	Mean
F_1	1289	1281	1288	1346	1493	1.98	1332
F_2	1122	1066	1090	1281	1117	1188	1144
F_3	1409	1396	1368	1583	1521	1555	1472
F_4	1368	1281	1410	1276	1484	1493	1585
Mean	1297	1256	1289	1371	1404	1384	1333

C.D. for F marginal means=269 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 65 (M.A.E.).

Site :- M.A.E. Centre ; Ujjain.

Type :- 'M'.

Object :—Type XII : To study the effect of foliar application of fertilisers on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

M. in plot treatments

4 fertilizer treatments: $F_1=22.4$ Kg/ha. of N as A/S. $F_2=22.4$ Kg/ha. of P_2O_5 as Super, $F_3=22.4$ Kg/ha. of N+22.4 Kg/ha. of P_2O_5 and $F_4=22.4$ Kg/ha. of N+22.4 Kg/ha. of P_2O_5 +22.4 Kg/ha. of K_2O .

Sub-plot treatments

All combinations of (1) and (2)+2 extra treatments.

(1) 3 methods of application: M_1 =Soil application, M_2 =Foliar application and M_3 =Soil application and foliar application.

(2) 2 levels of application: $L_1=\frac{1}{2}$ dose and L_2 =full dose.

Extra treatments: C_1 =Water spray and C_2 =Absolute Control.

3 DESIGN :

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

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 340 Kg/ha. (ii) (a) 161 Kg/ha. (b) 72 Kg/ha. (iii) Main effect of LM is significant (iv) Av. yield of grain in Kg/ha.

$C_0=305$ and $C_1=271$ Kg/ha.

	L_1M_1	L_2M_1	L_1M_2	L_2M_2	L_1M_3	L_2M_3	Mean
F_1	365	371	292	395	302	415	357
F_2	393	393	320	356	369	377	368
F_3	353	367	313	328	352	353	344
F_4	371	399	325	327	368	388	363
Mean	370	382	312	351	348	383	358

C.D. for LM marginal means=51 Kg/ha.

Crop :- Wheat(*Rabi*).**Ref :-** M.P. 60(S.F.T.)**Site :- (District) :** Durg, Raipur, Shahdol,
Satna and Chhatrapur.**Type :-** 'M'.**Object :-** Type A : To study the response of Wheat to different levels of N, P and K applied individually and in combination.**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) As under results. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

8 manurial treatments :

Q=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 . andNPK=22.4 Kg/ha. of N+22.4 Kg/ha. 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 a *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 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) Grain yield. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

District	Soil class	No. of trials	Control mean in Kg/ha	Average response of grain in Kg/ha.								
				N	P	K	S.E.	NP	NK	PK	NPK	S.E.
Durg	Red	12	1000	80	130	10	44.0	40	10	70	60	41.0
Raipur	Red	11	590	270	190	200	31.0	-40	-20	40	-30	41.0
Shahdol	Red	7	740	120	90	80	33.0	-10	-50	20	60	26.0
Satna	Red & Black	7	590	100	80	120	17.0	-40	-30	-40	-30	11.0
Chhatrapur	Red & Black	12	1100	200	60	90	19.0	-20	-130	40	50	13.0

Crop :- Wheat (*Rabi*).**Ref :-** M.P. 61(S.F.T.)**Site :- (District),** Durg and Chhatrapur.**Type :-** 'M'.**Object :-** Type A : To study the response of Wheat to different levels of N, P and K applied individually and combination.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red for Durg and Red and black for Chhatarpur. (iii) to (vi) N.A. (vii) Unirrigated. (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 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 :

Same as in type A on wheat (irrigated) on page No. 141.

4. GENERAL :

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

5. RESULTS:

District	No. of trials	Control mean Kg/ha.	Average response of grain in Kg/ha.								
			N.	P.	K.	S.E.	NP	NK	PK	NPK	S.E
Durg	8	1120	150	130	0.0	65.0	100	-10	-50	0.0	61.0
Chhatarpur	11	1260	310	190	170	32.0	-80	50	-20	160	36.0

Crop :- Wheat (Rabi).

Ref :- M.P. 60(S.F.T.) for Durg, Raipur, Shahdol, Chhatarpur, Satna 61(S.F.T.) for Chhindwara.

Site :- (District) : Durg, Raipur, Shahdol, Chhatarpur and Chhindwara.

Type :- 'M'.

Object:—Type B: To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) As under results. (iii) to (vi) N.A. (vii) Irrigated. (viii) 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_1' =23.4 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 and

N_2'' =44.8 Kg/ha. of N as A/S/N.

3. DESIGN :

Same as in Type A on Wheat (irrigated) on page 141.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961 only for Chhindwara ; 1960 only for others
(b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

District	Year	Soil class	No. of trials	Control mean in Kg/ha	Average response of grain in Kg/ha.						S.E. of response
					N ₁	N ₁ '	N ₁ ''	N ₂	N ₂ '	N ₂ ''	
Durg	1960	Red	16	740	210	120	130	260	160	190	47.0
Rajpur	1960	Red	9	650	310	60	240	400	530	310	91.0
Shahdol	1960	Red	6	600	290	280	300	340	280	370	54.0
Chhatarpur	1960	Red& black	14	1310	180	390	370	390	580	390	45.0
Satna	1960	Red& black	7	660	300	290	320	360	320	310	29.0
Chhindwara	1961	Black	11	1100	210	220	120	270	260	350	131.0

Crop :- Wheat (Rabi).

Ref :- M.P. 61(S.F.T.).

Site :- (District) Durg and Chhatarpur.

Type :- 'M'.

Object :—Type B : To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red for Durg and red and black for Chhatarpur. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

Same as in Type B on Wheat (irrigated) on page 142.

3. DESIGN :

Same as in Type A on Wheat (irrigated) on page 141.

4. GENERAL :

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

5. RESULTS :

District	No. of trials	Control mean in Kg/ha.	Average response of grain in Kg/ha.						S.E. of response
			N ₁	N ₁ '	N ₁ ''	N ₂	N ₂ '	N ₂ ''	
Durg	10	1240	320	120	300	710	380	580	132.0
Chhatarpur	10	1400	390	570	490	590	690	740	53.0

Crop :- Wheat (Rabi).

**Ref :- M.P. 62(S.F.T.) for Chhindwara,
65(S.F.T.) for Ujjain.**

Site :- (District) : Chhindwara and Ujjain. Type :- 'M'.

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) (a) to (c) N.A. (ii) Shallow black for Chhindwara ; N.A. for Ujjain. (iii) 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.

$N_2=70$ Kg/ha. of N.

$P_1=35$ Kg/ha. of P_2O_5 .

$N_1P_1=35$ Kg. ha of N+35 Kg/ha. of P_2O_5 .

$N_2P_1=70$ Kg/ha. of N+35 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

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_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 an oilseed. All the three type—C experiments are conducted on a legume crop. 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_1 , A_2 and A_3 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-only for Chhatarpur ; 1965-only for Ujjain. (b) N.A. (c) Nil. (v) to (vii) Nil.

5 RESULTS :

Chhindwara

62(S.F.T.)

Treatment	N_1	N_2	P_1	N_1P_1	N_2P_1	N_2P_2	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	350	691	214	680	818	871	1234	84.7

Control mean=3528 Kg/ha. ; No of trials=10.

Ujjain

65(S.F.T.)

Treatment	N_1	N_2	P_1	N_1P_1	N_2P_1	N_2P_2	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	7	-35	80	80	85	95	135	68.8

Control mean=880 Kg/ha. ; No of trials=2.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 62(S.F.T.) for Chhatarpur ;
Sidhi ; 62, 64(S.F.T.) for Rewa ;
64(S.F.T.) Bilaspur, Durg, Raigarh,
Raipur, Indore, Ujjain, Jabalpur,
Mandla, Raisen and Sehore.

Site :- (District) : Chhatarpur,
Rewa, Sidhi, Bilaspur,
Durg, Raigarh, Raipur,
Indore, Ujjain, Jabalpur,
Mandla, Raisen and Sehore. **Type :-** 'M'.

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) (a) to (c) N.A. (ii) Red and black for Chhatarpur, red and yellow for Rewa, Sidhi, Bilaspur and Raigarh; red for Durg and Raipur, medium black for Indore, Ujjain, Jabalpur and Sehore; deep black for Raisen, and medium black or red and yellow for Mandla. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type A₁ on Wheat (unirrigated) on page 141.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1964—only for Chhatarpur ; 1962—64(63 N.A.) for Rewa, 1962—only for Sidhi ; 1964—only for Bilaspur, Durg, Raigarh, Raipur, Indore, Ujjain, Jabalpur, Mandla, Raisen and Sehore. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

Chhatarpur

62(S.F.T)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	309	320	135.0	191	414	479	500	97.9

Control mean=931 Kg/ha. ; No. of trials=5.

Rewa

62(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	122	134	59	157	171	212	261	41.6

Control mean=871 Kg/ha. ; No. of trials=8.

64(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	90	189	16	161	260	397	425	26.8

Control mean=573 Kg/ha. ; No. of trials=11.

Sidhi

62(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	36	192	150	230	270	365	605	85.1

Control mean=834 Kg/ha. ; No. of trials=4.

Bilaspur**64(S.F.T.)**

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	138	319	175	290	358	467	675	41.0

Control mean= 891 Kg/ha ; No. of trials=5.

Durg**64(S.F.T.)**

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	78	166	72	344	482	599	762	90.6

Control mean=1148 Kg/ha. ; No. of trials=9.

Raigarh**64(S.F.T.)**

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	172	148	321	420	296	172	296	127.2

Control mean=370 Kg/ha. ; No. of trials=4.

Raipur**64(S.F.T.)**

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	153	287	251	346	368	399	597	55.1

Control mean=526 Kg/ha. ; No. of trials=10.

Indore**64(S.F.T.)**

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	113	291	207	229	410	427	617	42.1

Control mean=778 Kg/ha. ; No. of trials=4.

Ujjain**64(S.F.T.)**

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	849	121	140	215	303	399	522	50.8

Control mean=830 Kg/ha. ; No. of trials=6.

Jabalpur**64(S.F.T.)**

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	502	635	425	1021	1427	1479	1839	194.6

Control mean=1484 Kg/ha. ; No. of trials=13.

Mandla**64(S.F.T.)**

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	164	428	395	527	757	1054	1350	165.5

Control mean=1120 Kg/ha. ; No. of trials=3.

Raisen

64(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	61	104	52	93	111	138	175	34.9

Control mean=1255 Kg/ha. ; No. of trials=9.

Sehore

64(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	135	133	127	171	142	196	310	39.2

Control mean=1238 Kg/ha. ; No. of trials=10.

Crop :- Wheat (Rabi).

Ref :- M.P. 62, 64(S.F.T.) for Ujjain, Rewa, 62(S.F.T.) for Chhatarpnr, Sidhi, 64(S.F.T.) for Bilaspur, Durg, Raigarh, Raipur, Indore, Jabalpur, Mandla, Raisen and Sehore.

Site :- (District) : Ujjain, Chhatarpnr, Rewa, Sidhi, Bilaspur, Durg, Raigarh, Raipur, Indore, Jabalpur, Mandla, Raisen and Sehore.

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) (a) to (c) N.A. (ii) Medium black for Ujjain, Indore, Jabalpur and Sehore ; red and black for Chhatarpnr, red and yellow for Rewa, Sidhi, Bilaspur and Raigarh ; red for Durg and Raipur, deep black or red and yellow for Mandla and deep black (skeletal) for Raisen. (iii) 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.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.N₂P₂=70 Kg/ha. of N+70 Kg/ha. of P₂O₅ andN₂P₂K₂=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 Mur Pot.**3. DESIGN :**Same as in Type A₁ on Wheat (irrigated) on page 143.**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-64(63 N.A.) for Ujjain and Rewa ; 1962- only for Chhatarpnr, Sidhi ; 1964- only for Bilaspur, Durg, Raigarh, Raipur, Indore, Jabalpur, Mandla, Raisen and Sehore. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

Ujjain

62(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	-248	121	103	302	425	460	687	256.3

Control mean=1817 Kg/ha. ; No. of trials=3

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	-106	-117	-49	49	99	172	262	31.1

Control mean=773 Kg/ha. ; No. of trials=5

Chhatarpur

62(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	217	252	243	414	447	618	549	134.7

Control mean=898 Kg/ha. ; No. of trials=5

Rewa

62(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	46	16	—	119	152	197	224	51.6

Control mean=981 Kg/ha. ; No. of trials=9

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	84	52	81	171	177	327	447	22.6

Control mean=588 Kg/ha. ; No. of trials=10

Sidhi

62(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.	
Av. response of grain in Kg/ha.		42	3	144	181	215	295	589	66.7

Control mean=900 Kg/ha. ; No. of trials=4

Bilaspur

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	159	256	327	329	360	527	700	63.0

Control mean=1037 Kg/ha. ; No. of trials=5

Durg

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	324	154	306	634	675	834	1094	153.4

Control mean=1186 Kg/ha. ; No. of trials=9

Raigarh

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	98	172	172	321	296	420	469	112.2

Control mean=321 Kg/ha. ; No. of trials=4

Raipur

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	203	154	266	322	370	345	608	54.2

Control mean=551 Kg/ha. ; No. of trials=10

Indore

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	93	164	303	224	490	569	711	47.2

Control mean=866 Kg/ha. ; No. of trials=4

Jabalpur

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	582	537	670	789	901	1502	2023	172.9

Control mean=1125 Kg/ha. ; No. of trials=11

Mandla

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	247	197	691	444	988	1235	1482	108.5

Control mean=1334 Kg/ha. ; No. of trials=2

Raisen

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	68	30	35	77	145	99	125	22.3

Control mean=1248 Kg/ha. ; No. of trials=10

Sehore

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	186	150	220	203	255	221	384	34.4

Control mean=1460 Kg/ha. ; No. of trials=11

Crop :- Wheat (Rabi).

**Ref :- M.P. 62(S.F.T.) for Chhindwara and
65(S.F.T.) for Ujjain.**

**Site :- (District) : Chhindwara and
Ujjain.**

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.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Shallow black for Chhindwara and medium black for Ujjain. (iii) 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=35 Kg/ha. of K₂O.

K₂=70 Kg/ha. of K₂O.

N₁K₁=35 Kg/ha. of N+35 Kg/ha. of K₂O.

N₁K₂=35 Kg/ha. of N+70 Kg/ha. of K₂O.

N₂K₂=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 A on Wheat (irrigated) on page 141.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 only for Chhindwara and 1965 only for Ujjain. (b) N.A. (c) Nil. (v) to (vii) Nil,

5. RESULTS :

**Chhindwara
62(S.F.T.)**

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	359	360	466	626	761	977	1019	45.7

Control mean=3096 Kg/ha. ; No. of trials=5.

**Ujjain
65(S.F.T.)**

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	47	67	77	150	147	182	227	53.1

Control mean=923 Kg/ha. ; No. of trials=2.

Crop :- Wheat (Rabi).

**Ref :- M.P. 62, 64(S.F.T.) for Ujjain
and Rewa, 62(S.F.T.) for
Chhatarpur and Sidhi. 64
(S.F.T.) for Bilaspur,
Durg, Raigarh, Raipur,
Indore, Jabalpur, Mandla
Raisen and Sehore.**

**Site :- (District) : Ujjain, Chhatarpur,
Rewa, Sidhi, Bilaspur, Durg,
Raigarh, Raipur, Indore, Jabalpur,
Mandla, Raisen and Sehore.**

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.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black for Ujjain, Indore, Jabalpur and Sehore, red and black for Chhatarpur, Red and yellow for Bilaspur, Raigarh, Rewa and Sidhi; Red for Durg and Raipur, medium black or red and yellow for Mandla and deep black for Raisen. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:

Same as in Type A₃ on Wheat (irrigated) on page 150.

3. DESIGN:

Same as in Type A₁ on Wheat (irrigated) on page 141.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-64 (63 N.A.) for Ujjain and Rewa; 1962-only for Chhatarpur; Sidhi 1964-only for Bilaspur, Durg, Raigarh, Raipur, Indore, Jabalpur Mandla, Raisen and Sehore: (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

Ujjain

62(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	19	192	85	187	207	11	548	185.2

Control mean=1591 Kg/ha. ; No. of trials=2.

64(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	115	140	325	424	495	525	661	34.7

Control mean=737 Kg/ha. ; No. of trials=5.

Chhatarpur

62(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	351	100	538	615	247	462	306	21.6

Control mean=929 Kg/ha. ; No. of trials=4.

Rewa

62(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	88	91	105	52	151	180	233	51.4

Control mean=845 Kg/ha. ; No. of trials=7.

64(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	103	40	58	134	174	341	312	32.7

Control mean=536 Kg/ha. ; No. of trials=9.

Sidhi

62(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	116	26	33	212	236	394	613	66.5

Control mean=803 Kg/ha. ; No. of trials=4.

Bilaspur**64(S.F.T.)**

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	107	239	378	351	510	593	601	88.8

Control mean=897 Kg/ha. ; No. of trials=5.

Durg**64(S.F.T.)**

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	83	280	406	630	565	702	890	105.8

Control mean=1249 Kg/ha. ; No. of trials=10.

Raigarh**64(S.F.T.)**

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₁	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	98	24	123	74	370	247	518	143.8

Control mean=420 Kg/ha. ; No. of trials=4.

Raipur**64(S.F.T.)**

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₁	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	86	74	211	162	318	410	494	46.0

Control mean=542 Kg/ha. ; No. of trials=9.

Indore**64(S.F.T.)**

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	151	75	128	174	250	329	436	64.0

Control mean=629 Kg/ha. ; No. of trials=4.

Jabalpur**64(S.F.T.)**

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	449	221	391	802	1092	990	1214	304.3

Control mean=1292 Kg/ha. ; No. of trials=14.

Mandla**64(S.F.T.)**

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	230	32	560	131	658	1186	889	175.5

Control mean=1087 Kg/ha. ; No. of trials=3.

Raisen

64(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	92	71	58	128	122	124	156	31.9

Control means=1243 Kg/ha ; No. of trials=10.

Sohore

64(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	122	123	115	209	179	317	406	40.5

Control mean=1545 Kg/ha. ; No. of trials=11.

Crop :- Wheat (Rabi).

Ref. :- M.P. 64(47), 65(46).

Site :- Govt. Agri. Res. Stn., Adhartal.

Type :- 'MV'.

Object :- To study the effect of fertilizers on the yield of Wheat varieties.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clay loam (Medium black). (iii) Nov., 64 ; 2nd week of Nov., 65. (iv) (a) N.A. (b) Transplanting. (c) N.A. (d) Rows 75 cm. apart. (e) —. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) April, 65 ; April, 66.

2. TREATMENTS :

Main-plot treatments :

4 varieties : V₁=Hy. 633, V₂=C-281, V₃=N.P. 839 and V₄=Hy-65.

Sub-plot treatments :

3 levels of fertilizers : F₀=Control, F₁=22 Kg/ha. of N+22 Kg/ha. of P₂O₅ and F₂=45 Kg/ha. of N+45 Kg/ha. of P₂O₅.

3. DESIGN:

(i) Split plot. (ii) (a) 4 main-plots/replication, 3 sub-plots/main/plot. (b) N.A. (iii) 4. (iv) (a) (b), and (v) N.A. (vi) Yes.

4. GENERAL:

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964-65. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Plot-wise yield data or complete results N.A.

5. RESULTS :

Treatment	V ₁	V ₂	V ₃	V ₄	Sig.	F ₀	F ₁	F ₂	Sig.
Years									
1964	813	874	892	977	N.S.	662	1000	1006	*
1965	2898	2725	2439	2429	N.S.	2040	2730	3100	*

G.M.	S.E./ Main-plot.	S.E./ Sub-plot
889	204.4	280.9
2623	647.8	622.5

64 (47)

C.D. for F means=205.0 Kg/ha.

65 (46)

C.D. for F means=449.0 Kg/ha.

Crop :- Wheat (Rabi).**Ref. :- M.P. 60(20).****Site :- Govt. Agri. Farm, Baroda.****Type :- 'MV'.**

Object :- To find out the most suitable combination of variety and manurial dose for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Mar. No. 1. (iii) 3.11.60. (iv) (a) *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) Rows 30 cm. apart. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 3.4.61.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 levels of N : $N_0=0$, $N_1=22.4$ and $N_2=44.8$ Kg/ha.(2) 3 levels of P_2O_5 : $P_0=0$, $P_1=22.4$ and $P_2=44.8$ Kg/ha.(3) 3 varieties : $V_1=Hy-65$, $V_2=N.P. 710$ and $V_3=C.281$ **3. DESIGN :**

(i) 3^3 Confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 11.9 m x 6.9 m. (b) 10.1 m x 5.0 m. (v) 91 cm. x 91 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) No. of plants ; height of plants, No. of tillers/plant, yield of grain and straw. (iv) (a) 1959-60, (b) No. (c) Nil. (v) *Bhind* and *Jora*. (vi) Nil. (vii) —.

5. RESULTS :

(i) 883 Kg/ha. (ii) 127.4 Kg/ha. (iii) Main effects of N, P and V are all highly significant. (iv) Av. yield grain in Kg/ha.

	N_0	N_1	N_2	P_0	P_1	P_2	Mean
V_1	866	1042	1022	723	1065	1143	977
V_2	717	1046	955	579	1062	1076	906
V_3	691	773	830	624	813	858	765
Mean	758	954	936	642	980	1026	883
P_0	551	731	644				
P_1	826	994	1121				
P_2	899	1138	1042				

C.D. for N or P or V marginal means = 88.1 Kg/ha.

Crop :- Wheat (Rabi).**Ref. :- M.P. 64(8), 65(9).****Site :- Govt. Agri. Farm, Baroda.****Type :- 'MV'.**

Object :- To find out a suitable variety and optimum fertilizer dose for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Sandy loam ; Clayey loam. (iii) 3.10.64 to 1.11.64 ; 1/2.11.65. (iv) 2 *bakherings*. (b) Line sowing by *Nari*. (c) 67 Kg/ha. ; 74 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) One hand weeding. (ix) N.A. (x) 3 to 13.4.65 ; 5/6.4.66.

2. TREATMENTS :

All combinations of (1), (2) and (3).

- (1) 3 varieties : $V_1=Hy-11$, $V_2=Hy-277$ and $V_3=Hy-65$.
 (2) 3 levels of N as A/S : $N_1=22.4$, $N_2=44.8$ and $N_3=67.2$ Kg/ha.
 (3) 3 levels of P_2O_5 as Super : $P_1=22.4$, $P_2=44.8$ and $P_3=67.2$ Kg/ha.

3. DESIGN :

- (i) 3^3 Confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 4. (iv) (a) 4.9 m. \times 13.7 m. (b) 4.3 m. \times 12.8 m. (v) 30 cm. \times 46 cm. (vi) Yes.

4. GENERAL:

- (i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1964-65. (b) Yes. (c) Results of combined analysis have been presented under 5 Results. (v) Jora and Bhind. (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled results

- (i) 2058 Kg/ha. (ii) 193.8 Kg/ha. (based on 158 d. f. made up of pooled error and Treatments \times years interaction). (iii) Main effects of V, N and P are highly significant and interaction V \times N is significant. (iv) Av. yield of grain in Kg/ha.

	N_1	N_2	N_3	P_1	P_2	P_3	Mean
V_1	1922	2186	2248	1977	2204	2175	2118
V_2	1732	1995	2248	1849	2071	2053	1992
V_3	1886	2128	2180	1916	2179	2099	2064
Mean	1847	2103	2225	1914	2151	2109	2058
P_1	1764	1913	2066				
P_2	1920	2230	2304				
P_3	1856	2165	2305				

C.D. for V, N or P marginal means = 63.3 Kg/ha.

C.D. for body of V \times N table = 109.6 Kg/ha.

Individual results

Treatments	V_1	V_2	V_3	Sig.	N_1	N_2	N_3	Sig.	P_1	P_2	P_3
Years 1964	2199	2123	2143	N.S.	1948	2211	230	**	2015	2276	2174
1965	2038	1860	1986	**	1745	1995	2144	**	1813	2027	2044
	2118	1992	2064	**	1847	2103	2225	**	1914	2151	2109

Sig.	G.M.	S.E./plot
**	2155	169.6
**	1 1	209.5
**	2058	193.8

Crop :- Wheat (*Rabi*).

Ref :- M.P. 64(16).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'MV'.

Object :—To find out the optimum fertilizer dose for different varieties of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 30.10.65. (iv) (a) 3 ploughings. (b) Line sowing. (c) and (d) N.A. (e) —. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 3 weeding. (ix) N.A. (x) 3-15 4.65.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 levels of N : $N_1=20$, $N_2=40$ and $N_3=60$ Kg/ha.(2) 3 levels of P_2O_5 : $P_1=20$, $P_2=40$ and $P_3=60$ Kg/ha.(3) 3 varieties : $V_1=Hy-11$, $V_2=Hy-277$ and $V_3=Hy-67$.

3. DESIGN :

(i) 3^3 Conf'd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 4. (iv) 4.9 m. \times 13.7 m. (b) 4.3 m. \times 12.8 m. (v) 30 cm. \times 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964—only. (b) and (c) —. (v) N.A. (vi) and (vii) —.

5. RESULTS:

(i) 2205 Kg/ha. (ii) 225.2 Kg/ha. (iii) Main effects of N and P are highly significant and interaction $N \times P$ is significant. (iv) Av. yield of grain in Kg/ha.

	N_1	N_2	N_3	P_1	P_2	P_3	Mean
V_1	2074	2302	2322	2133	2316	2250	2233
V_2	2011	2145	2459	2101	2300	2214	2205
V_3	1950	2290	2291	1999	2319	2213	2177
Mean	2012	2246	2357	2078	2312	2226	2205
P_1	1993	1999	2240				
P_2	2082	2425	2428				
P_3	1961	2313	2403				

C.D. for N or P marginal means = 105.8 Kg/ha.

C.D. for body of $N \times P$ table = 183.3 Kg/ha.Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(12).

Site :- Govt. Agri. Farm, Bhind.

Type :- 'MV'.

Object :—To find out the most suitable combination of variety and manurial dose for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) Sandy loam. (iii) 31.10.60. (iv) (a) 3 *bakherings* 1 ploughing and 4 levellings. (b) Line sowing. (c) 34 Kg/ha. (d) Rows 30 cm. apart. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 1 weeding. (ix) 7 cm. (x) 1.4.61.

2. TREATMENTS:

All combinations of (1), (2) and (3).

(1) 3 varieties : $V_1=Hy-65$, $V_2=N.P. 710$ and $V_3=C.281$.

(2) 3 levels of N : $N_0=0$, $N_1=22.4$ and $N_2=44.8$ Kg/ha.

(3) 3 levels of P_2O_5 : $P_0=0$, $P_1=22.4$ and $P_2=44.8$ Kg/ha.

3. DESIGN:

(i) 3^3 Confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) $11.1 \text{ m} \times 4.6 \text{ m}$.
(b) $9.1 \text{ m} \times 3.1 \text{ m}$. (v) $99 \text{ cm} \times 76 \text{ cm}$. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Mild attack of brown Rust. (iii) Height of plants, germination count, no. of tillers, no. of grains/ear head and yield of grain. (iv) (a) 1960—only. (b) and (c) —. (v) Baroda and Jora. (vi) and (vii) Nil.

5. RESULTS:

(i) 2709 Kg/ha. (ii) 1004.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	P_0	P_1	P_2	Mean
V_1	2616	3596	2797	2875	2892	3243	3003
V_2	2485	2563	2596	2294	2604	2746	2548
V_3	1742	2847	3137	1732	2619	3375	2575
Mean	2281	3002	2843	2300	2705	3121	2709
P_0	2103	2432	2365				
P_1	2208	3147	2761				
P_2	2533	3427	3403				

Crop :- Wheat (*Rabi*).

Ref. :- M.P. 64(19).

Site :- Govt. Agri Farm, Bhind.

Type :- 'MV.'

Object :—To find out a suitable variety and optimum fertilizer dose for Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Maize. (c) N.A. (ii) Sandy loam. (iii) 11.11.64. (iv) (a) Two *bakherings* and one ploughing. (b) Line sowing by *Desi Nari*. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings by *khurpi*. (ix) N.A. - (x) 2—4.4.65.

2. TREATMENTS:

All combinations of (1) and (2).

(1) 4 varieties of Wheat : $V_1=N.P. 839$, $V_2=Hy 65$, $V_3=Hy-4-4-65$ and $V_4=C-281$.

(2) 3 levels of fertilizers : $M_0=Control$ (No fertilizer), $M_1=22.4$ Kg/ha. of N as A/S+22.4 Kg/ha. of P_2O_5 as Super and $M_2=2 \times M_1$.

3. DESIGN:

(i) Fact in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) $3.7 \text{ m} \times 10.7 \text{ m}$. (b) $3.1 \text{ m} \times 9.8 \text{ m}$.
(v) $30 \text{ cm} \times 46 \text{ cm}$. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1954 only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 2872 kg/ha. (ii) 450.6 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	Mean
M ₀	2379	2522	2739	2103	2436
M ₁	2917	2672	3330	2991	2978
M ₂	3246	2907	3498	3159	3203
Mean	2847	2700	3189	2751	2872

C.D. for M marginal means=324.3 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 64(4).

Site :- Govt. Agri. Farm, Bhind.

Type :- 'MV'.

Object :-To find out a suitable variety and fertilizer dose for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 23-25, 11-64. (iv) (a) 2 *bakherings* and one ploughing. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) — (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) One weeding by khurpi. (ix) N.A. (x) 13, 15.4.65.

2. TREATMENTS :

All combinations of (1), (2) and (3) ..

(1) 3 varieties : V₁=C—273, V₂=N.P.—710 and V₃=Hy—65.

(2) 3 levels of N as A/S : N₁=22.4, N₂=44.8 and N₃=67.2 Kg/ha.

(3) 3 levels of P₂O₅ as Super : P₁=22.4, P₂=44.8 and P₃=67.2 Kg/ha.

3. DESIGN:

(i) 3³ confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 4. (iv) (a) 4.9 m. × 13.7 m. (b) 4.3 m. × 12.8 m. (v) 30 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain yield. (iv) (a) 1964—only. (b) and (c) — (v) to (vii) Nil.

5. RESULTS :

(i) 2885 Kg/ha. (ii) 561.6 Kg/ha. (iii) Main effects of V, N and P are all highly significant. Interaction VNP is significant. (iv) Av. yield of grain in Kg/ha.

	N ₁	N ₂	N ₃	P ₁	P ₂	P ₃	Mean
V ₁	2724	3378	3152	2770	3107	3377	3085
V ₂	2447	2465	3016	2745	2387	2796	2643
V ₃	2755	2862	3165	2581	2788	3412	2927
Mean	2642	2902	3111	2699	2761	3195	2885
P ₁	2336	2982	2778				
P ₂	2660	2668	2955				
P ₃	2930	3055	3600				

C.D. for N or P or V-marginal means=388.2 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 65(20).

Site :- Govt. Agri. Farm, Bhind.

Type :- 'MV'.

Object :- To find out the suitable variety and optimum dose of fertilizer for Wheat.

1. BASAL CONDITIONS :

(i) (a) Fallow—Wheat. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 8—10.11.65. (iv) (a) 3 ploughings followed by 2 *bakherings*. (b) Line sowing. (c) and (d) N.A. (e) — (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) Two weedings. (ix) 4.5 cm. (x) 26, 27.3.66.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 varieties : V₁=C—273, V₂=N.P.—710 and V₃=Hy—65.

(2) 3 levels of N : N₁=20, N₂=30 and N₃=40 Kg/ha.

(3) 3 levels of P : P₁=20, P₂=40 and P₃=60 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) 13.5 m.×4.8 m. (b) 12.6 m.×4.2 m. (v) 45 cm.×30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—contd. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1959 Kg/ha. (ii) 554.2 Kg/ha. (iii) Only the main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

	N ₁	N ₂	N ₃	P ₁	P ₂	P ₃	Mean
V ₁	1895	1883	2092	2315	1830	1726	1957
V ₂	1663	1886	2149	2012	1831	1855	1899
V ₃	1805	2151	2107	2000	1932	2130	2021
Mean	1788	1973	2116	2109	1864	1904	1959
P ₁	2152	1914	2260				
P ₂	1598	1930	2065				
P ₃	1613	2075	2023				

C.D. for N marginal means=259.1 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 60(3).****Site :- Govt. Agri. Farm, Jora.****Type :- 'MV'.****Object :-** To find out the most suitable combination of variety and manurial dose for Wheat.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Urid*. (c) Nil. (ii) Sandy loam. (iii) 3.11.60. (iv) (a) 3 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 6, 7.4.61.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 varieties : $V_1=Hy.-65$, $V_2=N.P.-710$ and $V_3=C-281$.(2) 3 levels of N : $N_0=0$, $N_1=22.4$ and $N_2=44.8$ Kg/ha.(3) 3 levels of P_2O_5 : $P_0=0$, $P_1=22.4$ and $P_2=44.8$ Kg/ha.**3. DESIGN :**

(i) 3^3 confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 15.7 m. \times 3.4 m. (b) 13.9 m. \times 2.7 m. (v) 91 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Height of plants, tillers and grain yield. (iv) (a) 1960—only. (b) and (c) — (v) Bhind and Baroda. (vi) and (vii) Nil.

5. RESULTS :

(1) 2199 Kg/ha. (ii) 274.1 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	P_0	P_1	P_2	Mean
V_1	1663	2208	2647	2258	2226	2034	2173
V_2	1767	2256	2629	2319	2215	2118	2217
V_3	1725	2248	2645	1993	2422	2202	2206
Mean	1718	2237	2640	2190	2288	2118	2199
P_0	1637	2358	2576				
P_1	1695	2251	2917				
P_2	1823	2103	2428				

C.D. for N marginal means = 189.5 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 64(14), 65(6).****Site :- Govt. Agri. Farm, Jora.****Type :- 'MV'.****Object :-** To find out a suitable variety and optimum fertilizer dose for Wheat.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Nil; Wheat. (c) N.A. (ii) Sandy loam. (iii) 15.11.64; 11.11.65. (iv) (a) 4 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) 2.0 cm.; N.A. (x) 30.3.65; 27.3.66.

2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) 3 varieties: $V_1=C.-281$, $V_2=C.-273$ and $V_3=Hy.-277$.

(2) 3 levels of N as A/S: $N_1=22.4$, $N_2=44.8$ and $N_3=67.2$ Kg/ha.

(3) 3 levels of P_2O_5 as Super: $P_1=22.4$, $P_2=44.8$ and $P_3=67.2$ Kg/ha.

3. DESIGN:

(i) 3³ confd. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 4. (iv) (a) 4.9 m. × 13.7 m.
(b) 4.3 m × 11.9 m. (v) 30 cm. × 92 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1964—contd. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) As the experiment is continued beyond 1965, the results of individual years have been presented under 5. Results.

5. RESULTS:

64 (14)

(i) 3574 Kg/ha. (ii) 488.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N_1	N_2	N_3	P_1	P_2	P_3	Mean
V_1	3654	3680	3605	3808	3614	3516	3646
V_2	3644	3417	3757	3610	3511	3698	3606
V_3	3503	3634	3276	3506	3557	3350	3471
Mean	3600	3577	3546	3641	3561	3521	3574
P_1	3749	3705	3470				
P_2	3583	3527	3572				
P_3	3468	3500	3596				

65(6)

(i) 2065 Kg/ha. (ii) 319.3 Kg/ha. (iii) Main effects of V and interactions $V \times N$ and $V \times N \times P$ are highly significant. Main effect of P is significant. (iv) Av. yield of grain in Kg/ha.

	N_1	N_2	N_3	P_1	P_2	P_3	Mean
V_1	2292	2361	2157	2193	2374	2243	2270
V_2	2104	1835	2298	1925	2257	2055	2079
V_3	1965	1787	1787	1814	1868	1857	1846
Mean	2120	1994	2081	1977	2166	2052	2065
P_1	2167	1817	1953				
P_2	2129	2096	2273				
P_3	2065	2070	2016				

C.D. for V or P marginal means = 156.0 Kg/ha.
C.D. for body of $V \times N$ table = 268.7 Kg/ha.

Crop : Wheat (Rabi).

Ref :- M.P. 63(47).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'MV'.

Object :- To find out a suitable variety and manurial dose for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Loamy to clayey black. (iii) 23.11.63. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) —. (v) 44.8 Kg/ha. of K_2O . (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 17.3.64.

2. TREATMENTS :

Main-plot treatments :

3 levels of fertilizers : $M_1=44.8$ Kg/ha. of N+22.4 Kg/ha. of P_2O_5 , $M_2=89.6$ Kg/ha. of N+44.8 Kg/ha. of P_2O_5 and $M_3=134.4$ Kg/ha. of N+89.6 Kg/ha. of P_2O_5 .

Sub-plot treatments :

14 varieties : $V_1=N.P. 339$, $V_2=Hy-4-4-65$, $V_3=Hy-65$, $V_4=N.P. 885$, $V_5=N.P. 872$, $V_6=C-302$, $V_7=R.S. 31-1$, $V_8=N.P. 852$, $V_9=N.P. 886$, $V_{10}=N.P. 835$, $V_{11}=N.P. 862$, $V_{12}=C 313$, $V_{13}=N.P. 876$ and $V_{14}=N.P. 887$.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 14 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 3.1 m. × 12.2 m. (b) 2.4 m. × 10.7 m. (v) 30 cm. × 76 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1963—64 (treatments modified in 64). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2877 Kg/ha. (ii) (a) 1179.4 Kg/ha. (b) 330.4 Kg/ha. (iii) Main effect of M and interaction $V \times M$ are highly significant. (iv) Av. yield of grain in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8
M_1	3158	3514	3337	3497	2735	3524	3955	3091
M_2	3425	3640	3482	2416	2979	3265	3179	3256
M_3	3506	3851	3121	2449	2584	3304	3160	2171
Mean	3363	3668	3313	2787	2766	3364	3431	2839

V_9	V_{10}	V_{11}	V_{12}	V_{13}	V_{14}	Mean
3108	2261	2561	2939	1224	3867	3055
2801	2124	2785	2845	1312	3104	2901
2484	1735	2378	2491	843	3346	2673
2798	2040	2575	2758	1126	3439	2877

C.D. for V marginal means = 385.3 Kg/ha.

C.D. for V means at the same level of M = 667.4 Kg/ha.

C.D. for M means at the same level of V = 1352.9 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 64(24).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'MV'.

Object :- To find out a suitable variety and manurial dose for Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Loamy to clayey loam. (iii) 13.11.64. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) —. (v) 45 Kg/ha. of K_2O + 67 Kg/ha. of P_2O_5 (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 30.3.65.

2. TREATMENTS:

Main-plot treatments:

2 levels of N : $N_1=45$ and $N_2=90$ Kg/ha.

Sub-plot treatments:

16 varieties : $V_1=Hy-65$, $V_2=C-306$, $V_3=N.P. 872$, $V_4=R.S 31-1$, $V_5=Hy-633$, $V_6=C-303$, $V_7=N.P. 839$, $V_8=K-68$, $V_9=N.P. 862$, $V_{10}=N.P.884$, $V_{11}=Sonora-63$, $V_{12}=N.P.-887$, $V_{13}=Lermarojo$, $V_{14}=N.P. 876$, $V_{15}=N.P. 852$, and $V_{16}=Sonora-64$.

3. DESIGN:

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 16 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 8.0 m. \times 1.8 m. (b) 7.0 m. \times 1.5 m. (v) 50 cm. \times 17 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1963-64 (Treatments modified in 1964). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 2494 Kg/ha. (ii) (a) 728.0 Kg/ha. (b) 290.8 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9
N_1	2662	2790	2867	2640	2717	2717	2567	2545	2504
N_2	2933	2793	2683	2869	2688	2669	2664	2619	2614
Mean	2797	2791	2775	2774	2702	2693	2615	2582	2559

V_{10}	V_{11}	V_{12}	V_{13}	V_{14}	V_{15}	V_{16}	Mean
2369	2281	2193	2145	2362	2293	1919	2473
2193	2386	2369	2393	2150	2169	2043	2515
2281	2333	2281	2269	2256	2231	1981	2494

C.D. for V marginal means = 289.3 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 64(27).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'MV'.

Object :- To find out a suitable variety and N dose for Wheat under irrigated conditions.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) (a) Loamy to clayey black. (iii) 14.10.64. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) — (v) 67 Kg/ha. of P_2O_5 as Super + 45 Kg/ha. of K_2O as Mur. Pot. (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 24.3.65.

2. TREATMENTS :

Main-plot treatments :

4 levels of N as A/S: $N_0=0$, $N_1=45$, $N_2=90$ and $N_3=134$ Kg/ha.

Sub-plot treatments:

6 varieties: $V_1=Sonora-63$, $V_2=Sonora-64$, $V_3=Lermarojo$, $V_4=C-306$. $V_5=N.P. 876$ and $V_6=N.P. 887$.

3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 10 m. \times 5 m. (b) 9 m. \times 4 m. (v) 50 cm. \times 50 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1964—only. (b) and (c) — (v) to (vii) Nil.

5. RESULTS :

(i) 2275 Kg/ha. (ii) (a) 241.7 Kg/ha. (b) 258.3 Kg/ha. (iii) Main effects of N and V are highly significant. (iv) Av. yield of grain in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	Mean
N_0	1897	1787	1894	2426	2130	1925	2010
N_1	2457	2270	2271	2333	2568	2335	2372
N_2	2256	2113	2291	2684	2604	2314	2377
N_3	2220	2166	2340	2581	2433	2315	2343
Mean	2207	2084	2199	2506	2434	2222	2275

C.D. for N marginal means=157.9 Kg/ha.

C.D. for V marginal means=182.6 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 64(22).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'MV'.

Object :- To find out a suitable variety and manurial dose for Wheat under rain fed conditions.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Loamy to clayey black. (iii) 27.11.64. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 29.3.65.

2. TREATMENTS :

Main-plot treatments :

4 levels of fertilizer : $M_0=0$, $M_1=16.7$ Kg/ha. of N+16.7 Kg/ha. of P_2O_5 , $M_2=33.5$ Kg/ha. of N+33.5 Kg/ha. of P_2O_5 and $M_3=50.0$ Kg/ha. of N+50.0 Kg/ha. of P_2O_5 .

Sub-plot treatments :

6 varieties : $V_1=N.P.-839$, $V_2=Hy-65$, $V_3=Hy-633$, $V_4=N.P.-404$, $V_5=Hy.-34$ and $V_6=N.P.-832$.

3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 3.1 m. × 12.2 m (b) 2.4 m. × 11.0 m. (v) 30 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1964—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1127 Kg/ha. (ii) (a) 239.1 Kg/ha. (b) 153.1 Kg/ha. (iii) Main effects of M and V are highly significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	Mean
M ₀	1033	952	882	763	773	737	857
M ₁	1145	1195	1074	1074	1028	1077	1099
M ₂	1565	1467	1179	1237	1279	1177	1317
M ₃	1349	1401	1438	1269	1012	942	1235
Mean	1273	1254	1143	1086	1023	983	1127

C.D. for M marginal means=195.4 Kg/ha.

C.D. for V marginal means=108.2 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(42), 61(26), 62(108).

Site :- Govt. Agri. Farm, Vidisha.

Type :- 'MV'.

Object :- To find out the most suitable variety and manurial schedule for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat ; Gram ; Wheat. (c) 25 C.L./ha. of F.Y.M. for 60 ; N.A. for others. (ii) Heavy clay. (iii) 7.11.60 ; 11.12.61 ; 14.11.62. (iv) (a) *Bakherings*. (b) Line sowing. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) — (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) Nil. (ix) 9 cm. ; 17 cm. ; N.A. (x) 3.4.61 ; 24.4.62 ; 9.4.63.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 manurial doses : M₀=Control, M₁=16.8 Kg/ha. of N as A/S+16.8 Kg/ha. of P₂O₅ as Super and M₂=2×M₁.

(2) 4 varieties : V₁=Ujjain-22, V₂=N.P.-832, V₃=C-281 and V₄=N.P. 825.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 5.5 m. (b) 7.9 m. × 4.3 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-62. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments×years interaction is present.

5. RESULTS :

Pooled results

(i) 1431 Kg/ha. (ii) 257.6 Kg/ha. (based on 22 d.f. made up of Treatments×years interaction). (iii) Main effects of M and V are highly significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	Mean
M ₀	1049	756	985	889	920
M ₁	1770	1475	1488	1472	1551
M ₂	1989	1822	1740	1737	1822
Mean	1603	1351	1404	1366	1431

C.D. for M marginal means=109.0 Kg/ha.

C.D. for V marginal means=125.8 Kg/ha.

Individual results

Treatments	M ₀	M ₁	M ₂	Sig.	V ₁	V ₂	V ₃	V ₄	Sig.	G.M.	S.E./plot
Years											
1960	995	1611	1862	**	1683	1328	1528	1418	**	1489	224.8
1961	858	1467	1759	**	1415	1470	1283	1277	*	1361	161.6
1962	907	1576	1845	**	1711	1256	1402	1402	**	1443	122.0
Pooled	920	1551	1822	**	1603	1351	1404	1366	**	1431	257.6

Crop :- Wheat (Rabi).

Ref :- M.P. 61(11), 62(13), 63(45), 64(7), 65(10).

**Site :- Govt. Agri. Farm,
Baroda.**

Type :- 'C'.

Object :- To find out a suitable legume crop for double cropping with Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) As per treatments. (ii) Sandy and clayey loam. (iii) 14.11.61 ; 25.11.62 ; 23.11.63 ; 7, 8.11.64 ; 7.11.65. (iv) (a) 2-4 *bakherings*. (b) Line sowing by *Nari*. (c) 67.0 Kg/ha. for 64 ; 74.1 Kg/ha. for 65 ; 90 Kg/ha. for others. (d) 30 cm between rows. (e) — (v) 44.8 Kg/ha. of N as A/S+44.8 Kg/ha. of P₂O₅ as Super for 61 ; 33.6 Kg/ha. of N+33.6 Kg/ha. of P₂O₅ for others. (vi) Hy—65 for 65 ; N.P.—710 for others. (vii) Irrigated. (viii) Hand weedings. (ix) N.A. (x) 10.4.62 ; 5, 6.4.63 ; 30.3.64 ; 1 to 7.4.65 ; 28.3.66.

2. TREATMENTS :

4 previous crops : C₀=Fallow, C₁=*Moong*, C₂=*Groundnut* and C₃=*Cowpea*.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 9.1 m. × 11.1 m. (b) 7.3 m. × 10.1 m. for 61 ; 7.9 m. × 10.1 m. for 65 ; 8.5 m. × 10.1 m. for others. (v) 91 cm. × 45 cm. for 61 ; 61 cm. × 45 cm. for 65 ; 30 cm. × 45 cm. for others. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—contd. (b) Yes. (c) Nil. (v) *Bhind* and *Jora*. (vi) Nil. (vii) As the experiment is continued beyond 1965, results of individual years have been presented under 5, Results. Results for 1965—N.A.

5. RESULTS :

61(11)

(i) 1433 Kg/ha. (ii) 287.3 Kg/ha. (iii) Treatment differences are not significant. (iv) (a) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃
Av. yield	1541	1191	1533	1467

62(13)

(i) 1046 Kg/ha. (ii) 237.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃
Av. yield	1008	985	1170	1020

63(45)

(i) 1198 Kg/ha. (ii) 182.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃
Av. yield	1124	1205	1286	1176

64(7)

(i) 1966 Kg/ha. (ii) 105.1 Kg/ha. (iii) Treatment differences are highly significant. (vi) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃
Av. yield	2085	1993	1773	2013

C.D. = 129.3 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(21).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'C'.

Object :- To find out the optimum combination of seed-rate, spacing and date of sowing for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram. (c) Nil. (ii) Mor. No. 1. (iii) As per treatments. (iv) (a) *Bakherings*. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 1.4.61.

2. TREATMENTS :

Main-plot treatments :

3 dates of sowing : D₁=25.9.60, D₂=1.10.60 and D₃=8.10.60.

Sub-plot treatments :

3 seed rates : R₁=36, R₂=78 and R₃=101 Kg/ha.

Sub-sub-plot treatments :

2 row-spacings : S₁=23 and S₂=30 cm.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot and 2 sub-sub-plots/sub-plot. (b) N.A. (iii) 4. (iv) (a) 11.0 m. × 5.1 m. (b) 9.1 m. × 4.5 m. (v) 91 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Plant height, No. of tillers/plant, No. of plants/plot and yield of grain and straw. (iv) (a) 1960-61 (modified in 1961). (b) No. (c) Nil. (v) Jora and Bhand. (vi) and (vii) Nil.

5. RESULTS :

(i) 643 Kg/ha. (ii) (a) 365.7 Kg/ha. (b) 144.5 Kg/ha (c) 110.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	R ₃	S ₁	S ₂	Mean
D ₁	565	609	605	571	615	593
D ₂	583	699	727	624	716	670
D ₃	731	595	675	658	676	667
Mean	626	634	669	618	669	643
S ₁	592	595	666			
S ₂	660	674	672			

Crop :- Wheat (Rabi).

Ref :- M.P. 61(14).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'C'.

Object :- To find out the optimum combination of seed-rate, spacing and date of sowing for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram. (c) N.A. (ii) Mor. No.1. (iii) As per treatments. (iv) (a) Three summer *bakherings* and three *bakherings* before sowing. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of P₂O₅ as Super. (vi) N.P. 710. (vii) Irrigated. (viii) Nil. (ix) and (x) N.A.

2. TREATMENTS :

Main-plot treatments :

3 dates of sowing : D₁=30.10.61, D₂=11.11.61 and D₃=22.11.61.

Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 seed-rates : R₁=56, R₂=78 and R₃=101 Kg/ha.

(2) 2 row-spacings : S₁=23 and S₂=30 cm.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 11.0 m. × 5.1 m (b) 10.1 m. × 4.5 m. (v) 45 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Normal except in D₁ sowing. (ii) Attack of termites. (iii) Height, No. of tillers, ear length, No. of grains per ear and yield of grain. (iv) (a) 1960—61 (modified in 1960). (b) No. (c) Nil. (v) Jora and Bhind. (vi) and (vii) Nil.

5. RESULTS :

(i) 791 Kg/ha. (ii) (a) 73.1 Kg/ha. (b) 114.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	R ₃	S ₁	S ₂	Mean
D ₁	870	776	742	823	769	796
D ₂	823	811	811	854	777	815
D ₃	817	672	798	715	810	762
Mean	837	753	784	797	785	791
S ₁	800	802	789			
S ₂	873	704	778			

Crop :- Wheat (Rabi).

Ref :- M.P. 60(162).

Site :- Seed and Demons. Farm, Betul.

Type :- 'C'.

Object :- To find out the optimum spacing and seeds per hole for Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Loamy black. (iii) 1.12.60. (iv) (a) 2 ploughing and 2 *bakherings*. (b) Drilled by *Nari* plough. (c) 90 Kg/ha. (d) and (e) As per treatments. (v) 33.6 Kg/ha. of N+33.6 Kg/ha. of P₂O₅. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 29.3.61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 row spacings : S₁=15, S₂=23 and S₃=30 cm.

(2) 3 number of seeds per hole : R₁=1, R₂=2 and R₃=3 seeds/hole.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 11.0 m. × 5.1 m. (b) 9.1 m. × 4.5 m. (v) 91 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1049 Kg/ha. (ii) 131.8 Kg/ha. (iii) Main effect of R alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	S ₁	S ₂	S ₃	Mean
R ₁	981	953	841	925
R ₂	1177	1121	1065	1121
R ₃	1065	1009	1233	1102
Mean	1074	1028	1046	1049

C.D. for R marginal means=111.0 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 60(11), 61(18), 62(6), 64(6).****Site :- Govt. Agri. Farm, Bhind.****Type :- 'C'.**

Object :—To find out the suitable legume crop for double cropping with Wheat.

1. BASAL CONDITIONS :

(i) (a) and (b) As per treatments. (c) Nil. (ii) Sandy loam. (iii) 18.11.60 ; 21, 22.11.61 ; 25, 26.11.62 ; 22.11.64. (iv) (a) *bakherings*, ploughings and levelling. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 23 cm. between rows for 60 ; 30 cm. between rows for others. (e) N.A. (v) Nil for 60 ; 33.6 Kg/ha. of N as A/S + 33.6 Kg/ha. of P_2O_5 as Super for others. (vi) N.P. 710 for 64 ; N.A. for others. (vii) Irrigated. (viii) 1 to 2 weedings. (ix) N.A. (x) 1.4.61 ; 8.4.62 ; N.A. ; 15, 16.4.65.

2. TREATMENTS :4 previous crops : C_0 =Fallow, C_1 =*Moong*, C_2 =Groundnut and C_3 =Cowpea.**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) 11.0 m. × 9.1 m. for 60 ; 11.1 m. × 4.6 m. for others. (b) 9.1 m. × 7.3 m. for 60 ; 10.2 m. × 4.0 m. for others. (v) 91 cm. × 91 cm. for 60 ; 45 cm. × 30 cm. for others. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Termites and mild brown Rust in 60 and 61 ; white ants and Rusts in 62 ; Nil for 64. (iii) Yield of grain. (iv) (a) 1960-64 [Data for 1963 N.A.]. (b) No. (c) Results of combined analysis have been presented under 5 Results. (v) Jora and Baroda. (vi) Hail storm in 61 ; Nil for others. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS:

Pooled results

(i) 2094 Kg/ha. (ii) 482.5 Kg/ha. (based on 69 d.f. made up of pooled error and Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C_0	C_1	C_2	C_3
Av. yield	2203	2183	2038	1952

Individual results

Treatments	C_0	C_1	C_2	C_3	Sig.	G.M.	S.E./plot
Years							
1960	2666	2603	2622	2360	N.S.	2563	676.8
1961	1784	1524	1351	1160	N.S.	1455	404.9
1962	1575	1695	1823	1867	N.S.	1740	388.5
1964	2789	2912	2356	2423	N.S.	2620	387.2
Pooled	2203	2183	2038	1952	N.S.	2094	482.5

Crop :- Wheat (Rabi).**Ref :- M.P. 60(13).****Site :- Govt. Agri. Farm. Bhind.****Type :- 'C'.**

Object :—To find out the optimum combination of seed-rate, spacing and date of sowing for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 2 *bakherings*., 1 ploughing and 2 levellings. (b) Line sowing by *Nari*. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) 1 weeding. (ix) 7 cm. (x) 2.4. 61.

2. TREATMENTS :

Main-plot treatments3 rates of sowing : $D_1=25.10.60$. $D_2=1.11.60$ and $D_3=8.11.60$.**Sub-plot treatments**3 seed-rates : $R_1=56$, $R_2=78$ and $R_3=101$ Kg/ha.**Sub-sub-plot treatments**2 row-spacings : $S_1=23$ and $S_2=30$ cm.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot and 2 sub-sub-plots/sub plot. (b) N.A. (iii) 4. (iv) (a) 11.0 m. \times 5.1 m. (b) 9.1 m. \times 4.2 m. (v) 92 cm. \times 45 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Attack of termites and mild incidence of brown Rust. B.H.C. was applied to control termites. (iii) Yield of grain. (iv) (a) 1959-61 (Modified in 1961). (b) No. (c) Nil. (v) Baroda and Jora. (vi) and (vii) Nil.

5. RESULTS :

(i) 1260 Kg/ha. (ii) (a) 857.8 Kg/ha. (b) 905.8 Kg/ha. (c) 418.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R_1	R_2	R_3	S_1	S_2	Mean
D_1	1214	1548	1028	1430	1095	1263
D_2	1349	1079	1490	1291	1321	1306
D_3	1421	1308	900	1142	1277	1210
Mean	1328	1312	1139	1288	1231	1260
S_1	1297	1398	1170			
S_2	1359	1226	1108			

Crop :- Wheat (Rabi).**Ref :- M.P. 61(19).****Site :- Govt. Agri. Farm, Bhind.****Type :- 'C'.****Object :-** To find out the optimum combination of seed-rate, spacing and date of sowing for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize. (c) Nil. (ii) (a) Sandy loam. (b) N.A. (iii) As per treatments. (iv) (a) 2 ploughings, 2 *patelas* and 2 *bakherings* (b) Line sowing with *Nari*. (c) and (d) As per treatments. (e) —. (v) 33.6 Kg/ha. of N as A/S applied as B.D. and 33.6 Kg/ha. of P_2O_5 as Super. Drilled with seed. (vi) N.A. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 5.4.62.

2. TREATMENTS :

Main-plot treatments3 dates of sowing : $D_1=28.10.61$. $D_2=8.11.61$ and $D_3=19.11.61$.**Sub-plot treatments**

All combinations of (1) and (2)

(1) 3 seed-rates : $R_1=56$, $R_2=78$ and $R_3=101$ Kg/ha.(2) 2 row-spacings : $S_1=23$ and $S_2=30$ cm.

3. DESIGN :

(i) Split plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main plot. (b) N.A. (iii) 4. (iv) (a) 11'0 m. × 5'1 m. (b) 9'1 m. × 4'5 m. (v) 91 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(iv) Satisfactory. (ii) Attack of Termite. (iii) Population count, length of earhead, no. of grains per ear head and yield of grain. (iv) 1959-61 (Modified in 1961). (b) No. (c) Nil. (v) Jora and Baroda. (vi) and (vii) Nil.

5. RESULTS :

(i) 1333 Kg/ha. (ii) (a) 831.6 Kg/ha. (b) 352.4 Kg/ha. (iii) Interaction S × R alone is significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	R ₃	S ₁	S ₂	Mean
D ₁	869	1064	1055	976	1015	996
D ₂	1293	1575	1559	1537	1414	1476
D ₃	1743	1366	1470	1672	1382	1526
Mean	1302	1335	1361	1395	1270	1333
S ₁	1556	1345	1284			
S ₂	1048	1325	1438			

C.D. for body of S × R table = 290.0 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(31).

Site :- Govt. Seed and Demons. Farm, Biora.

Type :- 'C'.

Object :- To find out the optimum spacing and seeds per hole for increase in the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) Nil. (ii) (a) Clay. (b) N.A. (iii) 3 to 7.11.60. (iv) (a) Two *bakherings*, two *patelas* and one ridger. (b) Drilling. (c) —. (d) and (e) As per treatments. (v) Nil. (vi) Hy—65. (vii) Irrigated. (viii) Nil. (ix) 3 cm. (x) 4.4 61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 spacings : S₁ = 15 cm. × 15 cm., S₂ = 23 cm. × 23 cm. and S₃ = 30 cm. × 30 cm.

(2) 3 number of seeds/hole : R₁ = 1, R₂ = 2 and R₃ = 3 seeds/hole.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 11'0 m. × 5'1 m. (b) 9'1 m. × 4'3 m. (v) 91 cm. × 37 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) 1960-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1149 Kg/ha. (ii) 203.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	R ₃	Mean
S ₁	1157	1205	1217	1193
S ₂	1210	1255	1064	1176
S ₃	966	972	1298	1079
Mean	1111	1144	1193	1149

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(98), 61(136).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'C'.

Object :- To find out the optimum spacing and seeds per hole for Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) *Moong* (G.M.). (c) Nil. (ii) *Morand*. (iii) 21—24.11.60; 21.11.61. (iv) Ploughing and *bakhering*. (b) Dibbling. (c) —. (d) and (e) As per treatments. (v) 25 C.L./ha. of F.Y.M. (vi) Hy—65. (vii) Irrigated. (viii) Nil. (ix) 4 cm.; 14 cm. (x) 23.4.61; 29.3.62.

2. TREATMENTS :

All combinations of (1) and (2)

(2) 4 row-spacings : S₁=15, S₂=23, S₃=30 and S₄=46 cm.

(2) 3 numbers of seeds/hole : R₁=1, R₂=2 and R₃=3 seeds/hole.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) and (b) 9.1 m. × 3.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959-61. (b) Yes. (c) Results of combined analysis have been presented under 5 Results. (v) and (vi) Nil. (vii) Experiment No : 59(102) has also been included for pooling. Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS :

Pooled results

(i) 1568 Kg/ha. (ii) 306.5 Kg/ha. (based on 121 d.f. made up of pooled error and Treatments × years interaction). (iii) Main effect of S alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	S ₁	S ₂	S ₃	S ₄	Mean
R ₁	1591	1478	1508	1507	1521
R ₂	1798	1665	1487	1455	1601
R ₃	1932	1555	1455	1389	1583
Mean	1774	1566	1483	1450	1568

~ C.D. for S marginal means = 143.1 Kg/ha.

Individual results

Treatments	S ₁	S ₂	S ₃	S ₄	Sig.	R ₁	R ₂	R ₃	Sig.	G.M.	S.E./plot
Years 1960	1848	1627	1523	1526	*	1651	1676	1564	N.S.	1631	307.6
1961	1826	1616	1498	1543	N.S.	1626	1681	1555	N.S.	1621	319.2
Pooled	1774	1566	1483	1450	**	1521	1601	1583	N.S.	1568	306.5

Crop :- Wheat (Rabi).

Ref :- M.P. 61(76).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'C'.

Object :- To find out the optimum spacing and seeds per hole for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Sannhemp* (G.M.). (c) Nil. (ii) Medium soil. (iii) 25 to 29.11.61. (iv) (a) One ploughing and two *bakherings*. (b) Hand dibbling. (c) —. (d) and (e) As per treatments. (v) 25 C.L./ha. of F.Y.M. (vi) Hy - 11. (vii) Irrigated. (viii) Nil. (ix) 14 cm. (x) 10.4.62.

2. TREATMENTS and 3. DESIGN :

Same as in Expts. No. 60(98) and 61(36) on page 173.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1961-only. (b) No. (c) Nil. (v) N.A. (vi) During flowering stage, the frost and rain affected the grain due to which grains had shrilled. (vii) Nil.

5. RESULTS :

(i) 1336 Kg/ha. (ii) 253.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S ₁	S ₂	S ₃	S ₄	Mean
R ₁	1458	1577	1339	1237	1403
R ₂	1322	1466	1102	1424	1328
R ₃	1195	1237	1509	1170	1278
Mean	1325	1427	1317	1277	1336

Crop :- Wheat (Rabi).

Ref :- M.P. 60(110).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'C'.

Object :- To study the effect of different *Kharif* crops on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) As per treatment. (c) Nil. (ii) Medium soil. (iii) 31.10.60. (iv) (a) One ploughing and 3 *bakherings*. (b) Sowing by *Argada*. (c) 90 Kg/ha. (d) 23 cm. x 8 cm. (e) N.A. (v) 25 C.L./ha. of F.Y.M. (vi) Hy—65. (vii) Irrigated. (viii) Nil. (ix) 9 cm. (x) 5.5.61.

2. TREATMENTS :

4 previous crops : C_0 =Fallow, C_1 =Gwar, C_2 =Groundnut and C_3 =Moong.
(G.M. crops sown on 30.6.60).

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) and (b) 12.2 m. × 3.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good (ii) Nil. (iii) Grain yield. (iv) (a) 1959-60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2056 Kg/ha. (ii) 230.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C_0	C_1	C_2	C_3
Av. yield	2047	1996	2034	2149

Crop :- Wheat (Rabi).

Ref :- M.P. 60(138).

Site :- Instt. of Plant Industry, Indore.

Type :- 'C'.

Object :—To find out the best *kharif* Crop after which Wheat can be sown for higher yields.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) As per treatments. (c) N.A. (ii) Black cotton soil. (iii) 15.10.60. (iv) (a) One ploughing and 1 harrowing. (b) Drilling. (c) 73 Kg/ha. (d) 36 cm. × 13 cm. (e) N.A. (v) Nil. (vi) N.P. 710. (vii) Unirrigated. (viii) 2 weedings. (ix) 4 cm. (x) 20.2.61.

2. TREATMENTS :

3 previous crops : C_1 =Cowpea, C_2 =Groundnut and C_3 =Moong.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) 12.2 m. × 3.7 m. (b) 10.7 m. × 2.7 m. (v) 76 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1959—61 (Modified 1961). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 698 Kg/ha. (ii) 119.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C_1	C_2	C_3
Av. yield	319	1465	311

C.D.=128.3 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 61(121).

Site :- Instt. of Plant Industry, Indore.

Type :- 'C'.

Object :—To study the effect of *kharif* Crops on the yield of succeeding Wheat crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) As per treatments. (c) Nil. (ii) Black Cotton soil (iii) 13.11.61. (iv) 2 ploughings and 2 *bakherings*. (b) Drilling. (c) 88 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) 22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅. (vi) Hy-65. (vii) Irrigated. (ix) 2 weedings. (ix) N.A. (x) 11.4.62.

2. TREATMENTS :

4 previous *kharif* crops: C₀=Fallow, C₁=Cowpea, C₂=Groundnut and C₃=Moong.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) 3.7 m. × 12.2 m. (b) 2.7 m. × 10.7 m. (v) 46 cm. × 76 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961—only (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1677 Kg/ha. (ii) 83.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃
Av. yield	1715	1656	1663	1675

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(6)

Site :- Govt. Agri. Farm, Jora.

Type :- 'C'.

Object :- To find out the optimum combination of seed rate, row spacing and date of sowing for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 5 ploughings. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) C.—281. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 23 to 25.3.61.

2. TREATMENTS :

Main-plot treatments :

3 dates of sowing : D₁=25.10.60, D₂=1.11.60 and D₃=8.11.60.

Sub-plot treatments :

3 seed rates : R₁=56, R₂=78 and R₃=101 Kg/ha.

Sub-sub-plot treatments :

2 row spacings : S₁=23 and S₂=30 cm.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot, 2 sub-sub-plots/sub-plot. (b) N.A. (iii) 4. (iv) (a) 15.2 m. × 3.7 m. (b) 13.4 m. × 3.1 m. (v) 91 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Slight incidence of rusts. (iii) Grain yield. (iv) (a) 1960—only. (b) No. (c) Nil. (v) Bhand and Baroda. (vi) and (vii) Nil.

5. RESULTS :

(i) 2123 Kg/ha. (ii) (a) 179.9 Kg/ha. (b) 349.1 Kg/ha. (c) 184.5 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	R ₃	S ₁	S ₂	Mean
D ₁	1828	2172	1919	1994	1952	1973
D ₂	2233	2158	2357	2305	2193	2249
D ₃	2193	1911	2335	2206	2087	2146
Mean	2085	2080	2204	2168	2077	2123
S ₁	2155	2113	2236			
S ₂	2014	2047	2171			

C.D. for D marginal means = 127.0 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 62(17).

Site :- Govt. Agri. Farm, Jora.

Type :- 'C'.

Object :- To find out the optimum combination of seed rate, row spacing and date of sowing for Wheat.

1. BASAL CONDITIONS

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 6 ploughings. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 28 Kg/ha of N as A/S + 28 Kg/ha. of P₂O₅ as Super. (vi) N.P. - 710. (vii) Irrigated. (viii) One weeding. (ix) N.A. (x) 28.3.63.

2. TREATMENTS:

Main-plot treatments :

3 dates of sowing : D₁ = 22.10.62, D₂ = 1.11.62, and D₃ = 11.11.62.

Sub-plot treatments :

2 row spacings : S₁ = 23 and S₂ = 30 cm.

Sub-sub-plot treatments :

3 seed rates : R₁ = 56, R₂ = 78 and R₃ = 101 Kg/ha.

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. (iii) 4. (iv) (a) 11.0 m. × 5.1 m. (b) 9.1 m × 4.5 m. (v) 91 cm. × 30 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Attack of seedling cut worm. B.H.C. dusted twice. (iii) Final height, tillers, population stand and grain yield. (iv) (a) 1962-63 (Modified in 1963). (b) No. (c) Nil. (v) Bind and Baroda. (vi) and (vii) Nil.

5. RESULTS:

(i) 2327 Kg/ha. (ii) (a) 393.5 Kg/ha. (b) 326.9 Kg/ha. (c) 420.7 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	R ₃	S ₁	S ₂	Mean
D ₁	2640	2554	2219	2539	2403	2471
D ₂	2134	1972	2394	2303	2030	2167
D ₃	2180	2363	2487	2446	2241	2343
Mean	2318	2296	2367	2429	2225	2327
S ₁	2509	2397	2381			
S ₂	2126	2196	2352			

C.D. for S marginal means=174.3 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 63(20).

Site :- Govt. Agri. Farm, Jora.

Type :- 'C'.

Object :- To find out the optimum combination of seed-rate, row-spacing and date of sowing for Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 3 ploughings. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of P₂O₅ as Super. (vi) N.P.—710. (vii) Irrigated. (viii) 2 weedings and hoeings. (ix) Nil. (x) 24.3.64.

2. TREATMENTS :

Main-plot treatments :

3 dates of sowing : D₁=10 days earlier than normal date, D₂=Normal date and D₃=10 days later than the normal date.

Sub-plot treatments :

2 row-spacings : S₁=23 and S₂=30 cm,

Sub-sub-plot treatments :

3 seed-rates : R₁=56, R₂=78 and R₃=101 Kg/ha.

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. (iii) 4. (iv) (a) 11.0 m. × 5.1 m. (b) 9.1 m. × 4.4 m. (v) 95 cm. × 35 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1962—63 (modified in 1963). (b) No. (c) Nil. (v) Bhind and Baroda. (vi) and (vii) Nil.

5. RESULTS :

(i) 1353 Kg/ha. (ii) (a) 332.2 Kg/ha. (b) 492.0 Kg/ha. (c) 350.4 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	S ₁	S ₂	R ₁	R ₂	R ₃	Mean
D ₁	1170	1204	1136	1239	1186	1187
D ₂	912	1068	1236	796	937	990
D ₃	1738	2024	1945	1891	1808	1881
Mean	1273	1432	1439	1309	1310	1353
R ₁	1392	1486				
R ₂	1226	1392				
R ₃	1201	1419				

C.D. for D marginal means=234.7 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(5), 61(6), 62(20), 63(17), 64(16).

Site :- Govt. Agri. Farm, Jora. Type :- 'C'.

Object :- To investigate the possibilities of double cropping with Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) As per treatments. (ii) Sandy loam. (iii) 24.11.60; 7.12.61; 12.11.62; 13.11.63; 30.11.64.
 (iv) (a) 1 to 3 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) 38 cm. between rows for 64 and 30 cm. for others. (e) N.A. (v) Nil. for 60; 33.6 Kg/ha. of N as A/S + 33.6 Kg/ha. of P₂O₅ as Super for 61, 63 and 64; 28 Kg/ha. of N + 28 Kg/ha. of P₂O₅ for 62. (vi) N.A. for 60 and 62; N.P. 710 for 61 and C-231 for 63 and 64. (vii) Irrigated. (viii) 1 weeding for 62 and 63 and Nil for others. (ix) N.A.; 2 cm.; 38 cm.; Nil.; N.A. (x) 3.4.61; 14.4.62; 27.3.63; 27.3.64; 5.4.65.

2. TREATMENTS :

4 previous crops : C₀=Fallow, C₁=Moong, C₂=Groundnut and C₃=Cowpea.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4 for 60 and 6 for others. (iv) (a) 14.0 m. × 7.3 m. for 60; 11.1 m. × 4.6 m. for others. (b) 12.2 m. × 5.5 m. for 60; 10.2 m. × 4.0 m. for others. (v) 91 cm. × 91 cm. for 60; 42 cm. × 30 cm. for others. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Attack of cut worms for which B.H.C. was dusted for 62; Nil for others. (iii) Yield of grain. (iv) (a) 1960-64. (b) Yes. (c) Nil. (v) Bhind and Baroda. (vi) Nil. (vii) As the error variances are heterogeneous and Treatments × years interaction is absent, results of individual years have been presented under 5.—Results.

5. RESULTS :

60(5)

(i) 1696 Kg/ha. (ii) 218.4 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃
Av. yield	1569	1559	1615	2041

C.D. = 349.3 Kg/ha.

61(6)

(i) 1293 Kg/ha. (ii) 153.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃
Av. yield	1289	1235	1272	1376

62(20)

(i) 1064 Kg/ha. (ii) 281.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃
Av. yield	1133	1019	1067	1038

63(17)

(i) 3275 Kg/ha. (ii) 485.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃
Av. yield	3313	3039	3419	3329

64(16)

(i) 3608 Kg/ha. (ii) 480.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃
Av. yield	2354	3530	3473	3888

Crop :- Wheat (Rabi).

Ref :- M.P. 60(149).

Site :- Agri. Res. Stn., Kuthulia.

Type :- 'C'.

Object :- To find out the optimum spacing and seeds per hole for Wheat.

1. BASAL CONDITIONS :

(i) (a) Paddy—Wheat. (b) Paddy. (c) N.A. (ii) Clayey and clayey loam. (iii) 25.10.60 (iv) (a) 4 ploughings. (b) Line sowing. (c) N.A. (d) and (e) As per treatments. (v) N.A. (vi) Hy—65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 1.5.61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 row-spacings : S₁=15, S₂=23, S₃=30 and S₄=46 cm.

(2) 3 numbers of seeds/hole : R₁=1, R₂=2 and R₃=3 seeds/hole.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 3.4 m. (b) 9.8 m. × 2.7 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) grain yield. (iv) (a) 1960—only. (b) and (c) — (v) to (vii) Nil.

5. RESULTS :

(i) 2019 Kg/ha. (ii) 568.9 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of grain is Kg/ha.

	S ₁	S ₂	S ₃	S ₄	Mean
R ₁	2582	2058	1684	683	1752
R ₂	2433	2227	1918	1357	1984
R ₃	2601	2713	2087	1881	2320
Mean	2539	2333	1896	1307	2019

C.D. for S marginal means=472.6 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(75).

Site :- Central Agri. Res. Farm, Nabibagh.

Type :- 'C'.

Object :- To find out the suitable spacing between rows and seeds per hole for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) 6 to 8.11.60. (iv) (a) 5 *bakherings*. (b) Drilling. (c) N.A. (d) and (e) As per treatments. (v) N.A. (vi) C-591. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 7.4.61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 row-spacings: $S_1=15$, $S_2=23$ and $S_3=30$ cm.

(2) 3 numbers of seeds/hole : $R_1=One$, $R_2=Two$ and $R_3=Three$ seeds/hole.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 11.0 m. \times 5.1 m. (b) 9.1 m. \times 4.5 m. (v) 91 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Tillers ; height, stand and grain yield. (iv) (a) 1958-60 (treatments modified in 1960). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1547 Kg/ha. (ii) 321.0 Kg/ha. (iii) Main effect of R alone is significant. (iv) Av. yield of grain in Kg/ha.

	R_1	R_2	R_3	Mean
S_1	1388	1639	1749	1592
S_2	1480	1400	1718	1533
S_3	1211	1553	1780	1515
Mean	1360	1531	1749	1547

C.D. for R marginal means = 270.5 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P 60(123), 61(96).

Site :- Govt. Soil. Cons. Res. Stn., Phanda.

Type 'C'.

Object :—To study the effect of *Kharif* crops on the yield of succeeding Wheat crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 7.10.60 ; 13.11.61. (iv) (a) One ploughing and 4 *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 8 cm. \times 30 cm. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Unirrigated. (viii) Nil. (ix) 1 cm. ; 5 cm. (x) 13.2.61 ; 29.3.62.

2. TREATMENTS :

8 *Kharif* crops: $C_0=$ Fallow, $C_1=$ Jowar, $C_2=$ Soybean, $C_3=$ Moong, $C_4=$ Urid, $C_5=$ Sann hemp, $C_6=$ Ipomea leaves and $C_7=$ Maize.

3. DESIGN :

(i) R.B.D. (ii) 8. (b) N.A. (iii) 4. (iv) (a) 11.3 m. \times 4.6 m. (b) 10.1 m. \times 3.4 m. (v) 61 cm. \times 61 cm. (vi) Yes.

4. GENERAL :

(i) Poor ; Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-64 [Modified in 1962]. (b) Yes. (c) Results of combined analysis have been presented under 5 Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is present.

5. RESULTS:

Pooled results

(i) 556 Kg/ha. (ii) 177.9 Kg/ha. [based on 7 d.f. made up of Treatments \times years interaction]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇
Av. yield	568	563	491	575	563	535	663	488

Individual results

Treatment	C ₀	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	Sig.	G.M.	S.E./plot
Years											
1960	308	348	345	298	281	231	303	234	N.S.	294	92.9
1961	829	778	637	852	845	838	1023	741	*	818	127.4
Pooled	568	563	491	575	563	535	663	488	N.S.	556	177.9

Crop :- Wheat (Rabi).

Ref :- 62(57), 63(3), 64(57).

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'C'.

Object :- To study the effect of *Kharif* crops on the yield of succeeding Wheat crop.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 12.10.62 ; 5.7.63 ; 16 10.64. (iv) (a) One ploughing and 4 *bakkerings*. (b) Drilling. (c) 56 Kg/ha. for 64 and 90 Kg/ha. for others. (d) 10 cm. \times 15 cm. for 64 and 8 cm. \times 30 cm. for others. (e) N.A. (v) Nil. (vi) Local for 64 and Hy-65 for others. (vii) Unirrigated. (viii) 1 weeding for 64 and Nil for others. (ix) 1 cm. ; 9 cm. ; 15 cm. (x) 22, 23.2.63 ; 6.3.64 ; 1st week of March, 65.

2. TREATMENTS:

7 *Kharif* crops : C₀=Fallow, C₁=*Jowar*. C₂=*Maize*, C₃=*Moong*, C₄=*Urid*, C₅=*Cowpea* and C₆=*Sann-hemp*.

3. DESIGN:

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 11.3 m. \times 4.6 m. (b) 10.1 m. \times 3.4 m. (v) 61 $\text{cm.} \times$ 61 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-64 [Modified in 1962]. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) As the error variances are heterogeneous and Treatments \times years interaction is absent, results of individual years have been presented under 5—Results.

5. RESULTS:

62(57)

(i) 1246 Kg/ha. (ii) 513.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆
Av. yield	978	1327	1134	1371	1156	1438	1319

63(3)

(i) 733 Kg/ha. (ii) 164.9 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆
Av. yield	709	799	823	856	660	456	830

C.D. = 244.8 Kg/ha.

64(57)

(i) 827 Kg/ha. (ii) 207.4 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆
Av. yield	1038	482	871	904	901	901	693

C.D. = 308.1 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(135).

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'C'.

Object :- To find out the optimum seed-rate for Wheat under local conditions.

1. BASAL CONDITIONS :

(i) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 14.10.60. (iv) (a) One ploughing and 4 *bakherings*. (b) Drilling. (c) As per treatments. (d) 8 cm. x 30 cm. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Unirrigated. (viii) Nil. (ix) 2 cm. (x) 24.3.61.

2. TREATMENTS :

4 seed rates: R₁=67, R₂=78, R₃=90 and R₄=101 Kg/ha.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 11.3 m. x 7.9 m. (b) 10.1 m. x 6.7 m. (v) 61 cm. x 61 cm. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) Nil. (iii) Grain yield. (iv) (a) 1959-60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 494 Kg/ha. (ii) 174.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	R ₁	R ₂	R ₃	R ₄
Av. yield	440	460	526	551

Crop :- Wheat (Rabi).

Ref :- M.P. 60(136), 61(98)

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'C'.

Object :- To find out the suitable seed-rate and row-spacing for Wheat under rain-fed conditions.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 15.10.60 ; 13.11.61. (iv) (a) One ploughing and 4 *bakherings*. (b) Drilling: (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) Hy—65. (vii) Un-irrigated. (viii) Nil. (ix) 2 cm. ; 5 cm. (x) 15.3.61 ; 18.4.62.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 3 seed-rates : $R_1=67$, $R_2=90$ and $R_3=101$ Kg/ha.

(2) 3 row-spacings : $S_1=23$, $S_2=30$ and $S_3=38$ cm.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 11.3 m. \times 6.3 m. (b) 10.1 m. \times 5.0 m. (v) 61 cm. \times 61 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-63 [Modified in 1962]. (v) No. (c) Nil. (v) and (vi) Nil. (vii) As error variances are heterogeneous and Treatments \times years interaction is absent, results of individual years have been presented under 5. Results.

5. RESULTS :

60(136)

(i) 581 Kg/ha. (ii) 78.8 Kg/ha. (iii) None of effects is significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	Mean
R_1	648	546	532	575
R_2	592	634	611	612
R_3	602	569	498	556
Mean	614	583	547	581

61(98)

(i) 1212 Kg/ha. (ii) 158.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	Mean
R_1	1235	1176	1102	1171
R_2	1334	1196	1191	1240
R_3	1339	1216	1122	1225
Mean	1303	1196	1138	1212

Crop :- Wheat (*Rabi*).

Ref :- M.P. 62(54), 63(5).

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'C'.

Object :- To find out the suitable row-spacing and seed-rate for Wheat under rain-fed conditions.

I. BASAL CONDITIONS :

(i) (a) Wheat—Gram—*Jowar* : Nil. (b) *Jowar* ; N.A. (c) N.A. (ii) Black cotton soil. (iii) 11.10.62 ; 17.10.63. (iv) (a) Ploughing and *bakherings*. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 39 C.L./ha. of F.Y.M. ; Nil. (vi) Hy—65. (vii) Unirrigated. (viii) Nil. (ix) 1 cm. ; 9 cm. (x) 20.3.63 ; 12.3.64.

2 TREATMENTS :

All combinations of (1) and (2)

(1) 2 seed-rates : $R_1=67$ and $R_2=90$ Kg/ha.

(2) 3 row-spacings : $S_1=23$, $S_2=30$ and $S_3=38$ cm.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 11.3 m. \times 6.3 m. (b). 10.1 m. \times 5.0 m.
(v) 61 cm. \times 61 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil ; Damage by ants and rats. (iii) Grain yield. (iv) (a) 1960—63 (modified in 1962). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As error variances are heterogeneous and Treatments \times years interaction is absent, results of individual years have been presented under 5.—
Results:

5. RESULTS :

62(54)

(i) 570 Kg/ha. (ii) 101.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	Mean
R_1	588	484	489	520
R_2	692	548	618	619
Mean	640	516	553	570

63(5)

(i) 796 Kg/ha. (ii) 88.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	Mean
R_1	808	797	783	796
R_2	783	805	803	797
Mean	795	801	793	796

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(131), 61(94).

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'C'.

Object :—To study the effect of weeding and hoeing on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 7.10.60 ; 12.11.61. (iv) (a) One ploughing and 4 *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 8 cm. \times 30 cm. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Unirrigated. (viii) As per treatments. (ix) 2 cm. ; 5 cm. (x) 16.2.61 ; 28.3.62.

2. TREATMENTS:

2 cultural treatments : C_0 =Control and C_1 =One weeding and light hoeing.

3. DESIGN:

(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 6. (iv) (a) 11.3 m. × 6.3 m. (b) 10.1 m. × 5.0 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL:

(i) Poor ; satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1959—61. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Experiment No. 59(120) has also been included while combining the results. Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results:

(i) 756 Kg/ha. (ii) 278.4 Kg/ha. (based on 2 d.f. made up of Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C ₀	C ₁
Av. yield	778	735

Individual results :

Treatment	C ₀	C ₁	Sig.	G.M.	S.E./plot
Year 1960	400	429	N.S.	414	88.2
1961	736	509	*	622	101.6
Pooled	778	735	N.S.	756	278.4

Crop :- Wheat (Rabi).

Ref :- M.P. 60(140), 61(104), 62(65).

Site :- Govt. Soil Cons. Res. Stn., Phanda. Type :- 'C'.

Object :- To find out the optimum frequency of harrowings and ploughings for proper cultivation and its effect on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 6.10.60; 24.11.61; 12.10.62. (iv) (a) As per treatments (b) Drilling. (c) 90 Kg/ha. (d) 8 cm. × 30 cm. (e) N.A. (v) Nil. (vi) N.P.—720 for 60; Hy—65 for others. (vii) Unirrigated. (viii) Nil. (ix) 3 cm.; 5 cm.; 1 cm. (x) 14.2.61; 29.3.62; 6.3.63.

2. TREATMENTS:

9 cultural treatments: T₁=3 harrowings, T₂=5 harrowings, T₃=7 harrowings, T₄=3 harrowings+one ploughing every year, T₅=5 harrowings+one ploughing every year, T₆=7 harrowings+one ploughing every year, T₇=3 harrowings+one ploughing in alternate years, T₈=5 harrowings+one ploughing in alternate years and T₉=7 harrowings+one ploughing in alternate years.

3. DESIGN:

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 3. (iv) (a) 21.3 m. × 4.6 m. (b) 20.1 m. × 3.4 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—63 (modified in 1963). (b) Ycs. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS:

Pooled results

(i) 576 Kg/ha. (ii) 71.1 Kg/ha. [based on 64 d.f. made up of pooled error and Treatments \times years interaction]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉
Av. yield	519	591	630	548	587	607	561	564	577

Individual results

Treatments	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	Sig.	G.M.	S.E./plot
Years												
1960	356	390	428	326	358	392	336	347	382	N.S.	368	52.5
1961	786	844	845	780	889	889	791	783	868	N.S.	830	93.3
1962	415	539	618	538	515	540	557	562	481	*	530	61.4
Pooled	519	591	630	548	587	607	561	564	577	N.S.	576	

Crop :- Wheat (Rabi).

Ref :- M.P. 63(11).

Site :- Govt. Soil. Cons. Res. Stn., Phanda.

Type :- 'C'.

Object :- To find out the optimum frequency of harrowing and ploughing for proper cultivation and its effect on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Black Cotton. (iii) 12 10.63. (iv) (a) As per treatments. (b) Drilling. (c) 90 Kg/ha. (d) 8 cm. \times 30 cm. (e) N.A. (v) Nil. (vi) Hy—55. (vii) Unirrigated. (viii) Nil. (ix) 4 cm. (x) 16.3.64.

2. TREATMENTS:

8 cultural treatments: T₁=3 harrowings, T₂=5 harrowings, T₃=7 harrowings, T₄=3 harrowings+one ploughing every year, T₅=5 harrowings+one ploughing every year, T₆=7 harrowings+one ploughing every year, T₇=3 harrowings+one ploughing in alternate years and T₈=5 harrowings+one ploughing in alternate years.

3. DESIGN:

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) 21.3 m. \times 4.6 m. (b) 20.1 m. \times 3.4 m. (v) 61 cm. \times 61 cm. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—63 (modified in 1963). (b) Yes. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 470 Kg/ha. (ii) 86.3 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Av yield	245	356	586	588	635	578	393	380

C.D.=151.1 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 62(56), 63(8).****Site :- Govt. Soil Cons. Res. Stn., Phanda.****Type :- 'C'.**

Object: —To study the effect of different cultivation practices on soil wash.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 12.10.62 ; 21, 22.10.63. (iv) (a) As per treatments. (b) Drilling. (c) 90 Kg/ha. (d) 8 cm. × 30 cm. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Unirrigated. (viii) Nil. (ix) 1 cm. ; 9 cm. (x) 20.3.63 ; 16.3.64.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 directions of cultural practices : S₁=Along the slope and S₂=Across the slope.

(2) 4 cultural practices : C₁=*Bakharing* alone in summer and during rainy season, C₂=One ploughing in summer followed by *bakharing* in rainy season, C₃=Deep summer ploughing at 30 cm. and *bakharing* in rainy season and C₄=Summer *bakharing* and early monsoon ploughing with first rain.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) and (b) 20.1 m. × 5.0 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield (iv) (a) 1961—62. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS :

Pooled results

(i) 857 Kg/ha. (ii) 86.9 Kg/ha. (based on 35 d.f. made up of pooled error and Treatments × years interaction). (iii) Only the main effect of C is significant. (iv) Av. yield of grain in Kg/ha.

	C ₁	C ₂	C ₃	C ₄	Mean
S ₁	814	832	924	758	832
S ₂	944	904	874	804	882
Mean	879	868	899	781	857

C.D. for C marginal means=72.0 Kg/ha.

Individual Results

Treatments	S ₁	S ₂	Sig.	C ₁	C ₂	C ₃	C ₄	Sig.	Control	S.E./plot
Years										
1962	836	895	N.S.	888	860	888	827	N.S.	866	85.0
1963	828	868	N.S.	870	876	910	735	**	848	90.3
Pooled	832	882	N.S.	879	868	899	781	*	857	86.9

Crop :- Wheat (Rabi).**Ref :- M.P. 63(7).****Site :- Govt. Soil Cons. Res. Stn., Phanda.****Type :- 'C'.**

Object:—To study the effect of different previous crops on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) As per treatments. (c) N.A. (ii) Black cotton soil. (iii) 20.10.63. (iv) (a) One ploughing and 4 *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 8 cm × 30 cm. (e) N.A. (v) Nil. (vi) Hy—65, (vii) Unirrigated. (viii) Nil. (ix) 9 cm. (x) 16.3.64.

2. TREATMENTS :

5 previous crops: G_0 =No G.M. crop (control), G_1 =*Sann hemp*, G_2 =*Moong*, G_3 =5604 Kg/ha. of *Palas* leaves and G_4 =5604 Kg/ha. of *Ipomea* leaves.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 11.3 m × 7.9 m. (b) 10.1 m. × 6.7 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Attack of ants and rats. (iii) Grain yield. (iv) (a) 1963—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 695 Kg/ha. (ii) 101.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	G_0	G_1	G_2	G_3	G_4
Av. yield	729	658	663	700	725

Crop :- Wheat (Rabi).**Ref :- M.P. 60(47).****Site :- Govt. Exptl. Farm, Powarkheda.****Type :- 'C'.**

Object:—To compare East-West and North-South sowing of Wheat crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) *Morand*. (iii) 30.10.60. (iv) (a) *Bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) Hy—11 (mid-late). (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 14.3.61.

2. TREATMENTS :

2 directions of sowing. D_1 =East-West and D_2 =North-South.

3. DESIGN:

(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 6. (iv) (a) 10.1 m. × 5.0 m. (b) 9.5 m. × 4.3 m. (v) 30 cm. × 38 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain and Straw yield. (iv) (a) 1958-60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1143 Kg/ha. (ii) 129.8 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	D ₁	D ₂
Av. yield	1110	1177

Crop :- Wheat (Rabi).

Ref :- M.P. 60(45).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'C'.

Object :- To compare line-sowing vs. broadcasting with different seed-rates under irrigated conditions.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 33.6 Kg/ha. of N+33.6 Kg/ha. of P₂O₅ (ii) Morand. (iii) 10.11.60. (iv) (a) 4 *bakherings*. (b) and (c) As per treatments. (d) 30 cm. between rows for line sowing. (e) —. (v) 33.6 Kg/ha. of N+33.6 Kg/ha. of P₂O₅. (vi) Hy -65 (mid-late). (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 16.3.61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 seed-rates: R₁=67 and R₂=90 Kg/ha.

(2) 2 methods of sowing: M₁=Broadcasting and M₂=Line sowing.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 10.1 m. × 5.0 m. (b) 9.5 m. × 4.3 m. (v) 30 cm. × 38 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1958-60. (b) Yes. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2439 Kg/ha. (ii) 218.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	Mean
M ₁	2506	2388	2447
M ₂	2393	2467	2430
Mean	2450	2428	2439

Crop :- Wheat (Rabi).

Ref :- M.P. 60(46).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'C'.

Object :- To find out suitable row-spacing and seeds per hole for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Morand. (iii) 10 to 12.11.60. (iv) (a) *Bakherings*. (b) Dibbling. (c) N.A. (d) and (e) As per treatments. (v) Nil. (vi) Hy—65(mid-late). (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 16.3.61.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 3 row spacings : $S_1=15$, $S_2=23$ and $S_3=30$ cm.

(2) 3 numbers of seeds/hole : $R_1=1$, $R_2=2$ and $R_3=3$ seeds/hole.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 5.0 m. \times 11.0 m. (b) 5.0 m. \times 8.1 m. (v) 146 cm. on either side, length wise. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1958-60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 3101 Kg/ha. (ii) 435.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R_1	R_2	R_3	Mean
S_1	2985	3069	2907	2987
S_2	3123	3504	2697	3108
S_3	2972	3272	3380	3208
Mean	3027	3282	2995	3101

Crop :- Wheat (Rabi).

Ref :- M.P. 64(30).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'C'.

Object :- To find out a suitable crop for double cropping with Wheat.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) and (c) As per treatments. (ii) Loamy [to clayey black. (iii) 29.10.64. (iv) (a) Cross bakherings. (b) Line sowing by Nari, (c) 90 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 22.3.65.

2. TREATMENTS:

4 Kharif crops : C_0 =Fallow, C_1 =Maize+112 Kg/ha. of N+67.2 Kg/ha. of P_2O_5 +33.6 Kg/ha. of K_2O , C_2 =Moong+33.6 Kg/ha. of P_2O_5 and C_3 =Urid+33.6 Kg/ha. of P_2O_5 .

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 12.2 m. \times 5.5 m. (b) 10.4 m. \times 4.3 m. (v) 91 cm. \times 61 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1964-contd. [Expt. for 1965 N.A.], (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 2428 Kg/ha. (ii) 171.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C_0	C_1	C_2	C_3
Av. yield	2387	2589	2338	2400

Crop :- Wheat (Rabi).**Ref :- M.P. 60(38).****Site :- Govt. Seed and Demons. Farm., Sagar.****Type :- 'C'.****Object :-** To findout the optimum seeds per hole and row-spacing for Wheat.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Morand I and II. (iii) 26 to 30.11.60. (iv) (a) 3 *bakherings* and one ploughing. (b) Dibbling. (c) N.A. (d) and (e) As per treatments. (v) 25 C.L./ha. of F.Y.M+11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of P_2O_5 as Super. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) 1 Cm. (x) 4.4.61.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 4 row-spacings : $S_1=15$, $S_2=23$, $S_3=30$ and $S_4=46$ Cm.(2) 3 numbers of seeds/hole $R_1=1$, $R_2=2$ and $R_3=3$ seeds/hole.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 3.7 m.×11.0 m. (b) 2.7 m.×9.8 m. (v) 46 cm.×61 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1958-60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 991 Kg/ha. (ii) 170.4 Kg/ha. (iii) Main effects of S and R are highly significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	S_4	Mean
R_1	991	922	806	721	860
R_2	1224	1001	901	917	1011
R_3	1245	1097	1113	959	1103
Mean	1153	1007	940	866	991

C.D. for S marginal means=141.5 Kg/ha.

C.D. for R marginal means=122.6 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 60(195), 61(164), 62(132).****Site :- Govt. Agri. Res. Stn., Adhartal.****Type :- 'CM'.****Object :-** To study the effect of different sowing dates under barrows seed-rates and levels of fertilizers on the yield of Wheat under rainfed conditions in Haveli area of Adhartal.**1. BASAL CONDITIONS :**

(i) to (c) N.A. (ii) Clay loam (Medium black). (iii) As per treatments. (iv) (a) 3 to 4 ploughings. (b) N.A. (c) As per treatments. (d) Rows 30 cm. apart. (e) Nil. (v) 50 Q/ha. of G.M. (vi) C-281. (vii) Unirrigated. (viii) N.A. (ix) 78 cm. ; 83 cm. ; 82 cm. (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 dates of sowing : $D_1=$ Oct. 27, for 60 ; Nov. 24, for 61 ; Oct. 22, for 62 ; $D_2=$ Nov. 6, for 60 ; Dec. 3, for 61 ; Nov. 2, for 62 and $D_3=$ Nov. 16, for 60 ; Dec. 13, for 61 ; Nov. 12, for 62.

(2) 3 seedrate : $S_1=89.4$, $S_2=112.0$ and $S_3=134.0$ Kg/ha.(3) 2 levels of fertilizers : $F_1=$ No fertilizer, and $F_2=22$ Kg/ha. of N+22 Kg/ha. of P_2O_5 .

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) Nil. (iii) Grain yield. (iv) (a) 1960-62. (b) N.A. (c) Nil. (v) to (vii) Nil. (vii) Neither the plot-wise yield data nor the complete results are available.

5. RESULTS :

Av. yield in Kg/ha.

Treatments	D ₁	D ₂	D ₃	Sig.	C.D.	S ₁	S ₂	S ₃	Sig.	C.D.
Years										
1960	487	539	516	N.S.	—	507	514	520	N.S.	—
1961	926	773	679	**	135.1	742	839	797	N.S.	—
1962	707	707	596	**	53.0	680	648	682	N.S.	—

F ₁	F ₂	Sig.	C.D.	G.M.	S.E./plot
484	545	N.S.	—	514	N.A.
553	1032	*	117.0	793	232.8
475	866	*	45.8	670	91.3

Crop :- Wheat (Rabi).

Ref :- M.P. 60(119).

Site :- Govt. Seed and Demons. Farm., Amlaha.

Type :- 'CM'.

Object :—To study the effect of P application to previous legume crops on the succeeding Wheat crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) As per treatments. (ii) Medium black. (iii) 25.10.60. (iv) (a) 2 *bakherings* in Summer. (b) Drilling. (c) 90 Kg/ha. (d) Rows 25 cm. apart. (e) — (v) Nil. (vi) Hy-65. (vii) Unirrigated. (viii) Nil. (ix) 1.0 cm. (x) 13.4.61.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 2 levels of P₂O₅ applied to previous crops : P₀=0 and P₁=16.8 Kg/ha.

(2) 3 previous crops : C₁=Legume A, C₂=Legume B and C₃=Wheat.

(3) 2 levels of N applied to present Wheat crop : N₀=0 and 16.8 Kg/ha.

Name of legume crops N.A.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 11.1 m. (b) 4.0 m. × 10.2 m. (v) 30 cm. × 43 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-only. (b) and (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 475 Kg/ha. (ii) 104.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	N ₀	N ₁	Mean
C ₁	426	503	469	460	465
C ₂	482	500	454	528	491
C ₃	476	463	485	454	469
Mean	461	489	469	481	475
N ₀	443	496			
N ₁	480	482			

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(121).

Site :- Govt. Seed and Demons. Farm, Amlaha.

Type :- 'CM'.

Object :- To find out the suitable seed-rate and manurial dose for Wheat.

1. BASAL CONDITIONS :

(i) (a) Wheat-wheat. (b) Wheat. (c) N.A. (ii) Medium black soil. (iii) 23.10.60. (iv) (a) 5 *bakherings*. (b) Drilling. (c) As per treatments. (d) 25 cm. (e) —. (v) Nil. (vi) Hy-65. (vii) Unirrigated. (viii) Nil. (ix) 1 cm. (x) 12.3.61.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 3 levels of fertilizers : F₀=Control (no manure), F₁=11.2 Kg/ha. of N+11.2 Kg/ha. of P₂O₅ and F₂=22.4 Kg/ha. of N+22.0 Kg/ha. of P₂O₅.

(2) 3 seed-rates : R₁=67.2, R₂=89.7 and R₃=112.0 Kg./ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 4.6 m.×11.1 m. (b) 4.1 m.×10.0 m. (v) 55 cm.×26 cm. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-only. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 451 Kg/ha. (ii) 108.8 Kg/ha. (iii) Main effect of R alone is significant. (iv) Av. yield of grain in Kg/ha.

	F ₀	F ₁	F ₂	Mean
R ₁	401	321	383	368
R ₂	451	525	475	484
R ₃	457	549	500	502
Mean	436	465	453	451

C.D. for R marginal means=91.7 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 61(68).

Site :- Govt. Seed and Demons. Farm, Betul.

Type :- 'CM'.

Object :- To find out suitable seed-rate and manurial dose for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Morand. II. (iii) 19.11.61. (iv) (a) 2 ploughings, harrowings and *bakhering*. (b) Seed drilled with *Nari*. (c) As per treatments. (d) 23 cm. \times 10 cm. (e) —. (v) Nil. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) and (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 manurial levels : M_0 = Control (no manure), M_1 = 16.8 Kg/ha. of N as A/S + 16.8 Kg/ha. of P_2O_5 as Super and M_2 = 33.6 Kg/ha. of N as A/S + 33.6 Kg/ha. of P_2O_5 as Super.

(2) 3 seed-rates : R_1 = 67.2, R_2 = 89.7 and R_3 = 112.1 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 4.6 m. \times 11.1 m. (b) 1/247 ha. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 956 Kg/ha. (ii) 123.3 Kg/ha. (iii) Main effect of M is highly significant and that of R is significant. (iv) Av. yield of grain in Kg/ha.

	M_0	M_1	M_2	Mean
R_1	742	897	981	873
R_2	714	981	1177	957
R_3	869	1009	1238	1039
Mean	775	962	1132	956

C.D. for M or R marginal means = 103.9 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(32), 61(16).

Site :- Govt. Seed and Demons. Farm, Biora.

Type :- 'CM'.

Object :- To find out a suitable manurial dose and seed-rate for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut ; Wheat. (c) Nil. (ii) Clay. (iii) 2.11.60 ; 21.11.61. (iv) (a) Ploughing, *bakhering* and levelling. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) —. (v) Nil ; G.M. (*Moong*). (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) 3 cm. ; 38 cm. (x) 5.4.61 ; 10.4.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 seed-rates : $R_1=67.2$, $R_2=89.6$ and $R_3=112.1$ Kg/ha.

(2) 3 levels of fertilizers : $M_0=0$, $M_1=11.2$ Kg/ha. of $P_2O_5+11.2$ Kg/ha. of N and $M_2=22.4$ Kg/ha. of $P_2O_5+22.4$ Kg/ha. of N.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9 (b) N.A. (iii) 4. (iv) (a) 11.1 m. \times 4.6 m. (b) 10.2 m. \times 4.0 m. (v) 43 cm. \times 30 cm (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—61. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) As the error variances are heterogeneous and Treatments \times years interaction is absent, results of individual years have been presented under 5.—Results.

5. RESULTS :

60(32)

(i) 891 Kg/ha. (ii) 162.8 Kg/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of grain in Kg/ha.

	M_0	M_1	M_2	Mean
R_1	546	892	1078	839
R_2	616	877	1241	911
R_3	622	857	1286	922
Mean	595	875	1202	891

C.D. for M marginal means=137.2 Kg/ha.

61(16)

(i) 1565 Kg/ha. (ii) 276.6 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M_0	M_1	M_2	Mean
R_1	1253	1695	1686	1545
R_2	1165	1522	1939	1542
R_3	1284	1661	1877	1607
Mean	1234	1626	1834	1565

C.D. for M marginal means=232.9 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 61(119).

Site :- Instt. of Plant Industry, Indore.

Type :- 'CM'.

Object:—To study the effect of P and leguminous crops on the yield of succeeding Wheat crop in the presence and absence of N.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) and (c) As per treatments. (ii) Black Cotton soil. (iii) 21.11.61. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) 67 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil. (vi) N.P.-710 (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 24.3.62.

2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) 3 previous crops : $C_1=Urid$, $C_2=Cowpea$ and $C_3=Wheat$.

(2) 2 levels of P_2O_5 as Super : $P_0=0$, and $P_1=16.8$ Kg/ha.

(3) 2 levels of N as A/S applied to present Wheat crop : $N_0=0$, and $N_1=16.8$ Kg/ha.

P_2O_5 applied to previous *Urid* and cowpea crop and to the present Wheat crop in the case of treatment C_3 .

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 3. (iv) (a) 4.6 m. \times 13.7 m. (b) 3.7 m. \times 12.2 m
(v) 76 cm. \times 46 cm. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1961—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 833 Kg/ha. (ii) 125.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	C_1	C_2	C_3	P_0	P_1	Mean
N_0	848	806	980	768	988	878
N_1	861	766	736	809	767	788
Mean	855	786	858	788	878	833
P_0	809	805	750			
P_1	900	767	967			

Crop :- Wheat (Rabi).

Ref :- M P. 60 (137).

Site :- Instt. of Plant Industry, Indore.

Type :- 'CM'.

Object :- To find out a suitable previous crop and N dose for Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) As per treatments. (ii) Black Cotton soil. (iii) 17.10.60. (iv) (a) One ploughing and harrowing. (b) Drilling. (c) 73 Kg/ha. (d) 35.6 cm. \times 12.7 cm. (e) N.A. (v) 12 C.L./ha. of farm compost. (vi) N.P.—710. (vii) Unirrigated. (viii) 2 weedings. (ix) 3.8 cm. (x) 20.2.61.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 2 previous crops : $C_1=Urid$ and $C_2=Cowpea$.

(2) 2 levels of N as A/S applied to previous crops : $N_0=0$ and $N_1=16.8$ Kg/ha.

(3) 2 levels of N as A/S applied to present Wheat crop : $N_0=0$, $N_1=16.8$ Kg/ha.

Previous crops sown on 24.6.60 and harvested on 19.9.60.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) 13.7 m. \times 4.6 m. (b) 12.2 m. \times 3.7 m.
(v) 76 cm. \times 46 cm. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

- (i) 391 Kg/ha. (ii) 69.9 Kg/ha. (iii) Main effect of C is highly significant and that of N is significant.
 (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₀ '	N ₁ '	Mean
C ₁	521	496	481	536	508
C ₂	270	276	229	317	273
Mean	395	386	355	426	391
N ₀ '	301	409			
N ₁ '	490	363			

C.D. for N/or C marginal means=61.1 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 61(90).

Site :- Instt. of Plant Industry, Indore.

Type 'CM'.

Object :—To find out a suitable previous crop with suitable doses of N and P for Wheat.

1. BASAL CONDITIONS :

- (i) (a) N.A. (b) and (c) As per treatments. (ii) Black cotton soil. (iii) 14.11.61. (iv) (a) 2 ploughings and 3 harrowings. (b) Drilling. (c) 73 Kg/ha. (d) 35.6 cm. × 12.7 cm. (e) N.A. (v) 12 C.L./ha. of F.Y.M. (vi) N.P. 710. (vii) Irrigated. (viii) 2 weedings. (ix) 5.2 cm. (x) 23.3.62.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 2 previous crops : C₁=Urid and C₂=Cowpea.

(2) 2 levels of N as A/S : N₀=0 and N₁=16.8 Kg/ha.

(3) 2 levels of P₂O₅ as Super : P₀=0 and P₁=16.8 Kg/ha.

Previous crops sown on 22.6.61 and harvested on 20/21.9.61. A/S and Super applied to previous crops.

3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 8, (b) N.A. (iii) 3. (iv) (a) and (b) 12.2 m. × 3.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

- (i) Very poor. (ii) Nil. (iii) Grain yield. (iv) (a) 1961-only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 356 Kg/ha. (ii) 85.4 Kg/ha. (iii) Main effect of C alone is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	P ₀	P ₁	Mean
C ₁	301	302	329	274	302
C ₂	399	420	381	438	409
Mean	350	361	355	356	356
P ₀	307	402			
P ₁	392	320			

C.D. for C marginal means=74.7 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 60(151).****Site :- Agri. Res. Stn., Kuthulia.****Type :- 'CM'.**

Object :—To find the optimum seed-rate and dose of fertiliser for Wheat.

1. BASAL CONDITIONS :

- (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Clayey and clayey loam. (iii) 23.10.60. (iv) (a) 4 ploughings. (b) Line sowing. (c) As per treatment. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Hy—65. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 25.4.61.

2. TREATMENTS :**Main-plot treatments**3 seed-rates : $R_1=67.2$, $R_2=89.6$ and $R_3=112.0$ Kg/ha.**Sub-plot treatments**

All combinations of (1) and (2)+Control (2 plots).

(1) 2 levels of N as A/S: $N_1=11.2$ and $N_2=22.4$ Kg/ha.(2) 2 levels of P_2O_5 as Super: $P_1=11.2$ and $P_2=22.4$ Kg/ha.**3. DESIGN :**

- (i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 2.4 m. \times 12.2 m. (v) Nil. (vi) Yes.

4. GENERAL :

- (i) and (ii) N.A. (iii) Yield of grain. (iv) 1960-only. (b) and (c) —. (v) to (vii) N.A.

5. RESULTS :

- (i) 1486 Kg/ha. (ii) (a) 275.7 Kg/ha. (b) 292.5 Kg/ha. (iii) None of the effects is significant. (iii) Av. yield of grain in Kg/ha.

Control=1426 Kg/ha.

	R_1	R_2	R_3	P_1	P_2	Mean
N_1	1374	1543	1442	1460	1446	1453
N_2	1340	1643	1723	1586	1552	1569
Mean	1357	1593	1582	1523	1499	1511
P_1	1337	1643	1589			
P_2	1378	1543	1576			

Crop : Wheat(Rabi).**Ref :- M.P. 60(179).****Site :- Govt. Seed and Demons. Farm, Mahagarh.****Type :- 'CM'.**

Object :—To find out the optimum seed rate and dose of fertilizer for Wheat.

1. BASAL CONDITIONS :

- (i) (a) to (c) N.A. (ii) Black Cotton soil. (iii) N.A. (iv) (a) Bakherings. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Hy—65. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 seed rates : $R_1=67.2$, $R_2=89.6$ and 112.0 Kg/ha.(2) 3 levels of fertilizers: F_0 =Control (no manure), $F_1=22.4$ Kg/ha. of N as A/S+22.4 Kg/ha. of P_2O_5 as Super and $F_2=2 \times F_1$.

3. DESIGN :

(i) Fact in R.B.D (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 11.1 m. (b) 4.0 m. × 10.2 m.
(v) 30 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—only. (b) and (c) — (v) to (vii) Nil.

5. RESULTS :

(i) 1953 Kg/ha. (ii) 259.6 Kg/ha. (iii) Main effects of R, F and interaction R × F are significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	R ₃	Mean
F ₀	1485	2060	1780	1775
F ₁	2074	1892	2256	2074
F ₂	1793	1961	2276	2010
Mean	1784	1971	2104	1953

C.D. for R or F marginal means = 218.7 Kg/ha.

C.D. for body of table = 378.9 Kg/ha.

— — —

Crop :- Wheat (Rabi).

Ref :- M.P. 60(74), 61(146).

Site :- Central Agri. Res. Farm, Nabibagh.

Type :- 'CM'.

Object :- To find out the effect of P and leguminous crops on the yield of succeeding Wheat crop in the presence and absence of N.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) As per treatments. (ii) Black Cotton soil. (iii) 27.10.60 ; 22.10.61. (iv) (a) 4 *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) C 581. (vii) Unirrigated. (viii) and (ix) N.A. (x) 4.4.61 ; 4.4.62.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 previous crops : C₁=Gram, C₂=Pea and C₃=Wheat.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=16.8 Kg/ha.

(3) 2 levels of N as A/S applied to present Wheat crop : N₀=0 and N₁=16.8 Kg/ha.

P₂O₅ applied to the previous gram and Pea crops and to the present Wheat crop in the case of treatment C₃.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) 27.4 m. × 27.4 m. ; N.A. (iii) 3. (iv) (a) 4.6 m. × 13.7 m. ; 4.6 m. × 4.9 m. (b) 4.0 m. × 13.1 m. ; 4.0 m. × 4.3 m. (v) 46 cm. × 30 cm. ; 30 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—61. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogenous and Treatments × years interaction is present.

5. RESULTS :

Pooled results

(i) 589 Kg/ha. (ii) 180.8 Kg/ha. (9 d.f. made up of Treatments \times years interaction). (iii) Main effect of C alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	C ₁	C ₂	C ₃	N ₀	N ₁	Mean
P ₀	503	463	699	545	564	555
P ₁	659	488	724	623	624	624
Mean	581	475	712	584	594	589
N ₀	563	495	694			
N ₁	599	455	729			

C.D. for C marginal means = 118.1 Kg/ha.

Individual results

Treatments	P ₀	P ₁	Sig.	C ₁	C ₂	C ₃	Sig.	N ₀	N ₁	Sig.
Years 1960	796	858	N.S.	796	793	892	N.S.	829	825	N.S.
1961	314	390	**	366	158	532	**	340	364	N.S.
Pooled	555	624	N.S.	581	475	712	**	584	594	N.S.

G.M.	S.E./plot
827	97.1
352	68.7
589	180.8

Crop :- Wheat (Rabi).

Ref :- M.P. 60(76).

Site :- Central Agri. Res. Farm, Nabibagh.

Type :- 'CM'.

Object :- To find out the optimum seed-rate and dose of fertilizer for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) 26.10.60. (iv) (a) 4 *bakharings*. (b) Drilling by *deshi* plough. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) C—591. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 1.4.61.

2. TREATMENTS:

All combinations of (1) and (2)

- (1) 3 manurial levels : M₀ = Control (no manure), M₁ = 11.2 Kg/ha. of N as A/S + 11.2 Kg/ha. of P₂O₅ as Super and M₂ = 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P₂O₅ as Super.
 (2) 3 seed-rates : R₁ = 67.2, R₂ = 89.7 and R₃ = 112.1 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 11.1 m. (b) 4.0 m. × 10.2 m. (v) 30 cm. × 42 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1938 Kg/ha. (ii) 304.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	Mean
R ₁	1721	1758	2030	1836
R ₂	1949	1860	2314	2041
R ₃	1906	2054	1851	1937
Mean	1859	1891	2065	1938

Crop :- Wheat (Rabi).

Ref :- M.P. 60(152).

Site :- Govt. Agri. Farm, Nowgong.

Type :- 'CM'.

Object :- To find out the optimum seed-rate and levels of N and P for Wheat.

1. BASAL CONDITINS :

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy black. (iii) 12.11.60. (iv) (a) One *bakhering* and 2 ploughings. (b) Line sowing. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) One weeding. (ix) N.A. (x) 5.4.61.

2. TREATMENTS :

Main-plot treatments :

3 seed rates : R₁=72.5, R₂=96.7 and R₃=120.8 Kg/ha.

Sub plot treatments :

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

(1) 2 levels of N as A/S : N₁=11.2 and N₂=22.4 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₁=11.2 and P₂=22.4 Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 3.7 m. × 13.8 m (b) 2.4 m. × 13.8 m. (v) 61 cm. on either side. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) N.A.

5. RESULTS :

(i) 1197 Kg/ha. (ii) (a) 211.8 Kg/ha. (b) 161.9 Kg/ha. (iii) Control vs. others alone is significant. (iv) Av. yield of grain in Kg/ha.

Control=1114 Kg/ha.

	R ₁	R ₂	R ₃	P ₁	P ₂	Mean
N ₁	1143	1355	1225	1226	1256	1241
N ₂	1146	1305	1254	1177	1293	1235
Mean	1144	1330	1239	1201	1274	1238
P ₁	1128	1249	1227			
P ₂	1160	1411	1251			

C.D. for control vs others=81.6 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 60(55), 61(32), 62(115).****Site :- Govt. Exptl. Farm, Powerkheda.****Type :- 'CM'.**

Object :- To study the effect of direct application of P to legumes and to see its after effect on the yield of Wheat crop with and without N.

1. BASAL CONDITIONS :

(i) (a) to (c) As per treatments. (ii) Morand. (iii) 26.10.60 ; 13, 14.11.61 ; 6/7.11.62. (iv) (a) Cross bakherings. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Hy-11. (vii) Un-irrigated. (viii) Nil. (ix) 5.7 cm. ; 27.7 cm. ; N.A. (x) 14.3.61 ; N.A. ; 25.3.63.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 previous crops : C₁=Gram, C₂=*Teora* and C₃=Wheat.

(2) 2 levels of P₂O₅ applied to present Wheat crop. : P₀=0, and P₁=16.8 Kg/ha.

(3) 2 levels of N : N₀=0 and P₁=16.8 Kg/ha.

P₂O₅ applied to the previous Gram and *Teora* crops and to the present Wheat crop in the case of treatment C₃

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 11.1 m. × 4.6 m. (b) 10.2 m. × 4.0 m. (v) 46 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1950-62. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results

(i) 943 Kg/ha. (ii) 192.0 Kg/ha. (based on 18 d.f. made up of Treatments × years interaction). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	C ₁	C ₂	C ₃	P ₀	P ₁	Mean
N ₀	833	853	853	810	882	846
N ₁	995	1076	1076	1026	1071	1049
Mean	914	964	964	918	977	948
P ₀	902	954	898			
P ₁	926	974	1030			

C.D. for N marginal means = 67.2 Kg/ha.

Individual results

Treatments	N ₀	N ₁	Sig.	C ₁	C ₂	C ₃	Sig.	P ₀	P ₁
Years									
1960	997	1067	*	1045	1053	998	N.S.	1030	1035
1961	752	1040	**	821	920	947	*	862	930
1962	790	1040	**	877	920	948	N.S.	863	967
Pooled	846	1049	**	914	964	964	N.S.	918	977

Sig.	G.M.	S.E/plot
N.S.	1032	104.6
N.S.	896	141.6
*	915	149.5
N.S.	948	192.0

Crop :- Wheat (Rabi).

Ref :- M.P. 60(50).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'GM'.

Object :- To find out suitable manurial dose and seed-rate for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Morand. (iii) 30.10.60. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Hy-11. (vii) Un-irrigated. (viii) Nil. (ix) 5.7 cm. (x) 13.3.61.

2. TREATMENTS :

Main-plot treatments :

3 seed-rates : R₁=67.2, R₂=89.7 and R₃=112.1 Kg/ha.

Sub-plot treatments :

All combinations of (1) and (2)+control (2 plots).

(1) 2 levels of N as A/S : N₁=11.2 add N₂=22.4 Kg/ha.

(2) 2 levels of P₂O₅ as SuPer : P₁=11.2 and P₂=22.4 Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (iii) 4. (iv) (a) 13.7 m. × 3.7 m. (b) 12.2 m. × 2.4 m. (v) 76 cm. × 61 m. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1959-60. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1354 Kg/ha. (ii) (a) 272.3 Kg/ha. (b) 138.0 Kg/ha. (iii) Control vs. others alone is highly significant. (iv) Av. yield of grain in Kg/ha.

Control=1192 Kg/ha.

	R ₁	R ₂	R ₃	P ₁	P ₂	Mean
N ₁	1485	1346	1384	1393	1418	1405
N ₂	1450	1466	1475	1479	1448	1464
Mean	1468	1406	1429	1436	1433	1434
P ₁	1466	1413	1428			
P ₂	1469	1400	1431			

C.D. for Control vs. others=69.5 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(160).

Site :- Govt. Seed and Demons. Farm, Raisen.

Type :- 'CM'.

Object :- To study the effect of P and leguminous crops on the yield of succeeding Wheat crop in the presence and absence of N.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) and (c) As per treatments. (ii) and (iii) N.A. (iv) (a) 2 ploughings. (b) Drilling. (c) 67 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Unirrigated. (viii) 2 interculturings. (ix) and (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 previous crops : C₁=Pea, C₂=Gram and C₃=Wheat.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=16.8 Kg/ha.

(3) 2 levels of N as A/S applied to present Wheat crop : N₀=0 and N₁=16.8 Kg/ha.

P₂O₅ applied to previous Pea and Gram crops and to the present Wheat crop in the case of treatment C₃.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) 4.0 m. × 10.2 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1960-only. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS :

(i) 876 Kg/ha. (ii) 241.0 Kg/ha. (iii) Main effect of C alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	C ₁	C ₂	C ₃	P ₀	P ₁	Mean
N ₀	498	743	1392	919	833	878
N ₁	554	664	1405	873	875	874
Mean	526	704	1399	846	856	876
P ₀	568	727	1392			
P ₁	483	680	1405			

C.D. for C marginal means=173.3 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(159).

Site :- Govt. Seed and Demons. Farm, Raisen.

Type :- 'CM'.

Object :—To find the optimum seed-rate and manurial dose for Wheat.

1. BASAL CONDITIONS:

(i) to (iii) N.A. (iv) (a) 2 ploughings and one *bakhering*. (b) Drilling. (c) As per treatments. (d) 30 cm. between lines. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) and (x) N.A.

2. TREATMENTS:

All combinations of (1) and (2).

(1) 3 seed-rates : R₁=67.2, R₂=89.6 and R₃=112.1 Kg/ha.

(2) 3 levels of fertilizers : F₀=Control (No manure), F₁=11.2 Kg/ha. of N+11.2 Kg/ha. of P₂O₅ and F₂=2×F₁.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 9. (iii) 4. (iv) (a) and (b) 4.0 m. × 10.2 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1960-only. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:

(i) 1532 Kg/ha. (ii) 373.9 Kg/ha. (iii) Main effect of R alone is significant. (iv) Av. yield of grain in Kg/ha.

	F ₀	F ₁	F ₂	Mean
R ₁	1349	1118	1320	1262
R ₂	1862	1735	1421	1673
R ₃	1764	1641	1576	1660
Mean	1658	1498	1439	1532

C.D. for R marginal means=315.1 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(147), 61(149).

Site :- State Mechanised Farm, Reora.

Type :- 'CM'.

Object :- To study the effect of N and P on the yield of Wheat with varying seed-rates.

1. BASAL CONDITIONS :

(i) (a) Nil ; Fallow-Wheat. (b) and (c) N.A. (ii) Medium black. (iii) 18/19:11.60 ; 5.12.61.
 (iv) (a) 6 ploughings. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) —. (v) Nil.
 (vi) Hy-65 ; C-591. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 3rd week of March, 61 ; 23.4.62.

2. TREATMENTS :

Main-plot treatments :

3 seed-rates : $R_1=67.2$, $R_2=89.6$ and $R_3=112.1$ Kg/ha.

Sub-plot treatments :

All combinations of (1) and (2) + control (2 plots).

(1) 2 levels of N as A/S : $N_1=11.2$ and $N_2=22.4$ Kg/ha.

(2) 2 levels of P_2O_5 as Super : $P_1=11.2$ and $P_2=22.4$ Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main plot. (b) N.A. (iii) 4. (iv) (a) 14.9 m. \times 3.7 m.
 (b) 13.7 m. \times 2.4 m. (v) 60 cm. \times 65 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-61. (b) No. (c) Nil. (v) and (vi) Nowgong, Powerkheda and Kuthulia. (vii) As sub-plot error variances are heterogeneous, results of individual years have been presented under 5 Results.

5. RESULTS :

60(147)

(i) 1265 Kg/ha. (ii) (a) 390.8 Kg/ha. (b) 284.7 Kg/ha. (iii) Control vs. others alone is significant.
 (iv) Av. yield of grain in Kg/ha.

Control = 794 Kg/ha.

	R_1	R_2	R_3	P_1	P_2	Mean
N_1	1515	1338	1433	1329	1528	1429
N_2	1502	1297	1380	1342	1444	1393
Mean	1508	1318	1406	1336	1486	1411
P_1	1418	1235	1354			
P_2	1599	1400	1459			

C.D. for control vs. others = 143.5 Kg/ha.

61(149)

(i) 1016 Kg/ha. (ii) (a) 226.5 Kg/ha. (b) 223.7 Kg/ha. (iii) Control vs. others alone is highly significant.
 (iv) Av. yield of grain in Kg/ha.

Control=736 Kg/ha.

	R ₁	R ₂	R ₃	P ₁	P ₂	Mean
N ₁	1254	1102	1140	1147	1184	1165
N ₂	1220	1042	1178	1170	1124	1147
Mean	1237	1072	1159	1158	1154	1156
P ₁	1237	1106	1132			
P ₂	1237	1038	1186			

C.D. for control vs. others=112.7 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 60(36).****Site :- Govt. Seed and Demons. Farm, Sagar.****Type :- 'CM'.**

Object :- To study the effect of different manurial doses with different seed-rates on the yield of Wheat under rain-fed conditions.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Morond I and II (black soil with *kankars*). (iii) 19.11.60. (iv) (a) 3 *bakherings* and one ploughing. (b) Sown by *Nari* method. (c) As per treatments. (d) Rows 30 cm. apart. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Unirrigated. (viii) Nil. (ix) 0.5 cm. (x) 3.4.61.

2. TREATMENTS :

All combinations of (1) and (2).

- (1) 3 manurial doses : M₀=No manure, M₁=11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of P₂O₅ as Super and M₂=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super.
 (2) 3 seed rates : R₁=67.2, R₂=89.7 and R₃=112.1 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 11.1 m. × 4.6 m. (b) 10.2 m. × 4.0 m. (v) 42 cm. × 30 cm. (vi) Yes.

4. GENERAL :

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

5. RESULTS :

(i) General=938 Kg/ha. (ii) 186.1 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	Mean
R ₁	554	879	1184	872
R ₂	634	1040	1272	982
R ₃	645	967	1272	961
Mean	611	962	1243	938

C.D. for M marginal means=156.8 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(37).

Site :- Govt. Seed and Demons Farm, Sagar.

Type :- 'CM'.

Object :-To study the effect of different manurial doses with different seed-rates on the yield of Wheat under-irrigated conditions.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Morand. I and II (Black soil with *Kankars*). (iii) 26.11.60. (iv) 3 *bakherings* and one ploughing (b) Sown by *Nari* method. (c) As per treatments. (d) 30 cm. between lines. (e) N.A. (v) 25 C.L./ha. of F.Y.M.. (vi) Hy-65. (vii) Irrigated. (viii) Nil. (ix) 0.5 cm. (x) 4.4.61.

2. TREATMENTS to 4. GENERAL :

Same as in Expt. No. 60(36) on page 208.

1. RESULTS :

(i) 945 Kg/ha. (ii) 263.3 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M ₁	M ₂	M ₃	Mean
R ₁	676	1163	1128	989
R ₂	581	995	1198	925
R ₃	578	981	1209	923
Mean	612	1046	1178	945

C.D. for M-marginal means=221.9 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(154).

Site :- Govt. Seed and Demons Farm, Sagar.

Type :- 'CM'.

Object :-To find out the optimum seed-rate and dose of fertilizer for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Black soil with *kankars*. (iii) 28.11.60. (iv) 3 *bakherings* and one ploughing. (b) Sown by *Nari* method. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) 4 C.L./ha. of F.Y.M. (vi) Hy-65. (vii) Unirrigated. (viii) Nil. (ix) 0.5 cm. (x) 4.4.61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 seed-rates: R₁=44.8, R₂=67.2, R₃=89.6 and R₄=112.0 Kg/ha.

(2) 2 doses of fertilizers: M₀=0 and M₁=11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of P₂O₅ as Super.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 2. (iv) (a) and (b) 6.1 m. × 15.2 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 777 Kg/ha. (ii) 102.1 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	R ₃	R ₄	Mean
M ₀	582	546	592	677	599
M ₁	695	1086	1055	985	955
Mean	639	816	823	831	777

C.D. for M marginal means=120.8 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(59), 61(147).

Site :- Central Exptl. Farm, Ujjain.

Type :- 'CM'.

Object :—To study the effect of manurial doses and seed-rates on the yield of Wheat under irrigated conditions.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 7.11.60 ; 5.11.61. (iv) (a) *Bakherings*. (b) Drilling. (c) As per treatments. (d) 50 cm. between rows. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Irrigated. (viii) N.A. (ix) 1.0 cm. ; N.A. (x) 10.4.61 ; 12.4.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 manurial doses: M₀=Control (no manure), M₁=22.4 Kg/ha, of N as A/S+22.4 Kg/ha. of P₂O₅ as Super and M₂=44.8 Kg/ha. of N as A/S+44.8 Kg/ha. of P₂O₅ as Super.

(2) 3 seed-rates: R₁=67.3, R₂=89.7 and R₃=112.1 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9, (b) N.A. (iii) 4. (iv) (a) 11.1 m. × 4.6 m. (b) 10.2 m. × 4.0 m. (v) 46 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain yield. (iv) (a) 1960-61. (b) N.A. (c) Results of combined analysis have been 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) 1187 Kg/ha, (ii) 84.6 Kg/ha. (based on 56 d.f. made up of pooled error and Treatments × years interaction). (iii) Main effect of M is highly significant. Interaction M × R is significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	R ₃	Mean
M ₀	780	850	804	811
M ₁	1258	1251	1243	1251
M ₂	1453	1442	1603	1499
Mean	1164	1181	1217	1187

C.D. for M marginal means=48.9 Kg/ha.

C.D. for body of table =84.8 Kg/ha.

Individual results

Treatment	M ₀	M ₁	M ₂	Sig.	R ₁	R ₂	R ₃	Sig.	G.M.	S.E./plot
Years										
1960	810	1245	1501	**	1162	1184	1210	N.S.	1185	83.0
1961	813	1257	1497	**	1165	1178	1224	N.S.	1189	98.5
Pooled	811	1251	1499	**	1164	1181	1217	N.S.	1187	84.6

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60/60).

Site :- Central Exptl. Farm, Ujjain.

Type :- 'CM'.

Object :- To study the effect of different seed-rates and manurial doses on the yield of Wheat under rain-fed conditions.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 27.10.60. (iv) (a) *Bakhering*. (b) Seed sown by *duffan*. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Un-irrigated. (viii) N.A. (ix) 0.8 cm. (x) 28.3.61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 manurial doses : M₀=Control (no manure), M₁=11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of P₂O₅ as Super and M₂=2×M₁.

(2) 3 seed-rates : R₁=67.3, R₂=89.7 and R₃=112.1 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 11.1 m.×4.6 m. (b) 10.2 m.×4.0 m. (v) 46 cm.×30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain yield. (iv) (a) 1960-only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1033 Kg/ha. (ii) 112.9 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	R ₁	R ₂	R ₃	Mean
M ₀	939	1012	968	973
M ₁	1009	1033	1032	1025
M ₂	1143	1089	1073	1102
Mean	1030	1045	1024	1033

C.D. for M marginal means=95.1 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(40), 61(24), 62(77).

Site :- Govt. Agri. Farm, Vidisha.

Type :- 'CM'.

Object :- To find out a suitable seed-rate and manurial dose for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat ; Gram ; N.A. (c) 25 C.L./ha. of F.Y.M. for 60 ; N.A. for others. (ii) Heavy clay. (iii) 28.10.60 ; 29.11.61 ; 14.11.62. (iv) (a) Ploughing and *bakherings*. (b) Line sowing. (c) As per treatments. (d) 30 cm. between lines for 62 ; N.A. for others. (e) N.A. (v) Nil. (vi) N.P.—718. (vii) Unirrigated. (viii) Nil. (ix) 9.0 cm. ; 68.1 cm. ; N.A. (x) 1.4.61 ; 15.4.62 ; 3.4.63.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 3 seed-rates : $R_1=67.2$, $R_2=89.7$ and $R_3=112.1$ Kg/ha.(2) 3 manurial doses : M_0 =Control, $M_1=11.2$ Kg/ha. of N as A/S+11.2 Kg/ha. of P_2O_5 as Super and $M_2=22.4$ Kg/ha. of N as A/S+22.4 Kg/ha. of P_2O_5 as Super.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 11.0 m. \times 4.6 m. for 60 ; 11.9 m. \times 4.3 m. for others. (b) 10.1 m. \times 3.7 m. for 60 ; 11.0 m. \times 3.7 m. for others. (v) 46 cm. \times 46 cm. for 60 ; 46 cm. \times 30 cm. for others. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959-62. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments \times years interaction is present. Experiment No. 59(58) has also been included for pooling the results.

5. RESULTS :

Pooled results

(i) 1015 Kg/ha. (ii) 195.4 Kg/ha. (based on 24 d.f. made up of Treatments \times years interaction). (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M_0	M_1	M_2	Mean
R_1	741	1020	1251	1004
R_2	715	1058	1230	1001
R_3	774	1082	1264	1040
Mean	743	1053	1248	1015

C.D. for M marginal means=82.2 Kg/ha.

Individual results

Treatments	R_1	R_2	R_3	Sig.	M_0	M_1	M_2	Sig.	G.M.	S.E./plot
Years										
1960	913	947	978	N.S.	604	1003	1231	**	946	76.0
1961	1270	1208	1308	N.S.	953	1274	1559	**	1262	169.5
1962	857	854	824	N.S.	711	868	961	**	848	115.2
Pooled	1004	1001	1040	N.S.	743	1053	1248	**	1015	195.4

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(41), 61(25), 62(109).

Site :- Govt. Agri. Farm, Vidisha.

Type :- 'CM'.

Object :- To find out the optimum tillage which will increase the yield of Wheat crop.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Wheat ; Peas ; Peas. (c) N.A. (ii) Heavy clay. (iii) 17.10.60 ; 2.12.61 ; 21.11.62.
 (iv) (a) As per treatments. (b) Line sowing (c) 90 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil.
 (vi) C—281. (vii) Unirrigated. (viii) Nil. (ix) 9.0 cm. ; 17.3 cm. ; N.A. (x) 31.3.61 ; 19.4.62 ; 30.3.68.

2. TREATMENTS :

All combinations of (1) and (2)

- (1) 4 tillage operations : C₀=Control (Local practice), C₁=Deep ploughing once, C₂=Shallow ploughing once and C₃=2 harrowings in summer.
 (2) 2 manurial doses given to Wheat : M₀=No manure and M₁=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super.

3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 11.3 m. × 6.7 m. (b) 10.1 m. × 6.1 m. for 60 ; 10.1 m. × 5.5 m. for others. (v) 61 cm. × 30 cm. for 60 ; 61 cm. × 61 cm. for others. (vi) Yes.

4. GENERAL :

- (i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1960—62. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results

- (i) 1088 Kg/ha. (ii) 233.3 Kg/ha. (based on 14 d.f. made up of Treatments × years interaction). (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	C ₀	C ₁	C ₂	C ₃	Mean
M ₀	865	777	802	862	826
M ₁	1435	1194	1363	1408	1350
Mean	1150	985	1083	1135	1088

C.D. for M marginal means=102.1 Kg/ha.

Individual results

Treatments	C ₀	C ₁	C ₂	C ₃	Sig.	M ₀	M ₁
Years							
1960	1059	712	746	983	**	682	1068
1961	1215	1168	1269	1226	N.S.	908	1530
1962	1177	1076	1233	1198	N.S.	889	1453
Pooled	1150	985	1083	1135	N.S.	826	1350

Sig.	G.M.	S.E./plot
**	875	96.2
**	1219	115.1
**	1171	141.2
**	1088	233.3

Crop :- Wheat (Rabi).

Ref :- M.P. 63 to 65(M.A.E.)

Site :- M.A.E. Centre, Obedullaganj.

Type :- 'CV'.

Object :- Type XIII : To study the effect of N, P and K levels with different dates of sowing on Wheat varieties.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Deep black. (iii) and (iv) N.A. (v) 600 Kg/ha. of F.Y.M. (vi) As per treatments. (vii) Un-irrigated. (viii) to (x) N.A.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1), (2) and (3)

(1) 3 dates of sowing : $D_1=2$ weeks before normal date of sowing, $D_2=$ Normal date of sowing and $D_3=2$ weeks after normal date of sowing,

(2) 3 varieties : $V_1=$ Local, $V_2=N.P.-710$ and $V_3=N.P.-718$.

(3) 3 levels of N : $N_0=0$, $N_1=50$ and $N_2=100$ Kg/ha.

Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of P_2O_5 : $P_0=0$ and $P_1=70$ Kg/ha.

(2) 2 levels of K_2O : $K_0=0$, and $K_1=50$ Kg/ha.

3. DESIGN :

(i) Split-plot confd. (ii) (a) 9 main-plots/block, 3 blocks/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-65. (b) N.A. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS :

1963

(i) 1198 Kg/ha. (ii) (a) 234 Kg/ha. (b) 202 Kg/ha. (iii) Main effects of V, D and P are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	V_1	V_2	V_3	D_1	D_2	D_3	N_0	N_1	N_2
Mean yield	1265	988	1342	1311	1246	1038	1210	1254	1130
	P_0	P_1	K_0	K_1					
	1130	1266	1180	1216					

C.D. for V or D means=135 Kg/ha.

C.D. for P means =95 Kg/ha.

1964

(i) 1285 Kg/ha. (ii) (a) 407 Kg/ha. (b) 168 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Treatment	V_1	V_2	V_3	D_1	D_2	D_3	N_0	N_1	N_2
Mean yield	1328	1272	1255	1320	1363	1174	1189	1293	1373
	P_0	P_1	K_0	K_1					
	1302	1268	1313	1257					

1965

(i) 1745 Kg/ha. (ii) (a) 586 Kg/ha. (b) 399 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Treatment	V ₁	V ₂	V ₃	D ₁	D ₂	D ₃	N ₀	N ₁	N ₂
Mean yield	1911	1582	1743	1795	1771	1670	1757	1714	1767
	P ₀	P ₁	K ₀	K ₁					
	1660	1830	1780	1710					

Crop :- Wheat (Rabi).

Ref :- M.P. 60(180).

Site :- Reg. Res. Stn, Bagwai.

Type :- 'I'.

Object :- To find out the most suitable time and number of irrigations for Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clayey loam. (iii) 9.11.60. (iv) (a) Ploughing and *bakhering*. (b) Drilling. (c) 69 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P₂O₅ as Super. (vi) Hy-65. (vii) As per treatments. (viii) (ix) N.A. (x) 3.4.61.

2. TREATMENTS :

5 irrigational treatments : I₀=No irrigation (control), I₁=One irrigation at tillering, I₂=One irrigation at heading, I₃=Two irrigations—1st. at tillering and 2nd at heading and I₄=3 irrigations 1st at tillering, 2nd at heading and 3rd at milky stage.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 10:1 m. × 4:0 m. (v) N.A. (vi) N.A.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain yield. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 2090 Kg/ha. (ii) 223.2 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I ₀	I ₁	I ₂	I ₃	I ₄
Av. yield	1727	1939	2304	2275	2206

C.D.=268.7 Kg/ha.

Crop :- Wheat (Rabi).

Ref.:- M.P. 63(26), 64(9).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'I'.

Object :- To find out suitable stages of irrigation for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) N.A. ; 25 to 27.10. 64. (iv) (a) 1 to 2 *bakherings*. (b) Drilling. (c) N.A. ; 90 Kg/ha. (d) N.A. ; 30 cm. between rows. (e) —. (v) 44.8 Kg/ha. of N as A/S + 22.4 Kg/ha. of P₂O₅ as Super. (vi) Hy-65. (vii) As per treatments. (viii) 1 to 2 hand weedings. (ix) N.A. (x) 11/13.4.64 ; 20.3.65 to 3.4.65.

2 TREATMENTS :

All combinations of (1), (2), (3) and (4)

(1) 2 levels of irrigations at early growth stage : $A_0=0$ and $A_1=1$ irrigation.

(2) 2 levels of irrigation at boot stage : $B_0=0$ and $B_1=1$ irrigation.

(3) 2 levels of irrigation at full bloom stage : $C_0=0$ and $C_1=1$ irrigation.

(4) 2 levels of irrigation at dough stage : $D_0=0$ and $D_1=1$ irrigation.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) 5.0 m. \times 40.2 m. (b) 4.6 m. \times 38.4 m.
(v) 23 cm. \times 91 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1963—64. (b) No. (c) Nil. (v) Powerkheda.
(vi) Nil. (vii) As the error variances are heterogeneous and Treatments \times years interaction is absent, results of individual years have been presented under 5.—Results.

5. RESULTS :

63(26)

(i) 834 Kg/ha. (ii) 220.1 Kg/ha. (iii) Main effect of B alone is highly significant. (vi) Av. yield of grain in Kg/ha.

	B_0	B_1	C_0	C_1	D_0	D_1	Mean
A_0	693	895	811	777	810	778	794
A_1	798	950	863	884	815	933	874
Mean	745	922	837	830	812	855	834
D_0	733	892	753	872			
D_1	757	953	921	789			
C_0	722	953					
C_1	769	892					

C.D. for B marginal means=110.9 Kg/ha.

64(9)

(i) 1947 Kg/ha. (ii) 542.0 Kg/ha. (iii) Main effect of A alone is significant. (iv) Av. yield of grain in Kg/ha.

	B_0	B_1	C_0	C_1	D_0	D_1	Mean
A_0	1553	1996	1818	1730	1762	1787	1774
A_1	2071	2169	2075	2165	2052	2188	2120
Mean	1812	2082	1947	1948	1907	1987	1947
D_0	1816	1997	1920	1894			
D_1	1808	2167	1973	2002			
C_0	1800	2093					
C_1	1824	2072					

C.D. for A marginal means=273.2 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 61(69).

Site :- Govt. Seed and Demons. Farm, Betul.

Type :- 'P'.

Object :- To determine the response of irrigation at different stages of crop growth.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Morand II. (iii) 19.11.61. (iv) (a) 2 ploughings, harrowings and *bakherings*. (b) Drilled by *Nari*. (c) 90 Kg/ha. (d) 23 cm. x 10 cm. (e) N.A. (v) Nil. (vi) Hy-65. (vii) As per treatments. (viii) Nil. (ix) and (x) N.A.

2. TREATMENTS :

5 irrigational treatments : I_0 =No irrigation (control), I_1 =One irrigation at tillering, I_2 =One irrigation at heading, I_3 =Two irrigation—one at tillering and one at flowering and I_4 =3 irrigations—one at tillering, one at heading and one at milk stage.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 11.1 m. x 4.6 m. (b) 10.2 m. x 4.0 m. (v) 45 cm. x 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—only. (b) and (c) —. (v) Nabibagh and Biora. (vi) and (vii) N.A.

5. RESULTS :

(i) 1132 Kg/ha. (ii) 154.5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I_0	I_1	I_2	I_3	I_4
Av. yield	813	1009	1018	1345	1476

C.D. = 186.1 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(33), 61(15).

Site :- Govt. Seed and Demons. Farm, Biora.

Type :- 'P'.

Object :- To find out the optimum frequency and time of irrigation for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut, wheat. (c) Nil. (ii) Clay. (iii) 29.10.60 ; 21.11.61. (iv) (a) *Bakherings*, *patelas* and ridger ; ploughing, *bakherings* and levellings. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil ; Moong-G.M. (vi) Hy-65. (vii) As per treatments. (viii) Nil. (ix) 3.0 cm. ; 38.0 cm. (x) 2.4.61 ; 10.4.62.

2. TREATMENTS :

5 irrigational treatments : I_0 =Control (No Irrigation), I_1 =One irrigation at tillering, I_2 =One irrigation at heading, I_3 =2 irrigations—one at tillering and one at flowering and I_4 =3 irrigations one at tillering, one at heading and one at milk stage.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 4.6 m. x 11.1 m. (b) 4.0 m. x 10.2 m. (v) 30 cm. x 42 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-61. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) Nabibagh and Betul. (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled results

(i) 1562 Kg/ha. (ii) 333.6 Kg/ha. (based on 44 d.f. made up of pooled error and Treatments \times years interaction). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I ₀	I ₁	I ₂	I ₃	I ₄
Av. yield	1474	1674	1285	1563	1815

C.D. = 275.1 Kg/ha.

Individual results

Treatments	I ₀	I ₁	I ₂	I ₃	I ₄	Sig.	G.M.	S.E./plot
Years 60(33)	1509	1363	1065	1342	1595	*	1375	256.8
61(15)	1439	1985	1506	1784	2034	*	1750	371.6
Pooled	1474	1674	1285	1563	1815	*	1562	333.6

Crop :- Wheat (Rabi).

Ref :- M.P. 60(77).

Site :- Central Agri. Res. Farm, Nabibagh.

Type :- 'P'.

Object :- To find out the optimum frequency and stage of irrigation for Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) 26.10.60. (iv) (a) 5 *bakherings*. (b) Seed drilled by plough. (c) 90 Kg/ha. (d) 30 cms. between rows. (e) N.A. (v) Nil. (vi) C-591. (vii) A₈ per treatments. (viii) Nil. (ix) N.A. (x) 1.4.61.

2. TREATMENTS :

5 irrigational treatments : I₀ = Control (No irrigation), I₁ = One irrigation at tillering, I₂ = One irrigation at heading, I₃ = Two irrigations—one at tillering and one at heading and I₄ = Three irrigations—one at tillering, one at heading and one at milk stage.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 4.6 m. \times 11.1 m. (b) 4.0 m. \times 10.2 m. (v) 30 cm. \times 42 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-only. (b) and (c) Nil. (v) Betul and Biora. (vi) and (vii) Nil.

5. RESULTS :

(i) 1560 Kg/ha. (ii) 125.1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I ₀	I ₁	I ₂	I ₃	I ₄
Av. yield	1295	1574	1588	1757	1586

C.D.=150.7 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(56), 63(49).

Site :- Govt. Exptl. Farm, Powerkheda.

Type :- 'I'.

Object :- To find out suitable stages of irrigation for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Loamy to clayey loam. (iii) 28.10.60 ; 16.11.63. (iv) (a) Cross *bakhering*. (b) Line sowing (c) 90 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) 33.6 Kg/ha. of N+33.6 Kg/ha. of P₂O₅ as Super. drilled with seed ; 22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅. (vi) Hy-65 (Medium). (vii) As per treatments. (viii) Nil. (ix) 6 cm. ; N.A. (x) 15.3.61 ; 3.4.64.

2. TREATMENTS :

All combinations of (1), (2), (3) and (4).

- (1) 2 levels of irrigations at early stage : A₀=0 and A₁=1 irrigation.
- (2) 2 levels of irrigation at boot stage : B₀=0 and B₁=1 irrigation.
- (3) 2 levels of irrigation at full bloom stage : C₀=0 and C₁=Irrigation.
- (4) 2 levels of irrigation at dough stage : D₀=0 and D₁=1 irrigation.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 4 for 60 and 3 for 63. (iv) (a) 5.0 m. × 10.1 m. ; 11.0 m. × 4.3 m. (b) 4.3 m. × 9.5 m. ; 9.1 m. × 3.7 m. (v) 38 cm. × 30 cm. ; 91 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-63 (Data for 1961 and 62 N.A.). (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) Baroda. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS :

Pooled results

(i) 1873 Kg/ha. (ii) 168.6 Kg/ha (based on 85 d.f. made up of pooled error and Treatments × years interaction). (iii) Main effects of A and B are highly significant. (iv) Av. yield of grain in Kg/ha.

	B ₀	B ₁	C ₀	C ₁	D ₀	D ₁	Mean
A ₀	1285	1929	1529	1685	1587	1628	1607
A ₁	1978	2298	2041	2236	2062	2214	2138
Mean	1632	2113	1785	1960	1824	1921	1873
D ₀	1580	2068	1744	1904			
D ₁	1684	2158	1825	2017			
C ₀	1538	2032					
C ₁	1726	2195					

C.D. for A or B marginal means=63.5 Kg/ha.

Individual results

Treatments	A ₀	A ₁	Sig.	B ₀	B ₁	Sig.	C ₀	C ₁	Sig.	D ₀	D ₁
Years											
1960	1680	2217	**	1673	2224	**	1910	1987	N.S.	1982	1915
1963	1510	2033	**	1577	1966	**	1618	1925	**	1614	1929
Pooled	1607	2138	**	1632	2113	**	1785	1960	N.S.	1824	1921

Sig.	G.M.	S.E./plot
N.S.	1949	180.9
**	1792	167.2
N.S.	1873	168.6

Crop :- Wheat (Rabi).

Ref :- M.P. 64(31), 65(49).

Site :- Govt. Exptl. Farm, Powerkheda.

Type :- 'P'.

Object :—To study the effect of time of application of irrigation on moisture deficit basis.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram ; N.A. (c) N.A. (ii) Clay loam. (iii) 5.11.64 ; 7.11.65. (iv) (a) *Bakherings*. (b) Line sowing ; hand sowing by local *Nari*. (c) 90 Kg/ha. ; 100 Kg/ha. (d) 30 cm. between lines ; 25 cms. between lines. (e) N.A. (v) 33.5 Kg/ha. of N+33.5 Kg/ha. of P₂O₅ ; 80 Kg/ha. of N+60 Kg/ha. of P₂O₅+20 Kg/ha. of K₂O. (vi) Hy-65. (vii) As per treatments. (viii) Nil ; Spray of 2, 4-D after 28 days of sowing to control weeds. (ix) N.A. ; 37.1 cm. (x) 1.4.65 ; 5.4.66.

2. TREATMENTS :

5 irrigational treatments : I₀=Control (No irrigation), I₁=Irrigated after about 20% available moisture was depleted from the soil, I₂=Irrigated after 40% available moisture was depleted, I₃=Irrigated after 60% available moisture was depleted and I₄=Irrigated after 80% available moisture was depleted.

The above treatments were applied after first uniform irrigation which was given after 30 days of sowing. Moisture was measured at the depth of 6" to 12".

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 11.0 m. × 4.3 m. (b) 9.1 m. × 3.7 m. (v) 91 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964-contd. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) As the experiment is continued beyond 1965, results of individual years have been presented under 5 Results.

5. RESULTS :

64(31)

(i) 2631 Kg/ha. (ii) 85.4 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I ₀	I ₁	I ₂	I ₃	I ₄
Av. yield	1213	2954	2735	2737	2817

C.D.—102.9 Kg/ha.

65(49)

(i) 2509 Kg/ha. (ii) 362.8 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I ₀	I ₁	I ₂	I ₃	I ₄
Av. yield	1264	2938	2754	2837	2750

C.D.=437 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 61(12).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'IM'.

Object :-To find out the suitable combination of fertilizer dose and frequency of irrigation for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Merand No. 1. (iii) 27.12.61. (iv) (a) Two summer *bakherings*, one ploughing and *bakhering*. (b) Seed drilled in lines. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) Hy—II. (vii) As per treatments. (viii) Nil. (ix) N.A. (x) 22, 23.4.62.

2. TREATMENTS :

Main-plot treatments :

3 levels of irrigation : I₁=2 irrigations—one at tillering and one at boot stage, I₂=3 irrigations—one at tillering, one at boot stage and one at dough stage and I₃=4 irrigations—one at tillering, one at boot stage, one at ear emergence and one at dough stage.

Sub-plot treatments :

4 levels of fertilizers : M₀=No manure, M₁=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super, M₂=2×M₁ and M₃=3×M₁.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main.plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 11.1 m. × 4.6 m. (b) 10.2 m. × 4.0 m. (v) 42 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Lodging of plots with high doses of manures and higher no. of irrigation was observed. (ii) Attack of Stem borer and Smut. (iii) Height, no. of tillers, ear length, no. of grains per ear and grain yield. (iv) (a) 1961—only. (b) and (c) —. (v) Jora and Bind. (vi) and (vii) Nil.

5. RESULTS :

(i) 840 Kg/ha. (ii) (a) 226.7 Kg/ha. (b) 200.1 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
I ₁	593	913	964	844	828
I ₂	576	1127	1169	784	914
I ₃	523	947	819	819	777
Mean	564	996	984	816	840

C.D. for M marginal means=134.5 Kg/ha.

Crop :- Wheat (Rabi).**Ref. :- M.P. 60(14),****Site :- Govt. Agri. Farm, Bhind.****Type :- 'IM'.**

Object :—To find out the most suitable dose of fertilizer and frequency of irrigation for Wheat crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Sandy loam. (iii) 31.10.60. (iv) (a) 4 *bakherings* and 3 levellings. (b) Line sowing. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) N.A. (vii) 1 irrigation applied on 7.12.60. (viii) One weeding. (ix) 7.0 cm. (x) 2.4.61.

2. TREATMENTS :**Main-plot treatments :**

3 levels of irrigations : $I_1=2$ irrigations—1 at tillering and 1 at boot stage, $I_2=3$ irrigations—1 at tillering, 1 at boot stage and 1 at dough stage at $I_3=4$ irrigations—1 at tillering, 1 at boot stage, 1 at ear emergence and 1 at dough stage.

Sub-plot treatments :

4 manurial treatments : M_0 =Control, $M_1=22.4$ Kg/ha. of N+32.4 Kg/ha. of P_2O_5 , $M_2=2 \times M_1$ and $M_3=3 \times M_1$.

Levels of irrigations could not be applied,

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 10.1 m. \times 5.0 m. (b) 7.6 m. \times 4.1 m. (v) 122 cm. \times 46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Mild attack of brown rust. (iii) Yield of grain (iv) (a) 1960-62 [modified in 1961]. (b) No. (c) Nil. (v) Jora and Baroda. (vi) Nil. (vii) The levels of irrigation could not be given due to unavoidable reasons and accordingly the experiment has been analysed as a R.B.D.

5. RESULTS :

(i) 2106 Kg/ha. (ii) 138.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M_0	M_1	M_2	M_3
Av. yield	1544	1926	2726	2229

C.D.=134.8 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 61(20), 62(4).****Site :- Govt. Agri. Farm, Bhind.****Type :- 'IM'.**

Object :—To find out the most suitable dose of fertilizer and frequency of irrigation for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) G.M. (ii) Sandy loam. (iii) 13/14.11.61 ; 22 to 24.10.62. (iv) (a) *Bakherings*, levellings and ploughings. (b) Line sowing. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) N.A. (vii) As per treatments. (viii) 3 weedings. (ix) N.A. (x) 8, 9.4.62 ; N.A.

TREATMENTS :**Main-plot treatments**

3 levels of irrigation : $I_1=2$, $I_2=3$ and $I_3=4$ irrigations.

Sub-plot treatments

4 manurial treatments : M_0 =Control, $M_1=22.4$ Kg/ha. of N+22.4 Kg/ha. of P_2O_5 , $M_2=2 \times M_1$ and $M_3=3 \times M_1$.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (ii) 6. (iv) (a) 11.1 m. × 4.6 m. (b) 10.2 m. × 4.0 m. (iv) 30 cm. × 45 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Attack of termite and rust. (iii) Yield of grain. (iv) (a) 1960-62 (Modified in 1961). (b) No. (c) Nil. (v) Jora and Basoda. (vi) N.A. (vii) As the sub-plot error variances are heterogeneous, results of individual years, have been presented under 5. Results.

5. RESULTS :

61(120)

(i) 1339 Kg/ha. (ii) (a) 514.9 Kg/ha. (b) 267.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
I ₁	1400	1395	1380	1581	1439
I ₂	1178	1326	1190	1363	1264
I ₃	1149	1503	1227	1383	1315
Mean	1242	1408	1266	1442	1339

62(4)

(i) 1545 Kg/ha. (ii) (a) 645.7 Kg/ha. (b) 617.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
I ₁	1247	1490	1309	1181	1307
I ₂	1716	2026	1434	1850	1756
I ₃	1123	1465	2111	1591	1573
Mean	1362	1660	1618	1541	1545

Crop :- Wheat (Rabi).

Ref :- M.P. 61(82), 62(49).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'IM'.

Object :- To find out the suitable number of irrigations and optimum dose of manures for Wheat crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Sann.* (G.M.) (c) Nil. (ii) Medium black soil. (iii) 23.10.61 ; 19.10.62. (iv) (a) One ploughing and 3 *bakherings*. (b) Drilling by *Nari*. (c) 90 Kg/ha. (d) 23 cm. × 8 cm. (e) N.A. (v) 25 C.L./ha. of F.Y.M. ; Nil. (vi) Hy-65. (vii) As per treatments. (viii) Nil. (ix) 18 cm. ; 15 cm. (x) 22.3.62 ; 18.3.63.

2. TREATMENTS :

All combinations of (1), (2) and (3)+control (2 plots).

(1) 2 levels of irrigations : I₁=1 irrigation -1 month after sowing and I₂=2 irrigations—1st one month after sowing and 2nd two months after sowing.

(2) 3 levels of N as A/S : N₁=16.8, N₂=33.6 and N₃=50.4 Kg/ha.

(3) 2 levels of P₂O₅ as Super : P₁=16.8 and P₂=33.6 Kg/ha.

$\frac{1}{2}$ N applied at sowing and the remaining at 1st irrigation.

3. DESIGN :

(i) (a) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) and (b) 12.2 m. × 3.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1961-62. (b) Yes. (c) Nil. (v) Nabibagh and Powerkeda. (vi) Nil. (vii) As error variances are heterogeneous and Treatments × years interaction is absent, results of individual years have been presented under 5. Results.

5. RESULTS :

61(82)

(i) 2300 Kg/ha. (ii) 354.7 Kg/ha. (iii) Main effect of I and control *Vs.* others are highly significant. Main effects of N and interaction N × P are significant. (iv) Av. yield of grain in Kg/ha.

Control = 1713 Kg/ha.

	N ₁	N ₂	N ₃	P ₁	P ₂	Mean
I ₁	20.0	2282	2403	2233	2263	2248
I ₂	2454	2384	2807	2598	2498	2548
Mean	2257	2333	2605	2416	2381	2398
P ₁	2180	2581	2486			
P ₂	2333	2085	2724			

C.D. for I marginal means = 206.8 Kg/ha.

C.D. for N marginal means = 253.4 Kg/ha.

C.D. for body of N × P table = 358.2 Kg/ha.

C.D. for control *Vs.* others = 273.6 Kg/ha.

62(49)

(i) 2281 Kg/ha. (ii) 157.2 Kg/ha. (iii) Main effects of I, N, P and interactions I × P, N × P and control *Vs.* others are highly significant. (iv) Av. yield of grain in Kg/ha.

Control = 1505 Kg/ha.

	N ₁	N ₂	N ₃	P ₁	P ₂	Mean
I ₁	2004	2144	2469	2198	2214	2206
I ₂	2425	2565	2853	2754	2474	2614
Mean	2214	2355	2661	2476	2344	2410
P ₁	2268	2573	2587			
P ₂	2161	2136	2736			

C.D. for I or P marginal means = 91.7 Kg/ha.

C.D. for N marginal means = 112.3 Kg/ha.

C.D. for body of I × P table = 129.7 Kg/ha.

C.D. for body of N × P table = 158.8 Kg/ha.

C.D. for control *Vs.* others = 121.3 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- M.P. 60(109), 61(84).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'IM'.

Object :—To find out the optimum number of irrigations and suitable dose of fertilizers for Wheat crop.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) *Moong* (G.M.); *Sannhemp* (G.M.). (c) N.A. (ii) Medium soil. (iii) 11.11.60; 18.11.61. (iv) (a) One ploughing and 3 *bakherings*. (b) Drilling with *Nari*, (c) 90 Kg/ha. (d) 23 cm. × 8 cm. (e) N.A. (v) 25 C.L./ha. of F.Y.M. (vi) Hy-65. (vii) As per treatments. (viii) Nil. (ix) 3 cm.; 13 cm. (x) 9.3.61; 27.3.62.

2. TREATMENTS:

All combinations of (1) and (2).

(1) 5 levels of irrigation : I_0 =No irrigation, I_1 =One irrigation at tillering, I_2 =One irrigation at heading, I_3 =2 irrigations—one at tillering and one at heading and I_4 =3 irrigations—one at tillering, one at heading and one at milk stage.

(2) 2 doses of fertilizers : F_0 =No fertilizers and F_1 =56 Kg/ha. of N+56 Kg/ha. of P_2O_5 .

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) and (b) 12.2 m. × 3.7 m.; 9.1 m. × 3.7 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1959-61. (b) No. (c) Nil. (v) to (vii) Nil. (vii) As error variances are heterogeneous and Treatments × years interaction is absent, results of individual experiments have been presented under 5. Results.

5. RESULTS:

60(109)

(i) 2441 Kg/ha. (ii) 490.6 Kg/ha. (iii) Main effects of I and F are highly significant. (iv) Av. yield of grain in Kg/ha.

	I_0	I_1	I_2	I_3	I_4	Mean
F_0	1526	2365	1729	2467	2568	2131
F_1	2034	2899	3102	2797	2924	2751
Mean	1780	2632	2415	2632	2746	2441

C.D. for I marginal means=503.2 Kg/ha.

C.D. for F marginal means=318.3 Kg/ha.

61(84)

(i) 1990 Kg/ha. (ii) 507.1 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	I_0	I_1	I_2	I_3	I_4	Mean
F_0	1332	1797	1899	1526	1729	1655
F_1	2543	2814	1797	2068	2407	2326
Mean	1932	2305	1848	1797	2068	1990

C.D. for F marginal means=329.1 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 60(102), 61(71).****Site :- Govt. Agri. Res. Farm, Chhindwara.****Type :- 'IM'.**

Object :—To find out the suitable number of irrigations for higher yields of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Sannhemp* (G.M.); *Moong* (G.M.). (c) N.A. (ii) Heavy soil. (iii) 26.10.60; 1.11.61. (iv) (a) One ploughing and 3 *bakherings*. (b) Drilled with *Nari*. (c) 90 Kg/ha. (d) 23 cm × 8 cm. (e) N A (v) 25 C.L./ha of F.Y.M. (vi) Hy-65; Hy-11. (vii) As per treatments. (viii) Nil. (ix) 8 cm.; 13 cm. (x) 9.3.61; 29.3.62.

2. TREATMENTS :

5 irrigational treatments: I_0 =No irrigation (control), I_1 =One irrigation at tillering stage (one month after sowing), I_2 =One irrigation at heading stage (2 months after sowing) I_3 =2 irrigations—1st at tillering stage and 2nd at heading stage and I_4 =3 irrigations—1st at tillering stage 2nd at heading stage and 3rd at milk stage.

33.6 Kg/ha. of P_2O_5 +33.6 Kg/ha. of N was given to treatments I_1 to I_4 and 16.8 Kg/ha. of N+16.8 Kg/ha. of P_2O_5 was given to I_0 .

3. DESIGN:

(i) R.B D. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a) and (b) 10.1 m. × 5.0 m (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-61. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS :**Pooled results**

(i) 1739 Kg/ha. (ii) 269.3 Kg/ha. [based on 36 d.f. made up of pooled error and Treatments × years interaction]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatments	I_0	I_1	I_2	I_3	I_4
Av. yield	1251	1677	1685	1887	2196

Individual results

Treatments	I_0	I_1	I_2	I_3	I_4	Sig.	G.M.	S.E/plot
Years								
1960	1166	1704	1488	1793	2098	**	1650	231.7
1961	1336	1650	1883	1982	2295	**	1829	305.9
Pooled	1251	1677	1685	1887	2196	N.S.	1739	269.3

Crop :- Wheat (Rabi).**Ref :- M.P: 60(161).****Site :- Seed and Demons. Farm, Damoh.****Type :- 'IM'.**

Object :—To find out the suitable time and number of irrigations for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Sugarcane. (c) N.A. (ii) Loamy black. (iii) 7.11.60. (iv) (a) 2 ploughings and 4 *bakherings* (b) *Nari* sowing with desi plough. (c) 67 Kg/ha. (d) N.A. (e) Nil. (v) Nil. (vi) Hy-65. (vii) As per treatments. (viii) Nil. (ix) and (x) N.A.

2. TREATMENTS :

5 irrigational treatments : I_0 =No irrigation (control), I_1 =1 irrigation at tillering, I_2 =1 irrigation at heading, I_3 =2 irrigations—one at tillering and one at heading and I_4 =2 irrigations—one at tillering and one at one month after heading.

16.8 Kg/ha. of N+16.8 Kg/ha. of P_2O_5 was applied to treatment I_0 and 33.6 Kg/ha. of N+33.6 Kg/ha. of P_2O_5 was applied to treatments I_1 to I_4 .

3. DESIGN :

(i) R.B.D. (ii) (a) 5, (b) N.A. (iii) 6. (iv) (a) 4.6 m. × 11.1 m. (b) 4.0 m. × 10.4 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-only. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 1494 Kg/ha. (ii) 217.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield o. grain in Kg/ha.

Treatment	I_0	I_1	I_2	I_3	I_4
Av. yield	801	1309	1253	1837	2269

C.D. = 262.1 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(7), 61(5), 63(18).

Site :- Govt. Agri. Farm, Jora.

Type :- 'IM'.

Object :- To find out the most suitable dose of fertilizer and levels of irrigation for Wheat crop.

1. BASAL CONDITIONS :

(i) and (ii) N.A. (iii) Sandy loam. (iii) 26.10.60; 2.12.61; 12.11.63. (iv) (a) 3-4 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) C-281 for 60 and 63; Hy-11 for 61. (vii) As per treatments. (viii) One weeding for 60 and 61 and one *bakhering*. for 63. (x) 21.3.61; 18.4.62; 1.4.64.

2. TREATMENTS :

Main-plot treatments :

3 levels of irrigation : I_1 =2 irrigations—one at tillering and one at boot stage, I_2 =3 irrigations—one at tillering, one at boot stage and one at dough stage, and I_3 =4 irrigations—one at tillering, one at boot stage, one at dough stage and one at complete ear-emergence stage.

Sub-plot treatments :

4 manurial doses : M_0 =No fertilizer, M_1 =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P_2O_5 as Super, M_2 =2 × M_1 and M_3 =3 × M_1 .

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 3 for 60 and 6 for others. (iv) (a) 11.1 m. × 4.3 m. for 60, 11.1 m. × 4.6 m. for others. (b) 9.3 m. × 3.7 m. for 60; 10.2 m. × 3.9 m. for others. (v) 91 cm. × 30 cm. for 60 and 45 cm. × 35 cm. for others. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-63 (Data for 1962 N.A.) (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) Bhand and Baroda. (vi) Nil. (vii) Sub-plot error variances are homogeneous. Main-plot error variances are heterogeneous and Treatments × years interaction is absent. Hence results of individual experiment have been presented under 5. Results.

5. RESULTS

60(7)

(i) 2851 Kg/ha. (ii) (a) 339.3 Kg/ha. (b) 333.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
I ₁	2591	2754	3000	3000	2836
I ₂	2670	2777	2982	3074	2876
I ₃	2641	2925	3004	2789	2840
Mean	2634	2819	2995	2954	2851

61(5)

(i) 1925 Kg/ha. (ii) (a) 963.1 Kg/ha. (b) 247.2 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
I ₁	1736	1845	1929	2066	1894
I ₂	1848	1865	1900	1976	1827
I ₃	1705	1964	2119	2152	1985
Mean	1763	1891	1983	2065	1925

C.D. for M marginal means=166.1 Kg/ha.

63(18)

(i) 2745 Kg/ha. (ii) (a) 372.1 Kg/ha (b) 326.3 Kg/ha. (iii) Main effect of M is highly significant. Interaction I × M is significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
I ₁	2413	2607	2686	2841	2637
I ₂	2501	2719	2820	3100	2785
I ₃	2430	2639	3251	2929	2812
Mean	2448	2655	2919	2957	2745

C.D. for M marginal means=219.3 Kg/ha.

C.D. for M means at the same level of I=379.8 Kg/ha.

C.D. for I means at the same level of M=393.7 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(150).

Site :- Agri. Res. Stn., Kathula.

Type :- 'IM'.

Object :- To find out the suitable stage and frequency of irrigation for wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Clayey and clayey loam. (iii) 24.10.60. (iv) (a) 4 ploughings. (b) line sowing. (c) 90 Kg/ha. (d) 15 cm. × 23 cm. between rows. (e) N.A. (v) Nil. (vi) Hy-65. (vii) As per treatments. (viii) Nil. (ix) N.A. (x) 25.4.61.

2. TREATMENTS :

All combinations of (1) and (2)

5 levels of irrigation : I_0 =No irrigation, I_1 =1 irrigation at tillering stage, I_2 =1 irrigation at flowering stage, I_3 =2 irrigations 1st at tillering stage and 2nd at flowering stage and I_4 =3 irrigation 1st at tillering stage 2nd at flowering stage and 3rd at milk stage.

(2) 2 levels of fertilizers : F_0 =No fertilizer and F_1 =56.0 Kg/ha. of N as A/S+56.0 Kg/ha. of P_2O_5 as Super.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) and (b) 4.9 m. × 10.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain weight. (iv) (a) 1960 - only. (b) and (c) —. (v) N.A. (vi) to (vii) Nil.

5. RESULTS :

(i) 3028 Kg/ha. (ii) 647.3 Kg/ha. (iii) Main effects of I and F are highly significant. (iv) Av. yield of grain in Kg/ha.

	I_0	I_1	I_2	I_3	I_4	Mean
F_0	1633	2545	2617	2910	3362	2613
F_1	2737	3193	3433	4106	3746	3443
Mean	2185	2869	3025	3508	3554	3028

C.D. for I marginal means=664.1 Kg/ha.

C.D. for F marginal means=420.0 Kg/ha.

Crop :- Wheat (Rabi).

Ref. :- M.P. 61(118).

site :- Agri. Res. Stn., Kathulia.

Type :- 'IM'.

Object :- To study the effect of levels of N, P and irrigation on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clayey and clayey loam. (iii) 9.11.61. (iv) (a) 4 ploughings. (b) Line sowing. (c) 90 Kg/ha. (d) 15 cm. × 23 cm. (e) N.A. (v) Nil. (vi) Hy-65. (vii) As per treatments. (viii) and (ix) N.A. (x) 16.4.62.

2. TREATMENTS :

All combinations of (1), (2) and (3) + Control (2 plots).

(1) 2 levels of Irrigation :- I_1 =1 and I_2 =2 irrigations.

(2) 3 levels of N as A/S : N_1 =16.8, N_2 =33.6 and N_3 =56.4 Kg/ha.

(3) 2 levels of P_2O_5 as Super. : P_1 =16.8 and P_2 =33.6 Kg/ha.

3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 3.7 m. × 12.1 m. (b) 3.1 m. × 10.7 m. (v) 30 cm. × 72 cm. (vi) Yes.

4. GENERAL :

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

5. RESULTS :

(i) 3301 Kg/ha. (ii) 35.0 Kg/ha. (iii) Main effects of N, P and control vs. others and interaction N×P are highly significant. (iv) Av. yield of grain in Kg/ha.

Control=2921

	N ₁	N ₂	N ₃	P ₁	P ₂	Mean
I ₁	3169	3323	3630	3355	3393	3374
I ₂	3149	3303	3610	3329	3380	3354
Mean	3159	3313	3620	3342	3386	3386
P ₁	3092	3400	3534			
P ₂	3226	3226	3706			

C.D. for P marginal means=20.4 Kg/ha.

C.D. for N marginal means=25.0 Kg/ha.

C.D. for body of N×P table=35.3 Kg/ha.

C.D. for control vs. others=27.0 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 61(42), 62(24).

Site :- Central Agri. Res. Farm, Nabibagh.

Type 'IM'.

Object: - To find out the optimum N and P doses and numbers of irrigation for Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) N.A.; Wheat. (c) N.A. (ii) Medium black. (iii) 24.11.61; 5.11.62. (iv) (a) *Bakherings*. (b) Seed drilled by Deshi plough. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) Nil. (vi) C-591; C-281. (vii) As per treatments. (viii) Nil. (ix) N.A. (x) 6.5.62; 3.4.63.

2. TREATMENTS:

All combinations of (1), (2) and (3)+control (2 plots).

(1) 2 levels of irrigation: I₁=One irrigation—one month after sowing and I₂=2 irrigations—1st one month after sowing and 2nd two months after sowing.

(2) 3 levels of N as A/S: N₁=16.8, N₂=33.6 and N₃=50.4 Kg/ha.

(3) 2 levels of P₂O₅ as Super: P₁=16.8 and P₂=33.6 Kg/ha.

3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4 (iv) (a) 12.2 m.×3.7 m. (b) 10.7 m.×3.1 m. (v) 76 cm.×30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—62. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) Chhindwara and Powerkheda. (vi) No. (vii) Error variances are homogeneous and Treatments×years interaction is present.

5. RESULTS:

Pooled results :

(i) 1333 Kg/ha. (ii) 315.6 Kg/ha. (based on 10 d.f. made up of Treatments×years interaction). (iii) Only control vs. others is highly significant. (iv) Av. yield of grain in Kg/ha.

Control=1005 Kg/ha.

	N ₁	N ₂	N ₃	P ₁	P ₂	Mean
I ₁	1403	1373	1422	1398	1401	1399
I ₂	1315	1405	1412	1402	1353	1377
Mean	1359	1389	1417	1400	1377	1388
P ₁	1382	1409	1409			
P ₂	1336	1369	1426			

C.D. for control vs. others=189.9 Kg/ha.

Individual results

Treatments	I ₁	I ₂	Sig.	N ₁	N ₂	N ₃	Sig.
Years							
1961	1556	1434	*	1369	1515	1601	**
1962	1443	1321	N.S.	1349	1263	1234	N.S.
Pooled	1399	1377	N.S.	1359	1389	1417	N.S.

P ₁	P ₂	Sig.	Control	Sig.	G.M.	S.E./plot
1522	1468	N.S.	1134	**	1442	161.9
1278	1286	N.S.	876	**	1225	179.3
1400	1377	N.S.	1005	**	1333	315.6

Crop :- Wheat (*Rabi*).

Ref :- M.p. 61(33), 62(113).

Site :- Govt. Exptl. Farm, Powerkheda.

Type :- 'IM'.

Object :- To study the effect of different levels of N, P and irrigation on the yield of Wheat.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Wheat. (c) N.A. (ii) Morand ; loamy to clayey black. (iii) 18.11.61 ; 6.11.62.
 (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) —
 (v) Nil. (vi) Hy-65. (vii) As per treatments. (viii) Nil. (ix) N.A. (x) 24, 25.4.62 ; 26.3.63.

2. TREATMENTS :

All combinations of (1), (2) and (3)+control (2 plots).

- (1) 2 levels of irrigation : I₁=One irrigation, one month after sowing and I₂=2 irrigations—1st one month after sowing and 2nd two months after sowing.
 (i) 3 levels of N as A/S : N₁=16.8, N₂=33.6 and N₃=50.4 Kg/ha.
 (3) 2 levels of P₂O₅ as Super : P₁=16.8 Kg/ha. and P₂=33.6 Kg/ha.

3. DESIGN :

- (i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 12.2 m. × 3.7 m. (b) 10.7 m. × 3.1 m. (v) 76 cm. × 30 cm.
 (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—62. (b) Yes. (c) Results of combined analysis have been presented under 5.—Results. (v) Chhindwara and Nabibagh. (vi) Nil. (vii) Error variances are homogeneous and Treatments×years interaction is absent.

5. RESULTS:

Pooled results

(i) 1760 Kg/ha. (ii) 209.5 Kg/ha. (based on 88 d.f. made up of pooled error and Treatments×years interaction). (iii) Main effect of N and control vs. others are highly significant and interaction I×P is significant. (iv) Av. yield of grain in Kg/ha.

Control=120.1 Kg/ha.

	N ₀	N ₁	N ₂	P ₁	P ₂	Mean
I ₁	1553	1924	2136	1933	1809	1871
I ₂	1480	1895	2130	1795	1875	1835
Mean	1516	1910	2133	1864	1842	1853
P ₁	1551	1903	2138			
P ₂	1482	1916	2127			

C.D. for N marginal means=104.3 Kg/ha.

C.D. for control vs. others=112.6 Kg/ha.

C.D. for the body of I×P table=120.3 Kg/ha.

Individual results

Treatments	N ₀	N ₁	N ₂	Sig.	P ₁	P ₂	Sig.	I ₁	I ₂
Years									
1961	1526	1910	2138	**	1855	1861	N.S.	1899	1817
1962	1507	1909	2128	**	1873	1823	N.S.	1843	1853
Pooled	1516	1910	2133	**	1864	1842	N.S.	1871	1835

Sig.	Control	Sig.	G.M.	S.E./plot
N.S.	1173	**	1760	214.1
N.S.	1230	**	1760	221.3
N.S.	1201	**	1760	209.5

Crop :- Wheat (Rabi).

Ref :- M.P. 60(182), 61(153), 62(110).

Site Wheat Res. Stn., Powerkheda.

Type :- 'IM'.

Object:—To see the effect of different levels of N, P, frequencies and intensities of irrigation on the yield of Wheat.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Wheat. (c) N.A. (ii) Loamy to clayey black. (iii) 10.11.60 ; 18.11.61 ; 23.11.62.
 (iv) (a) Cross *bakharing*. (b) Line sowing by *Nari*. (c) 8.6 Kg/ha. (d) 30.5 cm. between lines. (e) N.A.
 (v) Nil. (vi) Hy-65. (vii) As. per treatments. (viii) Nil. (ix) N.A. (x) 2.4.61 ; 26.4.62 ; 15.4.63.

2. TREATMENTS :

All combinations of (1), (2), (3) and (4)

- (1) 3 intensities of irrigations : $I_1=2$, $I_2=3$ and $I_3=4$ ac. inch.
 (2) 3 frequencies of irrigations : $F_1=2$, $F_2=3$ and $F_3=4$ irrigations.
 (3) 3 levels of N as A/S : $N_0=0$, $N_1=33.6$ and $N_2=67.2$ Kg/ha.
 (4) 3 levels of P_2O_5 as Super : $P_0=0$, $P_1=33.6$ and $P_2=67.2$ Kg/ha.

3. DESIGN :

- (i) 3^4 confd. (ii) (a) 9 plots/block, 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 11.1 m. \times 4.6 m.
 (b) 10.2 m. \times 4.0 m. (v) 46 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-62. (b) No. (c) Results of combined analysis have been presented under 5.—Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is present.

5. RESULTS :

Pooled results

- (i) 1626 Kg/ha. (ii) 275.2 Kg/ha. (based on 64 d.f. made up of Treatments \times years' interaction). (iii) Main effects of N, P and interaction $N \times P$ are highly significant. Main effect of F is significant. (iv) Av. yield of grain in Kg/ha.

	F_1	F_2	F_3	N_0	N_1	N_2	P_0	P_1	P_2	Mean
I_1	1546	1687	1637	937	1760	2173	1372	1726	1772	1623
I_2	1564	1636	1689	904	1752	2232	1408	1698	1783	1630
I_3	1567	1623	1686	899	1726	2251	1301	1759	1816	1625
Mean	1559	1649	1671	913	1746	2219	1360	1728	1790	1626
P_0	1323	1344	1414	868	1503	1709				
P_1	1648	1754	1781	919	1864	2401				
P_2	1706	1849	1816	953	1871	2546				
N_0	860	912	969							
N_1	1689	1774	1775							
N_2	2128	2260	2268							

C.D. for N, P or F marginal means = 86.5 Kg/ha.

C.D. for the body of $N \times P$ table = 149.8 Kg/ha.

Individual results

Treatments Years	I_1	I_2	I_3	Sig.	F_1	F_2	F_3	Sig.
1960	1763	1685	1763	N.S.	1628	1791	1792	**
1961	1520	1617	1532	N.S.	1565	1552	1552	N.S.
1962	1587	1587	1581	N.S.	1484	1603	1668	**
Pooled	1623	1630	1625	N.S.	1559	1649	1671	*

N ₀	N ₁	N ₂	Sig.	P ₀	P ₁	P ₂	Sig.	G.M.	S.E./plot
1175	1853	2183	**	1351	1885	1975	**	1737	185.9
771	1673	2225	**	1356	1616	1697	**	1556	198.6
795	1712	2248	**	1374	1682	1699	**	1585	143.8
913	1746	2219	**	1360	1728	1790	**	1626	275.2

Crop :- Wheat (Rabi).

Ref :- M.P. 64(33).

Site :- Govt. Agri. College Farm, Rewa.

Type :- 'IM'.

Object :-To study the effect of number of irrigations and levels of fertilizers on the yield and growth of Wheat.

1. BASAL CONDITIONS :

(i) (a) Jowar (*Chari*)—Wheat. (b) Jowar (*Chari*). (c) Nil. (ii) Clay loam. (iii) 1.11.64. (iv) (a) 3 to 5 ploughings followed by plankings. (b) Behind the plough. (c) 90 Kg/ha. (d) Rows 30 cm. apart. (e) —. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) Nil. (ix) 5.6 cm. (x) N A.

2. TREATMENTS :

Main-plot treatments

4 levels of irrigation : I₀=No irrigation, I₁=One irrigation 65 days after germination, I₂=Two irrigations—1st 35 days and 2nd 95 days after germination, I₃=Three irrigations 1st 35 days, 2nd 95 days and 3rd 125 days after germination.

Sub-plot treatments

4 levels of fertilizers : F₀=0. F₁=22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅+22.4 Kg/ha. of K₂O, F₂=2×F₁ and F₃=3×F₁.

N as A/S, P₂O₅ as Super and K₂O as Mur. Pot. Fertilizers drilled in furrows at sowing.

3. DESIGN :

(i) Split-plot- (ii) (a) 4 main-plots/replication, 4 sub-plots/main-plot. (b) 32.6 m.×26.5 m. (iii) 3. (iv) (a) 7.3 m.×6.1 m. (b) 6.1 m.×4.9 m. (v) 61 cm. on all the four sides of the plot. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Length of ear head, no. of spikelet/ear head, No. of grains/ear head, yield of straw and grain. (iv) (a) 1964-65 (Modified in 1965). (b) No- (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2279 Kg/ha. (ii) (a) 664.1 Kg/ha. (b) 110.4 Kg/ha. (iii) Main effect of F is highly significant and interaction I×F is significant. (iv) Av. yield of grain in Kg/ha.

	I ₀	I ₁	I ₂	I ₃	Mean
F ₀	1298	1399	1311	1343	1338
F ₁	2039	2110	2159	2298	2151
F ₂	2176	2384	2751	3219	2632
F ₃	2505	3098	3053	3323	2994
Mean	2004	2.48	2318	2546	2279

C.D. for F marginal means =93.0 Kg/ha.

C.D. for I means at the same level of F=408.1 Kg/ha.

C.D. for F means at the same level of I=186.1 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 65(34).****Site :- Govt Agri. College Farm, Rewa.****Type :- 'IM'.**

Object :- To study the effect of number of irrigations and levels of fertilizers on the yield and growth of Wheat.

1. BASAL CONDITIONS:

(i) (a) Paddy—fallow—Wheat. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 31.10.65, (iv) (a) 3 to 5 ploughings followed by plankings. (b) Behind the plough. (c) 95 Kg/ha. (d) Rows 30 cm. apart. (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated (viii) Nil. (ix) 2.3 cm. (x) 27.3.66.

2. TREATMENTS:**Main-plot treatments**

4 levels of irrigation : I_0 =No irrigation, I_1 =One irrigation 60 days after sowing, I_2 =2 irrigations—1st 30 days and 2nd 90 days after sowing and I_3 =3 irrigations—1st 30 days, 2nd 60 days and 3rd 90 days after sowing.

Sub-plot treatments:

4 levels of fertilizers : $F_0=0$, $F_1=22.4$ Kg/ha. of N+22.4 Kg/ha. of P_2O_5 +22.4 Kg/ha. of K_2O , $F_2=2 \times F_1$ and $F_3=3 \times F_1$.

N as A/S, P_2O_5 as Super and K_2O as Mur. Pot. Fertilizer applied by drilling in furrows at sowing.

3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/replication, 4 sub-plots/main-plot. (b) 17.4 m. \times 34.6 m. (iii) 4. (iv) (a) 6.7 m. \times 3.7 m. (b) 6.1 m. \times 3.0 m. (v) 30 cm. \times 30 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) BHC 5% dusted at the rate of 10 Kg/ha. to control grass hoppers and other insects. (iii) Yield of grain. (iv) (a) 1964-65 (Modified in 1965). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 2163 Kg/ha. (ii) (a) 296.5 Kg/ha. (b) 275.9 Kg/ha. (iii) Main effects of I and F are highly significant. (iv) Av. yield of grain in Kg/ha.

	I_0	I_1	I_2	I_3	Mean
F_0	1174	1487	1791	1894	1586
F_1	1623	1991	2467	2635	2179
F_2	1894	2440	2840	3045	2555
F_3	1585	2061	2399	3278	2331
Mean	1569	1995	2374	2713	2163

C.D. for I marginal means=237.0 Kg/ha.

C.D. for F marginal means=197.9 Kg/ha.

Crop :- Wheat**Ref :- M.P. 63, 64(M.A.E).****Site :- M.A.E. Centre, Bagwai.****Type :- 'IM'.**

Object :- Type I : To study the effect of different levels and intensities of irrigation, levels of N and P on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) As per treatments. (viii) to (x) N.A.

2. TREATMENTS:

All combinations of (1), (2), (3) and (4)

(1) 3 frequencies of irrigations : $F_1=2$; $F_2=3$ and $F_3=4$ irrigations.

(2) 3 Intensities of irrigation : $I_1=5.3$, $I_2=7.5$ and $I_3=10.0$ cm.

(3) 3 levels of N as A/S : $N_0=0$, $N_1=33.6$ and $N_2=67.2$ Kg/ha.

(4) 3 levels of P_2O_5 as Super : $P_0=0$, $P_1=33.6$ and $P_2=67.2$ Kg/ha.

3. DESIGN :

(i) 3⁴ Confd. (ii) (a) 9 plots/block ; 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-64. (b) N.A. (b) Nil. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS:

1963

(i) 1546 Kg/ha. (ii) and (iii) N.A. (iv) Av. grain yield in Kg/ha.

	F_1	F_2	F_3	Mean
I_1	1504	1539	1617	1553
I_2	1563	1486	1406	1485
I_3	1703	1594	1506	1601
Mean	1590	1540	1510	1546

Treatment	N_0	N_1	N_2	P_0	P_1	P_2
Av. yield	967	1313	2358	967	1581	2090

1964

(i) 1233 Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of grain in Kg/ha.

	F_1	F_2	F_3	Mean
I_1	1286	1295	1193	1258
I_2	1108	1211	1241	1187
I_3	1148	1389	1229	1255
Mean	1181	1298	1221	1233

Treatment	N_0	N_1	N_2	P_0	P_1	P_2
Av. yield	605	1024	1057	605	704	904

Crop :- Wheat (Rabi).

Ref :- M.P. 60 to 62(M.A.E.).

Site :- M.A.E. Centre, Obedulaganj.

Type :- 'IM'.

Object :—Type I : To study the effect of different levels and intensities of irrigation, levels of N and P on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) As per treatments. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2), (3) and (4)

(1) 3 frequencies of irrigation : $F_1=1$, $F_2=2$ and $F_3=3$ irrigations.

(2) 3 Intensities of irrigations : $I_1=2.5$, $I_2=5.0$ and $I_3=7.5$ cm.

(3) 3 levels of N as A/S : $N_0=0$, $N_1=33.6$ and $N_2=67.2$ Kg/ha.

(4) 3 levels of P_2O_5 as Super : $P_0=0$, $P_1=33.6$ and $P_2=67.2$ Kg/ha.

3. DESIGN:

(i) 3rd Confd. (ii) (a) 9 plots/block, 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-62. (b) N.A. (c) Nil. (v) Powarkheda and Reora. (vi) N.A. (vii) Nil.

5. RESULTS:

1960

(i) 1522 Kg/ha. (ii) 247.1 Kg/ha. (iii) Main effects of N and P and the interaction I×F are significant. (iv) Av. grain yield in Kg/ha.

	F ₁	F ₂	F ₃	Mean
I ₁	1457	1577	1466	1500
I ₂	1651	1328	1596	1525
I ₃	1513	1476	1632	1540
Mean	1540	1460	1565	1522

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂
Av. yield	1125	1651	1790	1436	1513	1616

C.D. for N or P mean = 143 Kg/ha.

C.D. for body of I×F table = 247 Kg/ha.

1961

(i) 1811 Kg/ha. (ii) 220.1 Kg/ha. (iii) Main effects of N and P only are significant. (iv) Av. Grain yield in Kg/ha.

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	I ₁	I ₂	I ₃	F ₁	F ₂	F ₃
Av. yield	1430	1826	2267	1583	1872	1977	1790	1841	1801	1768	1787	1875

C.D. for N or P mean = 127 Kg/ha.

1962

(i) 1485 Kg/ha. (ii) 123 Kg/ha. (iii) Main effects of N, P, I and F and the interaction I×F are significant. (iv) Av. grain yield in Kg/ha.

	F ₁	F ₂	F ₃	Mean
I ₁	1335	1478	1375	1396
I ₂	1425	1652	1597	1558
I ₃	1386	1520	1497	1501
Mean	1382	1530	1523	1485

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂
Av. yield	1034	1643	1778	1301	1521	1633

C.D. for N or P or I or F means = 71 Kg/ha.

C.D. for the body of I×F table = 123 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60 to 62(M.A.E.).

Site :- M.A.E. Centre ; Powerkheda.

Type :- 'IM'.

Object : Type I :—To study the effect of different levels and intensities of irrigation, levels of N and P on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) As per treatments. (viii) to (x) N.A.

2. TREATMENTS:

All combinations of (1), (2), (3) and (4)

(1) 3 frequencies of irrigations : $F_1=2$, $F_2=3$ and $F_3=4$ irrigations.(2) 3 intensities of irrigations : $I_1=5.0$, $I_2=7.5$ and $I_3=10.0$ cm.(3) 3 levels of N as A/S : $N_0=0$, $N_1=33.6$ and $N_2=67.2$ Kg/ha.(4) 3 levels of P_2O_5 as Super : $P_0=0$, $P_1=33.6$ and $P_2=67.2$ Kg/ha.

3. DESIGN:

(i) 3⁴ confd. (ii) (a) 9 plots/block, 9 blocks/replication. b) N.A. (iii) 1. (iv) (a) and (b) and (v) N.A. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1958–62. (b) N.A. (c) Nil. (v) Obedullaganj and Reora. (vi) N.A. (vii) Nil.

5. RESULTS:

1960

(i) 1672 Kfl/ha. (ii) 173 Kg/ha. (iii) Main effects of N, P and F and the interaction $F \times I$ are significant. (iv) Av. yield of grain in Kg/ha.

	F_1	F_2 *	F_3	Mean
I_1	1577	1817	1715	1703
I_2	1513	1623	1725	1620
I_3	1614	1734	1725	1691
Mean	1568	1725	1722	1672

Treatment	N_0	N_1	N_2	P_0	P_1	P_2
Av. yield	987	1411	1502	987	1171	1229

C.D. for N, or P or F means=100 Kg/ha.

C.D. for body of $I \times F$ table = 174 Kg/ha.

1961

(i) 1454 Kg/ha. (ii) and (iii) N.A. (iv) Av. grain yield in Kg/ha.

	F_1	F_2	F_3	Mean
I_1	1494	1503	1504	1500
I_2	1494	1531	1541	1522
I_3	1421	1448	1153	1341
Mean	1470	1494	1399	1454

Treatments	N_0	N_1	N_2	P_0	P_1	P_2
Av. yield	738	1448	1614	738	710	775

1962

(i) 1536 Kg/ha. (ii) and (iii) N.A. (iv) Av. grain yield in Kg/ha.

	F ₁	F ₂	F ₃	Mean
I ₁	1394	1553	1631	1526
I ₂	1399	1666	1616	1560
I ₃	1491	1508	1567	1522
Mean	1428	1576	1605	1536

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂
Av. yield	785	1473	1708	785	765	744

Crop :- Wheat (*Rabi*).**Ref :-** M.P. 60(M.A.E.).**Site :-** M.A.E. Centre ; Reora.**Type :-** 'IM'.

Object : Type I :—To study the effect of different levels and intensities of irrigation, levels of N and P on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Mixed red and black. (iii) to (vi) N.A. (vii) As per treatments. (viii) to (x) N.A.

2. TREATMENTS:

All combinations of (1), (2), (3) and (4)

(1) 3 frequencies of irrigations : F₁=2, F₂=3 and F₃=4 irrigations.(2) 2 intensities of irrigations : I₁=5.0, I₂=7.5 and I₃=10.0 cm.(3) 3 levels of N as A/S : N₀=0, N₁=33.6 and N₂=67.2 Kg/ha.(4) 3 levels of P₂O₅ as Super : P₀=0, P₁=33.6 and P₂=67.2 Kg/ha.**3. DESIGN :**(i) 3⁴ confd. (ii) (a) 9 plots/block ; 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) to (v) N.A. (vi) Yes.**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) Obedullaganj and Powerkheda. (vi) N.A. (vii) Nil.

5. RESULTS:

(i) 1873 Kg/ha. (ii) 727 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. grain yield in Kg/ha.

	F ₁	F ₂	F ₃	Mean
I ₁	2048	1577	1890	1838
I ₂	1872	1715	2029	1872
I ₃	1743	1974	2012	1910
Mean	1888	1755	1977	1873

Treatment	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂
Av. yield	1066	1711	1964	1282	1549	1600

C.D. for N means=400 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 63(52).****Site :- Govt. Exptl. Farm, Powarkheda.****Type :- 'IMV'.**

Object :-To find out a suitable variety, optimum frequency of irrigation and optimum dose of fertilizer for Wheat.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Wheat, (c) N.A. (ii) Loamy to clayey black. (iii) 7.11.63. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil. (vi) and (vii) As per treatments. (viii) Nil. (ix) N.A. (x) 30.3.64.

2. TREATMENTS:**Main-plot treatments :**

All combinations of (1) and (2)

(1) 3 frequencies of irrigation : $I_1=2$, $I_2=3$ and $I_3=4$ irrigations.

(2) 5 levels of fertilizers : M_0 =No fertilizer, $M_1=33.6$ Kg/ha. of N+16.8 Kg/ha. of P_2O_5 +16.8 Kg/ha. of K_2O , $M_2=2 \times M_1$, $M_3=3 \times M_1$ and $M_4=4 \times M_1$.

Sub-plot treatments :

4 varieties : $V_1=Hy-65$, $V_2=Hy-4-4-6-5$, $V_3=N.P. 824$ and $V_4=N.P. 839$.

3. DESIGN:

(i) Split-plot. (ii) (a) 15 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 11.0 m. \times 4.3 m. (b) 8.5 m. \times 3.1 m. (v) 122 cm. \times 61 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1963-64 (Modified in 1963). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2330 Kg/ha. (ii) (a) 710.9 Kg/ha. (b) 265.2 Kg/ha. (iii) Main effect of I alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M_0	M_1	M_2	M_3	M_4	V_1	V_2	V_3	V_4	Mean
I_1	1622	1915	2034	1701	1737	1871	1767	1787	1782	1802
I_2	2150	2407	2692	2629	2631	2696	2465	2362	2484	2502
I_3	2058	2537	2835	2987	3017	2645	2878	2596	2629	2687
Mean	1943	2286	2520	2439	2462	2404	2370	2248	2298	2330
V_1	1896	2281	2534	2638	2670					
V_2	1887	2420	2748	2306	2489					
V_3	2080	2101	2427	2310	2322					
V_4	1909	2324	2372	2502	2367					

C.D. for I marginal means=341.1 Kg/ha.

Crop :- Wheat (Rabi).**Ref :- M.P. 64(25).****Site :- Govt. Exptl. Farm, Powarkheda.****Type :- 'IMV'.**

Object :-To find out a suitable variety, optimum frequency of irrigation and optimum dose of fertilizers for Wheat.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) Wheat. (c) N.A. (ii) Loamy to clayey black. (iii) 2.11.64. (iv) (a) Cross-bakherings. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between lines. (e) —. (v) Nil. (vi) and (vii) As per treatments. (viii) Nil. (ix) N.A. (x) 27.3.65.

2. TREATMENTS:

Main-plot treatments:

All combinations of (1) and (2)

(i) 3 frequencies of irrigation: $I_1=2$, $I_2=3$ and $I_3=4$ irrigations.

(2) 5 levels of fertilizers: M_0 =No fertilizer, $M_1=33.5$ Kg/ha. of N+16.7 Kg/ha. of P_2O_5 +16.7 Kg/ha. of K_2O , $M_2=2 \times M_1$, $M_3=3 \times M_1$ and $M_4=4 \times M_1$.

Sub-plot treatments:

4 varieties: $V_1=Hy-65$, $V_2=Hy-633$, $V_3=N.P. 824$ and $V_4=Hy-839$.

3. DESIGN:

- (i) Split-plot. (ii) (a) 15 main-plots/replication; 4 sub-plots/main-plot (b) N.A. (iii) 2. (iv) (a) 9.8 m. \times 3.7 m. (b) 7.9 m. \times 2.4 m. (v) 91 cm. \times 61 cm. (vi) Yes.

4. GENERAL:

- (i) Good. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1963-64 (Modified in 1964). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

- (i) 2562 Kg/ha. (ii) (a) 437.4 Kg/ha. (b) 289.9 Kg/ha. (iii) Main effects of I , M and V are highly significant. Interaction $I \times V$ is significant. (iv) Av. yield of grain in Kg/ha.

	M_0	M_1	M_2	M_3	M_4	V_1	V_2	V_3	V_4	Mean
I_1	1894	2285	2179	2438	2319	1828	2388	2248	2428	2223
I_2	1909	2637	2868	2849	3072	2432	2639	2822	2775	2667
I_3	2068	2686	2822	2900	3498	2580	2589	3051	2960	2795
Mean	1957	2563	2623	2729	2963	2280	2539	2707	2721	2562
V_1	1737	2281	2455	2341	2586					
V_2	1843	2540	2648	2696	2966					
V_3	2109	2609	2672	2906	3239					
V_4	2139	2714	2717	2974	3061					

C.D. for I marginal means = 209.9 Kg/ha.

C.D. for M marginal means = 270.9 Kg/ha.

C.D. for V marginal means = 150.8 Kg/ha.

C.D. for I means at the same level of $V=308.4$ Kg/ha.

C.D. for V means at the same level of $I=261.3$ Kg/ha.

Crop :- Wheat (*Rabi*).

Site :- Govt. Agri. College Farm, Rewa.

Ref :- M.P. 62(127).

Type :- 'IMV'.

Object :- To study the effect of levels of fertilizer and irrigation on the yield of different Wheat varieties.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) Jowar (*chari*). (c) N.A. (ii) Clay loam. (iii) N.A. (iv) (a) 4 ploughings followed by plantings. (b) Behind the plough. (c) 99 Kg/ha. (d) N.A. (e) Nil. (v) Nil. (vi) and (vii) As per treatments. (viii) Nil. (ix) 6.4 cm. (x) N.A.

2. TREATMENTS :

Main-plot treatments :

All the combinations of (1) and (2).

(1) 4 levels of irrigation : I_0 =No irrigation, I_1 =One irrigation 45 days after sowing, I_2 =Two irrigations—1st 45 days and 2nd 75 days after sowing, I_3 =Three irrigations—1st 35 days, 2nd 65 days and 3rd 95 days after sowing.

(2) 2 levels of fertilizers : F_0 =No fertilizer and F_1 =56 Kg/ha. of N as A/S+56 Kg/ha. of P_2O_5 as Super.

Sub-plot treatments :

4 varieties : V_1 =Local, V_2 =N.P. 824, V_3 =C—591 and V_4 =Hy 65.

3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/replication, 4 sub-plots/main-plot. (b) 61.3 m. × 13.1 m. (iii) 3. (iv) (a) 6.1 m. × 3.1 m. (b) 4.9 m. × 2.1 m. (v) 61 cm. × 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-63 (Modified in 63). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1766 Kg/ha. (ii) (a) 1379.6 Kg/ha. (b) 341.5 Kg/ha. (iii) Main effect of F and interaction $F \times V$ are highly significant. (iv) Av. yield of grain in Kg/ha.

	I_0	I_1	I_2	I_3	F_0	F_1	Mean
V_1	1356	1710	1759	1943	1152	2232	1692
V_2	1512	1655	1828	1965	1190	2290	1740
V_3	1480	1751	1943	2242	1256	2453	1854
V_4	1472	1752	1818	2078	1145	2415	1780
Mean	1455	1717	1837	2057	1186	2347	1766
F_0	992	1164	1183	1495			
F_1	1918	2270	2491	2709			

C.D. for F marginal means =604.0 Kg/ha.

C.D. for F means at the same level of V=650.8 Kg/ha.

C.D. for V means at the same level of F=280.6 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 63(64).

Site :- Govt. Agri. College Farm, Rewa.

Type :- 'IMV'.

Object :- To study the effect of levels of fertilizer and irrigation on the yield of different Wheat varieties.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Jowar (*chari*). (c) N.A. (ii) Clay loam. (iii) N.A. (iv) (a) 4 ploughings followed by planking. (b) Behind the plough. (c) 94 Kg/ha. (d) N.A. (e) Nil. (v) Nil. (vi) and (vii) As per treatments. (viii) Nil. (ix) 1 cm. (x) N.A.

2. TREATMENTS:

Main-plot treatments:

All combinations of (1) and (2).

(1) 4 levels of irrigations : I_0 =No irrigation, I_1 =One irrigation after 70 days of sowing, I_2 =2 irrigations --1st 35 days and 2nd 70 days after sowing, I_3 =3 irrigations --1st 35 days, 2nd 70 days and 3rd 100 days after sowing.

(2) 2 levels of fertilizer: F_0 =No fertilizer and F_1 =56 Kg/ha. of N as A/S+56 Kg/ha. of P_2O_5 as Super.

Sub-plot treatments :

4 varieties : V_1 =Local, V_2 =NP-824, V_3 =C-591 and V_4 =Hy-65.

3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/replication, 4 sub-plots/main-plot. (b) 61.3 m. x 13.1 m. (iii) 3. (iv) (a) 6.1 m. x 3.0 m. (b) 5.5 m. x 2.4 m. (v) 30 cm. x 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-63 (Modified in 1963). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1565 Kg/ha. (ii) (a) 154.5 Kg/ha. (b) 91.4 Kg/ha. (iii) Main effects of F, I, V and interaction $F \times V$ are highly significant. (iv) Av. yield of grain in Kg/ha.

	I_0	I_1	I_2	I_3	F_0	F_1	Mean
V_1	994	1276	1493	1657	926	1784	1355
V_2	1179	1418	2083	1956	1067	2251	1659
V_3	1329	1583	1881	2127	1172	2288	1730
V_4	1098	1435	1627	1904	1007	2029	1516
Mean	1150	1428	1771	1911	1043	2088	1565
F_0	650	962	1172	1388			
F_1	1650	1895	2372	2435			

C.D. for F marginal means = 67.6 Kg/ha.

C.D. for V marginal means = 53.1 Kg/ha.

C.D. for I marginal means = 95.7 Kg/ha.

C.D. for F means at the same level of V = 93.8 Kg/ha.

C.D. for V means at the same level of F = 77.2 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 60(197).

Site :- Govt. Agri. Res. Stn. Adhartal.

Type :- 'D'.

Object :- To study the efficiency of different methods of weed control on the yield and quality of Wheat.

1. BASAL CONDITIONS :

(i) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) 2 ploughings and one discing. (b) Dibbling. (c) 112 Kg/ha. (d) and (e) N.A. (v) 20 Kg/ha. of N as A/S+25 Kg/ha. of P_2O_5 as Super. (vi) Hy-65. (vii) Irrigated. (viii) As per treatments. (ix) N.A. (x) 25.3.61.

2. TREATMENTS :

8 weedicidal treatments : T_0 =Control (No treatment), T_1 =Hand weeding, T_2 =CuSO₄-3%, T_3 =H₂SO₄-2% at pre-emergence and 3% at post-emergence, T_4 =2, 4-D @0.56 Kg/ha., T_5 =2, 4-D@ 1.1 Kg/ha., T_6 =2, 4-D@ 1.7 Kg/ha. and T_7 =M.C.P.B. @1.1 Kg/ha.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 25.0 m. × 3.1 m. (b) 24.4 m. × 2.5 m. (v) 30 cm. × 25 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain and weed population. (iv) (a) 1960-only. (b) N.A. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

(i) 971 Kg/ha. (ii) 120.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatments	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7
Av. yield	840	929	855	861	1032	1122	1039	1093

C.D.=176.8 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 61(167).

Site :- Govt. Agri. Res. Stn., Adhartal.

Type :- 'D'.

Object :- To study the efficiency of different methods of weed control on growth, yield and quality of Wheat.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 15,11.61. (iv) (a) N.A. (b) Dibbling. (c) 90 Kg/ha. (d) Rows 23 cm. apart. (e) N.A. (v) 22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅. (vi) C-591. (vii) Irrigated. (viii) As per treatments. (ix) N.A. (x) 9.4.62.

2. TREATMENTS :

10 weedicidal treatments : T_0 =Control (No treatment), T_1 =Hand weeding, T_2 =Sulphuric acid-5%, T_3 =CuSO₄-3%, T_4 =Copper chloride-2%, T_5 =M.C.P.S. @1.7 Kg/ha., T_6 =2, 4-D@0.6 Kg/ha., T_7 =2, 4-D@1.1 Kg/ha., T_8 =2, 4-D@1.7 Kg/ha. and T_9 =2, 4-D@ 2.2 Kg/ha.

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 5.5 m. × 13.1 m. (b) 4.9 m. × 12.5 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Germination counts and yield of grain. (iv) (a) 1962-only. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1471 Kg/ha. (ii) 897.1 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	T_8	T_9
Av. yield	1248	1732	1478	1134	1517	1468	1463	1258	1846	1562

Crop :- Wheat (Rabi).

Ref :- M.P. 61(140), 62(99).

**Site :- Govt. Seed Multiplication and Demons.
Farm, Nabibagh.**

Type :- 'D'.

Object :- To see the effect of different post-emergence application of weedicide on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) 9.11.61 ; 24.10.62. (iv) (a) Ploughing and *bakherings*. (b) Drilling by *Deshi* plough. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) 16.8 Kg/ha. of N as A/S+16.8 Kg/ha. of P₂O₅ as Super. (vi) C-281, C-591. (vii) Unirrigated. (viii) As per treatments. (ix) N.A. (x) 9.4.62 ; 29.3.63.

2. TREATMENTS :

6 weedicidal treatments : T₀=Control (no weeding), T₁=One post-emergence application of weedicide, T₂=2 post-emergence application of weedicide, T₃=One post-emergence application of weedicide+one local method of weeding, T₄=Local method of weeding, T₅=Cultural method of weeding.

Name of weedicide—N.A.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 7.3 m. × 8.5 m. ; 7.9 m × 7.9 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—62. (b) No. (c) Results of combined analysis have been presented under 5.—Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results

(i) 1157 Kg/ha. (ii) 281.3 Kg/ha. (based on 5 d.f. made up of Treatments × years interaction)- (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
Av. yield	1044	1093	1123	1272	1147	1263

Individual results

Treatments	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	Sig	G.M.	S.E./plot
Years									
1961	866	960	903	1235	1126	1201	**	1048	84.9
1962	1223	1225	1344	1308	1168	1326	N.S.	1266	141.9
Pooled	1044	1093	1123	1272	1147	1263	N.S.	1157	281.3

Crop :- Wheat (Rabi).

Ref :- M.P. 61(141).

**Site :- Govt. Seed Multiplication and Demons. Farm,
Nabibagh.**

Type :- 'D'.

Object :- To study the effect of weedicides for the control of weeds and on the yield of Wheat.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black. (iii) 28.10.61. (iv) (a) *Bakherings*. (b) Drilling by *deshi* plough. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) 16.8 Kg/ha. of N+16.8 Kg/ha. of P₂O₅. (vi) C-281. (vii) Unirrigated. (viii) As per treatments. (ix) N.A. (x) 20.3.62.

2. TREATMENTS:

All combinations of (1) and (2)+2 extra treatments.

(1) 4 weedicides : W₁=Ferroxone, W₂=Dicotox, W₃=Amina salt and W₄=M.C.P.A.

(2) 3 doses of weedicides : D₁=0.6, D₂=1.1 and D₃=1.7 Kg. acid eq/ha.

Extra treatments : T₀=Control and T₁=Cultural method of weeding.

3. DESIGN:

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 5.5 m. × 6.1 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1961-62 (modified in 1962). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1404 Kg/ha. (ii) 1941 Kg/ha. (iii) T₀ vs. T₁ is highly significant. (iv) Av. yield of grain in Kg/ha.

T₀=1313 and T₁=1693 Kg/ha.

	W ₁	W ₂	W ₃	W ₄	Mean
D ₁	1496	1646	1384	1374	1475
D ₂	1449	1492	1252	1325	1380
D ₃	1292	1384	1258	1288	1307
Mean	1412	1507	1298	1329	1387

C.D. for T₀ vs. T₁ means=277.1 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- M.P. 62(100).

**Site :- Govt. Seed Multiplication and Demons. Farm,
Nabibagh.**

Type :- 'D'.

Object :- To study the effect of weedicides for the control of weeds and on the yield of Wheat.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) 1.11.62. (iv) (a) Ploughing and *bakherings*. (b) Drilling by *Deshi* plough. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) 16.8 Kg/ha. of N+16.8 Kg/ha. of P₂O₅. (vi) C-591. (vii) Unirrigated. (viii) As per treatments. (ix) N.A. (x) 27.3.63.

2. TREATMENTS :

All combinations of (1) and (2)+2 extra treatments

(1) 4 weedicides : W₁=Ferroxone, W₂=Dicotox, W₃=Kathone and W₄=Phenoxylene.

(2) 3 doses of weedicides : D₁=1.7, D₂=1.1, and D₃=0.6 Kg. of acid eq/ha.

T₀=Control and T₁=Cultural method of weeding.

3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4.9 m. × 6.7 m. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1961=62 (modified in 1962). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

- (i) 1238 Kg/ha. (ii) 198.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

$T_0=1315$ and $T_1=1362$ Kg/ha.

	W_1	W_2	W_3	W_4	Mean
D_1	1215	1213	1255	1317	1250
D_2	1253	1277	1170	1340	1260
D_3	1300	1103	1147	1062	1153
Mean	1256	1198	1191	1240	1221

Crop :- Wheat (Rabi).

Site :- Govt. Exptl. Farm, Powarkheda.

Ref :- M.P. 60(51).

Type :- 'D'.

Object :- To study the effect of seed dressing on foot root disease of Wheat.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) Wheat. (c) N.A. (ii) Morand. (iii) 24.10.60. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 90 Kg/ha. (d) 30 cm. between row. (e) N.A. (v) Nil. (vi) Hy-65. (vii) Unirrigated. (viii) Nil. (ix) 6 cm. (x) 25.2.61.

2. TREATMENTS:

3 seed treatments : T_0 =Control, T_1 =Cereson dry @ 20 gm. per 1 Kg. of seed and T_2 =Dithane Dry @ 20 gm. per 1 Kg. of seed. Chemicals mixed with seed by seed dressing machine.

3. DESIGN :

- (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 6.1 m. x 15.2 m. (b) 4.9 m. x 14.0 m. (v) 61 cm. x 61 cm. (vi) Yes.

4. GENERAL:

- (i) Satisfactory. (ii) N.A. (iii) Grain and straw yield. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

- (i) 543 Kg/ha. (ii) 68.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T_0	T_1	T_2
Av. yield	549	557	522

Crop :- Barley (Rabi).

Site :- (District) : Chhatarpur.

Ref :- M.P. 60(S.E.T.)

Type :- 'M'.

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

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and black. (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 . andNPK=22.4 Kg/ha. of N+22.4 Kg/ha. 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 a *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 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—only. (b) —. (c) —. (v) to (vii) N.A.

5. RESULTS :

No. of trials	Control mean Kg/ha	Average response of grain in Kg/ha.									
		N	P	K	S.E.	NP	NK	PK	NPK	S.E.	
2	1290	360	180	-170	123.0	-240	-50	-130	320	68.0	

Crop :- Jowar (*Kharif*).**Ref :- M.P. 62(88).****Site :- Govt. Agri. Res. Farm, Bahadari.****Type :- 'M'.**Object :- to study the effect of different levels of N and P on the yield of *Jowar*.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Black Cotton soil. (iii) 26.7.62. (iv) (a) *Bakherings*. (b) *Drilling*. (c) 5.6 Kg/ha. (d) 46 cm. between lines. (e) —. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) 2 interculturings. (ix) N.A. (x) 29.12.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 5 levels of N as A/S : $N_0=0$, $N_1=8.4$, $N_2=16.8$, $N_3=25.2$ and $N_4=33.6$ Kg/ha.(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=16.8$ Kg/ha.

Fertilizers drilled with seed at sowing.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) N.A. (iii) Grain yield. (iv) (a) 1962—only. (b) and (c) —. (v) *Kathulia*. (vi) and (vii) Nil.

5. RESULTS :

(i) 415 Kg/ha. (ii) 124.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
P ₀	482	426	404	322	351	397
P ₁	366	382	418	512	489	433
Mean	424	404	411	417	420	415

Crop :- Jowar (*Kharif*).

Site :- Govt. Agri. Res. Farm, Bahadari.

Ref :- M.P. 64(63).

Type :- 'M'.

Object :- To study the effect of different levels of N and P on the yield of *Jowar*.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (ii) Black Cotton soil. (iii) 15.7.64. (iv) (a) *Bakharing* and harrowing. (b) By seed drill. (c) 10 to 12 Kg/ha (d) 45 cm. between rows. (e) —. (v) 25 C.L/ha. of F.Y.M. (vi) Ujjain-6. (vii) Unirrigated. (viii) 2 thinnings and weeding. (ix) N.A. (x) 3.12.64.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 5 levels of N: N₀=0, N₁=10, N₂=20, N₃=30 and N₄=40 Kg/ha.

(2) 3 levels of P₂O₅: P₀=0, P₁=10 and P₂=20 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 15. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 18.3 m. × 2.7 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Stem-borer and shoot fly damage. Carbaryl 4%, Endrin 4% and Granular Dimecron 0.04% applied. (iii) Grain yield. (iv) (a) 1964—only. (b) and (b) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1503 Kg/ha. (ii) 193.9 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
P ₀	1396	1262	1309	1133	1639	1348
P ₁	1369	1902	1484	1423	1774	1591
P ₂	1464	1498	1444	1633	1808	1569
Mean	1410	1554	1412	1396	1741	1503

C.D. for N marginal means=187.1 Kg/ha.

C.D. for P marginal means=145.0 Kg/ha.

Crop :- Jowar (Kharif).**Ref :- M.P. 60(34).****Site : Govt. Seed and Demons. Farm, Biora.****Type :- 'M'.****Object :—**To study the effect of different levels of N and P on the yield of *Jowar*.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) 16.8 Kg/ha. of N+33.6 Kg/ha. of P_2O_5 . (ii) Clay. (iii) 30.6.60 (iv) (a) Two *bakherings*. (b) By seed drill. (c) 9 Kg/ha. (d) 46 cm. between lines. (e)—. (v) Nil. (vi) Ujjain-6. (vii) Unirrigated. (viii) 2 applications of *Kulpas* and one hand weeding by *khurpi*. (ix) 56 cm. (x) 14.12.60.

2. TREATMENTS :

(i) Same as in Expt. No. 62(88) on page 248.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 10.7 m.×4.6 m. (b) 9.1 m×3.7 m. (v) 80 cm.×45 cm. (vi) Yes.

4. GENERAL :

(i) Good stand, germination and growth. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—only. (b) and (c) —. (v) Kathulia, Khandwa, Khargone and Ujjain. (vi) and (vii) Nil.

5. RESULTS :

(i) 884 Kg/ha. (ii) 105.8 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	N_3	N_4	Mean
P_0	754	776	920	929	996	875
P_1	823	848	809	987	996	893
Mean	788	812	864	958	996	884

C.D. for N marginal means=108.5 Kg/ha.

Crop :- Jowar (Kharif).**Ref :- M.P. 60(128).****Site :- Institute of Plant Industry, Indore.****Type :- 'M'.****Object :—**To study the residual effect of N, P and K, applied to Bhoj variety of Cotton on the yield of *Jowar*.**1. BASAL CONDITIONS:**

(i) (a) Nil. (b) Cotton. (Bhoj variety). (c) As per treatments. (ii) Black cotton soil. (iii) 10.6.60. (iv) (a) *bakherings*. (b) Drilling. (c) 11 Kg/ha. (d) 35.6 cm.×30 cm. (e) —. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) 2 weedings and 3 interculturings. (ix) 82 cm. (x) 20.11.60.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 levels of N as A/S : $N_0=0$, $N_1=33.6$ and $N_2=67.2$ Kg/ha.

(2) 3 levels of P_2O_5 as Super : $P_0=0$, $P_1=33.6$ and $P_2=67.2$ Kg/ha.

(3) 3 levels of K_2O as Mur. Pot : $K_0=0$, $K_1=33.6$ and $K_2=67.2$ Kg/ha.

3. DESIGN :

(i) 3³ Confd. (ii) (a) 3 blocks/replication; 9 plots/block. (b) N.A. (iii) 2. (iv) (a) 12.2 m. × 4.3 m. (b) 10.7 m × 2.8 m. (v) 76 cm. × 76 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (2) Nil. (iii) Grain yield. (iv) (a) 1959-60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS

(i) 566 Kg/ha. (ii) 148.3 Kg/ha. (iii) Interaction N × P × K. alone is significant. (iv) Av yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	K ₀	K ₁	K ₂	Mean
N ₀	618	553	605	631	637	509	592
N ₁	586	506	548	547	525	568	547
N ₂	564	536	578	559	542	576	559
Mean	589	532	577	579	568	551	566
K ₀	589	519	629				
K ₁	562	629	512				
K ₂	617	447	590				

Crop :- Jowar (Kharif).

Ref :- M.P. 60(130)

Site :- Institute of Plant Industry, Indore.

Type :- 'M'.

Object :- To find out the residual effect of N, P and K, applied to Indore-2 variety of cotton, on the yield of Jowar.

1. BASAL CONDITIONS

(i) (a) Nil. (b) Cotton (Indore-2 variety). (c) As per treatments. (ii) Black cotton soil. (iii) 10.6.60. (iv) (a) 2 *bakherings*. (b) Drilling. (c) 11 Kg/ha. (d) 35.6 cm × 30 cm. (e) —. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) 3 interculturings and 2 weedings. (ix) 82 cm. (x) 18.11.60.

2. TREATMENTS :

Same as in Expt. No. 60(128) on page 250.

3. DESIGN :

(i) 3³ Confd. and (ii) 3 blocks/replication: 9 plots/block. (b) N.A. (iii) 2. (iv) (a) 12.2 m. × 4.6 m. (b) 10.7 m. × 3.7 m. (v) 76 cm. × 46 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1959-60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1023 Kg/ha. (ii) 238.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	K ₀	K ₁	K ₂	Mean
N ₀	1033	858	1022	970	1010	934	971
N ₁	1001	1098	1065	1034	1108	1023	1055
N ₂	1001	1068	1056	1062	949	1114	1042
Mean	1012	1008	1048	1022	1022	1024	1023
K ₀	1019	953	1094				
K ₁	1064	1007	995				
K ₂	953	1064	1054				

Crop :- Jowar (Kharif).

Ref :- M.P. 61(125).

Site :- Govt. Agri Res. Stn., Jhabua.

Type :- 'M'.

Object :- To find the best method of application of fertilizers.

1. BASAL CONDITIONS

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) *Bakhering*. (b) Drilling. (c) 5.6 Kg/ha. (d) 46 cm. between lines. (e) —. (v) Nil. (vi) Gwalior-304. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (i) and (2) + a Control (no manure).

(1) 2 levels of fertilizers : F₁=16.8 Kg/ha of N+16.8 Kg/ha of P₂O₅ and F₂=33.6 Kg/ha. of N+33.6 Kg/ha. of P₂O₅

(2) 2 methods of fertilizer application : M₁=Broad cast and M₂=Drilled.

N as A/s and P₂O₅ as Super.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 3. (iv) (a) 4.6 m. × 15.2. (b) 2.7 m. × 13.7 m. (v) 95 cm. × 75 cm. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1961 only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 250 Kg/ha. (ii) 101.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=358 Kg/ha.

	F ₁	F ₂	Mean
M ₁	190	185	187
M ₂	240	279	259
Mean	215	232	223

Crop :- Jowar (*Kharif*).

Ref :- M.P. 60(163), 61(116), 62(107).

Site :- Agri. Res. Stn., Kathulia.

Type :- 'M'.

Object :- To study the effect of different levels of N and P on the yield of Jowar.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clayey and clayey loam. (iii) 20.7.60 ; 11.7.61 ; 29.7.62. (iv) (a) 2 ploughings and 3 *bakherings*. (b) Drilling. (c) 13.4 Kg/ha. (d) 41 cm. between rows. (e) Nil. (v) Nil. (vi) Ujjain-8. (vii) Unirrigated. (viii) Nil ; 2 weedings ; Nil. (ix) N.A. (x) 11.12.60 ; 15.12.61 ; 2.1.63.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 5 levels of N as A/S: $N_0=0$, $N_1=8.4$, $N_2=16.8$, $N_3=25.2$ and $N_4=33.6$ Kg/ha.(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=16.8$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 4.9 m. \times 11.1 m. for 60 ; N.A. for others. (b) 4.6 m. \times 10.7 m. for 60 ; 4.0 m. \times 10.7 m. for others. (v) 23 cm. \times 15 cm. for 60 ; N.A. for others. (vi) Yes.

4. GENERAL :

(i) Poor ; Good ; Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-62. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) Bahadari, Biora, Khandwa, Khargone and Ujjain. (vi) Nil. (vii) Error variances are heterogeneous and Treatments \times years interaction is present.

5. RESULTS:

Pooled results

(i) 676 Kg/ha. (ii) 358.4 Kg/ha. (based on 18 d.f. made up of Treatments \times years interaction). (iii) Main effects of N and P are significant (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	N_3	N_4	Mean
P_0	402	497	556	824	717	599
P_1	500	750	801	834	874	752
Mean	451	624	679	829	796	676

C.D. for N marginal means = 217.3 Kg/ha.

C.D. for P marginal means = 137.5 Kg/ha.

Individual results

Treatments	N_0	N_1	N_2	N_3	N_4	Sig.	P_0	P_1
Years								
1960	287	177	256	418	261	N.S.	311	248
1961	754	1184	1279	1443	1481	**	1056	1400
1962	313	510	552	626	645	**	451	607
Pooled	451	624	679	829	796	*	599	752

Sig.	G.M.	S.E./plot
N.S.	280	212.5
**	1228	21.8
**	529	12.4
*	676	358.4

Crop :- Wheat (*Kharif*).

Ref :- M.P. 60(68), 61(37).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'MP'.

Object :—To study the effect of different levels of N and P on the yield of Jowar.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Jowar ; N.A. (c) N.A. (ii) Medium black. (iii) 7.7.60 ; 20.7.61. (iv) (a) *Bakherings*. (b) Seed drilled by *Tiffan*. (c) 7 Kg/ha. (d) 23 cm. between rows. (v) Nil. (vi) N.J. 171. (vii) Un-irrigated. (viii) Weeding and hoeing. (ix) 65 cm. ; 118 cm. (x) 17.2.60 ; 12.1.62.

2. TREATMENTS :

Same as in Expt. No. 60(163), 61(116), 62(107) on page 253.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) 22.9 m. × 21.3 m. (iii) 4 for 60 ; 2 for 61. (iv) (a) 10.7 m. × 4.6 m. (b) 9.1 m. × 3.7 m. (v) 76 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-61. (b) No. (c) Results of combined analysis presented under 5. Results. (v) Kathulia, Biora, Khargone and Ujjain. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS :

Pooled results

(i) 1130 Kg/ha. (ii) 347.9 Kg/ha. (based on 45 d.f. made up of pooled error and Treatments × years interaction). (iii) Main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
P ₀	765	1059	1170	1127	1343	1093
P ₁	827	925	1333	1363	1386	1167
Mean	796	992	1251	1245	1365	1130

C.D. for N marginal means = 404.9 Kg/ha.

Individual results

Treatments	N ₀	N ₁	N ₂	N ₃	N ₄	Sig.	P ₀	P ₁
Years								
1960	511	786	1186	1142	1228	**	931	1010
1961	1368	1405	1383	1450	1637	N.S.	1417	1480
Pooled	796	992	1251	1245	1365	*	1093	1167

Sig.	G.M.	S.E./plot
N.S.	971	375.4
N.S.	1449	282.1
N.S.	1130	347.9

Crop :- Jowar (*Kharif*):

Ref :- M.P. 60(69), 61(38), 62(2).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'M'.

Object : To study the effect of N with and without F.Y.M. on the yield of Jowar.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) As per treatments. (ii) Medium black. (iii) 14.7.60; 5.7.61; 29.7.62. (iv) (a) *Ba hering*. (b) Drilling by *Tiffan*. (c) 7 Kg/ha. (d) 46 between rows. (e) Nil. (v) Nil. (vi) N.J.-171. (vii) Unirrigated. (viii) Weeding and hoeing. (ix) 65 cm.; 118 cm.; 107 cm. (x) 27.12.60; 4.1.62; 1st week of Jan., 63.

2. TREATMENTS :

Main-plot treatments :

2 levels of F.Y.M. : F_0 =No F.Y.M. and F_1 =F.Y.M.

Sub-plot treatments :

3 levels of N as A/S : $N_0=0$, $N_1=22.4$ and $N_2=44.8$ Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 8. (iv) (a) 15.5 m. \times 4.1 m. (b) 14.9 m. \times 3.2 m. (v) 30 cm. \times 46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-62. (b) Yes. (c) Results of combined analysis (c) have been presented under 5. Results, (v) and (vi) Nil. (vii) Main-plot error variances are homogeneous. Main-plot Treatments \times years interaction is absent and sub-plot Treatments \times years interaction is present.

5. RESULTS :

Pooled results

(i) 1497 Kg/ha. (ii) (a) 184.4 Kg/ha. (based on 23 d.f. made up of pooled error and Treatments \times years interaction). (b) 648.8 Kg/ha. (based on 8 d.f. made up of Treatments \times years interaction). (iii) Main-effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	Mean
F_0	1254	1545	1649	1483
F_1	1257	1574	1703	1512
Mean	1256	1560	1676	1497

C.D. for N marginal means = 305.4 Kg/ha.

Individual results

Treatments	N_0	N_1	N_2	Sig.	F_0	F_1
Years						
1960	1349	1584	1826	*	1534	1639
1961	1286	1507	1254	*	1356	1342
1962	1131	1588	1948	*	1558	1554
	1256	1560	1676	*	1483	1512

Sig.	G.M.	S.E./main-plot	S.E./sub-plot
N.S.	1586	198.9	253.8
N.S.	1349	190.6	201.8
N.S.	1556	145.2	190.0
N.S.	1497	184.4	648.8

Crop :- Jowar (Kharif).**Ref :- M.P. 60(166).****Site :- Reg. Res. Stn., Khargone.****Type :- 'M'.**

Object :—To study the effect of different levels of N and P on the yield of Jowar.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) N.A. (iv) (a) 2 ploughings and 4 *bakherings*. (b) Drilling. (c) 13 Kg/ha. (d) 40 cm. between rows. (e) —. (v). (vi) Rs-110. (vii) Unirrigated. (viii) 2 weedings and 1 interculture. (ix) and (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 2 levels of N as A/S : $N_0=0$ and $N_1=11.2$ Kg/ha.(2) 4 levels of P_2O_5 as Super : $P_0=0$, $P_1=8.4$, $P_2=16.8$ and $P_3=25.2$ Kg/ha.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 4.9 m. × 10.7 m. (b) 4.1 m. × 9.1 m. (v) 46 cm. × 76 cm. (vi) Yes.

GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 572 Kg/ha. (ii) 200.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P_0	P_1	P_2	P_3	Mean
N_0	587	546	565	581	570
N_1	535	572	579	606	573
Mean	561	559	572	594	572

Crop :- Jowar (Kharif).**Ref :- M.P. 60(165), 61(62).****Site :- Reg. Res. Stn., Khargone.****Type :- 'M'.**

Object :—To study the effect of different levels of N and P on the yield of Jowar.

1. BASAL CONDITIONS :

(i) (a) N.A. ; Groundnut—Cotton—Jowar. (b) N.A. ; Cotton. (c) N.A. ; Nil. (ii) Black cotton soil. medium black cotton soil. (iii) 3.7.60 ; 1.7.61. (iv) (a) 2 ploughings and one *bakherings* 2 ploughing and 3 *bakherings*. (b) Drilling. (c) 7 Kg/ha. ; 13 Kg/ha. (d) 40 cm. between rows ; 41 cm. × 15 to 23 cm. (e) —. (v) Nil. (vi) Ujjain—8. (vii) Unirrigated. (viii) N.A. ; 2 hand weedings and 3 interculturings. (ix) N.A. ; 119 cm. (x) 9.12.60 ; 5.12.61.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 5 levels of N as A/S : $N_0=0$, $N_1=8.4$, $N_2=16.8$, $N_3=25.2$ and $N_4=33.6$ Kg/ha.(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=16.8$ Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 4.9 m. × 10.7 m. (b) 4.1 m. × 9.1 m. (v) 76 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Good ; satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960 - 61. (b) No. (c) Results of combined analysis presented under 5.—Results. (v) Biora, Kathulia Khandwa and Ujjain. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS:

Pooled results

(i) 983 Kg/ha. (ii) 315.1 Kg/ha. (based on 9 d.f. made up of Treatments × years interaction). (iii) None of the effects is significant. (iv) (a) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
P ₀	794	951	1047	1024	1055	974
P ₁	858	865	958	1089	1193	992
Mean	826	908	1002	1057	1124	983

Individual results

Treatments	N ₀	N ₁	N ₂	N ₃	N ₄	Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
Years											
1960	1290	1204	1311	1306	1272	N.S.	1248	1305	N.S.	1277	179.3
1961	361	612	694	807	976	*	700	680	N.S.	690	177.7
Pooled	826	908	1002	1057	1124	N.S.	974	992	N.S.	983	315.1

Crop :- Jowar (Kharif).

Ref :- M.P. 62(25).

Site :- Central Agri. Res. Farm, Nabibagh.

Type :- 'M'.

Object :- To correlate the departmental fertilizer recommendations with actual requirements calculated after soil testing.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) 19.7.62. (iv) (a) 2 *bakherings*. (b) Seed drilled by *deshi* plough. (c) 6 Kg/ha. (d) Rows 30 cm. apart. (e) —. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) 2 interculturing. (ix) N.A. (x) 28.12.62.

2. TREATMENTS :

4 manurial treatments : M₀ = Control (no manure), M₁ = State Departmental recommendations—22.4 Kg/ha. of N, M₂ = Soil testing survey recommendations—22.4 Kg/ha. of N + 11.2 Kg/ha. of P₂O₅ and M₃ = Local practice—16.8 Kg/ha. of N + 16.8 Kg/ha. of P₂O₅.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 3. (iv) (a) 11.3 m. × 7.9 m. (b) 10.1 m. × 6.7 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1962—only. (b) and (c) —. (v) to (vii) Nil.

2. RESULTS:

(i) 826 Kg/ha. (ii) 89.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂	M ₃
Av. yield	652	791	885	978

C.D. = 178.1 Kg/ha.

Crop :- Jowar (Kharif).

Ref :- M.P. 60(63), 61(114).

Site :- Central Exptl. Farm, Ujjain.

Type :- M²

Object ;—To study the effect of different levels of N and P on the yield of *Jowar*.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 2.7.60 ; 22.6.61. (iv) (a) *Bakherings*. (b) Drilling. (c) 6 Kg/ha. (d) 23 cm. between rows ; 45 cm. between rows. (e) —. (v) Nil. (vi) Ujjain—6. (vii) Unirrigated. (viii) N.A. (ix) 60 cm. ; 41 cm. (x) 14.12.60 : 26.12.61.

5. TREATMENTS:

All combinations of (1) and (2)

(1) 5 levels of N as A/S : N₀=0, N₁=8.4, N₂=16.8, N₃=25.2 and N₄=33.6 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=16.8 Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 10.7 m. × 4.6 m. ; N.A. (b) 9.1 m. × 3.7 m. ; 12.2 m. × 2.4 m. (v) 76 cm. × 46 cm. ; N.A. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1960—61. (b) No. (c) Nil. (v) Biora, Kathulia, Khandwa and Khargone. (vi) Nil. (vii) As error variances are heterogeneous and Treatments × years interaction is absent, results of individual years have been presented under 5.—Results.

5. RESULTS:

60(63)

(i) 1131 Kg/ha. (ii) 230.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
P ₀	1195	945	1013	1081	1292	1105
P ₁	970	1314	1004	1203	1296	1158
Mean	1083	1129	1009	1142	1294	1131

61(114).

(i) 555 Kg/ha. (ii) 70.5 Kg/ha. (iii) Interaction N × P alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
P ₀	483	555	483	583	709	563
P ₁	553	573	572	572	465	547
Mean	518	564	527	577	587	555

C.D. for body of table=49.9. Kg/ha.

Crop :- Jowar.

Ref :- M.P. 60(M.A.E.)

Site :- M.A.E. Centre, Ujjain.

Type :- 'M'.

Object : Type VI : To study the effect of different sources and levels of P along with their methods of application.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3) with a control

(1) 2 sources of P₂O₅ : S₁=Ammono. Phos. and S₂=Super.

(2) 2 levels of P₂O₅ : P₁=22.4 and P₂=44.8 Kg/ha.

(3) 3 methods of application : M₁=Broadcasting, M₂=6 cm. below seed and M₃=Band placement.

3. DESIGN :

(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of Grain. (iv) (a) 1957-60. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 844 Kg/ha. (ii) 420 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=849 Kg/ha.

Treatment	M ₁	M ₂	M ₃	S ₁	S ₂	P ₁	P ₂
Mean yield	783	854	896	786	903	841	849

Crop :- Jowar (Rabi).

Ref :- M.P. 60, 61(S.F.T.)

Site :- (District), Chhindwara and Sehore.

Type :- 'M'.

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

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Shallow black for Chhindwara and medium black for Sehore. (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 . andNPK=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 on type C trials on two out of the four zones in each district every year. The experiments are laid out in randomly located fields in in randomly selected villages in each of the four 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) 1960-61. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

District	Year	No. of trials	Control mean Kg/ha.	Average response of grain in Kg/ha.								
				N.	P.	K.	S.E.	NP	NK	PK	NPK	S.E.
Chhindwara	1960	4	1100	80	110	200	24.0	-20	60	-40	90	22.0
	1961	3	1210	50	40	80	24.0	10	0.0	-20	70	12.0
Sehore	1960	4	2010	490	160	200	36.0	70	0.0	-110	160	41.0
	1961	12	3080	280	290	200	43.0	70	70	40	20	41.0

Crop :- Jowar (*Kharif*).**Ref :- M.P. 60(S.F.T.) for Chhindwara ;
61(S.F.T.) for Sehore.****Site :- (District) : Chhindwara
and Sehore.****Type :- 'M'.****Object :-**Type B: To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Shallow black for Chhindwara ; Medium black for Sehore. (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. $N_1'=22.4$ 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 and $N_2''=44.8$ Kg/ha of N as A/S/N.

3. DESIGN :

Same as in Type A on *Jowar* on page 260.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-only for Chhindwara ; 1961-only for Sehore. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

District	Year	No. of trials	Control mean in Kg/ha.	Average response of grain in Kg/ha.						S.E. of response
				N ₁	N ₁ '	N ₁ ''	N ₂	N ₂ '	N ₂ ''	
Chhindwara	1960	4	1050	220	120	110	270	250	160	43.0
Sehore	1961	16	2960	240	310	480	470	380	590	89.0

Crop :- Jowar (*Khaif*).

**Ref :- M.P. 65(S.F.T.) for Indore ; 62(S.F.T.)
for Chhindwara ; 63(S.F.T.) for
Ratlam ; 63, 65(S.F.T.) for Ujjain.**

**Site :- (District) : Indore,
Chhindwara, Ratlam
and Ujjain.**

Type :- 'M'.

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) (a) to (c) N.A. (ii) Medium black for Indore, Ratlam and Ujjain and Shallow black for Chhindwara. (iii) 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.

N₂P₂ = 70 Kg/ha. of N + 70 Kg/ha. of P₂O₅ and

N₂P₂K₁ = 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 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 grain. (iv) (a) 1965-only for Indore ; 1962-only for Chhindwara ; 1963-only for Ratlam ; and 1963-65 (64 N.A.) for Ujjain. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

Indore

65(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	85	146	147	207	359	473	604	32.9

Control mean=580 Kg/ha. ; No of trials=9.

Chhindwara

62(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	345	622	346	586	780	965	1338	196.2

Control mean=1959 Kg/ha. ; No of trials=5.

Ratlam

63(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	215	242	242	306	350	321	415	55.7

Control mean=607 Kg/ha. ; No. of trials=2.

Ujjain

63(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	197	261	172	509	469	583	736	98.3

Control mean=889 Kg/ha. ; No. of trials=2.

65(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	92	264	228	523	643	719	872	31.1

Control mean=663 Kg/ha. ; No. of trials=12.

Crop :- Jowar (Kharif).

**Ref :- M.P. 64, 65(S.F.T.) for Indore ;
63, 64, 65(S.F.T.) for Ujjain,
63(S.F.T.) for Ratlam ;
62(S.F.T.) for Chhindwara.**

**Site :- (District) : Indore, Ujjain,
Ratlam and Chhindwara.**

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) (a) to (c) N.A. (ii) Medium black for Ujjain, Indore, and Ratlam and shallow black for Chhindwara. (iii) to (vi) N.A. (vii) Unirrigated. (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 .

$P_2=70$ 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

$N_2P_2K_2=70$ Kg/ha. of N+70 Kg/ha. of P_2O_5 +70 Kg/ha. of K_2O .

3. DESIGN:

Same as in Type A₁ on Jowar on page 261.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1964-65 for Indore; 1963-65 for Ujjain; 1963-only for Ratlam; 1962-only for Chhindwara; (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

Indore

64(S.F.T.)

Treatment	N_1	P_1	P_2	N_1P_1	N_1P_2	N_2P_2	$N_2P_2K_2$	S.E.
Av. response of grain in Kg/ha.	361	243	264	374	615	563	1088	206.2

Control mean=1278 Kg/ha.; No. of trials=5

65(S.F.T.)

Treatment	N_1	P_1	P_2	N_1P_1	N_1P_2	N_2P_2	$N_2P_2K_2$	S.E.
Av. response of grain in Kg/ha.	83	85	163	258	321	422	590	43.5

Control mean=538 Kg/ha.; No. of trials=9

Ujjain

63(S.F.T.)

Treatment	N_1	P_1	P_2	N_1P_1	N_1P_2	N_2P_2	$N_2P_2K_2$	S.E.
Av. response of grain in Kg/ha.	168	128	149	405	420	474	934	30.2

Control mean=593 Kg/ha.; No. of trials=2

64(S.F.T.)

Treatment	N_1	P_1	P_2	N_1P_1	N_1P_2	N_2P_2	$N_2P_2K_2$	S.E.
Av. response of grain in Kg/ha.	247	751	835	407	375	721	934	330.8

Control mean=1230 Kg/ha.; No. of trials=4

65(S.F.T.)

Treatment	N_1	P_1	P_2	N_1P_1	N_1P_2	N_2P_2	$N_2P_2K_2$	S.E.
Av. response of grain in Kg/ha.	82	251	407	548	621	716	858	43.8

Control mean=645 Kg/ha.; No. of trials=12

Ratlam**63(S.F.T.)**

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	92	156	501	210	230	235	398	207.1

Control mean=703 Kg/ha. ; No. of trials=2

Chhindwara**62(S.F.T.)**

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	427	319	512	651	927	1214	1541	100.5

Control mean=1647 Kg/ha. ; No. of trials=8

Crop :- Jowar (Kharif).**Ref :- M.P. 62(S.F.T.) for Ratlam ; 63, 64, 65(S.F.T.) for Ujjain ; 64, 65(S.F.T.) for Indore.****Site :- (District) : Ratlam, Ujjain and Indore. 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.**1. BASAL CONDITIONS:**

(i) (a) to (c) N.A. (ii) Medium blask. (iii) 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=35Kg/ha. of K₂O.K₂=70 Kg/ha. of K₂O.N₁K₁=35 Kg/ha. of N+35 Kg/ha. of K₂O.N₁K₂=35 Kg/ha. of N+70 Kg/ha. of K₂O.N₂K₂=70 Kg/ha. of N+70 Kg/ha. of K₂O andN₁P₁K₁=35 Kg/ha. of N+35 Kg/ha. of P₂O₅+35 Kg/ha. of K₂O.**3. DESIGN :**Same as in Type A₁ on Jowar on page 261.**4. GENERAL:**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-only for Ratlam, 1963-65 for Ujjain and 1964-65 for Indore. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS :**Ratlam****62(S.F.T.)**

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	59	93	128	197	177	232	281	37.6

Control mean=756 Kg/ha. ; No. of trials=2.

Ujjain
63(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	153	163	143	252	352	326	1013	110.4

Control mean=701 Kg/ha. ; No. of trials=2.

64(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	247	266	889	876	722	938	1420	240.8

Control mean=840 Kg/ha. ; No. of trials=2.

65(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	119	114	489	568	603	713	837	29.9

Control mean=634 Kg/ha. ; No. of trials=12.

Indore

64(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	264	66	178	296	499	336	748	353.0

Control mean=1102 Kg/ha. ; No. of trials=3.

65(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of grain in Kg/ha.	85	105	183	282	391	507	576	43.4

Control mean=440 Kg/ha. ; No. of trials=8.

Crop :- Jowar (Kharif).**Ref :- M.P. 60(124).****Site :- Govt. Soil Cons. Res. Stn. Phanda.****Type :- 'C'.**Object :-To study the effect of interculturing and mulching on the yield of *Jowar*.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 25.6.60. (iv) (a) 2 harrowings and 2 *bakherings*. (b) Drilling. (c) 6 kg/ha. (d) 46 cm. × 23 cm. (e) —. (v) Nil. (vi) N.J.—171. (vii) Unirrigated (viii) As per treatments. (ix) 55.6 cm. (x) 12.12.60.

2. TREATMENTS :

All combinations of (1) and (2) + a control.

(1) 2 methods of interculturing : I₁=Hand picking of weed with soil undisturbed and I₂=Hoeings 5 cm. deep.

(2) 2 rates of spreading straw ; R₀=0 and R₁=75.3 Q/ha.

3. DESIGN

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 11.3 m. × 7.9 m. (b) 10.1 m. × 6.7 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1959-60. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 670 Kg/ha. (ii) 219.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=547 Kg/ha.

	R ₀	R ₁	Mean
I ₁	730	625	677
I ₂	655	796	725
Mean	692	710	701

Crop :- Jowar (Kharif).

Ref :- M.P. 64(62).

Site :- Govt. Agri. Res. Farm, Bahadari.

Type :- 'CM'.

Object :-To study the effect of N and spacing on the yield of *Jowar*.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) N.A. (iv) (a) N.A. (b) Seed drill. (c) N.A. (d) As per treatments. (e) —. (v) N.A. (vi) CK 60 × IS 3691. (vii) to (x) N.A.

2. TREATMENTS :

All combination of (1) and (2).

(1) 5 levels of N: N₀=0, N₁=50, N₂=100, N₃=150 and N₄=200 Kg/ha.

(2) 3 row spacings : S₁=8, S₂=16 and S₃=24 cm.

3. DESIGN

(i) Fact in R.B.D. (ii) (a) 15. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 5.0 m. × 2.8 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N A. (iii) Grain yield. (iv) (a) 1964—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 2855 Kg/ha. (ii) 270.2 Kg./ha. (iii) Main effect of N and interaction N × S are significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
S ₁	2449	2797	2884	3087	2870	2817
S ₂	2652	3174	3043	2739	3029	2928
S ₃	2855	2899	2725	2710	2913	2820
Mean	2652	2957	2884	2845	2937	2855

C.D. for N marginal means=197.4 Kg/ha.

C.D. for body of table =342.0 Kg/ha.

Crop :- Jowar (Kharif).

Ref :- M.P. 64(67)

Site :- Govt. Agri. Res. Farm, Bahadari.

Type :- 'CM'.

Object :- To study the effect of N and spacing on the yield of *Jowar*.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Black Cotton Soil. (iii) N.A. (iv) (a) N.A. (b) By seed drill. (c) N.A. (d) As per treatments. (e) —. (v) N.A. (vi) Ujjain-6. (vii) to (x) N.A.

2. TREATMENTS:

All combinations of (1) and (2) —.

(1) 5 levels of N: $N_0=0$, $N_1=50$, $N_2=100$, $N_3=150$ and $N_4=200$ Kg/ha.

(2) 3 row spacings: $S_1=8$, $S_2=16$ and $S_3=24$ cm.

3. DESIGN:

(i) Fact in R.B.D. (ii) (a) 15. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 5.0 m. × 2.8 m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal (ii) N.A. (iii) Grain yield. (iv) (a) 1964—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS:

(i) 2160 Kg/ha. (ii) 331.2 Kg/ha. (iii) Interaction N × S is significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	N_3	N_4	Mean
S_1	1971	1710	2087	2159	2333	2052
S_2	1906	2261	2507	2094	2159	2186
S_3	2268	2145	2507	2377	1920	2243
Mean	2048	2039	2367	2210	2138	2160

C.D. for body of table = 419.3 Kg/ha.

Crop :- Jowar (Kharif).

Ref :- M.P. 60(127.)

Site :- Institute of Plant Industry, Indore.

Type :- 'CM'.

Object :- To study the effect of different levels of N, spacings and number of plants per plot on the yield of *Jowar*.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 25.6.60. (a) 2 *bakherings*. (b) Dibbling. (c) N.A. (d) As per treatments (e) N.A. (v) Nil. (vi) Indore-2. (vii) Unirrigated. (viii) 2 weedings. (ix) 82.0 cm. (x) 12.12.60.

2. TREATMENTS:

All combinations of (1), (2) and (3).

(1) 3 spacings: $S_1=91$ cm. × 30 cm., $S_2=61$ cm. × 61 cm. and $S_3=30$ cm. × 18 cm.

(2) No. of plants/hill: $P_1=1$, $P_2=2$ and $P_3=3$ plants.

(3) 3 levels of N as A/S. $N_0=0$, $N_1=33.6$ and $N_2=67.2$ Kg/ha.

3. DESIGN:

(i) 3³ Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) 10.7 m. × 3.7m. (b) 9.1 m. × 3.7 m. (v) 76 at each end. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) N.A.

5. RESULTS:

(i) 920 Kg/ha. (ii) 214.0 Kg/ha. (iii) Main effect of N is highly significant and that of S and P are significant. (iv) Av. yield of grain in Kg/ha.

	P ₁	P ₂	P ₃	N ₀	N ₁	N ₂	Mean
S ₁	794	861	881	740	874	921	845
S ₂	811	1071	1083	912	1034	1020	988
S ₃	895	931	956	808	937	1037	927
Mean	833	954	973	820	948	993	920
N ₀	777	825	858				
N ₁	850	947	1047				
N ₂	873	1091	1014				

C.D. of any marginal means = 100.5 Kg/ha.

Crop :- Jowar (Kharif).

Ref :- M.P. 60(113), 61(89).

Site :- Institute of Plant Industry, Indore.

Type :- 'CM'.

Object :- To study the residual effect of manures applied to cotton crop with different spacings on the yield of Jowar.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Cotton. (c) As per treatments. (ii) Black cotton soil. (iii) 15.6.60 ; 12.6.61. (iv) (a) Two bakherings. (b) Drilling. (c) 11 Kg/ha. (d) 36 cm. × 30 cm. (e) N.A. (v) Nil ; 22.4 Kg/ha. of P₂O₅. (vi) *Deshu jowar* ; I.P.I-9. (vii) Unirrigated. (viii) 2 weedings and 3 interculturings. (ix) 82 cm. ; 161 cm. (x) 27.11.60 ; 26.12.61.

2. TREATMENTS:

8 manurial-cum-cultural treatments applied to previous cotton crop : T₁ = 46 cm. between rows, T₂ = 61 cm. between rows, T₃ = T₁ + 44.8 Kg/ha. of N as F.Y.M., T₄ = T₂ + G.M. with *gird*, T₅ = 22.4 Kg/ha. of P₂O₅ + G.M. with *gird*, T₆ = T₃ + G.M. with *sann*, T₇ = 22.4 Kg/ha. of P₂O₅ + G.M. with *sann* and T₈ = T₁ + 22.4 Kg/ha. of N as A/S.

3. DESIGN:

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 12.2 m. × 5.5 m. ; 10.7 m. × 4.1 m. (b) 10.7 m. × 4.1 m. (v) 76 cm. × 69 cm. ; Nil, (vi) Yes

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-61. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results :

(i) 667 Kg/ha. (ii) 251.7 Kg/ha. (based on 7 d.f. made up of Treatments \times years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Av. yield	783	863	898	783	820	835	811	879

Individual results

Treatments	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	Sig.	G.M.	S.E./plot
Years											
1960	1227	1115	1403	1098	1201	1257	1212	1392	*	1238	143.5
1961	339	610	394	468	439	412	410	365	N.S.	430	161.8
Pooled	783	863	898	783	820	835	811	879	N.S.	667	251.7

Crop :- Jowar (*Kharif*).

Ref :- M.P. 60(164).

Site :- Reg. Res. Stn., Khargone.

Type :- 'CM'.

Object :- To study the effect of manures with different seed-rates on the yield of Jowar.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) 8.7.60. (iv) (a) 2 ploughings and 3 *bakherings*. (b) Drilling. (c) As per treatments. (d) 40 cm. between rows. (e) —. (v) Nil. (vi) Ujjain-8. (vii) Unirrigated. (viii) and (ix) N.A. (x) 12.12.60.

2. TREATMENTS:

Main-plot treatments :

6 manurial treatments : M₀=Control, M₁=16.8 Kg/ha. of N, M₂=33.6 Kg/ha. of N, M₃=16.8 Kg/ha. of N+16.8 Kg/ha. of P₂O₅, M₄=33.6 Kg/ha. of N+16.8 Kg/ha. of P₂O₅ and M₅=33.6 Kg/ha. of N+33.6 Kg/ha. of P₂O₅.

Sub-plot treatments :

3 seed-rates : R₁=6.7, R₂=10.1 and R₃=13.4 Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 7.9 m. \times 9.1 m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1080 Kg/ha. (ii) (a) 466.2 Kg/ha. (b) 241.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	M ₄	M ₅	Mean
R ₁	968	816	1410	957	1021	1085	1043
R ₂	837	806	1191	1215	1224	1269	1090
R ₃	847	1049	1491	885	1138	1236	1108
Mean	884	890	1364	1019	1128	1197	1080

Crop :- Jowar (Kharif).

Ref :- M.P. 63 to 65(M.A.E.).

Site :- M.A.E. Centre, Ujjain.

Type :- 'CMV'.

Object :—Type XIII : To study the effect of N, P and K levels with different dates of sowing on Jowar varieties.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1), (2) and (3).

(1) 3 dates of sowing : D₁=2 weeks before normal date of sowing, D₂=Normal date of sowing and D₃=2 weeks after normal date of sowing.

(2) 3 varieties : V₁=Nimanwasa, V₂=Ujjain-6 and V₃=Damdama.

(3) 3 levels of N : N₀=0, N₁=50 and N₂=100 Kg/ha.

Sub-plot treatments :

All combinations of (1) and (2).

(1) 2 levels of P₂O₅ : P₀=0 and P₁=70 Kg/ha.

(2) 2 levels of K₂O : K₀=0 and K₁=70 Kg/ha.

Varieties for 64 are V₁=Nimanwasa, V₂=Ujjain-6 and V₃=Jomder Damdama. Varieties for 65 are V₁=Ghoa, V₂=Ujjain-6 and V₃=Jamdad.

3. DESIGN :

(i) Split-plot confd. (ii) (a) 9 main-plots/block ; 3 blocks/replication 4 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1963-65. (b) N.A. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS :

1963

(i) 1154 Kg/ha. (ii) (a) 428 Kg/ha. (b) 202 Kg/ha. (iii) Main effects of D, N, P and K are significant. (iv) Av. grain yield in Kg/ha.

Treatment	V ₁	V ₂	V ₃	D ₁	D ₂	D ₃	N ₀	N ₁	N ₂
Mean yield	1096	1156	1209	1429	1338	693	764	1195	1502
	P ₀	P ₁		K ₀	K ₁				
	941	1356		1056	1251				

C.D. for D or N means=247 Kg/ha.

C.D. for P or K means=95 Kg/ha.

1964

- (i) 1224 Kg/ha. (ii) (a) 808 Kg/ha. (b) 263 Kg/ha. (iii) Main effects of D and P are significant.
 (iv) Av. grain yield in Kg/ha.

Treatment	V ₁	V ₂	V ₃	D ₁	D ₂	D ₃	N ₀	N ₁	N ₂
Mean yield	1159	1230	1283	1918	1631	123	965	1298	1409
	P ₀	P ₁		K ₀	K ₁				
	1113	1335		1231	1217				

C.D. for D means=466 Kg/ha.

C.D. for P means=124 Kg/ha.

1965

- (i) 2252 Kg/ha. (ii) (a) 598 Kg/ha. (b) 272 Kg/ha. (iii) Main effects of N and P are significant.
 (iv) Av. grain yield in Kg/ha.

Treatment	V ₁	V ₂	V ₃	D ₁	D ₂	D ₃			
Mean yield	2121	2363	2271	2268	2379	2108			
	N ₀	N ₁	N ₂	P ₀	P ₁		K ₀	K ₁	
	1697	2341	2718	2117	2386		2261	2241	

C.D. for N means=345 Kg/ha.

C.D. for P means=128 Kg/ha.

Crop :- Jowar (Kharif).

Ref :- M.P. 62(105).

Site :- Regional Res. Stn., Bagwai.

Type :- 'D'.

Object :- To study the effect of different doses and weedicides on the yield of Jowar.

1. BASAL CONDITIONS :

- (i) (a) to (c) N.A. (ii) Clayey loam. (iii) 21.7.62. (iv) (a) *Bakherings*. (b) Drilling. (c) 7 Kg/ha.
 (d) 40 cm. between lines. (e) —. (v) 16.8 Kg/ha. of N + 16.8 Kg/ha. of P₂O₅. (vi) Gwalior. (vii) Irrigated.
 (viii) and (ix) N.A. (x) 19.12.62.

2. TREATMENTS:

All combinations of (1) and (2) + 2 extra treatments.

(1) 4 weedicides : W₁=Fenoxone, W₂=Dicotox, W₃=Amino-salt and W₄=M.C.P.A.

(2) 3 doses of weedicides : D₀=0.6, D₂=1.1 and D₃=1.7 Kg/ha.

2 extra treatments : E₀=Control (unweeded) and E₁=Local method of weeding.

3. DESIGN:

- (i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 5. (iv) (a) 4.6 m. × 3.6 m. (b) 3.7 m. × 2.7 m. (v) 46 cm. × 46 cm.
 (vi) Yes.

4. GENERAL:

- (i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1962-only. (b) and (c) —. (v) Nabibagh. (vi) and (vii) Nil.

5. RESULTS:

- (i) 1419 Kg/ha. (ii) 713.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

E₀=1267, and E₁=1566

	W ₁	W ₂	W ₃	W ₄	Mean
D ₁	1394	1429	1435	1057	1329
D ₂	1346	1877	1685	1241	1537
D ₃	1617	1619	1272	1063	1393
Mean	1452	1642	1464	1120	1420

Crop :- Jowar (Kharif).**Ref :- M.P. 62(106).****Site :- Regional Res. Stn., Bagwai.****Type :- 'D'.**Object :- To study the effect of cultural—cum—Weedicidal treatments on the yield of *Jowar*.**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Clayey loam. (iii) 13.7.62. (iv) (a) *bakherings*. (b) Drilling. (c) 7 Kg/ha. (d) 40 cm. between lines. (e) —. (v) 16.8 Kg/ha of N+16.8 Kg/ha of P₂O₅. (vi) Gwalior. (vii) Irrigated. (viii) and (ix) N.A. (x) 10.12.62.

2. TREATMENTS :

9 methods of application of weedicides : W₀=Control (unweeded), W₁=Local method of weedings, W₂=Pre-emergence application of weedicide-once, W₃=Post emergence application of weedicide once, W₄=Post-emergence application of weedicide twice, W₅=Pre and post-emergence applications of weedicide—once, W₆=Pre-emergence application of weedicide+cultural method of weeding (with implement or hand-weeded), W₇=Post-emergence application of weedicide+cultural method of weeding (with implement or hand weeded) and W₈=Pre-emergence application of weedicide+Post-emergence application of weedicide+cultural method of weeding (with implement or hand weeded).

3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 3.7 m. (b) 3.7 m. × 2.7 m. (v) 46 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1962—only. (b) and (c) —. (v) Nabibagh. (vi) to (vii) Nil.

5. RESULTS :

(i) 1008 Kg/ha. (ii) 356.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment : W ₀	W ₁	W ₂	W ₃	W ₄	W ₅	W ₆	W ₇	W ₈
Av. yield: 821	975	1018	1018	1079	933	1172	961	1098

Crop :- Jowar (Kharif).**Ref :- M.P. 62(102).****Site :- Govt. Seed Multiplication and Demons.
Farm, Nabibagh.****Type :- 'D'.****Object :-**To study the effect of different doses and weedicides on the yield of *Jowar*.**1. BASAL CONDITIONS :**(i) (a) to (c) N.A. (ii) Medium black. (iii) N.A. (iv) (a) *Bakherings*. (b) Drilling. (c) 5.6 Kg/ha. (d) 46 cm. between lines. (e) —. (v) 16.8 Kg/ha. of N+16.8 Kg/ha. of P₂O₅. (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.**2. TREATMENTS :**

All combinations of (1) and (2)+2 extra treatments.

(1) 4 weedicides : W₁=Ferroxone, W₂=Dicotox, W₃=Amino Salt and W₄=M.C.P.A.(2) 3 doses of weedicides : D₁=0.56, D₂=1.12 and D₃=1.68 Kg/ha.Extra treatments : E₀=Control (unweeded) and E₁=Cultural method of weeding.**3. DESIGN :**

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 6.1 m. × 5.5 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1962 —only. (b) and (c) —. (v) Bagwai. (vi) and (vii) Nil.

5. RESULTS :

(i) 240 Kg/ha. (ii) 45.5 Kg/ha. (iii) Control vs. treated and between extra treatments are highly significant.

(iii) Av. yield of grain in Kg/ha.

E₀=54 Kg/ha. and E₁=461 Kg/ha.

	W ₁	W ₂	W ₃	W ₄	Mean
D ₁	222	252	276	222	243
D ₂	234	228	204	222	222
D ₃	306	222	240	216	246
Mean	254	234	240	220	237

C.D. for control vs. treated =42.1 Kg/ha.

C.D. for extra treatment means=57.8 Kg/ha.

Crop :- Jowar (Kharif).**Ref :- M.P. 62(101).****Site :- Govt. Seed Multiplication and Demons.
Farm, Nabi bagh.****Type :- 'D'.****Object :-**To compare the different methods of application of weedicides.**1. BASAL CONDITIONS :**(i) (a) to (c) N.A. (ii) Medium black. (iii) 17.7.62. (iv) (a) *Bakherings*. (b) Drilling. (c) 6 Kg/ha. (d) 46 cm. between rows. (e) —. (v) 16.8 Kg/ha. of N+16.8 Kg/ha. of P₂O₅. (vi) N.A. (vii) Unirrigated. (viii) and (ix) N.A. (x) 21.12.62.

2. TREATMENTS:

10 methods of application of weedicides: W_0 =Control (No weeding), W_1 =Local method of weeding, W_2 =Pre-emergence application of weedicide—once, W_3 =Post-emergence application of weedicide—once, W_4 =Post-emergence application of weedicide—Twice, W_5 =Pre-emergence application + Post-emergence application of weedicide—once, W_6 =Pre-emergence application of weedicide+cultural method, W_7 =Post-emergence application of weedicide+cultural method, W_8 =Pre-emergence application of weedicide+Post-emergence application of weedicide—once+Cultural method and W_9 =Cultural method.

Name and dose of weedicide—N.A.

3. DESIGN:

(i) R.B.D. (ii) (a) 10, (b) N.A. (iii) 4. (iv) (a) N.A. (b) 8.8 m. × 6.7 m (v) N.A. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1962—only. (b) and (c) —. (v) Bagwai. (vi) and (vii) Nil.

5. RESULTS:

(i) 588 Kg/ha. (ii) 67.4 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment :	W_0	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8	W_9
Av. yield :	367	834	544	514	480	493	615	590	636	809

C.D.=97.7 Kg/ha.

Crop :- Maize (Kharif).

Ref :- M.P. 61(131), 62(87).

Site :- Govt. Agri. Res. Farm, Bahadari.

Type :- 'M'.

Object :- To find the effect of N and P on the yield of Maize.

BASAL CONDITIONS:

(i) (a) N.A.; Nil. (b) N.A.; Wheat. (c) N.A. (ii) Black cotton soil. (iii) 20.7.61; 25.7.62. (iv) (a) 3 *bakherings*. (b) Drilling. (c) 18 Kg/ha. (d) 45 cm. between rows. (e) —. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) N.A.; 1 weeding by *khurpi*. (ix) N.A. (x) 1.12.61; 7.11.62.

2. TREATMENTS:

All combinations of (1) and (2).

(2) 5 levels of N as A/S : $N_0=0$, $N_1=8.4$, $N_2=16.8$, $N_3=25.2$ and $N_4=33.6$ Kg/ha.

(1) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=16.8$ Kg/ha.

3. DESIGN

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 10.7 m. (b) 3.7 m. × 9.1 m. (v) 45 cm. × 80 cm. (vi) Yes.

4. GENERAL:

(i) and (ii) N A. (iii) Grain yield. (iv) (a) 1961-62. (b) No. (c) Nil. (v) Chhindwara (vi) Nil. (vii) As error variances are heterogeneous and treatments × years interaction is absent, results of individual years have been presented under 5—Results.

5. RESULTS:

61(131)

(i) 319 Kg/ha. (ii) 104.4 Kg/ha. (iii) None of the effects is significant. (iii) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
P ₀	237	424	343	344	221	314
P ₁	343	283	292	322	377	323
Mean	290	354	318	333	299	319

62(87)

(i) 703 Kg/ha. (ii) 221.2 Kg/ha. (iii) Interaction N×P alone is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
P ₀	523	935	755	761	486	672
P ₁	747	627	643	717	837	714
Mean	635	781	799	739	661	703

C.D. for body of table=318.9 Kg/ha.

Crop :- Maize (Kharif).

Ref :- M.P. 61(79), 62(47).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'M'.

Object :- To find out suitable doses of N and P for Maize.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. ; vegetables. (c) N.A. ; 22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅ (ii) Light soil. (iii) 14.6.61 ; 25.6.62. (iv) (a) 3 *bakherings*. (b) Dibbling. (c) 22 Kg/ha. (d) 61 cm.×30 cm. (e) —. (v) 24.7 C.L./ha. of F.Y.M. (vi) Improved variety (variety N.A.) (b) Unirrigated. (viii) 4 weedings. (ix) 95 cm. ; 72 cm. (x) 25.9.61 ; 28.9.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 5 levels of N as A/S : N₀=0, N₁=8.4, N₂=16.8, N₃=25.2 and N₄=33.6 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0, and P₁=16.8 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) and (b) 10.7 m.×3.1 m. ; 7.6 m.×3.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960–62 (Expt failed in 1960). (b) No. (c) Results of combined analysis have been presented under 5.—Results. (v) Bahadari. (vi) Nil. (vii) Error variances are homogeneous and Treatments×years interaction is present.

5. RESULTS :

Pooled results

(i) 1362 Kg/ha. (ii) 513.7 Kg/ha. (based on 9 d.f. made up of Treatments×years interaction). (iii) Main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
P ₀	721	1308	1343	1735	1485	1318
P ₁	1052	1250	1450	1511	1764	1405
Mean	887	1279	1396	1623	1625	1362

C.D. for N marginal means=410.8 Kg/ha.

Individual results :

Treatments	N ₀	N ₁	N ₂	N ₃	N ₄	Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
Years											
1961	1081	1744	1818	2127	2232	*	1855	1786	N.S.	1820	343.4
1962	692	814	874	1118	1017	*	781	1025	*	903	255.3
Pooled	887	1279	1396	1623	1625	*	1318	1405	N.S.	1362	513.8

Crop :- Maize (Kharif).

Ref :- M.P. 60(27).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'M'.

Object :- To find out the effect of N and P on the yield of Maize.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Gram. (c) 24.7 C.L./ha of F.Y.M. (ii) Sandy loam with stones. (iii) 21.6.60. (iv) (a) *Bakherings*. (b) Drilling by *duffan*. (c) 18 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) 2 interculturings, 1 hand weeding and 1 earthing by *desi* plough. (ix) 22.6 cm. (x) 20, 21.9.60.

2. TREATMENTS.

All combinations of (1) and (2)

(1) 5 levels of N as A/S : N₀=0, N₁=8.4, N₂=16.8, N₃=25.2, and N₄=33.6 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=16.8 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 2.7 m. × 10.7 m. (b) 1.8 m. × 9.1 m. (v) 46 cm. × 76 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—61 (Expt failed in 1961). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1958 Kg/ha. (ii) 558.6 Kg/ha. (iii) None of the effects is significant. (vi) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	N ₄	Mean
P ₀	1326	1931	1587	2433	1905	1836
P ₁	2058	1954	2019	2176	2197	2081
Mean	1692	1942	1803	2304	2051	1958

Crop :- Maize (Kharif).

Ref :- M.P. 60(177).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'M'.

Object :- To find out a suitable manurial schedule for Maize.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam with stones. (iii) 19.6.60. (iv) (a) *Bakherings*. (b) Line sowing. (c) 18 Kg/ha. (d) 40 cm. between lines. (e) —. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) and (ix) N.A. (x) 20.9.60.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : $N_0=0$, $N_1=22.4$ and $N_2=44.8$ Kg/ha.

(2) 3 levels of P_2O_5 as Super : $P_0=0$, $P_1=22.4$ and $P_2=44.8$ 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.

3. DESIGN :

(i) 3^3 confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.1 m. \times 5.5 m. (b) 7.3 m. \times 3.7 m. (v) 91 cm. \times 91 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1957-60. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2115 Kg/ha. (ii) 172.7 Kg/ha. (iii) Main effects of N, P and K and interaction $N \times P$, $P \times K$ and $N \times P \times K$ are highly significant. (iv) Av. yield of grain in Kg/ha.

	P_0	P_1	P_2	K_0	K_1	K_2	Mean
N_0	1727	2112	2631	2022	2239	2209	2157
N_1	1570	1771	1713	1587	1616	1850	1684
N_2	1918	2709	2889	2241	2543	2732	2505
Mean	1738	2197	2411	1950	2133	2264	2115
K_0	1446	2127	2276				
K_1	1930	2250	2218				
K_2	1838	2215	2739				

C.D. for marginal means = 118.8 Kg/ha.

C.D. of body of $N \times P$ or $P \times K$ table = 206.4 Kg/ha.

Crop :- Maize (Kharif).

Ref :- M.P. 64(40).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'M'.

Object :- To study the effect of manurial doses on the yield of Maize.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 29.6.64. (iv) and (v) N.A. (vi) Sumari (local). (vii) to (ix) N.A. (x) 22.10.64.

2. TREATMENTS :

5 manurial treatments : T_0 =Control, T_1 =22.4 Kg/ha. of N+22.4 Kg/ha. of P_2O_5 , T_2 =33.6 Kg/ha. of N+11.2 Kg/ha. of P_2O_5 , T_3 =33.6 Kg/ha. of N+22.4 Kg/ha. of P_2O_5 and T_4 =33.6 Kg/ha. of N.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) 16.8 m.×15.2 m. (iii) 4. (iv) (a) 16.8 m.×2.7 m. (b) 16.5 m.×2.4 m. (v) 15 cm.×15 cm. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1964-65. (Expt. failed in 1965). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1914 Kg/ha. (ii) 702.1 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	1122	1408	2006	2476	2560

C.D.=1081.2 Kg/ha.

Crop :- Maize (Kharif).

Ref :- M.P. 63(S.F.T.)

Site :- (District) : Ratlam.

Type :- 'M'.

Object :- Type A_1 : 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) (a) to (c) N.A. (ii) medium black (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

8 manurial treatments :

O =Control (no manure).

N_1 =60 Kg/ha. of N.

N_2 =120 Kg/ha. of N.

P_1 =35 Kg/ha. of P_2O_5 .

N_1P_1 =60 Kg/ha. of N+35 Kg/ha. of P_2O_5 .

N_2P_1 =120 Kg/ha. of N+35 Kg/ha. of P_2O_5 .

N_2P_2 =120 Kg/ha. of N+70 Kg/ha. of P_2O_5 .

$N_1P_2K_1$ =120 Kg/ha. of N+70 Kg/ha. of P_2O_5 +35 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 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. All the three type-C experiments are conducted on a legume crop. 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_1 , A_2 and A_3 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) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of grain in Kg/ha.	131	645	85	481	1192	1370	1383	294.3

Control mean=1739 Kg/ha. ; No. of trials=3.

Crop :- Maize (Kharif).

Ref :- M.P. 63(S.F.T.).

Site :- (District) : Ratlam.

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) (a) to (c) N.A. (ii) Medium black. (iii) 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.

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.

N₂P₂=120 Kg/ha. of N+70 Kg/ha. of P₂O₅.

N₂P₂K₂=120 Kg/ha. of N+70 Kg/ha. of P₂O₅+70 Kg/ha. of K₂O.

3. DESIGN :

Same as in Type A₁ on Maize on page 278.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of grain in Kg/ha.	336	158	408	691	593	1172	1370	244.1

Control mean=1818 Kg/ha. ; No. of trials=3.

Crop :- Maize (Kharif).

Ref :- M.P. 63(S.F.T.).

Site :- (District) : Ratlam.

Type :- 'M'.

Object :—A₂ : 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) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Unirrigated. (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_2O . $K_2 = 70$ Kg/ha. of K_2O . $N_1K_1 = 60$ Kg/ha. of N + 35 Kg/ha. of K_2O . $N_1K_2 = 60$ Kg/ha. of N + 70 Kg/ha. of K_2O . $N_2K_2 = 120$ Kg/ha. of N + 70 Kg/ha. of K_2O and $N_1P_1K_1 = 60$ Kg/ha. of N + 35 Kg/ha. of P_2O_5 + 35 Kg/ha. of K_2O .

3. DESIGN :

Same as in Type A₁ on Maize on page 278.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Treatment	N_1	K_1	K_2	N_1K_1	N_1K_2	N_2K_2	$N_1P_1K_1$	S.E.
Av. response of grain in Kg/ha.	658	-250	-98	566	573	467	1245	258.8

Control mean = 1363 Kg/ha. ; No. of trials = 3.

Crop :- Maize (Kharif).**Ref :- M.P. 61(130).****Site :- Agri. Res. Stn., Dhar.****Type :- 'MV'.**

Object :—To find out the best variety and dose of N for Maize.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) N.A. (iii) 29.6.61. (iv) (a) 2 *bakherings*. (b) Drilling. (c) 18 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) 2.10.61.

2. TREATMENTS :

Main-plot treatments :5 varieties: $V_1 = \text{Ganga-1}$, $V_2 = \text{Ganga-101}$, $V_3 = \text{Ranjit}$, $V_4 = \text{Deccan}$ and $V_5 = \text{Local}$.**Sub-plot treatments :**2 levels of N as A/S: $N_1 = 44.8$ and $N_2 = 112$ Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 5 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 15.2 m. \times 6.1 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1961—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 2136 Kg/ha. (ii) (a) 518.8 Kg/ha. (b) 349.2 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	Mean
N ₁	1539	2092	2013	2366	1393	1881
N ₂	1721	2726	2759	3054	1699	2392
Mean	1630	2409	2386	2710	1546	2136

C.D. for N marginal means=401.6 Kg/ha.

Crop :- Maize (Kharif).

Ref :- M.P. 61(128), 62(89), 63(68).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'MV'.

Object : To find out the best variety and fertilizer combination for Maize.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) (a) Sandy loam with stones. (iii) 26.6.61 ; 7.7.62 ; 1st week of July, 63. (iv) (a) 2 *bakherings*. (b) Drilling by *duffan*. (c) 18 Kg/ha. (d) 46 cm. between rows. (e) -. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) and (ix) N.A. (x) 30.9.61 ; 10.10.62 ; N.A.

2. TREATMENTS :

Main-plot treatments :

4 levels of fertilizers : M₀=0, M₁=22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅, M₂=44.8 Kg/ha. of N+44.8 Kg/ha. of P₂O₅ and M₃=44.8 Kg/ha. of N+44.8 Kg/ha. of P₂O₅+ 22.4 Kg/ha. of K₂O.

Sub-plot treatments :

2 varieties : V₁=Sumari and V₂=Yellow.

3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 3.7 m. × 18.3 m. for 61 ; N.A. for others. (b) 2.4 m. × 16.8 m. for 61 ; 2.5 m. × 13.7 m. for others. (v) 61 cm. × 70 cm. for 61 ; N.A. for others. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. ; Nil. ; N.A. (iii) Grain yield. (iv) (a) 1961—63. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As main-plot and sub-plot error variances are heterogeneous results of individual years have been presented under 5.—Results.

5. RESULTS :

61(128)

(i) 942 Kg/ha. (ii) (a) 177.3 Kg/ha. (b) 168.7 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
V ₁	495	650	1071	1495	928
V ₂	485	740	1169	1427	955
Mean	490	695	1120	1461	942

C.D. for M marginal means=283.4 Kg/ha.

62(89)

- (i) 1342 Kg/ha. (ii) (a) 430.6 Kg/ha. (b) 448.6 Kg/ha. (iii) Main effect of M alone is highly significant.
 (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
V ₁	502	991	1832	2246	1393
V ₂	520	1161	1376	2108	1291
Mean	511	1076	1604	2277	1342

C.D. for M marginal means=688.7 Kg/ha.

63(68)

- (i) 507 Kg/ha. (ii) (a) 258.8 Kg/ha. (b) 229.0 Kg/ha. (iii) Main effects of M and V are highly significant.

	M ₀	M ₁	M ₂	M ₃	Mean
V ₁	127	329	456	583	374
V ₂	183	422	755	1203	641
Mean	155	376	605	893	507

C.D. for M marginal means=292.6 Kg/ha.

C.D. for V marginal means=176.4 Kg/ha.

Crop :- Maize (Kharif).

Ref :- M.P. 62(91).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'MV'.

Object :- To find out the best variety and dose of N for Maize.

1. BASAL CONDITIONS :

- (i) (a) to (c) N.A. (ii) (a) Sandy loam. (iii) N.A. (iv) (a) *Bakherings*. (b) Drilling. (c) 18 Kg/ha.
 (d) 46 cm. between rows. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

Main-plot treatments :

- 9 varieties: V₁=Ganga-1, V₂=Ganga-101, V₃=Ranjit, V₄=Deccan, V₅=V.L.-54, V₆=D.T.×Mahan white, V₇=D.T.×Rudrapur white, V₈=D.T.×Indore state and V₉=Local.

Sub-plot treatments :

- 2 levels of N as A/S: N₁=44.8 and N₂=112 Kg/ha.

3. DESIGN :

- (i) Split-plot. (ii) (a) 9 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A.
 (b) 9.1 m.×6.1 m. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Nil. (iii) Grain weight. (iv) (a) 1962—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

- (i) 1783 Kg/ha. (ii) (a) 385.7 Kg/ha. (b) 260.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	V ₇	V ₈	V ₉	Mean
N ₀	1183	1722	1954	1788	2117	1323	2192	1889	1319	1721
N ₁	1691	1919	2408	1954	2193	1582	1906	1613	1335	1845
Mean	1437	1820	2181	1871	2155	1452	2049	1751	1327	1783

Crop :- Maize (Kharif).

Ref :- M.P. 62(136), 63(86).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'CMV'.

Object :-To study the effect of N and plant population on the yield of two varieties of Maize.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clayey loam. (iii) 5.7.62 ; 24.6.63. (iv) (a) N.A. (b) Dibbling. (c) 22 Kg/ha. (d) As per treatments. (e) —. (v) 92.5 Kg/ha. of P₂O₅ + 92.5 Kg/ha. of K₂O. (vi) As per treatments. (vii) Unirrigated. (viii) and (ix) N.A. (x) 24.10.62 ; 23.9.63 and 15.10.63.

2. TREATMENTS:

Main-plot treatments :

2 varieties : V₁=Dacca Hybrid and V₂=Local.

Sub-plot treatments :

3 row spacings : S₁=61 cm., S₂=86 cm. and S₃=91 cm.

Sub-sub-plot treatments :

3 levels of N : N₁=67.0, N₂=134.0 and N₃=202.0 Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 3 sub-plots/main-plot, 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 9.1 m. × 3.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain yield. (iv) (a) 1961—63 (complete results for 61 N.A.) (b) N.A. (c) Nil. (v) and (vi) Nil. (vii) Main-plot and sub-plot error variances are homogeneous. Sub-sub-plot error variances are heterogeneous and therefore, results of individual years have been presented under 5.—Results :

5. RESULTS:

62(136)

(i) 1656 Kg/ha. (ii) (a) 382.9 Kg/ha. (b) 249.5 Kg/ha. (c) 230.1 Kg/ha. (iii) Main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.

	S ₁	S ₂	S ₃	N ₁	N ₂	N ₃	Mean
V ₁	1868	1768	1634	1539	1762	1970	1757
V ₂	1607	1583	1476	1409	1540	1717	1555
Mean	1738	1676	1555	1474	1651	1843	1656
N ₁	1533	1476	1414				
N ₂	1710	1765	1478				
N ₃	1970	1786	1774				

C.D. for N marginal means = 134.8 Kg/ha.

63(86)

(i) 1318 Kg/ha. (ii) (a) 352.2 Kg/ha. (b) 220.6 Kg/ha. (c) 163.9 Kg/ha. (iii) Main effects of V and N and interaction $V \times N$ are highly significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	N_1	N_2	N_3	Mean
V_1	1616	1605	1686	1220	1766	1921	1635
V_2	1096	970	934	894	986	1119	1000
Mean	1356	1288	1310	1057	1376	1520	1318
N_1	1129	1017	1026				
N_2	1402	1323	1404				
N_3	1537	1524	1499				

C.D. for V marginal means = 264.2 Kg/ha.
 C.D. for N marginal means = 96.0 Kg/ha.
 C.D. for V means at the same level of N = 135.7 Kg/ha.
 C.D. for N means at the same level of V = 201.6 Kg/ha.

Crop :- Maize (Kharif).

Ref :- M.P. 62(96).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'D'.

Object :- To study the effect of the herbicides in controlling weeds.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 28.6.62. (iv) (a) 2 *bakherings*. (b) Drilling by duffan. (c) 18 Kg/ha. (d) 46 cm. between rows. (e) —. (v) and (vi) N.A. (vii) Unirrigated. (viii) and (ix) N.A. (x) 11.9.62.

2. TREATMENTS :

All combinations of (1) and (2)+2 extra treatments.

(1) 4 weedicides : W_1 =Fenoxone—Sodium salt of 2, 4-D, W_2 =Dicotox—Ethyl Ester of 2, 4-D, W_3 =Hedonal—Amine salt of 2, 4-D, and W_4 =Agroxone—M.C.P.A.

(2) 3 doses of weedicides : D_1 =0.56, D_2 =1.12 and D_3 =1.68 Kg acid eq./ha.

Extra treatments :- T_0 =control and T_1 =Local method of weeding.

3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 5. (iv) (a) 4.6 m. \times 3.6 m. (b) 3.7 m. \times 2.7 m. (v) 46 cm. \times 46 cm. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) Nil. (iii) Grain yield. (iv) (a) 1962—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 575 Kg/ha. (ii) 357.1 Kg/ha. (iii) T_0 vs. T_1 is significant. (iv) Av. yield of grain in Kg/ha.

T_0 =399 Kg/ha., T_1 =927 Kg/ha.

	W_1	W_2	W_3	W_4	Mean
D_1	439	584	326	486	459
D_2	977	634	543	573	682
D_3	574	334	507	743	540
Mean	663	517	459	601	560

C.D. for T_0 vs. T_1 =453.9 Kg/ha.

Crop :- Maize (Kharif).

Ref :- M.P. 62(95).

Site :- Govt. Agri. Res. Stn. Jhabua.

Type :- 'D'.

Object :- To study the effect of cultural-cum-herbicidal treatments in controlling weeds.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 27.6.62. (iv) (a) *bakherings*. (b) Drilling. (c) 18 Kg/ha. (d) 46 cm. between rows. (e) —. (v) to (x) N.A.

2. TREATMENTS :

10 cultural-cum-weedicidal treatments: T₀ control (No weeding), T₁=Local method of weeding, T₂=Pre-emergence application of weedicide—once, T₃=Post-emergence application of weedicide—once, T₄=Post-emergence application of weedicide—twice, T₅=Combination of post-emergence and pre-emergence application of weedicide—once, T₆=Pre-emergence application of weedicide+Cultural method of weeding—once (with implement or hand weeding), T₇=Post-emergence application of weedicide+Cultural method of weeding—once (with implement or handweeding), T₈=Combination of post-emergence and pre-emergence applications of weedicide+Cultural method of weeding—once (with implement or hand weeding) and T₉=Cultural method of weeding—once (with implement or hand weeding).

Pre-emergence application 3 days after sowing and post-emergence applications 3 and 6 weeks after sowing. Name of weedicide and its dose N.A.

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 3.6 m. (b) 3.7 m. × 2.7 m. (v) 46 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain yield. (4) (a) 1962—only, (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1734 Kg/ha. (ii) 507.6 Kg/ha. (iii) Treatment differences are highly 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	T ₈	T ₉
Av. yield:	1146	1844	1894	1570	1532	1283	1794	2566	1221	2492

C.D.=736.0 Kg/ha.

Crop :- Kutki (Kharif).

Ref :- M.P. 60(101), 61(78), 62(43).

Site :- Govt. Agri. Res. Farm, Chhindwara. Type :- 'M'.

Object :- To find out the optimum N and P levels for *kutki*.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. for 60; Kodon for others. (c) Nil for 61 and N.A. for others. (ii) Sandy. (iii) 29.6.60; 21.6.61; 2.7.62. (iv) (a) 2 *bakherings*. (b) Drilling. (c) 17 Kg/ha. (d) 23 cm. between rows. (e) —. (v) Nil. (vi) Local for 60, No. 45 for others. (vii) Unirrigated. (viii) One weeding. (ix) 97 cm.; 100 cm.; 70 cm. (x) 8.10.60; 14.10.61; 5.10.62.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 3 levels of N as A/s. : $N_0=0$ $N_1=8.4$ $N_2=16.8$ Kg/ha.

(2) 2 levels of P_2O_5 as Super: $P_0=0$ and $P_1=11.2$ Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 9.1 m. \times 3.1 m. (v) Nil. (vi) Yes

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-62 (b) No. (c) Results of combined analysis have been presented under 5.—Results. (v) and (vi) Nil. (vii) Error variances are heterogenous and treatments \times years interaction is present.

5. RESULTS :

Pooled results

(i) 296 Kg/ha. (ii) 142.5 Kg/ha. (based on 10 d.f. made up of treatments \times years interaction). (iii) Main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	184	312	323	273
P_1	299	302	356	319
Mean	242	307	340	296

C.D. for N marginal means = 74.8 Kg/ha.

Individual results:

Treatment	N_0	N_1	N_2	Sig.	P_0	P_1	Sig.	G.M.	S.E./plot
Year									
1960	158	186	271	*	184	226	N.S.	205	90.0
1961	241	340	341	*	274	341	*	307	53.2
1962	325	393	407	*	362	389	N.S.	375	48.0
Pooled	242	307	340	*	273	319	N.S.	296	142.5

Crop :- Kodon (*Kharif*).

Site :- Govt. Agri. Res. Farm,

Chhindwara.

Ref :- M.P. 60(100), 61(77), 62(44).

Type :- 'M'.

Object :- To find out the effect of N and P on the yield of Kodon.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) N.A. for 60; Kutki for others. (c) N.A. for 60; Nil for others. (ii) Light sandy. (iii) 28.6.60; 20.6.61; 3.7.62. (iv) (a) 2-3 *bakherings*. (b) Drilling in lines. (c) 17 Kg/ha. (d) 23 cm. between rows. (e) —. (v) Nil for 60, 61; 25 C.L./ha of F.Y.M. for 62. (vi) Local. (vii) Unirrigated. (viii) One weeding. (ix) 97 cm.; 100 cm.; 70 cm. (x) 13.10.60; 15.10.61; 31.10.62.

2. TREATMENTS :

All combinations of (1) and (2).

- (1) 3 levels of N as A/s : $N_0=0$, $N_1=8.4$ and $N_2=16.8$ Kg/ha.
 (2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=11.2$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 9.1 m. \times 3.1 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-62. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) Kuthulia. (vi) Nil. (vii) Error variances are heterogeneous and Treatments \times years interaction is present.

5. RESULTS :

Pooled results

(i) 629 Kg/ha. (ii) 277.7 Kg/ha. (based on 10 d.f. made up treatment \times years interaction). (iii) Main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	352	605	635	597
P_1	523	634	824	660
Mean	438	619	830	629

C.D. for N marginal means = 145.8 Kg/ha.

Individual results

Treatments	N_0	N_1	N_2	Sig.	P_0	P_1	Sig.	G.M.	S.E./plot
Years									
1960	549	656	1045	**	712	788	N.S.	750	261.9
1961	222	347	393	**	258	384	**	321	67.2
1962	542	854	1051	**	823	809	N.S.	816	192.8
Pooled	438	619	830	**	597	660	N.S.	629	277.7

Crop :- Kodon (Kharif).

Ref :- M.P. 61(123), 62(75).

Site :- Agri. Res. Stn., Kuthulia.

Type :- 'M'.

Object :- To study the effect on N and P on the yield of Kodon.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Clayey and clayey loam. (iii) and (iv) N.A. (v) Nil.; N.A. (vi) Local. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)

- (1) 3 levels of N as A/S : $N_0=0$, $N_1=8.4$ and $N_2=16.8$ Kg/ha.
 (2) 2 levels of P_2O_5 as Super : $P_0=0$, and $P_1=11.2$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 4.9 m. × 8.5 m. ; 4.9 m. × 7.6 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—62. (b) No. (c) Results of combined analysis have been presented under 5 - Results. (v) Chhindwara. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS :

Pooled results

(i) 662 Kg/ha. (ii) 195.2 Kg/ha. (based on 55 d.f. made up of pooled error and Treatments × years interaction). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	615	684	762	687
P ₁	628	615	671	638
Mean	621	649	717	662

Individual results

Treatment	N ₀	N ₁	N ₂	Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
Years									
1961	696	764	714	N.S.	752	697	N.S.	725	205.5
1962	546	534	719	*	621	578	N.S.	600	174.8
Pooled	621	649	717	N.S.	687	638	N.S.	662	195.2

Crop :- Kodon (Kharif).

Ref :- M.P. 65(22).

Site :- Agri. Res. Stn., Kuthulia.

Type :- 'MV'.

Object :—To study the performance of different varieties of *Kodon* under different levels of N and P.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Wheat. (c) N.A. (ii) Clay loam. (iii) July, 65. (iv) (a) 2 ploughings and 1 harrowing by tractor. (b) Behind *Nari* plough. (c) N.A. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) 1 to 2 weedings. (ix) and (x) N.A.

2. TREATMENTS :

Main-plot treatments :

5 varieties : N₁=No.—10, V₂=T—18, V₃=H.S.—66, V₄=No—96 and V₅=Local.

Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of N : N₀=0, N₁=16.8 and N₂=33.6 Kg/ha.

(2) 2 levels of P₂O₅ : P₁=16.8 and P₂=33.6 Kg/ha.

All fertilizers were applied before sowing.

3. DESIGN:

(i) Split-plot. (ii) 5 main-plots/replication ; 6 sub-plots/main-plot. (b) 21.3 m. × 25.3 m. (iii) 4.
(iv) (a) 7.3 m. × 5.5 m. (b) 6.4 m. × 4.9 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Tiller count, height of plants, length of ear head and grain yield. (iv) (a) 1965 Contd. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 2682 Kg/ha. (ii) (a) 703.4 Kg/ha. (b) 415.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P ₁	P ₂	V ₁	V ₂	V ₃	V ₄	V ₅	Mean
N ₀	2585	2540	2547	2391	2599	2627	2651	2563
N ₁	2443	3112	2825	2887	2625	2563	2987	2777
N ₂	2696	2717	2693	2953	2805	2539	2543	2707
Mean	2575	2790	2688	2744	2676	2576	2727	2682
V ₁	2592	2784						
V ₂	2527	2961						
V ₃	2646	2707						
V ₄	2612	2540						
V ₅	2496	2958						

Crop :- Bhadli (Kharif).

Ref :- M.P. 60(30):

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'M'.

Object:—To study the response of N and P doses on the yield of *Bhadli*.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Groundnut. (c) Nil. (ii) Sandy loam with stone. (iii) 28.7.60. (iv) (a) *Bakharing* and ploughing cross-wise. (b) Drilling with *desi duffan*. (c) 9 Kg/ha. (d) 30 cm. between rows. (e) — (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) 1 interculture and 2 hand weedings. (ix) 23 cm. (x) 25.10.60.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N₀=0, N₁=8.4 and N₂=16.8 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=16.8 Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) 6. (b) N.A. (iii) 6. (iv) (a) 3.7 m. × 9.1 m. (b) 3.1 m. × 7.6 m. (v) 30 cm. × 76 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS:

(i) 381 Kg/ha. (ii) 83.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	372	383	389	381
P ₁	345	389	408	381
Mean	358	386	398	381

Crop :- Lakh (Rabi).

Ref :- M.P. 61(61), 62(41).

Site :- Govt. Agri. Res. Stn., Labhandi.

Type :- 'M'.

Object :-To study the residual effect of fertilizer applied to Paddy crop on the succeeding Lakh crop.

1. BASAL CONDITIONS:

(i) (a) Paddy—Lakh; Nil. (b) Paddy. (c) As per treatments. (ii) *Dorsa*. (iii) N.A. (iv) (a) Nil, (b) Lakh broadcasted in standing Paddy crop. (c) N.A. (d) and (e) —. (v) Nil. (vi) N.A. (vii) U₁irrigated. (viii) N.A. (ix) 2 cm., 4 cm. (x) N.A.; 5.3.63.

2. TREATMENTS:

3 manurial treatments : M₀ = No manure ((control), M₁ = 22.4 Kg/ha. of N at puddling + 22.4 Kg/ha. of N at tillering and M₂ = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P₂O₅ at puddling + 22.4 Kg/ha. of N at tillering.

N as A/S and P₂O₅ as Super applied to previous Paddy crop.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) 5.2 m. × 9.5 m. (b) 4.6 m. × 8.5 m. (v) 30 cm. × 50 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961—62. (b) Yes. (c) Results of combined analysis have been presented under 5.—Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results

(i) 585. Kg/ha. (ii) 194.0 Kg/ha. (based on 2 d.f. made up of Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M ₀	M ₁	M ₂
Av. yield	566	628	560

Individual results

Treatment	M ₀	M ₁	M ₂	Sig.	G.M.	S.E./plot
Years						
1961	753	864	699	*	772	122.7
1962	378	392	421	N.S.	397	53.3
Pooled	566	628	560	N.S.	585	194.0

Crop :- Tur (*Kharif*).

Ref :- M.P. 60(35), 61(22).

Site :- Govt. Seed and Demons. Farm, Biora.

Type :- 'M'.

Object :- To find out the suitable manurial combination of N and P for increasing the yield of Tur.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Wheat, *Jowar*. (c) 16.8 Kg/ha. of N+33.6 Kg/ha. of P_2O_5 ; 16.8 Kg/ha. of N+16.8 Kg/ha. of P_2O_5 . (ii) Clay. (iii) 1.7.60; 9.7.61. (iv) (a) 2 *bakherings*. (b) Drilling. (c) 11 Kg/ha.; 18 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) One hand weeding by *khurpi*. (ix) 56 cm.; 56 cm. (x) 30.12.60; 20.1.62.

2. TREATMENTS:

All combinations of (1) and (2).

(1) 2 levels of N as A/S: $N_0=0$ and $N_1=11.2$ Kg/ha.(2) 4 levels of P_2O_5 as Super: $P_0=0$, $P_1=8.4$, $P_2=16.8$ and $P_3=25.2$ Kg/ha.

Fertilizer drilled with seed.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 4.6 m. \times 10.7 m. (b) 3.7 m. \times 9.1 m. (v) 45 cm. \times 80 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-61. (b) No. (c) Nil. (v) Khargone, Khandwa and Reora. (vi) Nil. (vii) As error variances are heterogeneous and treatments \times years interaction is absent, results of individual years have been presented under 5-Results.

5. RESULTS:

60(35)

(i) 371 Kg/ha. (ii) 90.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P_0	P_1	P_2	P_3	Mean
N_0	412	409	307	375	376
N_1	382	359	333	394	367
Mean	397	384	320	385	371

61(22)

(i) 757 Kg/ha. (ii) 275.4 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	P_0	P_1	P_2	P_3	Mean
N_0	620	577	806	545	637
N_1	756	862	1070	821	877
Mean	688	720	938	683	757

C.D. for N marginal means = 202.3 Kg/ha.

Crop :- Tur (Kharif).**Ref :- M.P. 60(67)****Site :- Govt. Expt. Farm., Khandwa.****Type :- 'M'.**

Object :—To find out the suitable manurial combination of N and P for increasing the yield of Tur.

1. BASAL CONDITIONS :(i) (a) Nil. (b) *Jowar*. (c) N.A. (ii) Medium black. (iii) 6.7.60. (iv) (a) 3 *bakherings*. (b) Drilled by tiffan. (c) 22 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) E.B.—38. (vii) Unirrigated. (viii) Weeding and hoeing. (ix) 65 cm. (x) 26.12.60.**2. TREATMENTS :**

Same as in Expts. No. 60(35), 61(22) on page 291.

3. DESIGN :

(i) Fact in R.B.D. (ii) (a) 8. (b) 21.3 m. × 18.3 m. (iii) 4. (a) 4.6 m. × 10.7 m. (b) 3.7 m. × 9.1 m. (v) 45 cm. × 80 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—only. (t) and (c) —. (v) Biora and Reora. (vi) and (vii) Nil.

5. RESULTS :

(i) 2024 Kg/ha. (ii) 403.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	P ₃	Mean
N ₀	1757	1875	2071	2078	1945
N ₁	2130	2123	2011	2150	2103
Mean	1942	1999	2041	2113	2024

Crop :- Tur (Kharif).**Ref :- M.P. 61(63).****Site :- Regional Res. Stn., Khargone.****Type :- 'M'.**

Object :—To find out the suitable manurial combination of N and P for increasing the yield of Tur.

1. BASAL CONDITIONS:(i) (a) Cotton—*Jowar*—*Tur*. (b) *Jowar*. (c) Nil. (ii) Medium black cotton soil. (iii) 30.6.61. (iv) (a) 2 ploughings and 3 *bakherings*. (b) Seed drilled. (c) 13 Kg/ha. (d) 41 cm. × 15 to 23 cm. (e) N.A. (v) Nil. (vi) Khargone—2. (vii) Unirrigated. (viii) Two hand weedings and intercultures. (ix) 119 cm. (x) 4.1.62.**2. TREATMENTS :**

Same as in Expts. No. 60(35) and 61(22) on page 291.

3. DESIGN

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.7 m. × 4.9 m. (b) 9.1 m. × 4.1 m. (v) 80 cm. × 40 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—only. (b) and (c) —. (v) Biora. (vi) and (vii) N.A.

5. RESULTS:

(i) 614 Kg/ha. (ii) 92.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	P ₃	Mean
N ₀	502	559	675	668	601
N ₁	629	623	612	646	627
Mean	566	591	644	657	614

Crop :- Tur (Kharif).

Ref :- M.P. 60(142).

Site :- State Mechanised Farm, Reora.

Type :- 'M'.

Object :- To find out the suitable manurial combination of N and P for increasing the yield of Tur.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) First week of July '60. (iv) (a) Two ploughings. (b) Line sowing. (c) 17 Kg/ha. (d) 61 cm. × 30 cm. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) One weeding. (ix) N.A. (x) First week of March, '61.

2. TREATMENTS:

Same as in Expts. No. 60(35), and 61(22), on page 291.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.6 m. × 4.6 m. (b) 9.1 m. × 3.7 m. (v) 75 cm. × 45 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain-yield. (iv) (a) 1960—only. (b) and (c) —. (v) Khandwa and Biora. (v) to (vii) Nil.

5. RESULTS:

(i) 2309 Kg/ha. (ii) 192.4 Kg/ha (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	P ₃	Mean
N ₀	1330	1718	2062	2382	1873
N ₁	1970	2568	3056	3385	2745
Mean	1650	2143	2559	2883	2309

C.D. for N marginal means=141.5 Kg/ha.

C.D. for P marginal means=200.0 Kg/ha.

Crop :- Gram (Rabi).

Ref :- M.P. 60(93), 61(73).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'M'.

Object :- To find out the effect of N and P on the yield of Gram.

1. BASAL CONDITIONS :

(i) (a) Wheat—Gram ; Nil. (b) Wheat ; Vegetable. (c) 33.6 Kg/ha. of N as A/S+16.8 Kg/ha. of P_2O_5 as Super ; 24.7 C.L./ha. of F.Y.M. (ii) Light soil ; Medium. (iii) 14.10.60 ; 14.11.61. (iv) (a) 1 ploughing and *bakherings*. (b) Drilled by *Nari*. (c) 78 Kg/ha. (d) 23 cm.×15 cm. (e) N.A. (v) Nil. (vi) Grain No. 28. (vii) Unirrigated. (viii) Nil. (ix) 7 cm. ; 13 cm. (x) 12.2.61 : 19.3.62.

2. TREATMENTS :

All combinations of (1) and (2)+a control (T_0)

- (1) 2 levels of N as A/S : $N_1=8.4$ and $N_2=16.8$ Kg/ha.
 (2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=11.2$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 6.4 m.×3.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1959-61. (b) No. (c) Nil. (v) Reora. (vi) Nil. (vii) Expt No 59(100) is also taken into account. Error variances are heterogeneous, Treatments×years interaction is absent hence results of individual years are presented below.

5. RESULTS :

60(93)

(i) 558 Kg/ha. (ii) 206.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

$T_0=436$ Kg/ha.

	P_0	P_1	Mean
N_1	565	573	569
N_2	666	549	607
Mean	615	561	588

61(73)

(i) 458 Kg/ha. (ii) 93.7 Kg/ha. (iii) Main effect of N and control vs. others are highly significant. (iv) Av. yield of grain in Kg/ha.

$T_0=323$ Kg/ha.

	P_0	P_1	Mean
N_1	420	452	436
N_2	581	516	549
Mean	500	484	492

C.D. for N marginal means=79.6 Kg/ha.

C.D. for control vs. others=113.9 Kg/ha.

Crop :- Gram (Rabi).

M.P. 60(94), 61(72).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'M'.

Object :- To find out the optimum combination of different levels of N and P for Gram.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Vegetable ; groundnut. (c) 12.8 Kg/ha. of P_2O_5 as super + 6.9 Kg/ha. of N as A/S ; Nil.
 (ii) Light soil. (iii) 18.10.60 ; 24.10.61. (iv) (a) 1 ploughing and 2 bakherings. (b) Sown by Dubba ; drilled by Nari. (c) 78 Kg/ha. (d) 23 cm. x 15 cm. (e) N.A. (v) Nil. (vi) Gwalior T-87, (vii) Unirrigated.
 (viii) Nil. (ix) 7 cm. ; 18 cm. (x) 18.2.61 ; 9.3.62.

2. TREATMENTS:

All combinations of (1) and (2).

(1) 3 levels of P_2O_5 as Super : $P_0=0$, $P_1=8.4$ and $P_2=16.8$ Kg/ha.(2) 2 levels of N as A/S : $N_0=0$ and $N_1=11.2$ Kg/ha.

Fertilizers drilled with seed.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 7'0 in. x 4'3 in. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good ; Poor, (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-61. (b) No. (c) Results of combined analysis and individual analysis are presented under 5. Results. (v) Nabibagh, Vidisha, Kuthulia, Khargone, for 1960 ; Vidisha for 61. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:

Pooled results

(i) 484 Kg/ha. (ii) 146.0 Kg/ha. (based on 55 d.f. made up of pooled error and Treatments x years interaction). (iii) Main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

	P_0	P_1	P_2	Mean
N_0	366	516	455	445
N_1	488	512	567	522
Mean:	427	514	511	484

C,D. for N marginal means = 69.0 Kg/ha.

Individual results

Treatments	N_0	N_1	Sig.	P_0	P_1	P_2	Sig.	G.M.	S.E./plot
Years									
1960	651	767	*	679	701	747	N.S.	709	161.0
1961	239	278	N.S.	175	326	274	*	258	128.1
Pooled	445	522	*	427	514	511	N.S.	484	146.0

Crop :- Gram (Rabi).

Ref :- 60(95), 61(138), 62(48).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'M'.

Object :- To find out N and P requirement of Gram and its effect on succeeding-Wheat crop.

1. BASAL CONDITIONS :

(i) (a) Wheat-Gram. (b) Wheat. (c) N.A. (ii) Medium for 60 and 62 ; Sehra for 61. (iii) 4.11.60 ; 9.11.61 ; 21.10.62. (iv) (a) Ploughing and *bakherings*. (b) Drilled by *Nari*. (c) 60 Kg/ha. ; 78 Kg/ha. ; 58 Kg/ha. (d) 23 cm. × 15 cm. (e) N.A. (v) Nil. (vi) Gwalior T-87. (vii) Unirrigated. (viii) Nil. (ix) 29 cm. ; N.A. ; 15 cm. (x) 2.3.61 ; 9.3.62 ; 2.3.63.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 3 levels of N as A/S : $N_0=0$, $N_1=8.4$ and $N_2=16.8$ Kg/ha.

(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=11.2$ Kg/ha.

Fertilizers mixed with seed and sown.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 9.1 m. × 4.3 m. for 1960, 61 ; 10.7 m. × 2.7 m. for 62. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good for 60, 61 ; crop affected by cold waves for 1962. (ii) Nil for 1960, 61 ; crop was affected with Fungi up to 40% for 1962. (iii) Grain yield. (iv) (a) 1959-62. (b) No. (c) Nil. (v) Nil for 1960 ; Ujjain, Nabibagh, Kuthulia for 61 ; Vidisha, Reora, Kuthulia for 1962. (vi) Nil. (viii) Expt. No. 59(96) was also taken in account. Variances are heterogeneous, Treatment × years interaction is absent, hence the results of individual years are presented under 5. Results.

5. RESULTS :

60(95)

(i) 536 Kg/ha. (ii) 164.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	477	642	557	559
P_1	516	497	530	514
Mean	496	569	543	536

61(138)

(i) 538 Kg/ha. (ii) 162.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	481	643	559	561
P_1	518	499	529	515
Mean	499	571	544	538

62(48)

(i) 629 Kg/ha. (ii) 48.0 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	523	601	639	588
P_1	652	672	685	670
Mean	588	636	662	629

C.D. for N marginal means = 40.2 Kg/ha.

C.D. for P marginal means = 32.9 Kg/ha.

Crop :- Gram (Rabi).**Ref :- M.P. 61(126).****Site :- Govt. Agri. Res. Stn., Jhabna.****Type :- 'M'.****Object :-**To find out the effect of N and P on the yield of Grain.**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 27.10.61. (iv) (a) *Bakhering*. (b) Drilling. (c) 67.0 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) Ujjain-21. (vii) Unirrigated. (viii) and (ix) N.A. (x) 6.2.62.

2. TREATMENTS:

All combinations of (1) and (2)+a control (C).

(1) 2 levels of N as A/S : $N_1=8.4$ and $N_2=16.8$ Kg/ha.(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=11.2$ Kg/ha.**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 2.4 m. \times 10.7 m. (b) 1.8 m. \times 9.1 m. (v) 30 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1961-only. (b) and (c) Nil. (v) (a) Chhindwara. (b) Nil. (vi) and (vii) No.

5. RESULTS :

(i) 390 Kg/ha. (ii) 35.9 Kg/ha. (iii) Effect of 'control vs others' is highly significant. Main effect of P is significant. (iv) Av. yield of grain in Kg/ha.

C=299 Kg/ha.

	P_0	P_1	Mean
N_1	388	427	407
N_2	375	462	419
Mean	381	445	413

C.D. for 'P' marginal means=39.0 Kg/ha.

C.D. for "control vs others" means=55.2 Kg/ha.

Crop :- Gram (Rabi).**Ref :- M.P. 61(115), 62(80).****Site :- Agri. Res. Stn., Kuthulia.****Type :- 'M'.****Object :-**To find out the N and P requirement on Gram.**1. BASAL CONDITIONS:**

(i) (a) to (c) N.A. (ii) Clayey and clayey loam. (iii) 15.11.61 ; 23.10.62. (iv) (a) 3 ploughings. (b) Line sowing. (c) 34 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) T-81. (vii) Unirrigated. (viii) N.A. ; 1 weeding. (ix) N.A. (x) 11.4.62 ; 15.3.63.

2. TREATMENTS :

Same as expt. Nos. 60(95), 61(138), 62(48) presented on page 295.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 3.0 m. × 13.7 m. (b) 2.4 m. × 12.2 m. (v) 30 cm. × 76 cm (vi) Yes.

4. GENERAL:

(i) Poor; satisfactory. (ii) N.A.; Nil. (iii) Yield of grain. (iv) (a) 1961-62. (b) N.A. (c) Nil. (v) Ujjain, Nabibagh, Chhindwara for 61; Vidisha, Reora, Chhindwara for, 62. (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is absent, hence individual results are presented under 5.—Results.

5. RESULTS:

61(115)

(i) 309 Kg/ha. (ii) 4.7 Kg/ha. (iii) Main effects of N, P and interaction N × P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	225	309	336	290
P ₁	295	323	364	327
Mean	260	316	350	309

C.D. for N marginal means = 4.0 Kg/ha.
 C.D. for P marginal means = 3.2 Kg/ha.
 C.D. for body of N × P table = 5.6 Kg/ha.

62(80)

(i) 1255 Kg/ha. (ii) 282.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	1208	1151	1329	1229
P ₁	1220	1251	1373	1281
Mean	1214	1201	1351	1255

Crop :- Gram (Rabi).

Ref :- M.P. 60(148).

Site :- Agri. Res. Stn., Kuthulia.

Type :- 'M'.

Object :- To find out the N and P requirements of Gram.

1. BASAL CONDITIONS:

(i) (a) Paddy.—Gram. (b) Paddy. (c) N.A. (ii) Clayey and clayey loam. (iii) 17.10.60. (iv) (a) 3 ploughings. (b) Line sowing. (c) 33.6 Kg/ha. (d) 23 cm. between lines (e) —. (v) Nil. (vi) T—81. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 18.3.61.

2. TREATMENTS:

Same as expt. Nos. 60(94), 61(72) on Gram at page 295.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 9.1 m. × 3.0 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) and (c) Nil. (v) Chhindwara, Vidisha, Nabibagh and Khargone. (vi) and (vii) Nil.

5. RESULTS :

(i) 1416 Kg/ha. (ii) 505.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	Mean
N ₀	1439	1304	1470	1404
N ₁	1463	1256	1562	1427
Mean	1451	1280	1516	1416

Crop :- Gram (*Rabi*).

Ref :- M.P. 60(89).

Site :- Regional Res. Stn., Khargone.

Type :- 'M'.

Object :—To find out the N and P requirements of Gram.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black cotton soil. (iii) 6.10.60. (iv) (a) Bakharing. (b) Drilling. (c) 67 Kg/ha. (d) 41 cm. between rows. (e) —. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

Same as expt. Nos. 60(94), 61(72) on Gram at page 295.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 10.2 m. × 4.0 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Stand, height, No of Branches and yield of grain. (iv) (a) 1959—60. (b) No. (c) Nil. (v) Kuthulia, Chhindwara, Vidisha, Nabibagh. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 588 Kg/ha. (ii) 108.0 Kg/ha. (iii) Interaction N × P is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	Mea
N ₀	483	624	659	589
N ₁	612	607	539	586
Mean	548	616	599	588

C.D. of body of N × P table = 128.3 Kg/ha.

Crop :- Gram (Rabi).

Ref :- M.P. 60(78).

Site :- Central Agri. Res. Farm, Nabibagh.

Type :- 'M'.

Object :—To find out the N and P requirement of Gram.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram. (c) As per treatments. (ii) Medium black. (iii) 16.10.60. (iv) (a) 3 *bakherings*. (b) Seed drilled by *deshi* plough. (c) 56 Kg/ha. (d) 23 cm. between rows. (e) —. (v) Nil. (vi) N.P. 58. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 30.3.61.

2. TREATMENTS :

Same as expt. No. 60(94) on Gram at page 295.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 4.6 m. × 11.0 m. (b) 4.0 m. × 10.2 m. (v) 30 cm. × 40 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959—61 (modified in 1961). (b) Yes. (c) Nil. (v) Kuthulia, Chhindwara, Vidisha. Khargone. (vi) and (vii) Nil.

5. RESULTS:

(i) 484 Kg/ha. (ii) 130.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	Mean
N ₀	420	461	480	454
N ₁	490	511	544	515
Mean	455	486	512	484

Crop :- Gram (Rabi).

Ref :- M.P. 61(43).

**Site :- Govt. Seed Multiplication and Demon.
Farm, Nabibagh.**

Type :- 'M'.

Object :—To find out the N and P requirements of Gram.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Medium Black. (iii) 27.11.61. (iv) (a) 2 *bakherings* by *Bakher*. (b) Drilled by *deshi* plough. (c) 56 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) N.P. 58. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 22.4.62.

2. TREATMENTS :

Same as Expt. Nos. 60(95), 61(138), 62(48) on Gram at page 295.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 4.6 m. × 11.0 m. (b) 4.0 m. × 10.2 m. (v) 30 cm. × 40 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Bhusa and Grain yield. (iv) (a) 1959-61 (Modified in 1961). (b) No. (c) Nil. (v) Ujjain. Chhindwara, Kuthulia. (vi) and (vii) Nil.

5. RESULTS:

(i) 952 Kg/ha. (ii) 141.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	902	976	886	921
P ₁	935	1067	947	983
Mean	919	1022	916	952

Crop : Gram (Rabi).

Ref :- 62(116), 63(53).

Site :- Govt. Exptl. Farm, Powarkheda.

Type :- 'M'.

Object :—To find out the N and P requirements of Gram.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Gram. (c) As per treatments. (ii) Loamy to clayey black. (iii) 27.10.62; 23.10.63. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Adhartal-II. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 3.3.1963; 9.3.64.

2. TREATMENTS:

Same as expt. No. 60(89) on Gram at page 299.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 4.6 m. × 11.1 m. (b) 4.0 m. × 10.2 m. (v) 30 cm. × 46 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1962-63. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous. Treatments × years interaction is absent; hence the results of individual years are presented under 5. Results.

5. RESULTS:

62(116)

(i) 984 Kg/ha. (ii) 236.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	Mean
N ₀	886	972	977	945
N ₁	1004	1040	1024	1023
Mean	945	1006	1000	984

63(53)

(i) 838 Kg/ha. (ii) 62.0 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	Mean
N ₀	811	851	858	840
N ₁	761	873	874	836
Mean	786	862	866	838

C.D. for marginal means=52.1 Kg/ha.

Crop :- Gram (Rabi).

Ref :- M.P. 60(145).

Site :- State Mechanised Farm, Reora.

Type :- 'M'.

Object :—To find out the N and P requirements of Gram.

1. BASAL CONDITIONS :

(i) (a) Paddy—Gram. (b) Paddy. (c) N.A. (ii) Medium black. (iii) 4.11.60. (iv) (a) 3 *harrowings*. (b) Drilling. (c) 78 Kg/ha. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) IPI—707. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) First/second weeks of March, 61.

2. TREATMENTS :

Same as Expt. No. 60(93), 61(73) on Gram at page No. 293.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 13.7 m. × 3.7 m. (b) 12.2 m. × 2.4 m. (v) 75 cm. × 65 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) and (c) Nil. (v) Chhindwara. (vi) and (vii) Nil.

5. RESULTS :

(i) 995 Kg/ha. (ii) 316.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

T_e=1033.

	P ₀	P ₁	Mean
N ₁	975	1104	1039
N ₂	914	949	931
Mean	944	1026	985

Crop :- Gram (Rabi).

Ref :- M.P. 62(69).

Site :- State Mechanised Farm, Reora.

Type :- 'M'.

Object :—To find out N and P requirements of Gram.

1. BASAL CONDITIONS :

(i) (a) Paddy—Gram. (b) Paddy. (c) N.A. (ii) Medium black. (iii) 17.10.62. (iv) (a) 3 harrowings. (b) Drilling. (c) 78 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) T—87. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) First/Second week of March, 63.

2. TREATMENTS :

Same as expt. Nos. 60(95), 61(138), 62(48) as Gram at page No. 295.

3. DESIGN :

(i) Fact in R.B.D. (ii) (a) 6. (c) N.A. (iii) 6. (iv) (a) 13.7 m. × 3.7 m. (b) 12.2 m. × 3.0 m. (v) 75 cm. × 35 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) N.A. (iii) Grain yield. (iv) (a) 1962—only. (b) and (c) Nil. (v) Chhindwara, Kuthulia, Vidisha. (vi) and (vii) Nil.

5. RESULTS :

(i) 545 Kg/ha. (ii) 154.9 Kg/ha. (iii) P effect alone is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	516	444	475	478
P ₁	640	526	671	612
Mean	578	485	573	545

C.D. for P marginal means = 88.0 Kg/ha.

Crop :- Gram (Rabi).

Ref :- M.P. 61(112).

Site :- Central Exptl. Farm. Ujjain.

Type :- 'M'.

Object :- To find out the N and P requirement of Gram.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 18.11.61. (iv) (a) Bakherings and patela. (b) Drilling. (c) 67 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) Gram 4-24. (vii) Unirrigated. (viii) N.A. (ix) 8 cm. (x) 24.4.62.

2. TREATMENTS :

Same as expt. No. 60(95), 61(138), 62(48) on Gram at page 295.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 12.9 m. × 2.4 m. (iii) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1961-only. (b) and (c) Nil. (v) Nabibagh, Chhindwara, Kuthulia. (vi) and (vii) Nil.

5. RESULTS :

(i) 987 Kg/ha. (ii) 255.5 Kg/ha. (iii) Main effect of P alone is significant. (iii) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	731	850	1027	869
P ₁	1216	1010	1087	1104
Mean	974	930	1057	987

S.E. of N marginal mean=73.8 Kg/ha.

S.E. of P marginal mean=60.2 Kg/ha.

S.E. of body of table =104.3 Kg/ha.

Crop :- Gram (Rabi).

Ref :- M.P. 60(44), 61(110).

Site :- Govt. Agri. Farm, Vidisha.

Type :- 'M'.

Object :-To find out the N and P requirements of Gram.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Linseed ; wheat. (c) N.A. (ii) Heavy clay. (iii) 15.10.60 ; 24.11.61. (iv) (a) *Bakhering*. (b) Line sowing. (c) 67 Kg/ha. (d) 30 cm. between rows. (v) Nil. (vi) Ujjain-24. (vii) Unirrigated. (viii) Nil. (ix) 9 cm. ; 17 cm. (x) 5.3.61 ; 2.4.62.

2. TREATMENTS:

Same as expt. Nos. 60(94), 61(72) on gram at page 295.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 4.6 m.×11.0 m. (b) 4.0 m.×10.1 m. (v) 30 cm.×46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1959-61 (b) No. (c) Nil. (v) Khargone, Chhindwara, Nabibagh and Kuthulia for 60 ; Nabibagh for 61. (vi) Nil. (vii) Expt. No. 59(42) is also taken into account. Error variances are heterogeneous, Treatment×years interaction is absent, hence the results of individual years are presented under 5. Results.

5. RESULTS :

60(44)

(i) 1582 Kg/ha. (ii) 154.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	Mean
N ₀	1603	1662	1572	1612
N ₁	1513	1539	1601	1551
Mean	1558	1601	1587	1582

61(110)

(i) 2228 Kg/ha. (ii) 360.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P ₀	P ₁	P ₂	Mean
N ₀	2417	2230	1995	2214
N ₁	2211	2237	2277	2242
Mean	2314	2233	2136	2228

Crop :- Gram (Rabi).

Ref :- M.P. 62(79).

Site :- Govt. Agri. Farm, Vidisha.

Type :- 'M'.

Object :-To find out the N and P requirements of Gram.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Heavy clayey. (iii) 8.11.62. (iv) (a) 2 *bakherings*. (b) Drilling. (c) 34 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Ujjain-24. (vii) Unirrigated. (viii) and (ix) N.A. (x) 11.3.63.

2. TREATMENTS :

Same as expt. Nos. 60(95), 61(138), 62(48) on Gram given at page 295.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 3'0 m. × 13'7 m. (b) 2'4 m. × 12'2 m. (v) 30 cm. × 76 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-only. (b) No. (c) Nil. (v) Kuthulia, Chhindwara and Reora. (b) Nil (vi) and (vii) Nil.

5. RESULTS :

(i) 1203 Kg/ha. (ii) 134.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	1118	1195	1207	1173
P ₁	1239	1230	1230	1233
Mean	1178	1212	1218	1203

Crop :- Gram (Rabi).

Ref :- M.P. 61(123). 62(94).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'MV'.

Object :-To find the N and P requirement of two varieties of Gram.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 27.10.61 ; 13.10.62. (iv) (a) *Bakhering* and *patela*. (b) Drilling by *duffan*. (c) 67 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatment (vii) Unirrigated. (viii) and (ix) N.A. (x) 6.2.62 for Ujjain. 21 and 12.2.62 for T₁ ; 13.2.63 for U-21 and 5.3.63 for T₁.

2. TREATMENTS:

All combinations of (1), (2) and (3).

(1) 2 varieties : $V_1=Ujjain\ 21$ and $V_2=T_1$.

(2) 2 levels of N as A/S : $N_0=0$ and $N_1=16.8\ Kg/ha$.

(3) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=11.2\ Kg/ha$.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) $2.4\ m.\times 6.1\ m.$; $9.1\ m.\times 3.7\ m.$

(b) $1.8\ m.\times 4.9\ m.$, $7.3\ m.\times 2.4\ m.$ (v) $30\ cm.\times 61\ cm.$; $91\ cm.\times 61\ cm.$ (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1961-62. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments \times years interaction is absent, hence the results of individual years are presented under 5. Results.

5. RESULTS :

61(123)

(i) 402 Kg/ha. (ii) 73.1 Kg/ha. (iii) Main effect of N is significant. P effect is highly significant.

(iv) Av. yield of grain in Kg/ha.

	N_0	N_1	P_0	P_1	Mean
V_1	378	457	362	473	418
V_2	358	415	303	470	386
Mean	368	436	332	472	402
P_0	285	379			
P_1	451	493			

C.D. for N or P marginal means = 53.7 Kg/ha.

62(94)

(i) 807 Kg/ha. (ii) 131.2 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	P_0	P_1	Mean
V_1	744	927	751	919	835
V_2	693	866	689	870	779
Mean	719	896	720	894	807
P_0	610	831			
P_1	827	992			

C.D. for N or P marginal means = 96.5 Kg/ha.

Crop :- Gram (*Rabi*).

Ref :- M.P. 61(67).

Site :- Regional. Res. Stn., Khargone.

Type :- 'MV'.

Object :- To find out the N and P requirements of different varieties of Gram.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) and (c) N.A. (ii) Medium black cotton soil. (iii) 25.10.61. (iv) (a) 3 *bakherings*. (b) Drilling. (c) 67 Kg/ha. (d) 41 cm. between rows. (e) —. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) Hand weeding. (ix) N.A. (x) 24.1.62.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : $N_0=0$, $N_1=8.4$ and $N_2=16.8$ Kg/ha.(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=11.2$ Kg/ha.

Sub-plot treatments :

2 varieties : $V_1=Chafa$ and $V_2=Type-1$.

3. DESIGN :

- (i) Split-plot. (ii) (a) 6 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 9.1 m. \times 3.7 m (b) 7.6 m. \times 3.1 m. (v) 76 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

- (i) Satisfactory. (ii) Nil, (iii) Grain yield. (iv) (a) 1961—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 440 Kg/ha. (ii) (a) 97.6 Kg/ha. (b) 30.0 Kg/ha. (iii) Main effect of V is highly significant. (iv) Av. yield of grain in Kg/ha.

	N_0	N_1	N_2	V_1	V_2	Mean
P_0	455	486	422	417	491	454
P_1	437	433	406	402	449	425
Mean	446	459	414	410	470	440
V_1	419	435	375			
V_2	473	484	453			

C.D. for V marginal means = 14.5 Kg/ha.

Crop :- Gram (*Rabi*).

Ref :- M.P. 60(133), 61(93).

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'C'.

Object :- To find out a suitable seed rate and a suitable spacing for Gram under dry condition.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 2.10.60 ; 29.10.61. (iv) (a) One ploughing and 5 *bakherings*. (b) Drilling (c) As per treatments. (d) and (e) —. (v) Nil. (vi) T-87. (vii) Unirrigated. (viii) Nil. (ix) 2 cm. ; 22 cm. (x) 12.2.61 ; 16.3.62.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 3 seed rates : $R_1=50.4$, $R_2=67.2$ and $R_3=84.1$ Kg/ha.

(2) 3 spacings between rows : $S_1=23$, $S_2=30$ and $S_3=38$ cm.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 11.3 m. \times 6.2 m. (b) 10.1 m. \times 5.0 m. (v) 61 cm. \times 61 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-61. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments \times years interaction is absent, hence results of individual years are presented under 5.—Results.

5. RESULTS :

60(133)

(i) 537 Kg/ha. (ii) 61.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	Mean
R_1	546	533	586	555
R_2	546	539	514	533
R_3	526	461	581	523
Mean	539	511	560	537

61(93)

(i) 704 Kg/ha. (ii) 98.5 Kg/ha. (iii) Main effects of R and S are significant. (iv) Av. yield of grain in Kg/ha.

	S_1	S_2	S_3	Mean
R_1	662	623	796	694
R_2	642	628	687	652
R_3	820	672	805	766
Mean	708	641	763	704

C.D. for S or R marginal means = 82.3 Kg/ha.

Crop :- Gram. (Rabi).

Ref :- M.P. 62(52), 63(9)

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'C'.

Object :- To find out suitable seed rate and spacing for better yield of Gram.

1. BASAL CONDITIONS :

(i) (a) Jowar—Wheat ; Nil. (b) Jowar ; N.A. (c) N.A. (ii) Black cotton soil. (iii) 10.10.62 ; 4, 5.10.63. (iv) (a) 1 ploughing and 4 *bakhering* (b) Drilling. (c) and (d) As per treatments. (e) —. (v) Nil. (vi) T—87. (vii) Unirrigated. (viii) 1 cm. ; 9 cm. (ix) Nil. (x) 20.2.63 ; 20.2.64.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 seed rates : $R_1=50.4$ and $R_2=67.2$ Kg/ha.

(2) 3 spacings between rows : $S_1=23$, $S_2=30$ and $S_3=38$ cm.

3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 11.3 m. × 6.3 m. (b) 10.1 m. × 5.1 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL :

- (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1962—63. (b) No. (c) Results of combined analysis and individual 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) 651 Kg/ha. (ii) 97.0 Kg/ha. (based on 35 d.f. made up of pooled error and Treatments × years interaction). (iii) Main effect of S is significant. (iv) Av. yield of grain in Kg/ha.

	S ₁	S ₂	S ₃	Mean
R ₁	695	676	633	668
R ₂	685	646	575	635
Mean	690	661	604	651

C.D. for S marginal means = 69.7 Kg/ha.

Individual results

Treatment	S ₁	S ₂	S ₃	Sig.	R ₁	R ₂	Sig.	G.M.	S.E./plot
Years 1962	662	568	533	N.S.	611	585	N.S.	598	94.5
1963	718	754	644	*	724	685	N.S.	705	100.8
Pooled	690	661	604	*	668	635	N.S.	651	97.0

Crop :- Gram (Rabi).

Ref :- M.P. 61(92).

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'C'.

Object :- To study the effect of soil wash due to different cultivation practices on the yield of Gram.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 29.10.61. (iv) (a) As per treatments. (b) Drilling (c) 67 Kg/ha. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) T—87. (vii) Unirrigated. (viii) Nil. (ix) 22 cm. (x) 11.3.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 types slopes for cultivation : S₁ = Along the slope and S₂ = Across the slope.

(2) 4 cultural practices : C₁ = *Bakharing* alone in summer as well as during rainy season, C₂ = Ploughing in summer followed by *bakharing* in rainy season, C₃ = Deep summer ploughing at 30 cm. and *bakharing* during rainy season and C₄ = Summer *bakharing* and early monsoon ploughing with first rain.

Slope is 1 to 2 %

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) and (b) 20.1 m. × 5.0 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 1172 Kg/ha. (ii) 105.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	C ₁	C ₂	C ₃	C ₄	Mean
S ₁	1137	1186	1258	1239	1205
S ₂	1222	1189	1127	1018	1139
Mean	1179	1187	1192	1128	1172

Crop :- Peas (Rabi).

Ref :- M.P. 60(194).

Site :- Agri. Res. Stn., Adhartal.

Type :- 'MV'.

Object :—To see the effect of different levels of N and P on the yield and quality of two varieties of Pea.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Wheat. (c) N.A. (ii) Heavy black loam. (iii) N.A. (i) (a) and (b) N.A. (c) 67.2 Kg/ha. (d) Rows 30 cm. apart. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated (viii) N.A. (ix) 72.3 cm. (x) 8.2.61.

2. TREATMENTS :

All combinations of (1), (2) and (3).

- (1) 3 levels of N as A/S: N₀=0, N₁=8.4 and N₂=16.8 Kg/ha.
 (2) 3 levels of P₂O₅ as Super: P₀=0, P₁=22.4 and P₂=44.8 Kg/ha.
 (3) 2 varieties: V₁=Khaperkheda and V₂=New pusa—29.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) N.A. (b) 141.5 × 333'. (iii) 4. (iv) (a) N.A. (b) 1/2.6976 ha. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Population count and yield of grain. (iv) (a) 1960—only. (b) and (c) —. (v) No. (vi) and (vii) Nil.

5. RESULTS :

(i) 1778 Kg/ha. (ii) 229.8 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	Mean
V ₁	1883	2002	1985	1862	1999	2009	1957
V ₂	1516	1550	1733	1531	1647	1622	1600
Mean	1699	1776	1859	1626	1823	1815	1778
P ₀	1687	1704	1697				
P ₁	1685	1786	1997				
P ₂	1726	1837	1882				

C D. for V marginal means=108.9 Kg/ha.

Crop :- Peas (Rabi).

Ref :- M.P. 60(18).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'MV'.

Object: —To find out the most suitable variety and manurial dose for Peas.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Mor. No.—1. (iii) 30-10-60. (iv) (a) 3 *bakherings*. (b) Drilling. (c) 67 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) and (ix) Nil. (x) 21.3.61.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 3 varieties : V₁=T-163, V₂=NP-29 and V₃=T-17.

(2) 4 manurial treatments : M₀=0, M₁=22.4 Kg/ha. of P₂O₅, M₂=33.6 Kg/ha. of P₂O₅ and M₃=16.8 Kg/ha of N+33.6 Kg/ha. of P₂O₅.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 3. (iv) (a) 10.0 m. × 5.0 m. (b) 9.1 m. × 4.1 m. (v) 46 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—only. (b) and (c) Nil. (v) Jora. (vi) and (vii) Nil.

5. RESULTS:

(i) 210 Kg/ha. (ii) 149.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
V ₁	197	157	256	238	207
V ₂	187	152	203	358	225
V ₃	84	112	278	317	198
Mean	156	140	239	304	210

Crop :- Peas (Rabi).**Ref :- M.P. 61(13).****Site :- Govt. Agri. Farm. Baroda.****Type :- 'MV'.****Object :-**To find out suitable variety and fertilizer level for Peas.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Paddy. (c) F.Y.M. (ii) Mor. No. 1. (iii) 21.11.61. (iv) (a) 2 *bakherings* after harvesting *kharif* crops. (b) Seed drilled in lines. (c) 67 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 23.3.62.

2. TREATMENTS :

All combination of (1), (2) and (3).

(1) 3 varieties : $V_1=T-19$, $V_2=N$. $P-29$ and $V_3=T-163$.(2) 2 levels of N as A/S : $N_0=0$ and $N_1=16.8$ Kg/ha.(3) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=33.6$ Kg/ha.**4. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 11.1 m. \times 4.6 m. (b) 10.2 m. \times 4.0 m. (v) 43 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

(i) Germination was poor in the following plots. Rep 4. V_1M_3 , and V_3M_2 . Rep. 1 V_2M_3 and V_2M_2 . Crop growth Normal. (ii) Attack of pod borer. Dusting of B.H.C. was done. (iii) Nil. (iv) (a) 1960-64 (Modified since 1962). (b) and (c) Nil. (v) (a) Bhind and Jora. (b) Nil. (vi) and (vii) Nil.

5. RESULTS :

(i) 287 Kg/ha. (ii) 98.0 Kg/ha. (iii) Main effects of V and P are highly significant. Interaction $V \times P$ is significant. (iv) Av. yield of grain in Kg/ha.

	V_1	V_2	V_3	P_0	P_1	Mean
N_0	220	187	393	161	372	267
N_1	241	294	386	228	386	307
Mean	230	240	390	195	379	287
P_0	169	178	236			
P_1	291	303	544			

C.D. for V marginal means = 70.7 Kg/ha.

C.D. for P marginal means = 57.7 Kg/ha.

C.D. for $P \times V$ table = 99.8 Kg/ha.**Crop :- Peas (Rabi).****Ref :- M.P. 62(14), 63(21).****Site :- Govt. Agri. Farm, Baroda.****Type :- 'MV'.****Object :-**To find a suitable variety and optimum fertilizer dose for Peas.**1. BASAL CONDITIONS:**

(i) (a) Nil. (b) Wheat ; Paddy. (c) N.A. (ii) Mor. No. 1 for 62; Sandy loam for 63. (iii) 20.10.62; 29.10.63. (v) (a) 5 *bakherings*; 1 *bakhering*. (b) Line sowing by *Nari* for 62 ; Drilling with *Nari* for 63 (c) 67 Kg/ha. for 62; N.A. for 63. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated, (viii) Nil; 1 hand weeding. (ix) N.A. (x) 4 to 6.3.63; 12/18.3.64.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 varieties : $V_1=T-19$, $V_2=K.K.$ and $V_3=T-63$.

(2) 2 levels of N as A/S : $N_0=0$ and $N_1=16.8$ Kg/ha.

(3) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=33.6$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 4.6 m. \times 11.1 m. (b) 4.0 m. \times 10.2 m.
(v) 30 cm. \times 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960 to 64 (Modified since 1962 expt. rejected for 1963).
(b) No. (c) Results of combined analysis are presented under 5. Results. (v) Jora. (vi) Nil; Weather was cloudy throughout the year; Nil. (vii) Error variances are homogenous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled Results :

(i) 1020 Kg/ha. (ii) 238.5 Kg/ha. (based on 75 d.f. made up of pooled error and Treatments \times years interaction). (iii) Main effects of V and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	V_1	V_2	V_3	P_0	P_1	Mean
N_0	647	982	1217	825	1073	949
N_1	717	1265	1295	847	1338	1092
Mean	682	1124	1256	836	1205	1020
P_0	537	956	1014	/		
1	826	1291	1498			

C.D. for V marginal means = 119.0 Kg/ha.

C.D. for P marginal means = 97.1 Kg/ha.

Individual Results :

Treatments	N_0	N_1	Sig.	V_1	V_2	N_3	Sig.
Years							
1962	986	1295	**	645	1322	1454	**
1963	911	889	N.S.	718	925	1057	**
Pooled	949	1092	N.S.	682	1124	1256	**

P_0	P_1	Sig.	G.M.	S.E./plot
930	1351	**	1140	242.1
741	1059	**	899	236.4
836	1205	**	1020	238.5

Crop :- Peas (Rabi).**Ref :- M.P. 60(4).****Site :- Govt. Agri. Farm, Jora.****Type :- 'MV'.**

Object :-To find out the most suitable variety and manurial dose for Peas.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) G.M. crop. (c) Nil. (ii) Sandy loam. (iii) 27.10.60. (iv) (a) 3 ploughings. (b) Seed drilled by *Desi* seed drill. (c) 67 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) G. M. with Sannhemp. (vi) As per treatments. (vii) Irrigated. (viii) 1 weeding with *khurpi*. (ix) Nil. (x) 20.3.61.

2. TREATMENTS : and 3. DESIGN :

Same as expt. no. 60(18) on pea at page No 311.

4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1960-only. (b) and (c) Nil. (v) Baroda. (vi) and (vii) Nil.

5. RESULTS :

(i) 1652 Kg/ha. (ii) 312.6 Kg/ha. (iii) V effect alone is significant. (iv) Av. yield of grain in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
V ₁	1858	1910	1735	1590	1773
V ₂	1529	2092	1776	1682	1770
V ₃	1673	1054	1400	1529	1414
Mean	1687	1685	1637	1600	1652

C.D. for V marginal means=263.3 Kg/ha.

Crop :- Peas (Rabi).**Ref :- M.P. 61(8).****Site :- Govt. Agri. Farm, Jora.****Type :- 'MV'.**

Object :-To find out suitable varieties and fertilizer level for Peas.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 3.12.61. (iv) (a) 2 ploughings and 1 *bakhering*. (b) Seed drilled with *Desi* seed drill in line. (c) 67 Kg/ha. (d) 46 cm between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 1 weeding by *khurpi*. (ix) 2 cm. (x) 3.4.62.

2. TREATMENTS : and 3. DESIGN :

Same as expt. no. 61(13) on pea at page 312.

4. GENERAL ;

(i) Germination good and crop growth good. (ii) Nil. (iii) Height ; branches ; No. of pods and grain yield. (iv) (a) 1961-64 (modified since 1962). (b) No. (c) Nil. (v) Baroda. (vi) and (vii) Nil.

5. RESULTS :

(i) 568 Kg/ha. (ii) 243.9 Kg/ha. (iii) V effect alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	P ₀	P ₁	Mean
N ₀	503	343	762	541	531	536
N ₁	512	503	787	601	601	601
Mean	508	423	774	571	566	568
P ₀	507	398	809			
P ₁	509	447	741			

C.D. for V marginal means=175.9 Kg/ha.

Crop :- Peas (Rabi).

Ref :- M.P. 62(15), 63(14), 64(17).

Site :- Govt. Agri. Farm, Jora.

Type :- 'MV'.

Object :- To find a suitable variety and optimum fertilizer dose for Peas.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 20.10.62 ; 31.10.63 ; 11.11.64. (iv) (a) 3 ploughings for 62 ; 1 ploughing for others. (b) Drilling. (c) 74 Kg/ha. for 62 ; 90 Kg/ha. for others. (d) 46 cm. between rows for 62 ; 38 cm. between rows for others. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 1 weeding by *khurpi* ; 2 weedings and hoeings ; 2 weedings by *khurpi*. (ix) 38 cm. ; Nil ; N.A. (x) 8.3.63 ; 18.3.64 ; 26.3.65.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 varieties : V₁=T-163, V₂=N.P.-29 and V₃=Khaparkheda.

(2) 2 levels of N as A/S : N₀=0 and N₁=16.8 Kg/ha.

(3) 2 levels of P₂O₅ as Super : P₀=0 and P₁=33.6 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 11.1 m.×4.6 m. (b) 10.2 m.×4.0 m. (v) 45 cm.×30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Frost, Pod-borer, B.H.C. dusted three times in 1962 ; Nil for others. (iii) Grain yield. (iv) (a) 1960-64 (Modified since 1962). (b) No. (c) Nil. (v) Baroda. (vi) Nil. (vii) Error variances are heterogeneous and Treatments×years interaction is absent, hence the results of individual results are presented under 5. Results.

5. RESULTS :

62(15)

(i) 1810 Kg/ha. (ii) 391.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	P ₀	P ₁	Mean
N ₀	1784	1749	1715	1794	1704	1749
N ₁	1718	1926	1968	1911	1830	1871
Mean	1751	1837	1842	1853	1767	1810
P ₀	1851	1813	1894			
P ₁	1651	1861	1789			

63(14)

(i) 1228 Kg/ha. (ii) 152.7 Kg/ha. (iii) Main effects of V, N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	P ₀	P ₁	Mean
N ₀	1095	922	1337	1057	1225	1141
N ₁	1180	1287	1477	1267	1364	1316
Mean	1138	1139	1407	1162	1294	1228
P ₀	1067	1096	1322			
P ₁	1208	1183	1492			

C.D. for V marginal means = 110.1 Kg/ha.
C.D. for N or P marginal means = 89.9 Kg/ha.

64(17)

(i) 2086 Kg/ha. (ii) 485.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	V ₁	V ₂	V ₃	P ₀	P ₁	Mean
N ₀	2426	2062	2028	2111	2233	2172
N ₁	2068	2059	1869	2169	1829	1999
Mean	2247	2061	1949	2140	2031	2086
P ₀	2386	2224	1810			
P ₁	2108	1898	2087			

Crop :- Bhindi (Kharif).

Ref :- M.P. 62(74).

Site :- Govt. Farm, Silari, Piparia.

Type :- 'M'.

Object :- To find out the optimum combination of N, P and K for Bhindi.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 15.7.62. (iv) (a) 1 ploughing and 3 *bakherings*. (b) Drilling. (c) 7 Kg/ha. (d) 61 cm. × 61 cm. (e) 2 seeds/hole. (v) 61.7 C.L./ha. of Town Compost. (vi) Pusa sawani. (vii) Unirrigated. (viii) 5 weedings and mulching. (ix) N.A. (x) 5.9.62 to 15.10.62.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 levels of N as A/S : N₀=0, N₁=28 and N₂=56 Kg/ha.

(2) 3 levels of P₂O₅ as Super : P₀=0, P₁=28 and P₂=56 Kg/ha.

(3) 3 levels of K₂O as Mur. Pot. : K₀=0, K₁=28 and K₂=56 Kg/ha.

3. DESIGN:

(i) 3³ confd. (ii) (a) 3 blocks/replication : 9 plots/block. (b) N.A. (iii) 3. (iv) (a) 5.5 m. × 4.9 m. (b) 4.3 m. × 3.7 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Attack of shoot-borer for which Basudin sprayed. (iii) Yield of *bhindi*.
(iv) (a) 1962—N.A. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2751 Kg/ha. (ii) 957.1 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of fruit in Kg/ha.

	P ₀	P ₁	P ₂	K ₀	K ₁	K ₂	Mean
N ₀	1850	1995	1903	1431	2138	2179	1916
N ₁	2551	2675	2835	2592	2824	2645	2687
N ₂	3648	3805	3494	4122	3402	3423	3649
Mena	2683	2825	2744	2715	2788	2749	2751
K ₀	2807	2563	2775				
K ₁	2727	3157	2480				
K ₂	2515	2755	2977				

C.D. for N marginal means=524.7 Kg/ha.

Crop :- Bhindi (Kharif).

Ref :- M.P. 60(169).

Site :- Agri. Res. Stn., Kuthulia.

Type :- 'D'.

Object :—To find out suitable chemical control for *Bhindi* fruit-borer.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Peas. (c) N.A. (ii) Clayey loam. (iii) 23.7.60. (iv) (a) Ploughing and planking. (b) Dibbling. (c) N.A. (d) 76 cm.×61 cm. (e) 1 seed/hole. (v) Application of F.Y.M. and A/S (dose—N.A.) (vi) Pusa-Sawani. (vii) Irrigated. (viii) 7 intercultures by *Khurpi*. (ix) N.A. (x) 21.9.60 to 17.12.60.

2. TREATMENTS :

8 chemical treatments : T₀=Control, T₁=0.06 % Endrin emulsion, T₂=0.07 % Endrin emulsion, T₃=0.06 % Folidol emulsion, T₄=0.07 % Folidol emulsion, T₅=T₁+T₃, T₆=0.1 % Toxaphene suspension and T₇=0.1 % Dieldrin suspension.

Applied in 4 fortnightly sprayings.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1.8 m.×1.5 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Under study. (iii) Yield of *Bhindi* fruit. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 4231 Kg/ha. (ii) 2482 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of fruits in Kg/ha.

Treatment	T ₀	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇
Av. yield	3313	4929	6417	3064	3761	5001	2632	4733

Crop :- Bhindi (Kharif).**Ref :- M.P. 60(170).****Site :- Agri. Res. Stn., Kuthulia.****Type :- 'D'.**Object :—To find out suitable chemical control for *Bhindi* Jassids.**1. BASAL CONDITIONS :**

(i) (a) Brinjal—Peas—*Bhindi*—Fallow. (b) Peas. (c) N as A/S (Dose—N.A.) (ii) Clayey loam. (iii) 23.7.60. (iv) (a) Ploughing and planking. (b) Dibbling. (c) N.A. (d) 76 cm. × 61 cm. (e) 1 seed/hole. (v) Application of F.Y.M. and A/S (dose—N.A.) (vi) Pusa-Sawani. (vii) Irrigated. (viii) 7 intercultures by *Khurpi* (ix) N.A. (x) 1.10.60 to 17.12.60.

2. TREATMENTS :

8 chemical treatments : T_0 =Control, T_1 =0.06 % Endrin emulsion, T_2 =0.06 % Basudin emulsion, T_3 =0.06 % Folidol emulsion, T_4 =0.3 % D.D.T. spray, T_5 =0.1 % Malathion emulsion, T_6 =0.1 % Melasystox emulsion and T_7 =0.1 % Toxaphene emulsion.

Applied in 4 fortnightly spraying.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1.8 m. × 1.5 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Attack of Jassids. Chemicals sprayed as per treatments. (iii) Yield of fruits, population of Jassids before and after sprayings. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS:

(i) 3913 Kg/ha. (ii) 1295 Kg/ha. (iii) Treatment differences are highly significant, (iv) Av. yield of fruits in Kg/ha.

Treatment	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7
Av. yield	1643	5713	4088	5165	5612	2413	2826	3848

C.D.=1904.6 Kg/ha.

Crop :- Brinjal (Kharif).**Ref :- M.P. 65(30).****Site :- Govt. Agri. College Farm, Rewa.****Type :- 'M'.**

Object :—To study the effect of split applications of N on the growth and yield of Brinjal.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 27.7.65. (iv) (a) 3 to 4 ploughings. (b) Transplanting. (c) —. (d) 60 cm. × 60 cm. (e) One seedling/hole. (v) 22.4 Kg/ha. of N+89.7 Kg/ha. of P_2O_5 +89.7 Kg/ha. of K_2O . (vi) Pusa Purple Round. (vii) Irrigated. (viii) Weeding and hoeing. (ix) 50.6 cm. (x) 15.11.65 to 13.2.66.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 levels of N : N_1 =56, N_2 =168, N_3 =224 and N_4 =280 Kg/ha.(2) 3 split application of N: M_1 =Full dose as basal (at transplanting), M_2 = $\frac{1}{2}$ dose as basal and $\frac{1}{2}$ dose after 1st. fruit setting and M_3 = $\frac{1}{3}$ dose as basal+ $\frac{1}{3}$ dose at 1st. fruit setting+ $\frac{1}{3}$ dose at heavy harvest.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12. (b) 12.2 m. × 16.4 m. (iii) 4. (iv) (a) 3.7 m. × 3.7 m. (b) 2.4 m. × 2.4 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Plant height, No. of leaves, branches, and fruits/plant, diameter of fruits and yield of fruits. (iv) 1960—only (b) and (c) —. (v) to (vii) N.A.

5. RESULTS:

(i) 167.8 Q/ha. (ii) 37.9 Q/ha. (iii) Main effects of M and N are significant. (iv) Av. yield of fruits in Q/ha.

	N ₁	N ₂	N ₃	N ₄	Mean
M ₁	100.9	161.8	152.4	182.9	149.5
M ₂	112.3	142.0	172.4	209.1	158.9
M ₃	163.0	189.3	197.7	230.1	195.0
Mean	125.4	164.4	174.2	207.4	167.8

C.D. for M marginal means=27.3 Q/ha,

C.D. for N marginal means=31.5 Q/ha.

Crop :- Brinjal (Kharif).

Ref :- M.P. 64(32).

Site :- Govt. Agri. College Farm, Rewa.

Type :- 'MV'.

Object :- To study the effect of various levels of N on the yield of Brinjal varieties.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 1.8.64. (iv) (a) 3 to 4 ploughing. (b) Transplanting. (c) —. (d) 90 cm. × 60 cm. (e) 1. (v) 112 Kg/ha. of P₂O₅ before transplanting. (vi) As per treatments. (vii) Irrigated. (viii) Hoeing and weeding. (ix) 81.0 cm. (x) 1.11.64 to 12.2.65.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 4 varieties : V₁=Pusa Purple Round, V₂=Round Purple, V₃=Black beauty and V₄=Nurki Round.

(2) 4 levels of N as A/S : N₀=0, N₁=56, N₂=112 and N₃=168 Kg/ha.

½ dose of N was given before transplanting and the remaining dose applied after one month of transplanting as top dressing.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 16. (b) 32.3 m. × 7.9 m. (iii) 3. (iv) (a) 3.4 m. × 4.3 m. (b) 2.7 m. × 3.7 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Height of plants, No. of leaves, No. of branches and No. of fruits per plant, diameter of fruits and yield of fruits. (iv) (a) 1964—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

- (i) 166.5 Q/ha. (ii) 39.4 Q/ha. (iii) Main effect of N is highly significant and that of V is significant. (iv) Av. yield of fruits in Q/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
V ₁	101.8	165.8	237.7	276.8	195.5
V ₂	92.2	161.1	210.5	257.7	180.4
V ₃	82.8	156.7	179.6	230.3	162.3
V ₄	73.6	110.5	142.8	184.3	127.8
Mean	87.6	148.5	192.6	237.3	166.5

C.D. for V or N marginal means=32.9 Q/ha.

Crop :- Brinjal (Kharif).

Ref :- M.P. 60(178).

Site :- Agri. Res. Stn., Kuthulia, Rewa.

Type :- 'D'.

Object :- To find out the control measure against root-borer of Brinjal.

1. BASAL CONDITIONS :

- (i) (a) *Brinjal*—Peas. *Bhindi*—Fallow. (b) Fallow. (c) Nil. (ii) Clayey loam. (iii) 25.7.60.
 (iv) (a) Ploughing and planking. (b) Transplanting. (c) —. (d) 91 cm. × 61 cm. (e) 1 seeding/hole.
 (v) F.Y.M. and A/S (Doses N.A.) (vi) *Muktakeshi*. (vii) Irrigated. (viii) 7 intercultures by *khurpi*.
 (ix) N.A. (x) 8.11.60 to 2.3.61.

2. TREATMENTS :

8 chemical treatments : T₀=Control, T₁=0.06% Endrin emulsion, T₂=0.07% Endrin emulsion, T₃=0.06% Folidol emulsion, T₄=0.07% Folidol emulsion, T₅=0.06% Endrin+Folidol emulsions, T₆=0.1% Toxaphene suspension and T₇=0.1% Dieldrin suspension.

3. DESIGN :

- (i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1.8 m. × 1.8 m. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Attack of root-borer. Chemicals sprayed as per treatments. (iii) Yield of fruits and % of root borer attacked fruits. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

- (i) 361 Q/ha. (ii) 117.6 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of fruits in Q/ha.

Treatments : T ₀	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	
Av. yield :	277	267	447	435	286	360	262	557

Crop :- Cauliflower (Rabi).

Ref :- M.P. 63(64).

Site :- Govt. Agri. Farm, Silari, Pipariya.

Type :- 'M'.

Object :- To find out the optimum dose of N, P and K for cauliflower.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Bhindi. (c) N.A. (ii) Sandy loam. (iii) 17.10.63. (iv) (a) 1 ploughing and 2 *bakharings*.
 (b) Transplanted (c) —. (d) 61 cm. × 61 cm. (e) 1 seedling/hole. (v) 59.4 C.L./ha. of Town Compost.
 (vi) Mid season—Snowbar. (vii) Irrigated. (viii) 4 weedings and mulching. (ix) 2 cm. (x) 2.1.64 to 4.2.64.

2. TREATMENTS :

All combinations of (1), (2) and (3).

- (i) 3 levels of N as A/S : $N_1=56$, $N_2=84$ and $N_3=112$ Kg/ha.
 (2) 3 levels of P_2O_5 as Super : $P_1=56$, $P_2=84$ and $P_3=112$ Kg/ha.
 (3) 3 levels of K_2O as Mur. Pot : $K_1=56$, $K_2=84$ and $K_3=112$ Kg/ha.

3. DESIGN :

- (i) 3^3 Confd. (ii) (a) 3 blocks/replication; 9 plots/block. (b) N.A. (iii) 3. (iv) (a) 4.3 m. × 4.3 m.
 (b) 3.1 m. × 3.1 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Attacked by Aphids and leaf eating cater—pillars. Endrin sprayed. (iii) Yield of flowers.
 (iv) (a) 1963—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

- (i) 1533 Q/ha. (ii) 17.1 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of flowers in Q/ha

	P_1	P_2	P_3	K_1	K_2	K_3	Mean
N_1	805	857	834	824	831	841	832
N_2	1712	1714	1747	1677	1701	1795	1724
N_3	2065	2053	2008	2080	2115	1931	2042
Mean	1527	1541	1530	1527	1549	1522	1533
K_1	1519	1524	1538				
K_2	1494	1581	1572				
K_3	1569	1519	1479				

C.D. for N marginal means = 9.4 Q/ha.

Crop :- Potato (Rabi).
Site :- Govt. Agri. Farm, Bhind.

Ref :- M.P. 60(10).
Type :- 'M'.

Object :—To find out the most-suitable combination of of different doses of N, P and K for Potato.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 24, 25.10.60. (iv) 2 *bakherings* and 3 ploughings.
 (b) Dibbling. (c) N.A. (d) 46 cm. × 23 cm. (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated.
 (viii) 2 weedings and 3 earthings. (ix) 7 cm. (x) 8.3.61 to 18.3.61.

2. TREATMENTS :

All combinations of (1), (2) and (3)+a control.

- (1) 3 levels of N : $N_1=33.6$, $N_2=56.0$ and $N_3=78.4$ Kg/ha.
 (2) 3 levels of P_2O_5 : $P_1=33.6$, $P_2=56.0$ and $P_3=78.4$ Kg/ha.
 (3) 3 levels of K_2O : $K_1=33.6$, $K_2=56.0$ & $K_3=78.4$ Kg/ha.

3. DESIGN :

- (i) R.B.D. (ii) (a) 28. (b) N.A. (iii) 2. (iv) (a) 10.1 m × 5.0 m. (b) 8.2 m × 4.1 m. (v) 91 cm. × 46 cm. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Early blight and virus. (iii) Yield of Potato. (iv) 1960-62 (Modified every year). (b) No. (c) Nil. (v) Jora. (vi) Nil. (vii) Nil.

5. RESULTS :

- (i) 144.6 Q/ha. (ii) 23.2 Q/ha. (iii) Main effects of N and P are highly significant. Interaction N × P × K is significant. (iv) Av. yield of Potato in Q/ha.

Control=150.1 Q/ha.

	P ₁	P ₂	P ₃	K ₁	K ₂	K ₃	Mean
N ₁	106.3	134.9	140.6	131.7	118.3	131.9	127.3
N ₂	122.9	143.4	149.6	134.2	145.4	136.3	138.6
N ₃	150.3	173.5	178.2	159.5	176.5	156.0	167.3
Mean	126.5	150.6	156.1	145.1	146.7	141.4	144.4
K ₁	123.5	150.0	152.9				
K ₂	129.4	155.5	155.2				
K ₃	126.7	137.3	160.3				

C.D. for N or P marginal means=15.9 Q/ha.

Crop :- Potato (Rabi).
Site :- Govt. Agri. Farm. Bhind.

Ref :- M.P. 61(17).
Type :- 'M'.

Object :—To find out the optimum manurial dose for Potato.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) G.M. (c) Nil. (ii) Sandy loam. (iii) 6—13.11.61. (iv) (a) 2 ploughings ; 1 *bakharing* & 2 *patela*. (b) Line sowing on ridges with hand by *Khurpi*. (c) 922 Kg/ha. (d) 46 cm. × 23 cm. (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) 2 weedings by *khurpi* and earthing. (ix) N.A. (x) 21 to 24.4.62.

2. TREATMENTS :

All combinations of (1), (2) and (3)+control,

- (i) 3 levels of N A/S : N₁=28.0, N₂=56.0 and N₃=84.0 Kg/ha.
(2) 3 levels of P₂O₅ as Super : P₁=28.0, P₂=56.0 and P₃=84.0 Kg/ha.
(3) 3 levels of K₂O as Mur. Pot : K₁=28.0, K₂=56.0 and K₃=84.0 Kg/ha.

3. DESIGN :

- (i) 3³ Conf'd. with one control plot, in each block. (ii)(a) 3 blocks/replication ; 10 plots/block. (b) N.A. (iii) 2. (iv) (a) 10.1 m. × 5.0 m. (b) 8.2 m × 4.1 m. (v) 91 cm. × 46 cm. (vi) Yes.

4. GENERAL :

- (i) Poor. (ii) Heavy attack of pests. B.H.C. dusted. (iii) Yield of Potato. (iv) (a) 1960-62 (Modified every year). (b) No. (c) Nil. (v) Nil. (vi) Heavy attack of frost. (vii) Nil.

5. RESULTS :

- (i) 98.1 Q/ha. (ii) 23.8 Q/ha. (iii) control vs. others is highly significant. (iv) Av. yield of potato in Q/ha.

Control=68.8 Q/ha.

	P ₁	P ₂	P ₃	K ₁	K ₂	K ₃	Mean
N ₁	87.0	103.6	85.6	86.7	94.2	96.2	92.4
N ₂	102.4	117.1	103.5	128.3	102.5	92.2	107.7
N ₃	108.4	91.2	112.0	111.4	102.1	98.1	103.9
Mean	99.6	103.9	100.4	108.8	99.6	95.5	101.3
K ₁	112.4	117.8	96.2				
K ₂	94.1	94.8	109.9				
K ₃	92.3	99.2	95.0				

C.D. for control vs. others=21.0 Q/ha.

Crop :- Potato (Rabi).**Ref :- M.P. 62(73).****Site :- Govt. Agri. Farm, Bhind.****Type :- 'M'.**

Object :- To find out the optimum dose of N, P and K for Potato.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 10.11.62. (iv) (a) 2 ploughings and 2 *bakherings*. (b) N.A. (c) 922 Kg/ha. (d) 23 cm. × 30 cm. (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 31.3.63 to 7.4.63.

2. TREATMENTS :

All combinations of (1), (2) and (3)

- (1) 3 levels of N as A/S : N₁=28.0, N₂=56.0 and N₃=84.0 Kg/ha.
 (2) 3 levels of P₂O₅ as Super : P₁=28.0, P₂=56.0 and P₃=84.0 Kg/ha.
 (3) 3 levels of K₂O as Mur. Pot. : K₁=28.0, K₂=56.0 and K₃=84.0 Kg/ha.

3. DESIGN :

(i) 3³ confd. (ii) (a) 3 blocks/replication, 9 plots/block. (b) N.A. (iii) 2. (iv) (a) 10.1 m. × 5.0 m. (b) 8.2 m. × 4.1 m. (v) 91 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Ordinary. (ii) N.A. (iii) Yield of Potato. (iv) (a) 1960-62 (modified every year). (b) No. (c) Nil. (v) to (vii) J

5. RESULTS :

(i) 71.4 Q/ha. (ii) 19.0 Q/ha. (iii) Main effects of N, P and interaction N×K and N×P×K are highly significant. (iv) Av. yield of Potato in Q/ha.

	P ₁	P ₂	P ₃	K ₁	K ₂	K ₃	Mean
N ₁	61.5	69.3	62.7	60.7	77.8	55.0	64.5
N ₂	55.1	52.2	84.3	60.3	70.0	61.4	63.9
N ₃	77.3	73.1	107.4	71.2	75.5	111.0	85.9
Mean	64.6	64.9	84.8	64.1	74.4	75.8	71.4
K ₁	52.7	56.7	82.8				
K ₂	76.6	66.2	80.5				
K ₃	64.6	71.7	91.1				

C.D. for N or P marginal means=13.1 Q/ha.

C.D. for body of N x P table=22.6 Q/ha.

Crop :- Potato (Rabi).

Ref :- M.P. 60(2).

Site :- Govt. Agri. Farm, Jora.

Type :- 'M'.

Object :- To find out the most suitable combination of different doses of N, P and K for Potato.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Sannhemp*. (c) Nil. (ii) Sandy loam. (iii) 31.10.60. (iv) (a) 3 ploughings. (b) Line sowing. (c) 646 Kg/ha. (d) 46 cm. x 23 cm. (e) N.A. (v) *Sannhemp* G.M. (vi) Satha special. (vii) Irrigated. (viii) One weeding with *Kurpi*. (ix) N.A. (x) 7 to 17.3.61.

2. TREATMENTS:

All combinations of (1), (2) and (3)+a control.

(1) 3 levels of N as A/S : N₁=33.6, N₂=56.0, N₃=78.4 Kg/ha.

(2) 3 levels of P₂O₅ as Super : P₁=33.6, P₂=56.0 and P₃=78.4 Kg/ha.

(3) 3 levels of K₂O : K₁=33.6, K₂=56.0 and K₃=78.4 Kg/ha.

3. DESIGN :

(i) R.B.D. (ii) (a) 28. (b) N.A. (iii) 2. (iv) (a) 10.1 m. x 5.0 m. (b) 8.2 m. x 4.1 m. (v) 91 cm. x 46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of Potato. (iv) (a) 1960 only. (b) and (c) —. (v) Blind. (vi) and (vii) Nil.

5. RESULTS :

(i) 152.2 Q/ha. (ii) 32.2 Q/ha. (iii) Main effect of N and interaction N x P are significant. (iv) Av. yield of Potato in Q/ha.

Control=125.6 Q/ha.

	P ₁	P ₂	P ₃	K ₁	K ₂	K ₃	Mean
N ₁	116.9	130.4	161.1	140.7	136.4	131.3	136.1
N ₂	185.8	146.1	139.7	172.4	155.1	144.2	157.2
N ₃	150.4	180.7	167.9	161.4	164.2	173.4	166.3
Mean	151.3	152.4	156.2	158.2	151.9	149.6	153.2
K ₁	157.3	167.5	149.7				
K ₂	157.6	142.9	155.1				
K ₃	138.2	146.8	163.9				

C.D. for N marginal means=22.0 Q/ha.

C.D. for body of N x P table=38.2 Q/ha

Crop :- Potato (Rabi).**Ref :- M.P. 61(9).****Site :- Govt. Agri. Farm, Jora.****Type :- 'M'.****Object :-**To find out the optimum manurial dose for Potato.**1. BASAL CONDITIONS:**

(i) (a) Nil. (b) Cotton—Fallow. (c) A/S ; dose N.A. (ii) Sandy loam. (iii) 19.11.61. (iv) (a) 2 ploughings and 1 *bakhering*. (b) Line sowing. (c) N.A. (d) 46 cm. × 25 cm. (e) 1 cut of tuber/hole. (v) Nil. (vi) P.S.—196. (vii) Irrigated. (viii) 2 weedings. (ix) 15 cm. (x) 15 to 18.3.62.

2. TREATMENTS :

All combinations of (1) and (2)+a control.

(1) 3 levels of N as A/S : $N_1=28.0$, $N_2=56.0$ and $N_3=84.0$ Kg/ha.(2) 3 levels of P_2O_5 as Super : $P_1=28.0$, $P_2=56.0$ and $P_3=84.0$ Kg/ha.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 10.1 m. × 5.0 m. (b) 8.2 m. × 4.1 m. (v) 91 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Crop growth good. (ii) Tubers were eaten by some pest seen at the time of harvesting. (iii) Yield of Potato. (iv) (a) 1961—only. (b) and (c) —, (v) Nil. (vi) Attack of frost. (vii) Nil.

5. RESULTS :

(i) 73.2 Q/ha. (ii) 19.5 Q/ha. (iii) Control vs. others is significant. (iv) Av. yield of Potato in Q/ha.

 $T_0=31.3$ Q/ha.

	N_1	N_2	N_3	Mean
P_1	72.4	73.9	72.1	72.8
P_2	75.0	93.1	87.6	85.2
P_3	66.1	73.4	87.2	75.6
Mean	71.2	80.1	82.3	77.9

C.D. for Control vs. others = 16.9 Q/ha.

Crop :- Potato (Main).**Ref :- M.P. 62(S.F.T.).****Site :- (District) : Chhindwara.****Type :- 'M'.****Object :-**Type A_1 :—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) (a) to (c) N.A. (ii) Shallow black. (iii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments :

O=Control (no manure).

 $N_1=90$ Kg/ha. of N. $N_2=180$ Kg/ha. of N. $P_1=35$ Kg/ha. of P_2O_5 . $N_1P_1=90$ Kg/ha. of N+35 Kg/ha. of P_2O_5 . $N_2P_1=180$ Kg/ha. of N+35 Kg/ha. of P_2O_5 . $N_2P_2=180$ Kg/ha. of N+70 Kg/ha. of P_2O_5 and $N_2P_2K_1=180$ Kg/ha. of N+70 Kg/ha. of P_2O_5 +70 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 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 an oilseed. All the three type—C experiments are conducted on a legume crop. 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_1 , A_2 and A_3 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 Potato. (iv) (a) 1962—only. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

62(S.F.T.)

Treatment	N_1	N_2	P_1	N_1P_1	N_2P_1	N_2P_2	$N_2P_2K_1$	S.E.
Av. response of Potato in Kg/ha.	969	1423	672	1314	2076	1720	2372	1019.0

Control mean=4991 Kg/ha. ; No. of trials=2.

Crop :- Potato (Main).**Ref :- M.P.62(S.F.T.).****Site :- (District) Chhindwara.****Type :- 'M'.**Object :—Type A_2 : 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) (a) to (c) N.A. (ii) Shallow black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments :

O=Control (no manure).

 $N_1=90$ Kg/ha. of N. $P_1=35$ Kg/ha. of P_2O_5 . $P_2=70$ Kg/ha. of P_2O_5 . $N_1P_1=90$ Kg/ha. of N+35 Kg/ha. of P_2O_5 . $N_1P_2=90$ Kg/ha. of N+70 Kg/ha. of P_2O_5 . $N_2P_2=180$ Kg/ha. of N+70 Kg/ha. of P_2O_5 and $N_2P_2K_1=180$ Kg/ha. of N+70 Kg/ha. of P_2O_5 +120 Kg/ha. of K_2O .

3. DESIGN :

Same as in Type A_1 on Potato on page 325.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of Potato. (iv) (a) to (c) No. (v) to (vii) Nil,

5. RESULTS :

62(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of Potato in Kg/ha.	890	613	776	1616	1873	2170	2688	592.7

Control mean=10739 Kg/ha. ; No. of trials=3.

Crop :- Potato (Main).

Ref :- M.P. 62(S.F.T.).

Site :- (District) : Chhindwara.

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) (a) to (c) N.A. (ii) Shallow black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

Same as in Type A₂ on Potato (irrigated) on page 326.

3. DESIGN :

Same as in Type A₁ on Potato on page 325.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of Potato. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of Potato in Kg/ha.	1351	1417	1772	2188	2702	3163	3802	391.2

Control mean=3104 Kg/ha. ; No. of trials=3.

Crop :- Potato (Main).

Ref :- M.P. 62(S.F.T.).

Site :- (District) : Chhindwara.

Type :- 'M'.

Object :—Type A₃ : 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) (a) to (c) N.A. (ii) Shallow black. (iii) 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.K₁=60 Kg/ha. of K₂O.K₂=120 Kg/ha. of K₂O.N₁K₁=90 Kg/ha. of N+60 Kg/ha. of K₂O.N₁K₂=90 Kg/ha. of N+120 Kg/ha. of K₂O.N₂K₂=180 Kg/ha. of N+120 Kg/ha. of K₂O andN₁P₁K₁=90 Kg/ha. of N+35 Kg/ha. of P₂O₅+60 Kg/ha. of K₂O.

3. DESIGN :

Same as in Type A₁ on Potato on page 325.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of potato. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of Potato in Kg/ha.	1701	1362	2018	4564	7215	9158	11066	1315.4

Control mean=17204 Kg/ha. ; No. of trials=8.

Crop :- Potato (Main).**Ref :- M.P. 62(S.F.T.).****Site :- (District) : Chhindwara.****Type :- 'M'.**Object :- Type A₃ : 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) (a) to (c) N.A. (ii) Shallow black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

Same as in Type A₃ on Potato (unirrigated) on page 327.

3. DESIGN :

Same as in Type A₁ on Potato on page 325.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of potato. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of Potato in Kg/ha.	306	682	554	880	1809	1433	1196	649.6

Control mean=13926 Kg/ha. ; No. of trials=2.

Crop :- Potato (*Rabi*).

Ref :- M.P. 60(107), 61(137).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'D'.

Object :—To study the effect of application of fungicides to control Potato Blight.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) G.M. (c) Nil. (ii) Heavy soil for 60; Morand for 61. (iii) 29.10.60; 11.10.61.
 (iv) (a) Ploughing and *bakhering*. (b) Line sowing by *khurpi*. (c) 922 Kg/ha. (d) 30 cm. × 15 cm.
 (e) N.A. (v) 58 Kg/ha. of N+58 Kg/ha. of P_2O_5 for 60; 56 Kg/ha. of N as A/S for 61. (vi) Kufri.
 (vii) Irrigated. (viii) 2 to 3 weedings and 1 earthing. (ix) 8 cm.; N.A. (x) 30.3.61; 29.3.62.

2. TREATMENTS :

All combinations of (1) and (2).

- (1) 4 fungicidal treatments : S_0 =Control; S_1 =Spraying with Cupravit at 1.4 Kg. in 454 litres of water,
 S_2 =Bordeaux mixture 2 : 2 : 50 and S_3 =Dithane-2078 at 1.4 Kg. in 454 litres of water.

- (2) 2 times of application of fungicides : T_1 =15 and T_2 =30 days after sowing.

3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) and (b) 8.5 m. × 3.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of Potato. (iv) (a) 1959-61. (b) No. (c) Nil. (v) and (vi) Nil.
 (vii) Expt. No. 59(108) has also been included while pooling. As error variances are heterogeneous and Treatments × years interaction is absent, results of individual years have been presented under 5. Results.

5. RESULTS :

60(107)

- (i) 142 Q/ha. (ii) 32.9 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of potato in Q/ha.

	S_0	S_1	S_2	S_3	Mean
T_1	142	127	144	150	141
T_2	124	145	141	167	144
Mean	133	136	143	158	142

61(137)

- (i) 142 Q/ha. (ii) 29.5 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of Potato in Q/ha.

	S_0	S_1	S_2	S_3	Mean
T_1	139	129	143	152	141
T_2	123	144	141	166	143
Mean	131	137	142	159	142

Crop :- Potato (Rabi).**Ref :- M.P. 61(144).****Site :- Govt. Seed Multiplication and Demons.,
Farm, Nabibagh.****Type :- 'D'.**

Object :—To study the effect of pre and post-emergence application of weedicide in controlling weeds.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS :7 weedicidal treatments : T_0 =Control, T_1 =Pre-emergence application of weedicide after 6 days of sowing, T_2 =Pre-emergence application of weedicide after 10 days of sowing, T_3 =Pre-emergence application after 6 days of sowing+cultural method of weeding, T_4 =Pre-emergence application after 10 days of sowing+Cultural method of weeding, T_5 =Cultural method of weeding and T_6 =Local method of weeding.

Name of weedicide—N.A.

3. DESIGN:

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 4.6 m. × 3.5 m. (v) N.A. (vi) Yes.

4. GENERAL :

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

5. RESULTS :

(i) 10.0 Q/ha. (ii) 6.5 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of potato in Q/ha.

Treatment	T_0	T_1	T_2	T_3	T_4	T_5	T_6
Av. yield	5.0	9.6	10.3	7.5	9.9	8.9	19.1

Crop :- Potato (Rabi).**Ref :- M.P. 61(145).****Site :- Govt. Seed Multiplication and Demons.
Farm, Nabibagh.****Type :- 'D'.**

Object :—To study the effect of different doses and weedicides on the yield of Potato.

1. BASAL CONDITIONS :

(i) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)+a control.

(1) 2 weedicides : W_1 =Ferroxone and W_2 =M.C.P.A.(2) 2 doses of weedicides : D_1 =1.1 and D_2 =2.2 Kg. acid eq/ha.**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 6.1 m. × 4.6 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of potato. (iv) (a) 1961-62(modified in 62). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 29.8 Q/ha. (ii) 8.3 Q/ha. (iii) Control vs. others is significant. (iv) Av. yield of potato in Q/ha.

Control=17.4 Q/ha.

	W ₁	W ₂	Mean
D ₁	36.7	29.8	33.2
D ₂	31.8	33.6	32.7
Mean	34.2	31.7	32.9

C.D. for control vs. others=8.8 Q/ha.

Crop :- Potato (Rabi).

Ref :- M.P. 62(103).

Site :- Govt. Seed Multiplication and Demons.

Farm, Nabibagh.

Type :- 'D'.

Object :- To study the effect of different doses and weedicides on the yield of Potato.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

2. TREATMENTS:

All combinations of (1) and (2)+a control.

(1) 2 weedicides: W₁=Fenoxone, W₂=Phynoxylene.

(2) 2 doses of weedicides: D₁=High dose and D₂=Low dose.

Exact date of application N.A.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 4.6 m. x 6.1 m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of potato. (iv) (a) 1961-62 (modified in 1962). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 47.0 Q/ha. (ii) 6.2 Q/ha. (iii) Main effect of W alone is highly significant. (iv) Av. yield of potato in Q/ha.

Control=40.4 Q/ha.

	D ₁	D ₂	Mean
W ₁	58.7	58.0	58.3
W ₂	44.0	33.8	38.9
Mean	51.3	45.9	48.6

C.D. for W marginal mean=8.2 Q/ha.

Crop :- Pumpkin.
Site :- Agri. Res. Stn. Kuthulia.

Ref :- M.P. 60(171).
Type :- 'D'.

Object:—To study the control measures against red pumpkin beetle.

1. BASAL CONDITIONS :

(i) (a) to (c) Nil. (ii) Clayey loam (iii) 24.2.60. (iv) (a) Ploughing and planking. (b) Dibbling. (c) and (d) N.A. (e) 1 seed/hole. (v) N.A. (vi) Local. (vii) Irrigated. (viii) Weeding by *Khurpi*. (ix) N.A. (x) 23.5.60 to 23.6.60.

2. TREATMENTS:

8 chemical treatments : T_0 =Control, T_1 =5% D.D.T. dust, T_2 =5% B.H.C. dust, T_3 =1% Endrin dust, T_4 =1% Parathion dust, T_5 =2% Endrin dust, T_6 =Pyrodust—400 and T_7 =1% Systox emulsion.

Chemicals applied four times at fortnightly intervals.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 3.7 m. × 3.1 m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Attack of red beetle. Chemicals were sprayed as per treatments. (iii) Pumpkin yield, population of beetle, % leaves damaged by beetle. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

(i) 307.5 Q/ha. (ii) 36.2 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of pumpkin in Q/ha.

Treatment :	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7
Av. yield :	343.6	301.8	301.6	312.8	236.6	256.9	380.5	326.5

C.D. = 53.2 Q/ha.

Crop :- Raddish (*Rabi*).
Site :- Govt. Agri. College Farm, Rewa.

Ref :-M.P. 65(33).
Type :- 'D'.

Object :—To see the effect of different levels of N and spraying of pesticide on the growth and yield of Raddish.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 12.11.65. (iv) (a) 5 ploughings by victory, and *desi* ploughs followed by planking. (b) Broadcasting. (c) 13.4 Kg/ha. (d) and (e) —. (v) 167 Kg/ha. of P_2O_5 + 167 Kg/ha. of K_2O . applied before sowing. (vi) Local. (vii) Irrigated. (viii) Weeding and hoeing. (ix) 49.3 cm. (x) 21, 22.1.66.

2. TREATMENTS :

All combinations of (1) and (2).

(1) 4 levels of N : N_1 =44.8, N_2 =89.6, N_3 =134.4 and N_4 =179.2 Kg/ha.

(2) 3 intervals of 0.04% Dimecron sprayings : D_0 =No spraying, D_1 =at 10 days interval and D_2 =at 20 days interval.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12. (b) 9.8 m. × 14.6 m. (iii) 4. (iv) (a) 3.1 m. × 2.4 m. (b) 2.4 m. × 1.8 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) Incidence of *Athalia Proxima*. (iii) Wt. of plants, length, girth and yield of roots. Population of insects. (iv) (a) 1965—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

Yield data.

(i) 154.0 Q/ha. (ii) 52.9 Q/ha. (iii) Main effects of N and D are highly significant. (iv) Av. yield of fresh roots in Q/ha.

	N ₁	N ₂	N ₃	N ₄	Mean
D ₀	109.2	170.2	70.1	67.1	104.1
D ₁	231.4	316.2	216.6	132.2	224.1
D ₂	121.2	187.6	112.9	113.7	133.8
Mean	153.9	224.7	133.2	104.3	154.0

C.D. for D marginal means=38.1 Q/ha.

C.D. for N marginal means=44.0 Q/ha.

Incidence data.

Average Number of adults of *Athalia proxima*/plant.

(i) 10.1. (ii) 4.13. (iii) Main effects of N and D are highly significant. (iv) Av. number of proxima/plant.

	N ₁	N ₂	N ₃	N ₄	Mean
D ₀	3.5	9.5	19.5	24.2	14.2
D ₁	0.5	1.0	4.0	16.2	5.4
D ₂	3.0	4.0	14.0	20.7	10.4
Mean	2.3	4.8	12.5	20.4	10.0

C.D. for D marginal means=2.97 adults/plants.

C.D. for N marginal means=3.44 adults/plants.

Crop :- Sugarcane.

Ref :- M.P. 64(26).

Site :- Reg. Res. Stn., Bagwai.

Type :- 'M'.

Object :- To study the performance of Urea as foliar and soil application.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Clay loam. (iii) 20, 27, 28, 1.64. (iv) (a) 6 ploughings. (b) Planted in furrows. (c) 15 setts/row. (d) Rows 90 cm. apart. (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) Weedings. (ix) N.A. (v) 31.1.65.

2. TREATMENTS :

16 manurial treatments : T₀=Control (No treatments), T₁=Water spray, T₂=Soil application of 100 Kg/ha. of N, T₃=T₂+Foliar spray of 20 Kg/ha. of N every month, T₄=T₂+Foliar spray of 20 Kg/ha. of N every two months, T₅=T₂+Foliar application of 40 Kg/ha. of N every month, T₆=T₂+foliar application of 40 Kg/ha. of N every two months, T₇=Soil application of 200 Kg/ha. of N. T₈=T₇+20 Kg/ha. of N as foliar spray every month, T₉=T₇+foliar spray of 20 Kg/ha. of N every two months, T₁₀=T₇+foliar spray of 40 Kg/ha. of N every month, T₁₁=T₇+Foliar spray of 40 Kg/ha. of N every two months, T₁₂=Foliar spray of 20 Kg/ha. of N every month, T₁₃=Foliar spray of 20 Kg/ha. of N every two months, T₁₄=Foliar spray of 40 Kg/ha. of N every month & T₁₅=Foliar spray of 40 Kg/ha. of N every two months.

3. DESIGN:

- (i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) 5.4 m. × 1.5 m. (b) 5.1 m. × 1.1 m. (v) 15 cm. × 23 cm. (vi) Yes.

4. GENERAL :

- (i) Very poor. (ii) Nil. (iii) Yield of cane. (iv) (a) 1964—65 (modified in 65). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

- (i) 80.4 Q/ha. (ii) 16.1 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of cane in Q/ha.

Treatment : T ₀	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉
Av. yield: 46.9	39.0	70.0	85.6	91.6	90.8	86.2	105.9	99.7	108.6
	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅			
	107.9	114.0	58.6	48.9	71.0	62.5			

C.D.=26.7 Q/ha.

Crop :- Sugarcane.

Ref :- M.P. 65(24).

Site :- Reg. Res. Stn., Bagwai.

Type :- 'M'.

Object : —To find the best method of Urea application and optimum dose of N.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) Wheat. (c) 45 Kg/ha. of A/S+45 Kg/ha. of Super. (ii) Clay loam. (iii) 8.10.65. (iv) (a) Ploughings. (b) Planting of setts in furrows. (c) 40, 400 (three budded) setts. (e) 90 cm. between rows. (e) -. (v) Nil. (vii) N.A. (viii) Hoeing, weeding & earthing. (ix) N.A. (x) 24.12.66.

2. TREATMENTS :

16 manurial treatments : T₀=Control (No treatment), T₁=Water spray, T₂=125 Kg/ha. of N as soil application, T₃=T₂+25 Kg/ha. of N as foliar spray every month, T₄=T₂+25 Kg/ha. of N as foliar spray in every two months, T₅=T₂+50 Kg/ha. of N as foliar spray—every month, T₆=T₂+50 Kg/ha. of N as foliar spray in every two months, T₇=250 Kg/ha. of N as soil application, T₈=T₇+25 Kg/ha. of N as foliar spray—every month, T₉=T₇+25 Kg/ha. of N as foliar spray in every two months. T₁₀=T₇+50 Kg/ha. of N as foliar spray—every month, T₁₁=T₇+50 Kg/ha. of N as foliar spray in every two months. T₁₂=25 Kg/ha. of N as foliar spray every month, T₁₃=25 Kg/ha. of N as foliar spray in every two months, T₁₄=50 Kg/ha. of N as foliar spray every month and T₁₅=50 Kg/ha. of N as foliar spray in every 2 months.

3. DESIGN :

- (i) R B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) 9.0 m. × 5.5 m. (b) 7.2 m. × 3.7 m. (v) 90 cm. × 90 cm. (vi) Yes.

4. GENERAL :

- (i) Poor. (ii) Red-rot attack, Agglol dipping was done. (iii) Cane yield. (iv) (a) 1964-65 (Modified in 1965). (b) No. (c) N.I. (v) to (vii) Nil.

5. RESULTS :

- (i) 232.1 Q/ha. (ii) 87.8 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of cane in Q/ha.

Treatment : T ₀	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇
Av. yield : 187.7	158.9	127.6	264.0	276.5	163.9	240.2	247.7
T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅
205.2	208.9	264.0	337.8	265.3	304.4	237.7	224.0

Crop :- Sugarcane.

Ref :- M.P. 65(27).

Site :- Reg. Res. Stn., Bagwai.

Type :- 'M'.

Object:—To study the effect of different methods of application of trace—elements on the yield of Sugarcane.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Gram. (c) Nil. (ii) Clay loam. (iii) 13.10.65. (iv) (a) 3 ploughings. (b) Planted in furrows. (c) 32,760 (3 budded) setts/ha. (d) Rows 90 cm. apart. (e) —. (v) N.A. (vi) G—2. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) 10.12.66.

2. TREATMENTS :

18 trace-elements treatments : T₁=Control (No treatment), T₂=Water spray at 1,100 liters/ha., T₃=Water spray at 550 liters/ha., T₄=Fe at 11 Kg/ha. as soil application, T₅=Fe. at 11 Kg/ha. as foliar spray after final earthing, T₆=Fe. at 11 Kg/ha.—½ dose as foliar spray at earthing and ½ dose in October, T₇=Zn. at 11 Kg/ha. as soil application, T₈=Zn. at 11 Kg/ha. as foliar spray at earthing, T₉=Zn. at 11 Kg/ha.—½ dose as foliar spray at earthing and ½ dose in October, T₁₀=Mn. at 11 Kg/ha. as soil application, T₁₁=Mn. at 11 Kg/ha. as foliar spray at earthing, T₁₂=Mn. at 11 Kg/ha.—½ dose as foliar spray at earthing and ½ dose in October, T₁₃=Cu. at 11 Kg/ha. as soil application, T₁₄=Cu. at 11 Kg/ha. as foliar spray at earthing, T₁₅=Cu. at 11 Kg/ha.—½ dose as foliar spray at earthing and ½ dose in October, T₁₆=B at 11 Kg/ha. as soil application, T₁₇=B at 11 Kg/ha. as foliar spray at earthing and T₁₈=B at 11 Kg/ha.—½ dose as foliar spray at earthing and ½ dose in October.

3. DESIGN :

(i) R.B.D. (ii) (a) 18. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 8.2 m.×5.4 m. (v) 50 cm.×90 cm. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) Nil. (iii) Cane yield. (iv) (a) 1965 only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS:

(i) 175.7 Q/ha. (ii) 88.5 Q/ha. (iii) Treatment differences are not significant. (iv) (a) Av. yield of cane in Q/ha.

Treatment	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀
Av. yield	140.0	213.8	167.9	201.7	202.5	200.2	144.5	276.3	210.8	199.5
T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅	T ₁₆	T ₁₇	T ₁₈			
	78.3	128.0	101.6	210.8	141.5	165.6	185.2	194.2		

Crop :- Sugarcane.**Ref :- M.P. 60(116).****Site :- Instt. of Plant Industry, Indore.****Type :- 'M'.**

Object :—To study the effect of times of application of different levels of P on the yield of Sugarcane.

1. BASAL CONDITIONS :

(i) (a) Maize—Potato—Sugarcane. (b) Potato. (c) Nil. (ii) Black cotton soil. (iii) 18.3.60. (iv) (a) One harrowing and one *bakhering*. (c) Bud to bud system. (c) 36.9 Q/ha. (d) 91 cm. between rows. (e) —. (v) Nil. (vi) Co.—419. (vii) Irrigated. (viii) 2 weedings. (ix) 84.3 cm. (x) 16.1.61 and 16.2.61.

2. TREATMENTS :

All combinations of (1) and (2)+a control.

(1) 3 levels of P_2O_5 : $P_1=112$, $P_2=224$ and $P_3=336$ Kg/ha.(2) 4 times of application : $T_1=At$ pre-emergence, $T_2=2$, $T_3=4$ and $T_4=8$ weeks after sowing.**3. DESIGN :**

(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 4.6 m. (b) 4.6 m. × 2.7 m. (v) 91 cm. on either side. (vi) Yes.

4. GENERAL:

(i) Good. (ii) No. (iii) Cane yield. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 399 Q/ha. (ii) 64.7 Q/ha. (iii) Control vs. others alone is significant. (iv) Av. yield of cane in Q/ha.

Control=467 Q/ha.

	T_1	T_2	T_3	T_4	Mean
P_1	404	393	329	369	379
P_2	457	389	370	386	401
P_3	375	387	387	459	402
Mean	412	390	362	411	394

C.D. for Control vs. others=68.4 Q/ha.

Crop :- Sugarcane.**Ref :- M.P. 62(63), 63(13).****Site :- R.A.K. Agri. Res. Instt., Sehore.****Type :- 'M'.**

Object :—To study the effect of G.M. with and without P against compost on the yield of cane.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. ; Sugarcane. (c) N.A- (iii) Black cotton soil. (iii) 10.2.62 ; 9.12.62. (iv) (a) 2 ploughings and 2 *bakherings*. (b) Trench planting. (c) 100.0 eye buds/ha. (d) 91 cm. between rows. (e) —, (v) 25 C.L /ha. of F.Y.M, for 62 ; N.A. for 63. (vi) Co.—421. (vii) Irrigated. (viii) 2 blind hoeings 2 weedings and 2 earthings for 62 ; N.A. for 63. (ix) 134.8 cm. ; N.A. (x) 12.2.63 ; N.A.

2. TREATMENTS :**Main-plot treatments :**4 green manures : $G_0=Control$, $G_1=Compost$ at 224 Q/ha., $G_2=Sannhemp$ and $G_3=Cowpeas$.**Sub-plot treatments :**3 levels of P_2O_5 : $P_0=0$, $P_1=56$ and $P_2=112$ Kg/ha.

3. DESIGN :

(i) Split-plot. (iv) (a) 4 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 6.
 (iv) (a) 12.8 m. × 7.3 m, (b) 12.2 m. × 5.5 m. (v) 30 cm. × 91 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Cane yield. (iv) (a) 1962—63. (b) No. (c) Results of combined analysis have been presented under 5.—Results, (v) and (vi) Nil. (vii) Main-plot as well as sub-plot error variances are homogeneous and Treatments × years interaction in both the cases is absent.

5. RESULTS :

Pooled results

(i) 533.5 Q/ha. (ii) (a) 165.9 Q/ha. (based on 33 d.f. made up of pooled error and Treatments × years interaction). (b) 93.7 Q/ha. (based on 88 d.f. made up of pooled error and Treatments × years interaction). (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	G ₀	G ₁	G ₂	G ₃	Mean
P ₀	530.5	515.0	589.0	484.5	529.7
P ₁	429.0	526.5	505.5	525.0	521.5
P ₂	549.0	543.5	570.5	534.0	549.2
Mean	536.1	528.3	555.0	514.5	533.5

Individual results :

Treatments	G ₀	G ₁	G ₂	G ₃	Sig.	P ₀	P ₁	P ₂
Years								
1962	512	512	497	489	N.S.	499	490	518
1963	561	545	613	540	N.S.	560	553	581
Pooled	536	528	555	514	N.S.	530	521	549

Sig.	G.M.	S.E./main-plot	S.E./sub-plot
N.S.	502	209.2	109.7
N.S.	565	120.0	77.8
N.S.	533	165.9	93.7

Crop :- Sugarcane.

Ref :- M.P. 62(123).

Site :- Reg. Res. Stn., Bagwai.

Type :- 'MV'.

Object :- To study the effect of N on the yield of different varieties of Sugarcane.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Paddy. (c) N.A. (ii) Clay loam. (iii) 23.1.62. (iv) (a) 6 ploughings. (b) Planted in furrows. (c) to (e) N.A. (v) 60 Kg/ha. of P₂O₅. (vi) As per treatments. (vii) Irrigated. (viii) Earthing and weeding. (ix) and (x) N.A.

2. TREATMENTS :

Main-plot treatments :

4 varieties : $V_1 = \text{Co.}-954$, $V_2 = \text{Co.}-454$, $V_3 = \text{Co.}-794$ and $V_4 = \text{Co.}-421$.

Sub-plot treatments :

2 levels of N : $N_1 = 120$ and $N_2 = 180$ Kg/ha.

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) 9.9 m. \times 9.9 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) yield of cane. (iv) (a) 1962—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 622.0 Q/ha. (ii) (a) 102.0 Q/ha. (b) 135.5 Q/ha. (iii) Main effect of V alone is highly significant (iv) Av. yield of cane in Q/ha.

	V_1	V_2	V_3	V_4	Mean
N_1	478.0	403.8	644.3	811.1	584.3
N_2	519.6	524.2	736.6	858.6	659.7
Mean	498.8	464.0	690.5	834.8	622.0

C.D. for V marginal means = 115.4 Q/ha.

Crop :- Sugarcane.

Ref :- M.P. 65(26).

Site :- Reg. Res. Stn., Bagwai.

Type :- 'MV'.

Object :—To study the effect of N on different varieties of Sugarcane.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 111.2 Kg/ha. of A/S+111.2 Kg/ha. of Super. (ii) Clay loam. (iii) N.A. (iv) (a) Ploughings by *desi* plough. (b) Planted in furrows. (c) 41580 (3 budded) setts/ha. (d) 90 cm. between rows. (e) N.A. (v) Nil (vi) As per treatments. (vii) Irrigated. (viii) Hoeing and earthing. (ix) N.A. (x) 6.1.67.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 3 varieties : $V_1 = \text{Co.}-312$, $V_2 = \text{Co.}-245$ and $V_3 = \text{Co.}-457$.

(2) 4 levels of N : $N_0 = 0$, $N_1 = 150$, $N_2 = 300$ and $N_3 = 450$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 8.1 m. \times 8.0 m. (b) 7.2 m. \times 7.1 m. (v) 45 cm. \times 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Dipping setts in 5 % Agallol solution. Red-rot and shoot attack 1 % Endrin used. (iii) Yield of cane. (iv) (a) 1965—66. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

5. RESULTS :

(i) 177.0 Q/ha. (ii) 64.4 Q/ha. (iii) Main effects of V, N and interaction $V \times N$ are highly significant. (iv) Av. yield of cane in Q/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
V ₁	51.8	194.6	204.9	225.9	169.3
V ₂	12.7	187.3	330.6	361.4	223.0
V ₃	57.2	196.1	122.7	178.5	138.6
Mean	40.6	192.7	219.4	255.3	177.0

C.D. for V marginal means=46.4 Q/ha.

C.D. for N marginal means=53.5 Q/ha.

C.D. for body of table =92.6 Q/ha.

Crop :- Sugarcane.

Ref :- M.P. 63(31).

Site :- Govt. Agri. Farm, Bhind.

Type :- 'MV'.

Object :- To find out a suitable variety of sugarcane and optimum doses of N and P.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) N.A. (ii) Sandy loam. (iii) 28/31.3.63. (iv) (a) 3 ploughings and 2 *bakherings*. (b) Ridge planting. (c) N.A. (d) 91 cm. between rows. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 20.12.63 to 8.2.64.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 varieties ; V₁=CO.245, V₂=CO.419 and V₃=CO.421.

(2) 3 levels of N as A/S : N₁=56, N₂=112 and N₃=168 Kg/ha.

(3) 3 levels of P₂O₅ as Super : P₁=56, P₂=112 and P₃=168 Kg/ha.

$\frac{1}{2}$ P₂O₅ applied as basal dressing. $\frac{1}{2}$ N applied within 3 months of planting. $\frac{1}{2}$ N and $\frac{1}{2}$ P₂O₅ applied at the time of final earthing done before commencement of Monsoon.

3. DESIGN :

(i) 3³ confd. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 11.9 m. × 6.9 m. (b) 10.1 m. × 5.0 m. (v) 91 cm. × 91 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Yield of cane weight. (iv) (a) 1963—Only. (b) and (c) —. (v) Jora. (vi) and (vii) Nil.

5. RESULTS :

(i) 531 Q/ha. (ii) 210.5 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	N ₁	N ₂	N ₃	P ₁	P ₂	P ₃	Mean
V ₁	596	636	640	578	666	628	624
V ₂	481	384	346	412	384	415	404
V ₃	567	514	615	637	507	551	565
Mean	548	511	534	542	519	531	531
P ₁	500	562	565				
P ₂	543	519	494				
P ₃	600	453	541				

Crop :- Sugarcane.

Ref :- M.P. 60(108), 61(80).

Site :- Govt. Agri. Res. Farm. Chhindwara.

Type :- 'MV'.

Object :- To find out a suitable variety of Sugarcane and optimum doses of N and P.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. for 60; 22.4 Kg/ha of N+22.4 Kg/ha. of P_2O_5 for 61. (ii) *MorandI* for 60; Heavy soil for 61. (iii) 2.3.61; 16.1.62. (iv) (a) One deep ploughing and 2 *bakherings*. (b) Planting. (c) 64.6 Q/ha. (d) 91 cm. x 30 cm. (e) -. (v) Nil for 60; 25 C.L./ha. of F.Y.M. (vi) As per treatments. (vii) Irrigated. (viii) 4 weedings and earthings. (ix) 115.2 cm; 94.1 cm. (x) 26.3.62; 22.2.63.

2. TREATMENTS :

Main-plot treatments :

3 varieties : $V_1=Co.419$, $V_2=Co.1164$ and $V_3=Co.312$.

Sub-plot treatments :

All combinations of (1) and (2).

(1) 3 levels of N : $N_1=56$, $N_2=112$ and $N_3=168$ Kg/ha.(2) 3 levels of P_2O_5 : $P_1=56$, $P_2=112$ and $P_3=168$ Kg/ha.Half P_2O_5 applied at planting, $\frac{1}{2}N$ applied within three months of planting and $\frac{1}{2}P_2O_5 + \frac{1}{2}N$ applied at earthing.

3. DESIGN :

(i) Split plot. (ii) (a) 3 main plots/replication; 9 sub-plots/main plot. (b) N.A. (iii) 2. (iv) (a) and (b) 7.3 m. x 5.5 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good for 60; cane lodged due to rains for 61. (ii) Nil. (iii) Cane yield. (iv) (a) 1960—61. (b) No. (c) Nil. (v) N.A. (vi) Nil for 60; Heavy storm in August and September for 61. (vii) As sub-plot error variances are heterogeneous, results of individual years have been presented under 5. Results.

5. RESULTS :

60(108)

(i) 752 Q/ha. (ii) (a) 257.0 Q/ha. (b) 203.5 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	P_1	P_2	P_3	V_1	V_2	V_3	Mean
N_1	663	715	829	848	666	693	736
N_2	751	745	872	899	717	752	789
N_3	660	739	795	758	748	688	731
Mean	691	733	832	835	710	711	752
V_1	750	863	893				
V_2	603	701	827				
V_3	721	634	777				

61(80)

(i) 607 Q/ha. (ii) (a) 25.2 Q/ha. (b) 133.7 Q/ha. (iii) Main effect of V is highly significant and that of N is significant. (iv) Av. yield of cane in Q/ha.

	P ₁	P ₂	P ₃	V ₁	V ₂	V ₃	Mean
N ₁	666	666	659	821	558	612	664
N ₂	542	511	558	627	519	465	537
N ₃	604	620	635	674	628	558	620
Mean	604	599	617	707	568	545	607
V ₁	693	705	724				
V ₂	589	527	589				
V ₃	531	566	539				

C.D. for V marginal means=36.1 Q/ha.

C.D. for N marginal means=92. Q/ha.

Crop :- Sugarcane.

Ref :- M.P. 61(91).

Site :- Institute of Plant Industry, Indore.

Type :- 'MV'.

Object :--To find out the suitable variety of Sugarcane and optimum doses of N and P.

1. BASAL CONDITIONS :

(i) (a) Maize—Potato—Sugarcane. (b) Potato. (c) N.A. (ii) Black cotton soil. (iii) 5.4.61.
 (iv) (a) One harrowing and one *bakhering*. (b) Bud to bud system. (c) 36.9 Q/ha. (d) 91 cm. between rows. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 earthings and 3 weedings. (ix) 167.4 cm. (x) 2.5.62.

2. TREATMENTS :

Main-plot treatments :

3 varieties : V₁=Co.419, V₂=E.K. 28 and V₃=Ashumeri.

Sub-plot treatments :

All combinations of (i) and (ii).

(1) 3 levels of N as A/S : N₁=56.0, N₂=112.1 and N₃=168.1 Kg/ha.

(2) 3 levels of P₂O₅ as Super : P₁=56.0, P₂=112.1 and P₃=168.1 Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iii) (a) and (b) 12.8 m. x 3.7 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Crop lodged and damaged by rats and affected by cold on 22.1.62. (ii) Nil. (iii) Cane yield. (iv) (a) 1961—only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 646 Q/ha. (ii) (a) 249.6 Q/ha. (b) 110.7 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	P ₁	P ₂	P ₃	V ₁	V ₂	V ₃	Mean
N ₁	650	651	635	846	633	457	645
N ₂	639	676	664	907	574	498	660
N ₃	672	609	616	912	569	416	632
Mean	654	645	638	888	592	457	646
V ₁	876	864	925				
V ₂	626	631	519				
V ₃	459	441	470				

Crop :- Sugarcane.

Ref :- M.P. 62(18), 64(13).

Site :- Govt. Agri. Farm, Jora.

Type :- 'MV'.

Object :- To find out a suitable variety of Sugarcane and optimum doses of N and P.

1. BASAL CONDITIONS :

(i) (a) Nil; N.A. (b) and (c) N.A. (ii) Sandy loam. (iii) 14.3.62 ; 8.3.64. (iv) (a) 3 to 6 ploughings. (b) N.A. (c) 55.3 Q/ha. ; N.A. (d) 91 cm. between lines. (e) -. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 4 weedings and 4 earthings. (ix) 37.9 cm. ; 100.1 cm. (x) 14 to 28.3.63 ; 25.2.65.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 varieties: V₁=Co.245, V₂=Co.419 and V₃=C.421.

(2) 3 levels of N as A/S : N₁=56, N₂=112 and N₃=168 Kg/ha.

(3) 3 levels of P₂O₅ As Super : P₁=56, P₂=112 and P₃=168 Kg/ha.

3. DESIGN :

(i) 3³ Confd. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 11.9 m. x 6.9 m. (b) 10.1 m. x 5.0 m. (v) 91 cm. x 91 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Top and shoot-borers and rats attacks, Folidol sprayed for 62 ; Red rot, root and stem-borers attacks for 64. (iii) Height measurement, tiller count and yield of cane. (iv) (a) 1962-64 (Data for 1963 N.A.). (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) Bind. (vi) Nil. (vii) Variances are homogeneous and treatments x years interaction is absent.

5. RESULTS :

Pooled Results

(i) 777.2 Q/ha. (ii) 175.8 Q/ha. (62 d.f. made up of of pooled error and Treatment x years interaction). (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N ₁	N ₂	N ₃	P ₁	P ₂	P ₃	Mean
V ₁	791.5	816.0	767.0	652.0	797.0	825.5	791.5
V ₂	598.0	622.5	618.5	616.0	659.0	564.0	613.0
V ₃	919.0	853.5	1008.5	889.5	975.5	916.0	927.0
Mean	769.5	764.0	798.0	752.5	810.5	768.5	777.2
P ₁	714.5	786.0	757.0				
P ₂	844.0	778.0	809.5				
P ₃	750.0	728.0	827.5				

C.D. for V marginal means = 82.8 Kg/ha.

Individual results.

Treatments	N ₁	N ₂	N ₃	Sig.	P ₁	P ₂	P ₃	Sig.	V ₁	V ₂	V ₃
Years											
1962	819	871	852	N.S.	831	912	799	N.S.	891	709	942
1963	720	657	744	N.S.	674	709	738	N.S.	692	517	912
Pooled	770	764	798	N.S.	752	810	769	N.S.	792	613	927

Sig.	G.M.	S.E./plot
*	847	205.0
**	707	140.9
**	777	175.8

Crop :- Sugarcane.

Ref :- M.P. 65(7).

Site :- Govt. Agri. Farm, Jora

Type :- 'MV'.

Object :- To find out a suitable variety and optimum dose of N and P for Sugarcane.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 11.3.65. (iv) (a) 3 ploughings by *deshi* plough. (b) N.A. (c) Nil. (d) 91 cm. between rows. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated (viii) 3 earthings. (ix) 42.1 cm. (x) 18.4.66.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1) and (2)

(1) 4 levels of N as A/S: N₁=112, N₂=168, N₃=224 and N₄=280 Kg/ha.

(2) 2 levels of P₂O₅ as Super: P₁=56 and P₂=112 Kg/ha.

Sub-plot treatments :

3 varieties: V₁=Co.—245, V₂=Co.—419 and V₃=Co.—421.

3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 12.2 m (b) 5.8 m. × 10.7 m. (v) 76 cm. × 76 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Cane yield. (iv) (a) 1965—only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 461 Q/ha. (ii) (a) 56.3 Q/ha. (b) 62.5 Q/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of cane in Q/ha.

	N ₁	N ₂	N ₃	N ₄	P ₁	P ₂	Mean
V ₁	469	483	472	500	468	595	481
V ₂	378	380	378	390	401	361	381
V ₃	433	485	476	487	466	475	470
Mean	427	449	442	459	445	477	461
P ₁	407	450	438	485			
P ₂	446	449	445	433			

C.D. for V marginal means = 31.4 Q/ha.

Crop :- Sugarcane.

Ref :- M.P. 61(157).

Site :- Reg. Res. Stn., Bagwai.

Type :- 'CV'.

Object :- To find out the performance of dates of sowing on different varieties of Sugarcane.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Paddy. (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) 4 ploughings. (b) Planted in furrows. (c) N.A. (d) 91 cm. between rows. (e) —. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) Earthing and weeding. (ix) and (x) N.A.

2. TREATMENTS :

Main-plot treatments :

3 varieties : V₁=Co.—954, V₂=Co.—794 and V₃=Co.—453.

Sub-plot treatments :

2 sowing dates : D₁=7, 8.12.61 and D₂=23.1.62.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main plots/replication ; 2 sub plots/main plot. (b) N.A. (iii) 4. (iv) (a) 9.9 m. × 5.4 m. (b) 8.1 m. × 4.8 m. (v) 90 cm. × 30 cm. (v) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of cane. (iv) (a) 1961—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 676.5 Q/ha. (ii) (a) 176.8 Q/ha. (b) 209.1 Q/ha. (iii) None of the effects is significant. (iv) (a) Av. yield of cane in Q/ha.

	V ₁	V ₂	V ₃	Mean
D ₁	754.9	562.0	643.0	653.3
D ₂	754.9	637.8	706.7	699.8
Mean	754.9	599.9	674.8	676.5

Crop :- Sugarcane.

Ref :- M.P. 63(10).

Site :- R.A.K. Agri. Res. Instt., Sehore.

Type :- 'CV'.

Object :—To find out the best time of planting and a suitable variety of Sugarcane.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) As per treatments. (iv) (a) 2 ploughings and 2 *bakherings*. (b) Trench method. (c) 98842 eye buds/ha. (d) 91 cm. between rows. (e) —. (vi) 25 C.L./ha. of compost + 84.1 Kg/ha. of P_2O_5 + 56.0 Kg/ha. of N. (vi) As per treatments. (vii) Irrigated. (viii) 2 hoeings, weedings and 2 earthings. (ix) 114.1 cm. (x) 21 to 24.12.63.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 varieties : $V_1=Co.-421$, $V_2=Co.-678$, $V_3=Co.-740$ and $V_4=Co.-798$.(2) 2 dates of planting : $D_1=1.12.62$ and $D_2=1.2.63$.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 9.8 m. \times 7.3 m. (b) 9.1 m. \times 5.5 m. (v) 91 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Cane yield. (iv) (a) 1963—only. (b) and (c) —. (v) to (vii) N.A.

5. RESULTS :

(i) 659 Q/ha. (ii) 202.1 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	V_1	V_2	V_3	V_4	Mean
D_1	506	662	610	866	661
D_2	585	577	764	703	657
Mean	545	620	687	784	659

Crop :- Sugarcane.

Ref :- M.P. 65(25).

Site :- Reg. Res. Stn., Bagwai.

Type :- 'CM'.

Object :—To study the effect of inter-cropping sugarcane with Onion, Potato, Tomato, Maize, *Bhindi* and Groundnut in enhancing the economic return without affecting the yield in the presence and absence of N.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (ii) 11.10.65. (iv) (a) 2/3 ploughings. (b) Planting. (c) 37,065 (three budded) setts/ha. (d) Rows 90 cm. apart. (e) —. (v) N.A. (vi) Co.—421. (vii) Irrigated (viii) 4 hoeings and earthings. (ix) N.A. (x) 8.12.66.

2. TREATMENTS :

Main-plot treatments :

8 inter-cropping treatments : $T_1=Tomato$, $T_2=Potato$, $T_3=Onion$, $T_4=Maize$, $T_5=Groundnut$, $T_6= Bhindi$, $T_7=No\ legume$ and $T_8=Legume$.

Sub-plot treatments :

3 levels of N : $N_0=0$, $N_1=50$ and $N_2=100$ Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 7.2 m. × 5.5 m. (b) 5.4 m. × 3.7 m. (v) 90 cm. × 90 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Cane yield. (iv) (a) 1965—only. (b) and (c) —. (v) Nil. (vi) No. (vii) Nil.

5. RESULTS :

(i) 278.2 Q/ha. (ii) (a) 99.1 Q/ha. (b) 69.0 Q/ha. (iii) Main effect of T and interaction T × N are significant. (iv) Av. yield of cane in Q/ha.

	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	Mean
N ₀	263.6	308.6	273.6	163.5	265.3	305.3	355.4	322.0	282.1
N ₁	300.3	206.9	303.6	173.5	301.9	332.0	216.9	313.6	268.6
N ₂	266.9	375.4	432.1	138.5	181.8	328.7	276.9	270.3	283.8
Mean	276.9	296.9	336.4	158.5	249.7	322.0	283.1	302.0	278.2

C.D. for T marginal means = 100.3 Q/ha.
 C.D. for N means at the same level of T = 114.8 Q/ha.
 C.D. for T means at the same level of N = 138.4 Q/ha.

Crop :- Sugarcane.

Ref :- M.P. 61(100).

Site :- R.A.K. Agri. Res. Instt., Sehore.

Type :- 'CM'.

Object :- To study the effect of inter-cropping in Sugarcane for getting the maximum yield of Sugarcane and economic returns.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 1-3.1.61. (iv) (a) 2 ploughings and 2 *bakherings*. (b) Trench planting. (c) 111,197 eye buds/ha. (d) 91 cm. between rows. (e) —. (v) 25 C.L./ha. of F.Y.M. + 84.1 Kg/ha. of P₂O₅. (vi) Co-421. (vii) Irrigated. (viii) 2 hoeings, weedings and 2 earthings. (ix) 220.6 cm. (x) 20.2.62 to 1.3.62.

2. TREATMENTS :

Main-plot treatments :

7 inter-cropping treatments : C₁ = Sugarcane alone, C₂ = Sugarcane + Onion, C₃ = Sugarcane + Peas, C₄ = Sugarcane + Maize, C₅ = Sugarcane + Berseem, C₆ = Sugarcane + *Ambari* (on border) and C₇ = Sugarcane + *Ambari* (in lines).

Sub-plot treatments :

3 levels of N : N₀ = 0, N₁ = 224.2 and N₂ = 448.3 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) 12.8 m. × 7.3 m. (b) 12.2 m. × 5.5 m. (v) 91 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Cane yield. (iv) (a) 1961-62 (Modified in 1962). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 645 Q/ha. (ii) (a) 127.6 Q/ha. (b) 112.2 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	Mean
N ₀	606	648	645	606	587	637	545	611
N ₁	633	587	703	444	720	718	671	639
N ₂	574	710	679	711	748	724	648	685
Mean	604	648	676	587	685	693	621	645

Crop :- Sugarcane.

Ref :- M.P. 62(62).

Site :- R.A.K. Agri. Res. Instt., Sehore.

Type :- 'CM'.

Object :- To study the effect of inter-cropping in Sugarcane for getting the maximum yield of Sugarcane and economic returns.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 28.12.61. (iv) (a) 2 ploughings and 2 *bakherings*. (b) Trench planting. (c) 98,842 eye buds/ha. (d) 91 cm. between lines. (e) N.A. (v) 49 C.L./ha. of F.Y.M.+84.1 Kg/ha. P₂O₅. (vi) Co-421. (vii) Irrigated. (viii) 2 hoeings, 2 earthings and weedings. (ix) 121.9 cm. (x) 5.1.63.

2. TREATMENTS :

Main-plot treatments :

7 inter-cropping treatments : C₁=Sugarcane alone, C₂=Sugarcane+Onion, C₃=Sugarcane+Peas, C₄=Sugarcane+Maize, C₅=Sugarcane+Berseem, C₆=Sugarcane+*bhindi* and C₇=Sugarcane+*Ambari* (in lines).

Sub-plot treatments :

3 levels of N: N₀=0, N₁=224.2 and N₂=448.3 Kg/ha.

3. DESIGN : and 4. GENERAL :

Same as in Expt. No. 61(100) on page 346.

5. RESULTS:

(i) 522 Q/ha. (ii) (a) 106.0 Q/ha. (b) 87.9 Q/ha. (iii) Main effect of N and interaction C×N are highly significant. (iv) Av. yield of cane in Q/ha.

	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	Mean
N ₀	384	427	478	434	484	486	435	447
N ₁	558	568	521	567	598	559	584	565
N ₂	470	497	548	488	627	621	634	555
Mean	471	497	516	496	570	555	551	522

C.D. for N marginal means = 55.5 Q/ha.

C.D. for N means at the same level of C=147.0 Q/ha.

C.D. for C means at the same level of N=161.9 Q/ha.

C-rop :- Sugarcane.

Ref :- M.P. 61(101), 62(64).

Site :- R.A.K Agri. Res. Instt., Sehore.

Type :- 'CMV'.

Object :—To study the effect of N on different varieties of Sugarcane with different seed rates.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton. (iii) 6.2.61 ; 4.1.62. (iv) (a) 2 ploughings and 2 *bakherings*. (b) Trench planting. (c) As per treatments (d) 91 cm. between rows. (e) —. (v) 25 C.L./ha. of F.Y.M. for 61 ; 25 C.L./ha. of F.Y.M. +841 Kg/ha. of P_2O_5 as top dressing for 62. (vi) As per treatments. (vii) Irrigated. (viii) 2 hoeings, weeding and earthings. (ix) 220.6 cm. ; 138.6 cm. (x) 2 to 7.2.62 ; 6.2.63.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1) and (2).

(1) 4 varieties : $V_1=Co-527$, $V_2=Co-678$, $V_3=Co-1101$ and $V_4=Co-421$.(2) 3 levels of N : $N_0=0$, $N_1=224.2$ and $N_2=448.3$ Kg/ha.

Sub-plot treatments :

3 seed-rates : $R_1=74,131$, $R_2=98,842$ and $R_3=1,23,552$ eye buds/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 12 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 9.1 m. \times 7.3 m. for 61 ; 9.5 m. \times 9.1 m. for 62. (b) 8.2 m. \times 5.5 m. for 61 ; 8.8 m. \times 7.3 m. for 62. (v) 46 cm. \times 91 cm. for 61 ; 30 cm. \times 91 cm. for 62. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Cane yield. (iv) (a) 1961-62. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) No. (vi) Nil. (vii) Main-plot and sub-plot error variances are homogeneous Main-plot treatments \times years interaction is absent. Sub-plot treatments \times years interaction is present.

5. RESULTS :

Pooled results

(i) 500.5 Q/ha. (ii) (a) 174.1 Q/ha. [based on 33 d.f. made up of pooled error and Treatments \times years interaction]. (b) 180.0 Q/ha. (based on 12 d.f. made up of Treatments \times years interaction). (iii) Main effect of V alone is significant. (iv) Av. yield of cane in Q/ha.

	N_1	N_2	N_3	R_1	R_2	R_3	Mean
V_1	429.0	423.5	428.5	359.5	440.0	481.5	427.0
V_2	557.0	617.5	478.5	513.5	566.0	573.5	551.0
V_3	487.0	578.5	446.5	511.0	523.0	478.0	504.0
V_4	485.0	540.5	534.5	434.5	541.0	585.0	520.0
Mean	489.5	540.0	472.0	454.5	517.5	529.5	500.5
R_1	434.0	490.5	439.0				
R_2	513.0	532.5	507.0				
R_3	521.5	597.0	473.0				

C.D. for V marginal means = 83.5 Q/ha.

Individual results

Treatments	V ₁	V ₂	V ₃	V ₄	Sig.	N ₁	N ₂	N ₃	Sig.	R ₁	R ₂	R ₃
Years												
1961	368	534	486	500	N.S.	516	479	421	N.S.	380	499	537
1962	486	568	522	540	N.S.	463	601	523	*	529	536	522
Pooled	427	551	504	520	*	490	540	472	N.S.	454	518	530

Sig.	G.M.	S.E./main-plot	S.E./sub-plot
**	472	177.2	133.8
N.S.	529	158.3	102.3
N.S.	500	174.1	180.0

Crop :- Sugarcane.

Ref :- M.P. 61(109).

Site :- R.A.K. Agri. Res. Instt., Sehore.

Type :- 'IMV'.

Object :- To study the effect of different levels of N and depths of irrigations on different varieties of Sugarcane.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) 8.1.61. (iv) (a) 2 ploughings. (b) N.A. (c) 1 lakh eye buds/ha. (d) N.A. (e) —. (v) N.A. (vi) As per treatments. (vii) Irrigated as per treatments. (viii) 5 weedings. (ix) N.A. (x) 14.2.62.

2. TREATMENTS :

All combinations of (1), (2) and (3).

- (1) 3 depths of irrigation : I₁=5.1, I₂=7.6 and I₃=10.2 cm.
- (2) 3 varieties : V₁=Co-419, V₂=Co-678 and V₃=Co-421.
- (3) 3 levels of N as A/S : N₀=0, N₁=224 and N₂=448 Kg/ha.

3. DESIGN :

(i) 3³ Confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 3. (iv) (a) 12.8 m. × 6.1 m. (b) 11.0 m. × 5.5 m. (v) 91 cm. × 91 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Cane yield. (iv) (a) 1961-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 805 Q/ha. (ii) 135.6 Q/ha. (iii) Main effect of N and interaction I × V × N are highly significant. (iv) Av. yield of cane in Q/ha.

	V ₁	V ₂	V ₃	N ₀	N ₁	N ₂	Mean
I ₁	841	753	764	746	766	847	786
I ₂	812	843	876	781	807	942	843
I ₃	732	880	743	761	754	840	785
Mean	795	825	794	763	776	876	805
N ₀	748	780	759				
N ₁	773	742	811				
N ₂	863	954	812				

C.D. for N marginal means=76.5 Kg/ha.

Crop :- Sugarcane.

Ref :- M.P. 63(12).

Site :- R.A.K. Agri. Res. Instt., Sehore.

Type :- 'ICM'.

Object .—To study the effect of N and to find proper time of ratooning under different intervals of irrigation to get maximum yield of Sugarcane.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton. (iii) 14.12.62. (iv) (a) 2 ploughings. (b) N.A. (c) 1,00,000 eye buds/ha. (d) Rows 90 cm. apart. (e) —. (v) 2+7 C.L./ha. of compost. (vi) Co 421. (vii) As per treatments. (viii) 5 weedings. (ix) and (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 intervals of irrigation : I₁=10 days after planting, I₂=15 days after planting and I₃=20 days after planting.

(2) 3 times of ratooning : T₁=Early, T₂=Middle and T₃=Late.

(3) 3 levels of N as A/S : N₀=0, N₁=168 and N₂=336 Kg/ha.

3. DESIGN :

(i) 3³ Confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 3. (iv) (a) 12.8 m. × 6.1 m. (b) 11.0 m. × 5.5 m. (v) 91 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Cane yield. (iv) (a) 1963-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 660 Q/ha. (ii) 122.9 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	T ₁	T ₂	T ₃	N ₀	N ₁	N ₂	Mean
I ₁	740	664	682	671	720	695	695
I ₂	614	713	680	708	687	612	669
I ₃	582	600	666	593	581	673	616
Mean	645	659	676	657	662	660	660
N ₀	596	681	695				
N ₁	625	649	713				
N ₂	715	647	619				

Crop :- Sugarcane**Ref :- M.P. 60(172).****Site :- Agri. Res. Stn., Kuthulia.****Type :- 'D'.**

Object :—To find out a suitable control measure against Sugarcane borer.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Peas. (c) N.A. (ii) Clayey loam. (iii) 10.1.60. (iv) (a) Ploughing and planking. (b) Planting in trenches. (c) N.A. (d) 91 cm. between rows. (e) —. (v) F.Y.M. and 134.4 Kg/ha. of N as A/S. (vi) Co-419. (vii) Irrigated. (viii) 12 inter-cultures with spade. (ix) N.A. (x) 10.1.61.

2. TREATMENTS :

6 chemical treatments : T_0 =Control, T_1 =0.05 % Endrin emulsion, T_2 =0.05% Folidol emulsion, T_3 =0.1% Metasystox, T_4 =0.05% Folidol+0.05% Endrin emulsion and T_5 =0.05% Endrin+Malathion emulsions.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 1.8 m. × 1.2 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Sugarcane borer attack ; control measures as per treatment. (iii) % of tillers attacked by borers and cane yield and % of tillers. (iv) (a) 1960-only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 198.2 Q/ha. (ii) 45.3 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of cane in Q/ha.

Treatment	T_0	T_1	T_2	T_3	T_4	T_5
Av. yield	191.8	175.7	189.3	153.8	241.6	237.1

Crop :- Cotton (Kharif).**Ref :- M.P. 60(120).****Site :- Govt. Seed and Demons. Farm, Amlaha.****Type :- 'M'.**

Object :—To study the effect of different times of application of different sources of N on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Cotton—Jowar. (b) Fallow. (c) Nil. (ii) Medium black. (iii) 2.7.60. (iv) (a) One ploughing and 2 *bakherings*. (b) Drilling. (c) 20 Kg/ha. (d) 46 cm. × 30 cm. (e) N.A. (v) 25 C.L./ha. of F.Y.M. (vi) *Deshi* Cotton. (vii) Unirrigated. (viii) 2 weedings and 2 interculturings. (ix) 42.2 cm. (x) 5.1.61 to 4.2.61.

2. TREATMENTS :

All combinations of (1) and (2)+2 extra treatments.

(1) 3 sources of 22.4 Kg/ha. of N : S_1 =A/S, S_2 =Urea and S_3 =A/S/N.

(2) 3 times of application : T_1 =All at sowing, T_2 =Half at sowing+ $\frac{1}{2}$ at top dressing (one month after sowing) and T_3 =All at top dressing ($1\frac{1}{2}$ months after sowing).

Extra treatments : E_0 =Control (2 plots) and E_1 =22.4 Kg/ha. of P_2O_5 as Super.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12 (with 2 plots of control E_0). (b) N.A. (iii) 4. (iv) (a) and (b) 12.2 m. × 4.3 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of *Kapas*. (iv) (a) 1960—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5 RESULTS:

(i) 175 Kg/ha. (ii) 63.3 Kg/ha. (iii) Control vs. others is highly significant and main effect of T and "control vs. E_1 " are significant. (iv) Av. yield of *Kapas* in Kg/ha.

Control (E_0)=84 Kg/ha. and E_1 =163 Kg/ha.

	T ₁	T ₂	T ₃	Mean
S ₁	250	197	168	205
S ₂	269	154	154	192
S ₃	192	154	231	192
Mean	237	168	184	196

C.D. for T marginal means =52.6 Kg/ha.

C.D. for "control vs. others" =49.9 Kg/ha.

C.D. for "control vs. E_1 " =78.9 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- M.P. 60(129).

Site :- Instt. of Plant Industry, Indore.

Type :- 'M'.

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

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Black cotton soil. (iii) 22.6.60. (iv) (a) One *bakhering*. (b) Dibbling. (c) 11 Kg/ha. (d) 36 cm. × 30 cm. (e) N.A. (v) Nil. (vi) *Dhar*—43. (vii) Unirrigated. (viii) One weeding. (ix) 82.0 cm. (x) 26.10.60 to 29.11.60.

2. TREATMENTS:

Same as in expt. in 60(126) on page 355.

3. DESIGN:

(i) 3³ confd. (ii) (a) 3 blocks/replication ; 9 plots/block. (b) N.A. (iii) 2. (iv) (a) 12.2 m. × 4.3 m. (b) 10.7 m. × 2.8 m. (v) 76 cm. × 71 cm. (vi) Yes.

4. GENERAL :

Same as in expt. No. 60 (126) on page 355.

5. RESULTS :

(i) 904 Kg/ha. (ii) 138.0 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	P ₀	P ₁	P ₂	K ₀	K ₁	K ₂	Mean
N ₀	819	686	769	798	733	743	758
N ₁	954	947	863	955	955	854	921
N ₂	1060	1034	1009	937	1094	1071	1034
Mean	944	889	890	897	927	889	904
K ₀	970	896	824				
K ₁	942	890	949				
K ₂	920	880	868				

C.D. for N marginal means = 95.3 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 62(125).

Site :- Instt. of Plant Industry, Indore.

Type :- 'M'.

Object: —To see the effect of different doses of fertilizer on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Black cotton. (iii) N.A. (iv) (a) 4 *bakherings*. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. × 45 cm. (e) 2. (v) 10 Kg/ha. of N through F.Y.M. (vi) Badnawar-1. (vii) Unirrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS:

All combinations of (1) and (2)+control (2 plots).

(1) 2 levels of N as A/S: N₁=30 and N₂=60 Kg/ha.

(2) 8 times of fertilizer application: T₁=Full dose at sowing, T₂=Full at square formation, T₃=Full at ball formation, T₄= $\frac{1}{2}$ at sowing + $\frac{1}{2}$ at square formation, T₅= $\frac{1}{2}$ at sowing + $\frac{1}{2}$ at ball formation, T₆= $\frac{1}{3}$ at sowing + $\frac{1}{3}$ at square formation + $\frac{1}{3}$ at ball formation, T₇= $\frac{2}{3}$ at sowing + $\frac{1}{3}$ at square formation and T₈= $\frac{2}{3}$ at sowing + $\frac{1}{3}$ at boll formation.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/173.9 ha. (v) 45 cm. × 45 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) No. (iii) Yield of *Kapas*. (iv) (a) 1962—only. (b) Yes. (c) Nil. (v) Khargone and Khandwa. (vi) and (vii) Nil.

5. RESULTS:

(i) 127 Kg/ha. (ii) 49.7 Kg/ha. (iii) Only the effect of interaction N × T is significant. (iv) Av. yield of *Kapas* in Kg/ha.

Control E₁=133 Kg/ha. and E₂=159 Kg/ha.

	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	Mean
N ₁	162	99	97	151	131	94	99	165	125
N ₂	43	112	101	131	136	147	159	162	124
Mean	103	106	99	141	133	120	129	163	124

C.D. for the body of N × T table = 70 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 62(126).

Site :- Instt. of Plant Industry, Indore.

Type :- 'M'.

Object :- To see the effect of different levels of N, P and K on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) On the commencement of monsoon. (iv) (a) 2 ploughings followed by 3 *bakherings*. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. x 45 cm. (e) 2. (vi) N.A. (vi) Badnawar-1. (vii) Unirrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 levels of N : $N_0=0$, $N_1=30$ and $N_2=60$ Kg/ha.

(2) 3 levels of P_2O_5 : $P_0=0$, $P_1=20$, and $P_2=40$ Kg/ha.

(3) 3 levels of K_2O : $K_0=0$, $K_1=20$ and $K_2=40$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 11.3 m. x 4.6 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *Kapas*. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 341 Kg/ha. (ii) 139.8 Kg/ha (iii) Main effect of N is highly significant and effect of P is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	P_0	P_1	P_2	K_0	K_1	K_2	Mean
N_0	314	260	225	271	249	279	266
N_1	385	424	332	401	363	377	380
N_2	357	451	322	354	377	400	377
Mean	352	378	293	342	330	352	341
K_0	344	368	314				
K_1	345	382	263				
K_2	367	385	303				

C.D. for N or P marginal means = 65.7 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 63(57).

Site :- Institute of Plant Industry, Indore.

Type :- 'M'.

Object :- To study the effect of N doses on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) 6.7.63. (iv) (a) 3 ploughings followed by *bakherings*. (b) Dibblings. (c) 16 Kg/ha. (d) 45 cm. x 45 cm. (e) 2. (v) 10 Kg/ha. of N as F.Y.M. (vi) *Badnawar-I*. (vii) Unirrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS :

10 manurial treatments : N_0 =Control, $N_1=10$, $N_2=20$, $N_3=30$, $N_4=40$, $N_5=50$, $N_6=60$, $N_7=70$, $N_8=80$ and $N_9=90$ Kg/ha.

3. DESIGN :

- (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 3.6 m. (b) 6.4 m. × 2.8 m. (v) 45 cm. × 45 cm.
(v) Yes.

4. GENERAL:

- (i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1962—Only. (b) No. (c) Nil. (v) Khargone and Khandwa. (vi) N.A. (vii) Nil.

5. RESULTS :

- (i) 310 Kg/ha. (ii) 76.8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	N ₀	N ₁	N ₂	N ₃	N ₄	N ₅	N ₆	N ₇	N ₈	N ₉
Av. yield	185	240	270	271	370	386	341	322	356	359

C.D. = 111.5 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 60(126).

Site :- Instt. of plant Industry, Indore.

Type :- 'M'.

Object :—To study the effect of N, P and K on the yield of cotton.

1. BASAL CONDITIONS:

- (i) (a) Cotton—G.M.—Wheat. (b) Wheat. (c) N.A. (ii) Black cotton soil. (iii) 22.6.60.
(iii) (a) 2 *bakherings*. (b) Drilling. (c) 11 Kg/ha. (d) 36 cm. × 30 cm. (e) N.A. (v) Nil. (vi) Indore-2.
(vii) Unirrigated. (viii) 3 weedings and 4 interculturings. (ix) 82.0 cm. (x) 22.11.60.

2. TREATMENTS :

All combinations of (1), (2) and (3)

- (1) 3 levels of N as A/S: N₀=0, N₁=33.6 and N₂=67.2 Kg/ha.
(2) 3 levels of P₂O₅ as Super: P₀=0, P₁=33.6 and P₂=67.2 Kg/ha.
(3) 3 levels of K₂O as Mut. Pot. : K₀=0, K₁=33.6 and K₂=67.2 Kg/ha.

3. DESIGN :

- (i) 3³ Confd. (N.P.K. confounded). (ii) (a) 3 blocks/replication; 9 plots/block. (b) N.A. (iii) 2. (iv) 12.2 m. × 4.6 m. (v) 10.7 m. × 3.7 m. (vi) 76 cm. × 46 cm. (vii) Yes.

4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1959—60. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 841 Kg/ha. (ii) 97.3 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	P ₀	P ₁	P ₂	K ₀	K ₁	K ₂	Mean
N ₀	641	683	641	651	666	649	655
N ₁	791	812	837	782	852	806	813
N ₂	1050	1093	1024	1066	988	1114	1056
Mean	827	863	834	833	835	856	841
K ₀	868	823	808				
K ₁	806	863	836				
K ₂	808	903	858				

C.D. for N marginal means = 67.2 Kg/ha.

Crop :- Cotton (*Knarif*).

Ref :- M.P. 63(73), 65(41).

Site :- Instt. of Plant Industry, Indore.

Type :- 'M'.

Object :—To study the effect of time of application of fertilizers on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) Cotton—Cotton. (b) Cotton. (c) As per treatments. (iii) Black cotton soil. (iii) N.A.
 (iv) (a) Ploughings and *bakherings*. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. × 45 cm. (e) 3 to 4 (v) N.A.
 (vi) Badnawar-I. (vii) Unirrigated. (viii) Weeding and interculturing (ix) 86 cm.; 54 cm. (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)+control (2 plots).

(1) 2 levels of N : $N_1=30$ and $N_2=60$ Kg/ha.

(2) 9 times of application of N : T_1 =Full dose at sowing, T_2 =Full dose at square formation, T_3 =Full dose at ball formation, $T_4=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at square formation, $T_5=\frac{1}{2}$ at sowing + $\frac{1}{2}$ at ball formation, $T_6=\frac{1}{2}$ at square formation + $\frac{1}{2}$ at ball formation, $T_7=2/3$ rd at sowing + $1/3$ rd at sq. formation, $T_8=2/3$ rd at sowing + $1/3$ rd at ball formation and $T_9=1/3$ rd at sowing + $2/3$ rd at square formation + $1/3$ rd at ball formation.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 20. (b) N.A. (iii) 4. (iv) (a) 9.4 m. × 5.4 m. (b) 8.5 m. × 4.5 m. (v) 45cm. × 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *kapas* and plant population. (iii) (a) 1963—65 (Data for 1964 N.A.
 (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) Khandwa, and Khargone. (vi) Nil. (viii) Error variances are heterogeneous and Treatment × years interaction is present.

5. RESULTS:

Pooled results

(i) 250 Kg/ha. (ii) 102.7 Kg/ha. (based on 19 d.f. made up of Treatments × years interaction). (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

Control = 229 Kg/ha.

	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	Mean
N_1	273	229	216	240	242	209	235	284	286	246
N_2	297	216	238	259	287	228	219	292	300	260
Mean	285	222	227	249	264	219	227	288	293	253

Individual results

Treatments	N_1	N_2	Sig.	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9
Years 1963	82	90	N.S.	75	83	93	53	87	107	79	85	111
1965	410	429	N.S.	495	362	361	446	441	331	375	490	476
Pooled	246	260	N.S.	285	222	227	249	264	219	227	288	293

Sig.	Control	Sig.	G.M.	S.E./plot
*	75	N.S.	85	30.6
*	384	N.S.	416	67.7
N.S.	229	N.S.	250	102.7

Crop :- Cotton (*Kharif*).

Ref :- MP: 64(29), 65(14).

Site :- Instt. of Plant Industry, Indore.

Type :- 'M'.

Object: --To see the effect of N, P, K and F Y.M. on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Jowar. (c) N.A. (ii) Black cotton soil. (iii) N.A. (iv) (a) 2 *bakherings*. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. \times 45 cm. (e) 2. (v) N.A. (vi) Bandnawar-I. (vii) Unirrigated. (viii) 3 weedings. (ix) and (x) N.A.

2. TREATMENTS :

Main-plot treatments

All combinations of (1), (2) and (3).

(i) 3 levels of N as A/S : $N_0=0$, $N_1=30$ and $N_2=60$ Kg/ha.(2) 3 levels of P_2O_5 as Super : $P_0=0$, $P_1=20$ and $P_2=40$ Kg/ha.(3) 3 levels of K_2O as Mur. Pot. : $K_0=0$, $K_1=20$ and $K_2=40$ Kg/ha.

Sub-plot treatments

2 levels of N through F.Y.M. : $F_0=0$ and $F_1=20$ Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 27 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 4.5 m. \times 5.6 m. (b) 3.6 m. \times 4.7 m. (v) 45 cm. \times 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1964-65. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) Khargone, and Khandwa. (vi) N.A. (vii) Main plot error variances are heterogeneous and Treatment \times year interaction is present. Sub-plot error variances are homogeneous and Treatment \times years interaction is absent.

5. RESULTS :

Pooled results

(i) 399 Kg/ha. (ii) (a) 244.9 Kg/ha (based on 18 d.f. made up of Treatments \times years interaction). (b) 117.0 Kg/ha. (based on 169 d.f. made up of pooled error and Treatments \times years interaction). (iii) Only the main effect of N is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	P_0	P_1	P_2	K_0	K_1	K_2	F_0	F_1	Mean
N_0	315	346	308	336	303	330	321	325	323
N_1	393	396	436	398	428	399	406	411	408
N_2	445	476	474	446	485	465	468	463	466
Mean	384	406	406	393	405	398	398	399	399
F_0	384	418	393	393	402	400			
F_1	385	395	418	394	408	396			
K_0	370	401	409						
K_1	401	400	415						
K_2	382	418	393						

C.D. for N marginal means = 60.6 Kg/ha.

Individual results

Treatments	N ₀	N ₁	N ₂	Sig.	P ₀	P ₁	P ₂	Sig.
Years								
1964	333	480	594	**	450	475	482	N.S.
1965	313	337	337	N.S.	319	338	330	N.S.
Pooled	323	408	466	**	384	406	406	N.S.

K ₀	K ₁	K ₂	Sig.	F ₀	F ₁	Sig.	G.M.	S.E./main-plot	S.E./sub-plot
466	468	473	N.S.	466	472	N.S.	469	137.1	72.1
321	343	323	N.S.	331	327	N.S.	329	98.8	67.1
393	405	398	N.S.	398	399	N.S.	399	244.9	117.0

Crop :- Cotton.

Ref :- M.P. 64(30), 65(13).

Site :- Instt. of Plant Industry, Indore.

Type :- 'M'.

Object:—To determine the best time of application of N for the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) N.A. (iv) (a) 2 bakherings. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. × 45 cm. (e) 2. (v) 10 Kg/ha. of N as F.Y.M.+20 Kg/ha. of P₂O₅. (vi) Badnawar—1. (vii) Unirrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS :

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

(1) 2 levels of N as A/S : N₁=30 and N₂=60 Kg/ha.

(2) 10 times of application of N: T₁=Full dose at sowing, N₂=Full dose at square formation, T₃=Full at ball formation, T₄=½ at sowing+½ at square formation, T₅=½ dose at sowing+½ dose at ball formation, T₆=½ dose at square formation+½ dose at ball formation, T₇=2/3 dose at sowing+½ at square formation, T₈=2/3 at square formation+1/3 at ball formation, T₉=1/3 dose at sowing+1/3 at square formation+1/3 at ball formation.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 20. (b) N.A. (iii) 4. (iv) (a) 9.4 m. × 5.4 m. (b) 8.9 m × 4.5 m. (v) 45 cm. × 45 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of *Kapas*. (iv) (a) 1964—65. (b) Yes. (c) Results of combined analysis have been presented under 5. Results. (v) Khargone and Khandwa. (vi) Nil. (vii) Error variances are homogeneous and treatments × years interaction is present.

5. RESULTS :

Pooled results:

(i) 304 Kg/ha. (ii) 103.4 Kg/ha. (based on 19 d.f. made up of Treatments × years interaction). (iii) Main effect of T is significant and effect of interaction N × T is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

Control mean=274 Kg/ha.

	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	Mean
N ₁	327	280	253	333	279	236	307	316	354	298
N ₂	261	328	317	297	273	334	353	332	348	316
Mean	294	304	285	315	276	285	330	324	351	307

C.D. for T Marginal means =76.5 Kg/ha.

C.D. for the body of N×T table=108.2 Kg/ha.

Individual results

Treatments	N ₁	N ₂	Sig.	C	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉
Years													
1964	209	214	N.S.	206	190	220	164	253	202	190	243	218	226
1965	387	418	*	343	398	389	406	378	351	380	418	430	477
Pooled	298	316	N.S.	274	294	304	285	315	276	285	330	324	351

Sig.	G.M.	S.E./plot
N.S.	211	59.5
*	397	64.6
*	304	103.4

Crop :- Cotton (*Kharif*).

Ref :- M.P. 60(71), 61(40).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'M'.

Object :- To find out the effect of different times of application of N and P on the yield of Cotton.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) N.A.; Cotton. (c) As per treatments. (ii) Medium black. (iii) 15 and 16.7.60; 3.7.61.
 (iv) (a) *Bakhering*. (b) Drilled in lines. (c) 22 K/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil.
 (vi) Buri 0394. (vii) Unirrigated. (viii) Weedidg and hoeing. (ix) 65.0 cm.; 117.7 cm. (x) 8, 24, 26 and 27.12.60; 22.12.61.

2. TREATMENTS:

Main-plot treatments:

3 sources of 22.4 Kg/ha. of N : S₁=A/S, S₂=A/S/N and S₃=Urea.

Sub-plot treatments:

All combinations of (1) and (2)

(1) 2 levels of P₂O₅ as Super : P₀=0 and P₁=22.4 Kg/ha.(2) 3 times of application of manures : T₁=Full dose at sowing, T₂= $\frac{1}{2}$ at sowing + $\frac{1}{2}$ at 6 weeks after sowing and T₃=Full dose 6 weeks after sowing.

3. DESIGN :

- (i) Split-plot. (ii) (a) 3 main-plots/replication; 6 sub-plots/main-plot. (b) 84.1 m.×64.0 m. (iii) 4.
 (iv) (a) 15.5 m.×4.1 m. (b) 14.9 m.×3.2 m. (v) 46 cm.×46 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) *Kapas* yield. (iv) (a) 1960—61. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) As the sub-plot error variances are heterogeneous results of individual years have been presented under 5.—Results.

5. RESULTS :

60(71)

(i) 762 Kg/ha. (ii) (a) 125.4 Kg/ha. (b) 152.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S ₁	S ₂	S ₃	T ₁	T ₂	T ₃	Mean
P ₀	763	745	793	777	760	764	767
P ₁	715	753	805	758	803	712	758
Mean	739	749	799	767	782	738	762
T ₁	744	760	798				
T ₂	745	785	815				
T ₃	728	701	785				

61(40)

(i) 83 Kg/ha. (ii) (a) 56.4 Kg/ha. (b) 37.0 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S ₁	S ₂	S ₃	T ₁	T ₂	T ₃	Mean
P ₀	66	78	78	82	62	77	74
P ₁	83	82	109	88	93	93	91
Mean	75	80	93	85	78	85	83
T ₁	73	77	106				
T ₂	67	80	86				
T ₃	84	83	88				

C.D. for P marginal means=17.6 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 62(60).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'M'.

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

1. BASAL CONDITIONS:

(i) (a) Nil. (b) *Jowar*. (c) 11.2 Kg/ha. of N as A/S. (ii) Medium black. (ii) 29.7.62. (iv) (a) 2 *bakherings*. (b) Drilling. (c) 22 Kg/ha. (d) 46 cm. × 23 cm. (e) N.A. (v) Nil. (vi) A—51—9 (Narmada). (vii) Unirrigated. (viii) 2 hoeings and 2 hand weedings. (ix) 121.9 cm. (x) 7 and 8.2.63.

2. TREATMENTS :

All combinations (1), (2) and (3)

- (1) 3 levels of N as A/S: N₀=0, N₁=33.6 and N₂=67.2 Kg/ha.
- (2) 3 levels of P₂O₅ as Super: P₀=0, P₁=22.4 and P₂=44.8 Kg/ha.
- (3) 3 levels of K₂O as Mur. Pot. K₀=0, K₁=22.4 and K₂=44.8 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) 10.1 m. × 5.0 m. (b) 9.1 m. × 4.6 m. (v) 46 cm. × 23 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of *Kapas*. (iv) (a) 1962—only. (b) No. (c) Nil. (v) Indore. (vi) Nil. (vii) N.A.

5. RESULTS :

(i) 188 Kg/ha. (ii) 52.5 Kg/ha. (iii) Main effect of N and interaction N × K are highly significant and interaction N × P is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	P ₀	P ₁	P ₂	K ₀	K ₁	K ₂	Mean
N ₀	147	147	128	136	148	138	141
N ₁	193	184	187	167	206	191	188
N ₂	190	259	256	276	199	230	235
Mean	177	197	190	193	184	186	188
K ₀	184	195	200				
K ₁	180	194	179				
K ₂	166	201	191				

C.D. for N marginal means = 24.3 Kg/ha.
C.D. for the body of N × K or N × P table = 42.7 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 62(61).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'M'.

Object —To study the effect of different times of application of fertilizers on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) 11 Kg/ha. of N as A/S. (ii) Medium black. (iii) 29.7.62. (iv) (a) 2 *bakherings*. (b) Drilling. (c) 22.4 Kg/ha (d) 46 cm. × 23 cm. (e) N.A (v) Nil. (vi) A-51-9 (Narmada). (vii) Unirrigated. (viii) 2 hoeings and 2 weedings. (ix) 121.9 cm. (x) 11.2.63.

2. TREATMENTS :

All combinations of (1) and (2)+Control (2 plots).

(1) 2 levels of 'N' as A/S : N₁=30 and N₂=60 Kg/ha.

(2) 8 times of application : T₁=Full dose at sowing, T₂=Full dose at square formation, T₃=Full dose at boll formation, T₄=½ dose at sowing+½ dose at square formation, T₅=½ dose at sowing+½ dose at boll formation, T₆=½ dose at boll formation+½ dose at square formation, T₇=2/3 rd dose at sowing+1/3rd dose at square formation and T₈=2/3 rd dose at sowing+1/3rd dose at boll formation.

3. DESIGN :

(i) Fact. in R.B.D. (ii) 18. (b) N.A. (iii) 4. (iv) (a) 10.1 m. × 5.0 m. (b) 9.1 m. × 4.1 m. (v) 46 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1962-only. (b) No. (c) Nil. (v) Indore. (vi) Nil. (vii) N.A.

5. RESULTS :

(i) 209.0 Kg/ha. (ii) 36.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

Control=209 Kg/ha.

	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	Mean
N ₁	215	203	223	178	225	225	185	222	209
N ₂	246	220	206	218	191	163	205	221	209
Mean	230	211	214	198	208	194	195	221	209

Crop :- Cotton (Kharif).

Ref :- M.P. 63(83).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'M'.

Object :—To study the effect of different levels of N, P, K and F.Y.M. on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) N.A. (c) Nil. (ii) Light medium black soil. (iii) On onset of monsoon. (iv) (a) 2 *bakherings* and ploughings. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. (e) 2. (v) Nil. (vi) A-51-9. (vii) Unirrigated. (viii) 2 weedings. (ix) 82 cm. (x) N.A.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1) and (2).

(1) 4 levels of N as A/S : N₀=0, N₁=20, N₂=40 and N₃=60 Kg/ha.

(2) 2 levels of F.Y.M. : F₀=0 and F₁=20 Kg/ha.

Sub-plot treatments :

All combinations of (1) and (2).

(1) 3 levels of P₂O₅ as Super : P₀=0, P₁=20 and P₂=40 Kg/ha.

(2) 3 levels of K₂O as Mur. Pot. : K₀=0, K₁=20 and K₂=40 Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 4.5 m. × 4.2 m. (b) 3.6 m. × 3.6 m. (v) 45 cm. × 30 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Attack of Jassides, Aphids etc. insecticides sprayed. (iii) Yield of *kapas*, plant population etc. (iv) (a) 1963-modified in 64. (b) No. (c) Nil. (v) Indore and. Khargone. (vi) and (vii) Nil.

5. RESULTS :

(i) 495 Kg/ha. (ii) (a) 193.1 Kg/ha. (b) 108.1 Kg/ha. (iii) Only the effect of N is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	F ₀	F ₁	P ₀	P ₁	P ₂	K ₀	K ₁	K ₂	Mean
N ₀	477	405	438	456	427	424	450	448	441
N ₁	441	457	471	424	451	459	446	440	449
N ₂	532	456	506	475	501	520	479	483	494
N ₃	584	611	586	604	603	547	634	611	598
Mean	508	482	500	489	495	488	502	496	495
K ₀	504	471	510	485	468				
K ₁	509	496	495	506	506				
K ₂	512	478	496	479	512				
P ₀	505	496							
P ₁	509	470							
P ₂	511	480							

C.D. for N marginal means = 66.9 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 63(72), 64(45), 65(40).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'M'.

Object :- To study the effect of time of application of fertilizers on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Cotton-Cotton. (b) Cotton. (c) As per treatments. (ii) Light black cotton soil. (iii) On the onset of monsoon. (iv) (a) Ploughings and *bakherings*. (b) Dibblings. (c) 16 Kg/ha. (d) 45 cm. between rows. (e) 3 to 4. (v) N.A. (vi) A-51-9 (vii) Unirrigated. (viii) Weedings and interculturings. (ix) 82 cm. ; 81 cm. ; 57 cm (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)+control (2 plots).

(1) 2 levels of N: N₁=30 and N₂=60 Kg/ha.

(2) 9 times of application of N: T₁=Full dose at sowing, T₂=Full dose at square formation T₃=Full at boll formation, T₄= $\frac{1}{2}$ at sowing+ $\frac{1}{2}$ at sq. formation, T₅= $\frac{1}{2}$ at sowing+ $\frac{1}{2}$ at boll formation, T₆= $\frac{1}{2}$ at square formation+ $\frac{1}{2}$ at boll formation, T₇= $\frac{2}{3}$ rd at sowing+ $\frac{1}{3}$ rd at sq. formation, T₈= $\frac{2}{3}$ rd at sowing+ $\frac{1}{3}$ rd at boll formation and T₉= $\frac{1}{3}$ rd at sowing+ $\frac{2}{3}$ rd at square formation+ $\frac{1}{3}$ rd at boll formation.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 20. (b) N.A. (iii) 4. (iv) (a) 9.4 m. x 5.4 m. (b) 8.5 m. x 4.5 m. (v) 45 cm. x 45 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of *kapas*. Plant population. (iv) (a) 1962-contd. (modified in 1963 and 66). (b) No. (c) Nil. (v) Indore and Khargone. (vi) Nil. (vii) As the error variances are heterogeneous and Treatments x years interaction is absent, results of individual years have been presented under 5.—Results.

5. RESULTS :

63(72)

(i) 560 Kg/ha. (ii) 113.1 Kg/ha. (iii) Effects of N and "control vs others" are highly significant and that of T is significant. (iv) Av. yield of *kapas* in Kg/ha.

Controls, C=393.

	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	Mean
N ₁	522	512	479	573	522	536	525	532	533	526
N ₂	747	518	416	716	667	613	703	683	612	631
Mean	634	515	447	644	595	575	614	607	572	571

C.D. for N marginal means=53.4 Kg/ha.

C.D. for T marginal means=113.3 Kg/ha.

C.D. for control vs others=84.7 Kg/ha.

64(45)

(i) 649 Kg/ha. (ii) 126.4 Kg/ha. (iii) Main effects of N and T are highly significant and effect of 'control vs others' is significant. (iv) Av. yield of *kapas* in Kg/ha.

Controls, C=455

	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	Mean
N ₁	647	636	482	684	582	691	802	585	648	640
N ₂	691	684	525	865	732	571	828	654	755	701
Mean	669	660	504	775	657	631	816	620	701	670

C.D. for N marginal means=59.8 Kg/ha.

C.D. for T marginal means=126.8 Kg/ha.

C.D. for 'control vs others'=94.4 Kg/ha.

65(40)

(i) 422 Kg/ha. (ii) 64.8 Kg/ha. (iii) Main effect of N is highly significant and effect of T is significant. (iv) Av. yield of *kapas* in Kg/ha.

Controls, C=382

	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	Mean
N ₁	445	357	366	382	392	400	414	422	443	402
N ₂	489	371	379	530	450	366	460	550	467	451
Mean	467	364	373	456	421	383	437	486	455	426

C.D. for N marginal means=30.6 Kg/ha.

C.D. for T marginal means=64.9 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 64(31).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'M'.

Object :- To study the effect of time of application of fertilizers on the yield of Cotton.

1. BASAL CONDITIONS :

- (i) N.A. (ii) Black cotton soil. (iii) During commencement of monsoon. (iv) (a) 2 *bakharings*.
 (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. x 45 cm. (e) 2. (v) 10 Kg/ha. of N through F.Y.M.
 (vi) Badnawar-I. (vii) Unirrigated. (viii) 3 weedings. (ix) and (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2) + control (2 plots).

(1) 2 levels of 'N' as A/S : $N_1=30$ and $N_2=60$ Kg/ha of N.

(2) 9 times of application : $T_1=$ Full at sowing, $T_2=$ Full at square formation, $T_3=$ Full at boll formation, $T_4=$ $\frac{1}{2}$ at sowing + $\frac{1}{2}$ at square formation, $T_5=$ $\frac{1}{2}$ at sowing + $\frac{1}{2}$ at boll formation, $T_6=$ $\frac{1}{2}$ at square formation + $\frac{1}{2}$ at boll formation, $T_7=$ $\frac{2}{3}$ at sowing + $\frac{1}{3}$ at square formation, $T_8=$ $\frac{2}{3}$ at sowing + $\frac{1}{3}$ at boll formation and $T_9=$ $\frac{1}{3}$ at sowing + $\frac{1}{3}$ at square formation + $\frac{1}{3}$ at boll formation.

3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 20. (b) N.A. (iii) 4. (iv) (a) 4.5 m. x 5.6 m. (b) 3.6 m. x 4.7 m.
 (v) 45 cm. x 45 cm. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1964-only. (b) Yes. (c) Nil. (v) Khargone and Indore.
 (vi) and (vii) Nil.

5. RESULTS :

- (i) 150 Kg/ha. (ii) 8.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

Control = 153 Kg/ha.

	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	Mean
N_1	146	148	157	156	146	154	150	150	153	151
N_0	146	155	151	145	153	150	147	148	151	150
Mean	146	151	154	151	150	152	149	149	152	150

Crop :- Cotton (Kharif).

Ref :- M.P. 63(70), 64(41), 65(36).

Site :- Reg. Res. Stn., Khargone.

Type :- 'M'.

Object :- To determine the best stage of growth of cotton crop for the application of nitrogenous fertilisers in part or full, so as to get maximum yield.

1. BASAL CONDITIONS :

- (i) (a) to (c) N.A. (ii) Light black cotton soil. (iii) N.A.; 30.6.64; N.A. (iv) (a) Ploughings and *bakharings*. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. (e) 3-4. (v) N.A. (vi) *Maljari*. (vii) Unirrigated. (viii) Weedings and interculturings. (ix) 73 cm.; 66 cm.; 38 cm. (x) N.A.; 19.1.65; N.A.

2. TREATMENTS :

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

(1) 2 levels of N: $N_1=30$ and $N_2=60$ Kg/ha.

(2) 9 methods of application of N : T_1 =Full dose at sowing, T_2 =Full dose at square formation, T_3 =Full dose at boll formation, T_4 = $\frac{1}{2}$ at sowing+ $\frac{1}{2}$ at square formation, T_5 = $\frac{1}{2}$ at sowing+ $\frac{1}{2}$ at boll formation, T_6 = $\frac{1}{2}$ at square formation+at boll formation, T_7 = $\frac{2}{3}$ rd at sowing+ $\frac{1}{3}$ rd at square formation, T_8 = $\frac{2}{3}$ rd at sowing+ $\frac{1}{3}$ rd at boll formation and T_9 = $\frac{1}{3}$ rd at sowing+ $\frac{1}{3}$ rd at square formation+ $\frac{1}{3}$ rd at boll formation

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 20 (2 control plots in each replication). (b) N.A. (iii) 4. (iv) (a) 5.4 m. \times 9.4 m. (b) 4.5 m. \times 8.5 m. (v) 45 cm. \times 45 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Yield of *kapas* and plant population etc. (iv) (a) 1963-65 (b) No. (c) Results of pooled analysis and individual results are given under 5. Results (v) Indore, and Khandwa. (vi) Nil (vi) Error variances are heterogeneous and Treatment \times years interaction is present

5. RESULTS:

Pooled results

(i) 620 Kg/ha. (ii) 170.8 Kg/ha. (based on 38 d.f. made up of Treatments \times years interaction). (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

Control=588 Kg/ha.

	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	Mean
N_1	585	664	567	576	587	636	597	616	626	606
N_2	664	633	520	635	636	682	662	678	668	642
Mean	625	648	543	605	612	659	629	647	647	624

Individual results

Treatments	N_1	N_2	Sig.	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9
Years												
1963	889	1001	**	1065	909	824	981	943	927	1023	927	907
1964	675	693	N.S.	604	776	612	633	626	759	64	736	767
1965	254	232	*	205	261	195	202	267	290	221	278	266
Pooled	606	642	N.S.	625	648	543	605	612	659	629	647	647

Sig.	Control	Sig.	G.M.	S.E./plot
N.S.	763	**	927	141.7
*	731	N.S.	689	104.6
N.S.	269	N.S.	245	42.6
N.S.	588	N.S.	620	170.8

Crop :- Cotton (*Kharif*).

Ref :- M.P. 64(43), 65(38).

Site :- Reg. Res. Stn., Khargone.

Type :- 'M'.

Object :—To study the organic manurial and inorganic fertilizer requirement of Cotton crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 8.7.64; 22.6.65. (iv) (a) Ploughings and *bakherings*. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. × 45 cm. (e) 3-4. (v) 10 Kg/ha. of N. (vi) *Maljari*. (vii) Unirrigated. (viii) 2 weedings. (ix) 66 cm.; 38 cm. (x) N.A.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1), (2) and (3).

(1) 3 levels of N as A/S : $N_0=0$, $N_1=30$ of $N_2=60$ Kg/ha.(2) 3 levels of P_2O_5 as Super : $P_0=0$, $P_1=20$ and $P_2=40$ Kg/ha.(3) 3 levels of K_2O : $K_0=0$, $K_1=20$ and $K_2=40$ Kg/ha.

Sub-plot treatments :

2 levels of F.Y.M. : $F_0=0$ and $F_1=20$ Kg/ha. of N.

3. DESIGN :

(i) Split-plot confd. (ii) (a) 3 block/replication ; 9 main plots/block ; 2 Sub-plots/main plot. (b) N.A.
(iii) 4. (iv) (a) 4.5 m. × 5.6 m. (b) 3.6 m. × 4.7 m. (v) 45 cm. × 45 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Attack of Aphids and Jassids. Insecticides sprayed. (iii) Yield of *kapas*, plant population, height of plants etc. (a) 1963-65 (modified in 1964). (b) No. (c) Nil. (v) Indore and Khandwa. (vi) Nil. (vii) As the sub-plot error variances are hreterogeneous, results of individual years are given under 5. Results.

5. RESULTS :

64(43)

(i) 685 Kg/ha. (ii) (a) 174.3 Kg/ha. (b) 87.0 Kg/ha. (iii) Effects of N, P, and F are highly significant and that of interaction $P \times K$ is significant. (iv) Av. yield of *kapas* in Kg/ha.

	P_0	P_1	P_2	K_0	K_1	K_2	F_0	F_1	Mean
N_0	512	574	634	626	566	528	529	618	573
N_1	639	737	788	742	738	683	676	766	721
N_2	702	771	811	719	762	802	750	773	761
Mean	618	694	744	696	689	671	652	719	685
F_0	586	668	702	671	654	632			
F_1	650	720	787	721	724	711			
K_0	651	744	692						
K_1	603	689	775						
K_2	599	649	766						

C.D. for N or P marginal means = 57.8 Kg/ha.

C.D. for F marginal means = 23.2 Kg/ha.

C.D. for the body of $P \times K$ table = 100.2 Kg/ha.

65(38)

(i) 499 Kg/ha. (ii) (a) 104.3 Kg/ha. (b) 67.3 Kg/ha. (iii) Main effects of N and F are highly significant and that of P is significant. (iv) Av. yield of *kapas*. in Kg/ha.

	P ₀	P ₁	P ₂	K ₀	K ₁	K ₂	F ₀	F ₁	Mean
N ₀	389	401	370	396	353	412	378	395	387
N ₁	529	579	560	554	560	553	543	570	556
N ₂	503	586	576	568	527	570	535	576	555
Mean	474	522	502	506	480	512	485	514	499
F ₀	458	503	495	500	470	486			
F ₁	490	541	510	515	489	538			
K ₀	488	515	515						
K ₁	446	485	509						
K ₂	488	565	482						

C.D. for N or P marginal means = 34.4 Kg/ha.

C.D. for F marginal means = 18.0 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 62 to 65 (M.A.E.).

Site :- M.A.E. centre, Ujjain.

Type :- 'M'.

Object :- Type V(a): To study the effect of different methods of placement of N on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:

All combinations of (1) and (2) + a control.

(1) 5 methods of placement: M₁ = Broadcast at sowing, M₂ = By plough sole method to drop the fertilizers 12.7 cm. deep with the help of wooden plough about a week before sowing, M₃ = By seed-cum-fertilizer drill to drop the fertilizer in the same line M₄ = By seed-cum-fertilizer drill to drop the fertilizer 3.8 cm. deeper than the seed and M₅ = By seed-cum-fertilizer drill in such a way that the fertilizer drop 5 cm. deep and 5 cm away from the seed.

(2) 2 levels of N : N₁ = 33.6 and N₂ = 67.2 Kg/ha.

3. DESIGN :

(i) R.B.D. (ii) (a) 11. (b) N.A. (iii) 4. (iv) (a) and (b) N.A. (v) and (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of *kapas*. (iv) (a) 1962-65. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) Nil.

5. RESULTS :

1962

(i) 416 Kg/ha. (ii) 98 Kg/ha. (iii) Main effect of N and control vs. rest are significant. (iv) Av. yield of *kapas* in Kg/ha.

Control=218 Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄	M ₅	N ₁	N ₂
Mean yield	407	445	457	461	410	367	505

C.D. for N means =63 Kg/ha.

C.D. for control vs. rest=105 Kg/ha.

1963

(i) 792 Kg/ha. (ii) 177 Kg/ha. (iii) Main effects of M and N and control vs. rest are significant. (iv) Av. yield of *kapas* in Kg/ha.

Control=534 Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄	M ₅	N ₁	N ₂
Mean yield	901	639	1094	612	842	742	893

C.D. for M means =181 Kg/ha.

C.D. for N means =114 Kg/ha.

C.D. for control vs. rest=189 Kg/ha.

1964

(i) 1030 Kg/ha. (ii) 190 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

Control=945 Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄	M ₅	N ₁	N ₂
Mean yield	1063	1075	953	1091	1014	1010	1067

1965

(i) 530 Kg/ha. (ii) 254 Kg/ha. (iii) Main effect of M is significant. (iv) Av. yield of *kapas* in Kg/ha.

Control=567 Kg/ha.

Treatment	M ₁	M ₂	M ₃	M ₄	M ₅	N ₁	N ₂
Mean yield	563	462	424	485	697	535	518

C.D. for M means=259 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- M.P. 64, 65 (M.A.E.).

Site :- M.A.E. Centre, Ujjain.

Type :- 'M'.

Object:—Type XI: To determine the effect of micro-nutrients on Cotton.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

15 micro-nutrient treatments : T_0 =Control (no fertilizer), T_1 =50 Kg/ha. of N+25 Kg/ha. of P_2O_5 +25 Kg/ha. of K_2O , T_2 = T_1 +spartan at 395 Kg/ha. by soil application, T_3 = T_1 +Mg. as Manganese sul. at 60 Kg/ha., T_4 = T_1 +Zn as Zinc sul. at 30 Kg/ha. T_5 = T_1 +Cu as copper sul. at 30 Kg/ha., T_6 = T_1 +Boron as Borax at 17.5 Kg/ha. T_7 = T_1 +Molybdenum as sodium Molybdate at 1.25 Kg/ha., T_8 = T_1 +Mn+Zn+Cu+Bo+Mo, T_9 = T_1 +Mg. as Manganese Sul. at 17.5 Kg/ha., T_{10} = T_1 +Zn as Zinc Sul. at 12.5 Kg/ha., T_{11} = T_1 +Cu as copper sul. at 12.5 Kg/ha. T_{12} = T_1 +Boron as Borax at 6.2 Kg/ha., T_{13} = T_1 +Molybdenum as Sodium Molybdate at 0.62 Kg/ha. and T_{14} = T_1 +Mn+Zn+Cu+Bo+Mo.

Treatments T_2 to T_8 by soil application and T_9 to T_{14} by foliar spray.

3. DESIGN :

(i) R.B.D. (ii) (a) 15. (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 *kapas*. (iv) (a) 1964-66. (b) N.A. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS :

1964

(i) 1172 Kg/ha. (ii) 241.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment : T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7
Mean yield : 778	1225	1075	1264	1423	1213	1208	1162
	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}
	1223	1270	886	1195	1141	1222	1288

1965

(i) 452 Kg/ha. (ii) 154.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment : T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7
Mean yield : 239	419	664	418	386	330	584	513
	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}
	418	377	486	550	488	462	445

Crop :- Cotton (Kharif).

Ref :- M.P. 64, 65 (M.A.E.).

Site :- M.A.E. Centre, Ujjain.

Type :- 'M'.

Object :- Type XII : To study the effect of foliar application of fertilizers on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

Main-plot treatments :

4 fertilizer treatments : F_1 =44.8 Kg/ha. of N as A/S, F_2 =22.4 Kg/ha of P_2O_5 as Super, F_3 =44.8 Kg/ha. of N+22.4 Kg/ha. of P_2O_5 and F_4 =44.8 Kg/ha. of N+22.4 Kg/ha. of P_2O_5 +22.4 Kg/ha. of K_2O .

Sub-plot treatments :

All combinations of (1) and (2)+2 extra treatments

(1) 3 methods of application : M_1 =Soil application, M_2 =Foliar application and M_3 =Soil application and foliar application.(2) 2 levels of application : L_1 = $\frac{1}{2}$ dose and L_2 =Full dose.Extra treatments : C_1 =Water spray and C_2 =Absolute control.

3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 8 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 *kapas*. (iv) (a) 1964-66. (b) N.A. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil.

5. RESULTS :

1964

(i) 760 Kg/ha. (ii) (a) 180 Kg/ha. (b) 116 Kg/ha. (iii) Main effect of LM is significant. (iv) Av. yield of *kapas* in Kg/ha. $C_0=730$ and $C_1=714$ Kg/ha.

	L_1M_1	L_2M_1	L_1M_2	L_2M_2	L_1M_3	L_2M_3	Mean
F_1	793	721	686	771	803	607	730
F_2	796	766	672	735	826	818	769
F_3	788	926	707	695	776	724	769
F_4	895	828	801	718	798	885	821
Mean	818	810	716	730	801	759	772

C.D. for F marginal means=102 Kg/ha.

C.D. for LM marginal means=82 Kg/ha.

1965

(i) 632 Kg/ha. (ii) 156 Kg/ha. (b) 108 Kg/ha. (iii) Main effects of F and LM are significant. (iv) Av. yield of *kapas* in Kg/ha. $C_0=627$ and $C_1=645$ Kg/ha.

	L_1M_1	L_2M_1	L_1M_2	L_2M_2	L_1M_3	L_2M_3	Mean
F_1	548	540	575	580	652	617	585
F_2	635	658	590	557	631	702	629
F_3	608	617	557	645	817	554	633
F_4	771	700	598	628	695	653	674
Mean	640	629	580	603	699	631	630

C.D. for F marginal means =88 Kg/ha.

C.D. for LM marginal means=76 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 60(S.F.T.).

Site :- (District) : Chhindwara.

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) (a) to (c) N.A. (ii) Shallow black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

8 manurial treatments :

O=Control (no manure)

N=28 Kg/ha. of N.

P=22.4 Kg/ha. of P_2O_5 .

K=22.4 Kg/ha. of K_2O .

NP=28 Kg/ha. of N+22.4 Kg/ha. of P_2O_5 .

NK=28 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=28 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 four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the four 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) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

No. of trials	Control mean in Kg/ha.	Average response of <i>kapas</i> in Kg/ha.								
		N.	P.	K.	S.E.	NP	NK	PK	NPK	S.E.
4	880	250	170	170	26.0	70	90	—70	160	44.0

Crop :- Cotton (Kharif).

Ref :- M.P. 60(S.F.T.).

Site :- (District) : Chhindwara.

Type :- 'M'.

Object :—Type B : To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Shallow black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

7 manurial treatments :

Control=(no manure).

 $N_1=28$ Kg/ha. of N as A/S. $N_2=56$ Kg/ha. of N as A/S. $N_1'=28$ Kg/ha. of N as Urea. $N_2'=56$ Kg/ha. of N as Urea. $N_1''=28$ Kg/ha. of N as A/S/N and $N_2''=56$ Kg/ha. of N as A/S/N.

3. DESIGN :

Same as in Type A on Cotton on page 372.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of *Kapas*. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

No. of trials	Control mean in Kg/ha	Average response of <i>Kapas</i> in Kg/ha.						S.E. of response
		N_1	N_1'	N_1''	N_2	N_2'	N_2''	
4	750	220	170	240	580	350	550	116.0

Crop :- Cotton (*Kharif*).**Ref :- M.P. 65(S.F.T.) for Indore ;
64, 65(S.F.T.) for Ujjain.****Site :- (District) : Indore, and Ujjain. Type :- 'M'.**Object:— Type A_1 : 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) (a) to (c) N.A. (ii) Medium black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

8 manurial treatments :

O=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 . $N_2P_2=70$ Kg/ha. of N+50 Kg/ha. of P_2O_5 . and $N_2P_2K_1=70$ Kg/ha. of N+50 Kg/ha. 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—100 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. All the three type—C experiments are conducted on a legume crop. 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_1 , A_2 and A_3 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) 1965-only for Indore ; 1964-65 for Ujjain. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

Indore

65(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of kapas in Kg/ha.	33	70	31	92	132	136	310	61.9

Control mean=365 Kg/ha. ; No of trials=6.

Ujjain

64(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of kapas in Kg/ha.	187	339	313	113	289	474	724	104.9

Control mean=537 Kg/ha. ; No. of trials=5.

65(S.F.T.)

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of kapas in Kg/ha.	-7	33	49	91	64	91	121	16.6

Control mean=309 Kg/ha. ; No. of trials=10.

Crop :- Cotton (Kharif).

Ref :- M.P. 62(S.F.T.).

Site :- (District) : Chhindwara.

Type :- 'M'.

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) (a) to (c) N.A. (ii) Shallow black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

3 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.

N₂P₂=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 :

Same as in Type A₁ on Cotton (unirrigated) on page 373.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of *kapas*. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₁ P ₂ K ₁	S.E.
Av response of <i>kapas</i> in Kg/ha.	183	443	103	415	529	789	925	92.6

Control mean=795 Kg/ha. ; No. of trials=2.

Crop :- Cotton (Kharif).

**Ref :- M.P. 64, 65(S.F.T.) for Ujjain ;
62(S.F.T.) for Chhindwara.**

**Site :- (District): Ujjain and
Chhindwara.**

Type :- 'M'.

Object :- Type A₁ : To study the response curves of important cereal, cash and oilseed crops to P applied singly and in combination with other nutrients.

BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black for Ujjain and shallow black for Chhindwara. (iii) 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.

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.

N₂P₂=70 Kg/ha. of N+50 Kg/ha. of P₂O₅ and

N₂P₂K₂=70 Kg/ha. of N+50 Kg/ha. of P₂O₅+50 Kg/ha. of K₂O.

3. DESIGN :

Same as in Type A₁ on Cotton (unirrigated) on page 373.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of *kapas*. (iv) (a) 1964-65 for Ujjain ; 1962—only for Chhindwara. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

Ujjain.

64(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₁	N ₂ P ₂ K ₂	S.E.
Av. response of <i>kapas</i> in Kg/ha.	184	135	295	455	410	560	613	93.1

Control mean=533 Kg/ha. ; No. of trials=5.

65(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of <i>kapas</i> in Kg/ha.	12	27	75	63	83	121	150	15.9

Control mean=333 Kg/ha. ; No. of trials=11.

Chhindwara

62(S.F.T.)

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of <i>kapas</i> in Kg/ha.	140	47	278	462	611	726	923	85.4

Control mean=782 Kg/ha. ; No. of trials=2.

Crop :- Cotton (Kharif).**Ref :- M.P. 62(S.F.T.).****Site :- (District) : Chhindwara.****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) (a) to (c) N.A. (ii) Chhindwara. (iii) 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.N₂P₂ = 120 Kg/ha. of N + 70 Kg/ha. of P₂O₅ andN₂P₂K₂ = 120 Kg/ha. of N + 70 Kg/ha. of P₂O₅ + 70 Kg/ha. of K₂O.

3. DESIGN :

Same as in Type A₁ on Cotton (Unirrigated) on page 373.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of *kapas*. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS:

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of <i>kapas</i> in Kg/ha.	270	172	708	465	552	626	847	174.3

Control mean=778 Kg/ha. ; No. of trials=2.

Crop :- Cotton (Kharif).**Ref :- M.P. 65(S.F.T.) for Indore ;
62(S.F.T.) for Chhindwara and
64, 65(S.F.T.) for Ujjain.****Site :- (District) : Indore, Chhindwara
and Ujjain.****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.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Medium black for Indore and Ujjain and shallow black for Chhindwara. (iii) 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=25 Kg/ha. of K₂O.K₂=50 Kg/ha. of K₂O.N₁K₁=35 Kg/ha. of N+25 Kg/ha. of K₂O.N₁K₂=35 Kg/ha. of N+50 Kg/ha. of K₂O.N₂K₂=70 Kg/ha. of N+50 Kg/ha. of K₂O andN₁P₁K₁=35 Kg/ha. of N+25 Kg/ha. of P₂O₅+25 Kg/ha. of K₂O.

3. DESIGN :

Same as in Type A₁ on Cotton (unirrigated) on page 373.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of *kapas*. (iv) (a) 1965-only for Indore, 1962-only for Chhindwara ; 1964-65 for Ujjain. (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

Indore

65(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of <i>kapas</i> in Kg/ha.	60	90	70	135	205	265	500	34.8

Control mean=405 Kg/ha. ; No. of trials=4.

Chhindwara

62(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of <i>kapas</i> in Kg/ha.	122	131	138	276	411	529	521	56.1

Control mean=892 Kg/ha. ; No. of trials=3.

Ujjain

64(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. reponse of <i>kapas</i> in Kg/ha.	85	391	364	564	522	609	678	95.7

Control mean=468 Kg/ha. ; No. of trials=5.

65(S.F.T.)

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of <i>kapas</i> in Kg/ha.	12	45	57	84	80	101	118	20.2

Control mean=343 Kg/ha. ; No. of trials=10.

Crop :- Cotton (Kharif).

Ref :- M.P. 60(16).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'MV'.

Object :- To study the effect of N on the yield of different varieties of Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Barseem. (c) Nil. (ii) Mar. No. 1. (iii) 4.6.60. (iv) (a) 3 *bakherings*. (b) Dibbling. (c) N.A. (d) 61 cm. × 47 cm. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of N as A/S : $N_0=0$ and $N_1=44.8$ Kg/ha.

(2) 6 varieties : $V_1=R-4$, $V_2=R-5$, $V_3=R-13$, $V_4=Buri$, $V_5=320-F$ and $V_6=216-F$.

N applied by broadcast.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 6.1 m. × 5.9 m. (b) 4.9 m. × 5.0 m. (v) 61 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Attack of Warms, spraying of B.H.C. (iii) Yield of *Kapas*. (iv) (a) 1960—only. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 291 Kg/ha. (ii) 118.4 Kg/ha. (iii) Main effect of N is highly significant and that of V is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	Mean
N_0	120	164	270	319	276	267	236
N_1	328	233	333	400	453	333	347
Mean	224	198	301	359	364	300	291

C.D. for N marginal means=69.7 Kg/ha.

C.D. for V marginal means=120.6 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 60(176), 61(132), 62(8), 63(29), 64(2).

Site :- Govt. Agri. Farm, Bhind.

Type :- 'MV'.

Object :- To study the effect of N on the yield of different varieties of Cotton.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 16.5.60 ; 16.5.61 ; 8/9.6.62 ; 21/22.5.63 ; 11/12.6.64. (iv) (a) 2 to 3 ploughings with *Deshi* plough (b) Hand dibbling. (c) 14 Kg/ha. for 60 and 61 ; 18 Kg/ha. for others. (d) 61 cm. × 30 cm. for 60 and 61 ; 61 cm. × 46 cm. for others. (e) —. (v) Nil. (vi) As per treatments (vii) Irrigated. (viii) 3 in'erculturings for 61 and 2 weedings for others. (ix) N.A. (x) 24.9.60, 6.10.60 and 17.11.60 ; 17.10.61, 24.12.61, 16.1.62 and 3.2.62 ; 25.11.62, 19.12.62, 5.1.63 and 25.3.63 ; 25.9.63, 3.10.63, 18.10.63 and 25.11.63 ; 6.11.64, 25.11.64, 20.12.64 and 5.1.65.

2. TREATMENTS:

All combinations of (1) and (2)

- (1) 6 varieties : $V_1=C-58-4$, $V_2=C-58-5$, $V_3=C-58-9$, $V_4=Buri$, $V_5=320 F$ and $V_6=216-F$.
 (2) 2 levels of N as A/S : $N_0=0$ and $N_1=44.8 \text{ Kg/ha}$.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) and (b) $10.4 \text{ m.} \times 4.9 \text{ m.}$; $8.8 \text{ m.} \times 2.7 \text{ m.}$ for 62 and $10.4 \text{ m.} \times 4.9 \text{ m.}$; $9.8 \text{ m.} \times 3.7 \text{ m.}$ for others. (v) $61 \text{ cm.} \times 46 \text{ cm.}$ for 62 and $61 \text{ cm.} \times 30 \text{ cm.}$ for others. (vi) Yes.

4. GENERAL:

(i) Good. (ii) N.A. (iii) Yield of *Kapas*. (iv) (a) 1960-64. (b) No. (c) Nil. (v) Jora and Baroda. (vi) Nil. (vii) As the error variances are heterogeneous and Treatments \times years interaction is absent, therefore results of individual analysis are presented under 5.—Results.

5. RESULTS:

60(176).

- (i) 345 Kg/ha. (ii) 148.5 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	Mean
N_0	279	278	176	303	371	285	282
N_1	276	268	342	405	571	381	407
Mean	378	273	259	354	471	333	345

C.D. for N marginal means = 87.2 Kg/ha.

61(132)

- (i) 873 Kg/ha. (ii) 215.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	Mean
N_0	778	490	904	953	1009	904	839
N_1	806	799	904	1211	945	778	907
Mean	792	644	904	1082	977	841	873

62(8)

- (i) 1231 Kg/ha. (ii) 436.3 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	Mean
N_0	1098	905	1007	1516	1063	987	1096
N_1	1506	1182	1318	1608	1543	1041	1366
Mean	1302	1044	1162	1562	1303	1014	1231

C.D. for N marginal means = 256.5 Kg/ha.

63(29)

- (i) 737 Kg/ha. (ii) 132.1 Kg/ha. (iii) Main effect of V is highly significant and that of N is significant.
(iv) Av. yield of *Kapas* in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	Mean
N ₀	736	673	537	715	586	893	690
N ₁	822	591	617	841	830	996	783
Mean	779	632	577	778	708	945	737

C.D. for N marginal means=77.7 Kg/ha.
C.D. for V marginal means=134.5 Kg/ha.

64(2)

- (i) 1218 Kg/ha. (ii) 361.9 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	Mean
N ₀	1083	697	954	1127	1004	796	943
N ₁	1453	1345	1388	1799	1602	1374	1493
Mean	1268	1021	1171	1463	1303	1085	1218

C.D. for N marginal means=212.8 Kg/ha.

Crop :- Cotton (Kharif).

Site :- Govt. Exptl. Farm, Jora.

Ref :- M.P. 60(1).

Type :- 'MV'.

Object :- To study the effect of N on the yield of different varieties of Cotton.

1. BASAL CONDITIONS:

- (i) (a) Wheat—Cotton. (b) Wheat. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅. (ii) Sandy loam.
(iii) 7.6.60. (iv) (a) 2 ploughings. (b) Line sowing by dibbling. (c) N.A. (d) 61 cm.×46 cm. (e) 3-4.
(v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings with *Khurpi*. (ix) N.A. (x) 6 pickings
on 1, 4.11.60, 14, 27.12.60, 21, 22.11.61, 19, 21.2.61 and 5, 6.3.61.

2. TREATMENTS:

All combinations of (1) and (2)

- (1) 6 varieties: V₁=R-4, V₂=R-5, V₃=R-13, V₄=Buri, V₅=320-F and V₆=216-F.

- (2) 2 levels of N: N₀=0 and N₁=44.8 Kg/ha.

N applied $\frac{1}{2}$ at sowing and $\frac{1}{2}$ one month after sowing.

3. DESIGN:

- (i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10.5 m.×4.9 m. (b) 9.6 m.×3.7 m.
(v) 46 cm.×61 cm. (v) Yes.

4. GENERAL:

- (i) Good. (ii) Attack of Caterpillar and Redbug. (iii) Yield of *Kapas*. (iv) (a) 1960—only. (b) No.
(c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 378 Kg/ha. (ii) 114.3 Kg/ha. (iii) Main effect of N and V are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	Mean
N ₀	284	318	334	445	407	183	328
N ₁	359	358	564	508	465	315	428
Mean	321	338	449	476	436	249	378

C.D. for N marginal means=67.1 Kg/ha.

C.D. for V marginal means=116.3 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 61(135), 62(19), 63(16).

Site :- Govt. Agri. Farm, Jora.

Type :- 'MV'.

Object :—To study the effect of N on the yield of different varieties of Cotton.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam (iii) 11.5.61 ; 16.5.62 ; 16.5.63. (iv) (a) 1 ploughing by *Desht* plough for 61 and 3 ploughings for others (b) Hand dibbling. (e) 13 Kg/ha. for 61 and 62 ; 28 Kg/ha. for 63. (d) 61 cm. × 30 cm. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 3 weedings. (ix) N.A. ; 37.9 cm. ; 73.2 cm. (x) 21.9.61, 5.10.61 and 11.11.61 ; 24.9.62, 6.10.62 and 12.11.62 ; 17.10.63, 24.12.63, 16.1.64 and 3.2.64.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 6 varieties: V₁=C 58-4, V₂=C 58-5, V₃=C 58-9, V₄=Buri, V₅=215-F and V₆=320-F.

(2) 2 levels of N as A/S: N₀=0 and N₁=44.8 Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 4.9 m. (b) 9.8 m. × 3.7 m. (v) 30 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of *Kapas*. (iv) (a) 1961-63. (b) No. (c) Result of pooled analysis as well as individual analysis are presented under 5.—Results. (v) Baroda and Bhind. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS :

(i) 517 Kg/ha. (ii) 177.0 Kg/ha. (based on 121 d.f. made up of pooled error and Treatments × years interaction). (iii) Main effects of N and V are significant. (iv) Av. yield of *Kapas* in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	Mean
N ₀	458	375	409	527	601	509	480
N ₁	542	447	589	659	563	525	554
Mean	500	411	499	593	582	517	517

C.D. for N marginal means=58.4 Kg/ha.

C.D. for V marginal means=101.2 Kg/ha.

Treatments	N ₀	N ₁	Sig.	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆
Years									
1961	291	371	N.S.	343	296	292	349	381	323
1962	280	378	*	351	268	300	354	376	325
1963	869	913	N.S.	804	670	906	1076	957	902
Pooled	480	554	*	500	411	499	593	581	517

Sig.	G.M.	S.E./plot
N.S.	331	159.7
N.S.	329	162.5
**	891	196.7
*	517	177.0

Crop :- Cotton (Kharif).

Ref :- M.P. 62(118).

Site :- Govt. Agri. Farm, Jora.

Type :- 'MV'.

Object :- To study the effect of N on the yield of different varieties of Cotton.

1. BASAL CONDITIONS :

(i) (a) Wheat—Cotton. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) 3 ploughings. (b) Dibbling in lines. (c) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings (ix) and (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 6 varieties : V₁=R-4, V₂=R-5, V₃=R-13, V₄=Buri, V₅=320-F and V₆=216-F.

(2) 2 levels of N as A/S : N₀=0 and N₁=44.8 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10.3 m. × 4.8 m. (b) 9.3 m. × 3.6 m. (v) 50 cm. × 60 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *Kapas*. (iv) (a) 1960-62 (data for 1961 N.A.) (b) Yes. (c) Nil. (v) Bhind and Baroda. (vi) and (vii) Nil.

5. RESULTS :

(i) 384 Kg/ha. (ii) 279.3 Kg/ha. (iii) Main effect of N is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	V ₅	V ₆	Mean
N ₀	146	290	293	323	394	295	290
N ₁	907	453	271	431	406	402	478
Mean	526	372	282	377	400	349	384

C.D. for N marginal means=164 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 65(2).

Site :- Govt. Agri. Farm, Jora.

Type :- 'MV'.

Object :- To see the effect of N on the yield of different varieties of Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 22.5.65. (iv) (a) 3 ploughings. (b) Dibbling. (c) N.A. (d) 60 cm. x 60 cm. (e) 3-5. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 5 weedings. (ix) 42.1 cm. (x) 3 pickings on 25.9.65 ; 14.10.65 and 6.11.65.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 6 varieties: $V_1=C-58-5$, $V_2=C-59-78$, $V_3=C-59-153$, $V_4=C-59-228$, $V_5=Buri$ and $V_6=320-F$.

(2) 2 levels of N as A/S : $N_0=0$ and $N_1=44.8$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10.4 m. x 4.9 m. (b) 9.1 m. x 3.7 m. (v) 61 cm. x 61 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Attacked by Red Cotton-bug and Aphids, dusting of B.H.C. 5 %. (iii) Yield of *Kapas*. (iv) (a) 1965—only. (b) N.A. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 2067 Kg/ha. (ii) 246.9 Kg/ha. (iii) Main effect of V alone is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	V_1	V_2	V_3	V_4	V_5	V_6	Mean
N_0	2205	2257	1648	2175	2029	1984	2050
N_1	2070	2227	1910	2460	1932	1910	2084
Mean	2137	2242	1779	2318	1980	1947	2067

C.D. for V marginal means=251.4 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 60(70), 61(39).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'MV'.

Object :- To study the effect of different levels of N with and without F.Y.M. on the yield of different varieties of Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A.; Cotton. (c) As per treatments. (ii) Medium black. (iii) 14.7.60 ; 5.7.61. (iv) (a) *Bakherings*. (b) Seed drilled in lines. (c) 22 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) Weeding and hoeing. (ix) 65.0 cm. ; 117.7 cm. (x) 23, 24.11.60, 6, 7, 22 to 24.12.60 ; 3.11.61 and 1.12.61.

2. TREATMENTS :

Main-plot treatments :

2 varieties: $V_1=Malziri$ and $V_2=Buri-0394$.

Sub-plot treatments :

2 levels of F.Y.M. : $F_0=No$ F.Y.M. and $F_1=F.Y.M.$

Sub-sub-plot treatments :

3 levels of N as A/S : $N_0=0$, $N_1=22.4$ and $N_2=44.8$ Kg/ha.

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) 4. (iv) (a) 15.5 m. × 4.1 m. (b) 14.9 m. × 3.2 m. (v) 30 cm. × 46 cm. (vi) Yes.

4. GENERAL:

- (i) Satisfactory. (ii) N.A. (iii) Yield of *Kapas*. (iv) (a) 1960—62 (modified in 1962). (b) Yes. (c) Results of combined analysis and individual analysis are presented under 5.—Results. (v) N.A. (vi) Nil. (vii) All the error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS:

- (i) 1053 Kg/ha. (ii) (a) 369.1 Kg/ha. (based on 7 d.f. made up of pooled error and Treatments × years interaction). (b) 229.3 Kg/ha. (based on 14 d.f. made up of pooled error and Treatments × years interaction). (ii) 217.6 Kg/ha. (based on 54 d.f. made up of pooled error and Treatments × years interaction).
 (iii) Only the main effect of N is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N ₀	N ₁	N ₂	F ₀	F ₁	Mean
V ₁	903	1132	1260	1052	1144	1098
V ₂	729	1032	1261	1009	1005	1008
Mean	816	1082	1261	1031	1075	1053
F ₀	762	1091	1239			
F ₁	870	1072	1282			

C.D. for N marginal means = 109.2 Kg/ha.

Treatment	V ₁	V ₂	Sig.	F ₀	F ₁	Sig.	N ₀	N ₁	N ₂
Years 1960	1069	1035	N.S.	1023	1081	N.S.	890	1088	1178
1961	1128	980	N.S.	1039	1069	N.S.	742	1076	1344
Pooled	1098	1007	N.S.	1031	1075	N.S.	816	1082	1261

Sig.	G.M.	M.P.	S.E./plot S.P.	S.S.P.
**	1052	481.8	154.1	193.0
**	1054	244.5	251.4	221.0
**	1053	369.1	229.3	217.6

Crop :- Cotton (Kharif).

Ref :- M.P. 62(3).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'MV'.

Object :- To study the effect of N with and without F.Y.M. on the yield of different varieties of Cotton.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) Cotton. (c) As per treatments. (ii) Medium black. (iii) 29.7.62. (iv) (a) *Bakherings*. (b) Seed drilled in lines. (c) 22 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) Weeding and hoeing. (ix) 106.5 cm. (x) 3.11.61 and 1.12.61.

2. TREATMENTS:

Main-plot treatments:

2 varieties : $V_1 = A-51-9$ (American) and $V_2 = AK-277$ (Deshi).

Sub-plot treatments :

2 levels of F.Y.M. : $F_0 = 0$ and $F_1 = 50.2$ Kg/ha.

Sub-sub-plot treatments :

3 levels of N as A/S : $N_0 = 0$, $N_1 = 22.4$ and $N_2 = 44.4$ and $N_3 = 44.8$ Kg/ha.

3. DESIGN :

Same as in expt. No. 60(70), 61(39) on Page 383.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Yield of *Kapas*. (iv) (a) 1960-62 (modified in 1962). (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Varieties have been changed this year.

5. RESULTS :

(i) 949 Kg/ha. (ii) (a) 93.8 Kg/ha. (b) 113.6 Kg/ha. (c) 137.3 Kg/ha. (iii) Main effect of V, N and interaction $V \times N$ are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N_0	N_1	N_2	F_0	F_1	Mean
V_1	885	1002	1213	1018	1049	1033
V_2	508	925	1162	829	902	865
Mean	696	963	1187	923	975	949
F_0	672	948	1149			
F_1	721	979	1226			

C.D. for V marginal means = 86.0 Kg/ha.

C.D. for N marginal means = 100.0 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- M.P. 60(65).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'C'.

Object :- To study the effect of different methods of sowing on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) N.A. (ii) Medium black. (iii) 8.7.60. (iv) (a) *Bakharings*. (b) As per treatments. (c) N.A. (d) and (e) As per treatments. (v) Nil. (vi) *Buri-0394*. (vii) Unirrigated. (viii) N.A. (ix) 65.0 cm. (x) 10.12.60.

2. TREATMENTS :

6 methods of sowing : S_1 = Sowing by seed drill with 61 cm. \times 30 cm. spacing, S_2 = Sowing by seed drill with 76 cm. \times 30 cm. spacing, S_3 = Dibbling with 61 cm. \times 61 cm. spacing and 1 plant/hole, S_4 = Dibbling with 61 cm. \times 61 cm. spacing and 2 plants/hole, S_5 = Dibbling with 76 cm. \times 76 cm. spacing and 1 plant/hole and S_6 = Dibbling with 76 cm. \times 76 cm. spacing 2 plants/hole.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) 18.3 m. \times 18.3 m. (iii) 3. (iv) (a) 9.1 m. \times 6.1 m. (b) 6.7 m. \times 4.3 m. ; 6.1 m. \times 4.3 m. ; 7.9 m. \times 4.9 m. ; 7.6 m. \times 4.6 m. for S_1 ; S_2 ; S_3 and S_4 ; S_5 and S_6 respectively. (v) Varies from treatment to treatment. (vi) Yes.

4 GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Yield of *Kapas*. (iv) (a) 1960—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 390 Kg/ha. (ii) 180.8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆
Av. yield	642	674	226	334	223	243

C.D.=328.9 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- M.P. 60(122).

Site :- Govt. seed and Demons. Farm, Amlaha.

Type :- 'CM'.

Object.—To study the effect of G.M. along with different spacings on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Wheat-Cotton-Jowar. (b) Wheat. (c) N.A. (ii) Medium black cotton soil. (iii) 2.7.60. (iv) (a) One ploughing and 2 *bakherings*. (b) Drilling. (c) 2.2 Kg/ha. (d) As per treatments. (e) N.A. (v) 25 C.L./ha. of F.Y.M. (vi) *Desi* cotton. (vii) Unirrigated. (viii) 4 weedings. (ix) 42.2 cm (x) 5.1 6l and 4.2.6l.

2. TREATMENTS :

8 cultural-cum-manurial treatments: T₁=Sowing at 46 cm. spacing between rows, T₂=Sowing at 61 cm. spacing between rows, T₃=T₁+44.8 Kg/ha. of N as F.Y.M., T₄=T₂+G.M. with *Urid*, T₅=T₄+22.4 Kg/ha. of P₂O₅ as Super, T₆=T₂+G.M. with *Sann*, T₇=T₆+22.4 Kg/ha. of P₂O₅ as Super and T₈=T₁+22.4 Kg/ha. of N as A/S.

3. DESIGN :

(i) R B D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) and (b) 12.2 m × 5.5 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1260—Only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 296 Kg/ha. (ii) 92.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Av. yield	209	235	284	291	336	310	299	400

Crop :- Cotton (Kharif).

Ref :- M.P. 60(115).

Site :- Instt. of Plant Industry, Indore.

Type :- 'CM'.

Object :- To study the effect of N, P, G.M. and spacing on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 24.6.60. (iv) One *bakhering*. (b) Dibbling. (c) 11.2 Kg/ha. (d) 36 cm. x 30 cm. (e) N.A. (v) Nil. (vi) *Deshi* cotton (*Bhoj*). (vii) Unirrigated. (viii) 5 weedings and 2 interculturings. (ix) 82.0 cm. (x) 8.11.60 and 30.11.60.

2. TREATMENTS:

8 cultural-cum-manurial treatments: $T_1=56$ cm. spacing between rows, $T_2=61$ cm. spacing between rows, $T_3=T_1+44.8$ Kg/ha. of N as F.Y.M., $T_4=T_3+G.M.$ with gird, $T_5=22.4$ Kg/ha. of $P_2O_5+G.M.$ with gird, $T_6=T_2+G.M.$ with *sann*, $T_7=22.4$ Kg/ha. of $P_2O_5+G.M.$ with *sann* and $T_8=T_1+22.4$ Kg/ha. of N as A/S.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 12.2 m. x 5.5 m. (b) 10.7 m. x 4.1 m. (v) 76 cm. x 68 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1960-61. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Experiment failed in 1961 due to heavy rain and subsequent frost.

5. RESULTS :

(i) 696 Kg/ha. (ii) 64.8 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment :	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
As yield :	663	744	825	668	634	638	661	734

C.D.=95.3 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 60(117).

Site :- Instt. of Plant Industry, Indore.

Type :- 'CM'.

Object :- To study the effects of different levels of N and spacings on the yield of Cotton.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) N.A. (c) Nil. (ii) Black cotton soil. (iii) 25.6.60. (iv) (a) One *bakhering*. (b) Dibbling. (c) 22 Kg/ha. (d) As per treatments. (e) —. (v) 12 C.L./ha. of farm compost. (vi) Indore-2. (vii) Unirrigated. (viii) 7 weedings. (ix) 79.6 cm. (x) 21.12.60 to 5.2.61.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1) and (2).

(1) 3 spacings between rows: $S_1=30$, $S_2=46$ and $S_3=61$ cm.

(2) 4 levels of N: $N_0=0$, $N_1=22.4$, $N_2=44.8$ and $N_3=67.2$ Kg/ha.

Sub-plot treatments :

2 spacings between plants: $P_1=30$ and $P_2=46$ cm.

3. DESIGN :

(i) Split-plot. (ii) (a) 12 main plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 11.0 m. x 3.7 m. (b) 9.1 m. x 2.4 m. (v) 91 cm. x 61 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) N.A. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1089 Kg/ha. (ii) (a) 168.8 Kg/ha. (b) 101.6 Kg/ha. (iii) Main effect of N is highly significant and effects of S and P are significant. (iv) Av. yield of *kapas* in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	P ₁	P ₂	Mean
S ₁	915	1119	1269	1317	1190	1121	1155
S ₂	776	1143	1193	1312	1128	1084	1106
S ₃	755	1032	1077	1160	1033	980	1006
Mean	815	1098	1180	1263	1117	1062	1089
P ₁	848	1098	1195	1326			
P ₂	783	1099	1164	1201			

C.D. for N marginal means=116.8 Kg/ha.

C.D. for S marginal means=101.0 Kg/ha.

C.D. for P marginal means=49.3 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 60(125).

Site :- Instt. of Plant Industry, Indore.

Type :- 'CM'.

Object :- To find out the optimum spacing and seed rate for Cotton crop and study the 'N' requirements.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) 29.9.60. (iv) (a) 2 *bakherings*. (b) Dibbling. (c) --. (d) and (e) As per treatments. (v) Nil. (vi) *Bhoj*. (vii) Unirrigated. (viii) 7 weedings and 5 interculturings. (ix) 84.1 cm. (x) 31.10.60 to 10.1.61.

2. TREATMENTS :

Main-plot treatments :

All combinations (1), (2) and (3)

(1) 2 spacings between rows : R₁=30 and R₂=46 cm.

(2) 2 spacings between plants : S₁=15 and S₂=30 cm.

(3) No. of plants per hole : H₁=1 and H₂=2 plants/hole.

Sub-plot treatments :

4 levels of N as A/S : N₀=0, N₁=22.4, N₂=44.8 and N₃=67.2 Kg/ha.

2. DESIGN

(i) Split-plot. (ii) (a) 8 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 11.0 m. × 4.6 m. (b) 9.1 m. × 3.7 m. (v) 91 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) 1960—Only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 772 Kg/ha. (ii) (a) 127.9 Kg/ha. (b) 65.9 Kg/ha. (iii) Main effect of N is highly significant and effect of S and interaction H×S are significant. (iv) Av. yield of *kapas* in Kg/ha.

	S ₁	S ₂	H ₁	H ₂	N ₀	N ₁	N ₂	N ₃	Mean
R ₁	819	764	804	779	722	829	803	812	791
R ₂	800	708	708	800	667	766	768	814	754
Mean	809	736	756	789	695	797	785	813	772
N ₀	744	646	677	713					
N ₁	828	797	773	821					
N ₂	819	752	777	794					
N ₃	847	779	796	830					
H ₁	797	715							
H ₂	821	757							

C.D. for N marginal means=38.2 Kg/ha.

C.D. for S marginal means=56.0 Kg/ha.

C.D. for the body of H×S table=79.2.

Crop :- Cotton (Kharif).

Ref :- M.P. 62(124).

Site :- Instt. of Plant Industry, Indore.

Type :- 'CM'.

Object :- To see the effect of different dates of sowing, spacings and different levels of N on the yield of Cotton.

1. BASAL CONDITIONS :

1. (a) to (c) N.A. (ii) Black cotton soil. (iii) As per treatments. (iv) (a) 2 *bakherings*. (b) Dibbling. (c) 16 Kg/ha. (d) As per treatments. (e) 2. (v) 10 Kg/ha. of N through F.Y.M. (vi) *Badnawar-I*. (vii) Unirrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS :

Main-plot treatments :

3 dates of sowing : D₁=15.7.62, D₂=19.7.62 and D₃=25.7.62.

Sub-plot treatments :

All combinations of (1) and (2).

(1) 2 spacings : S₁=35 and S₂=45 cm.

(2) 6 levels of N : N₀=0, N₁=20, N₂=40, N₃=60, N₄=80 and N₅=100 Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 12 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.3 m. × 7.8 m. (b) 5.4 m. × 6.9 m. (v) 45 cm. × 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1962-only. (b) Yes. (c) Nil. (v) *Khandwa* and *Khargone*. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 399 Kg/ha. (ii)(a) 145.2 Kg/ha. (b) 148.6 Kg/ha. (iii) Main effects of D, S and interaction D×S are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	S ₁	S ₂	N ₀	N ₁	N ₂	N ₃	N ₄	N ₅	Mean
D ₁	497	487	379	427	521	501	557	569	492
D ₂	589	412	556	445	471	512	539	480	501
D ₃	208	199	156	164	188	257	252	202	203
Mean	431	366	364	345	393	423	449	417	399
N ₀	449	278							
N ₁	363	327							
N ₂	412	375							
N ₃	454	392							
N ₄	470	429							
N ₅	439	395							

C.D. for D marginal means=72.5 Kg/ha.

C.D. for S marginal means=49.2 Kg/ha.

C.D. for D means at the same level of S=85.8 Kg/ha.

C.D. for S means at the same level of D=85.2 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- M.P. 63(56), 64(23).

Site :- J.N.K.V.V. Instt. of Plant Industry, Indore. Type :- 'CM'.

Object .—To find out the optimum sowing time and spacing for Cotton and study 'N' requirements applied in different terms.

1. BASAL CONDITIONS :

(i) (a) N.A. (ii) Black cotton soil. (iii) As per treatments. (iv) (a) Two *bakherings*. (b) Dibbling. (c) 16 Kg/ha. (d) As per treatments. (e) 2. (v) 10 Kg/ha. of N through F.Y.M. (vi) Badnawari. (vii) Unirrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1) and (2).

(1) 3 dates of sowing : D₁=Dry sowing a week before normal sowing, D₂=Normal sowing and D₃=One week later than normal sowing.

(2) 3 spacings : S₁=30 cm. × 22 cm., S₂=45 cm. × 22 cm. and S₃=60 cm. × 22 cm.

Sub-plot treatments :

All combinations of (3) and (4).

(3) 3 levels of N : N=0, N₁=30 and N₂=60 Kg/ha.

(4) 2 sources of N : M₁=A/S and M₂=A/C.

3. DESIGN

(i) Split-plot. (ii) (a) 9 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.3 m. × 5.4 m. (b) 8.4 m. × 4.5 m. (v) 45 cm. × 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) No. of bolls/plant and yield of *kapas*. (iv) (a) 1963-65 (modified in 1965). (b) Yes. (c) Nil. (v) Khargone-Khandwa. (vi) N.A. (vii) As sub-plot error variances are heterogeneous, results of individual years have been presented under 5. Results.

5. RESULTS :

1963

(i) 189 Kg/ha. (ii) (a) 84.1 Kg/ha. (b) 66.4 Kg/ha. (iii) Main effects of D and N are highly significant and effect of S, interactions D×S and D×N are significant. (iv) Av. yield of *kapas* in Kg/ha.

	S ₁	S ₂	S ₃	N ₀	N ₁	N ₂	M ₁	M ₂	Mean
D ₁	244	325	308	246	292	339	291	294	292
D ₂	207	222	132	131	195	234	202	171	186
D ₃	104	89	67	80	74	106	80	94	87
Mean	185	212	169	152	187	226	191	186	189
M ₁	190	217	167	145	193	235			
M ₂	180	207	171	160	181	217			
N ₀	146	168	143						
N ₁	186	214	161						
N ₂	223	254	202						

C.D. for D or S marginal means = 28.9 Kg/ha.

C.D. for N marginal means = 21.7 Kg/ha.

C.D. for the body of D×S table = 50.0 Kg/ha.

C.D. for D means at the same level of N = 42.1 Kg/ha.

C.D. for N means at the same level of D = 37.5 Kg/ha.

1964

(i) 317 Kg/ha. (ii) (a) 123.4 Kg/ha. (b) 76.1 Kg/ha. (iii) Main effects of D and N are highly significant. Effect of S is significant. (iv) Av. yield of *kapas* in Kg/ha.

	S ₁	S ₂	S ₃	N ₀	N ₁	N ₂	M ₁	M ₂	Mean
D ₁	353	405	309	293	358	416	370	342	356
D ₂	356	401	333	305	366	419	344	382	363
D ₃	191	266	237	203	237	255	216	247	232
Mean	300	357	293	267	321	363	310	324	317
M ₁	302	347	281	245	317	369			
M ₂	299	367	305	289	324	358			
N ₀	241	312	248						
N ₁	303	349	310						
N ₂	357	411	322						

C.D. for D or S marginal means = 42.4 Kg/ha.

C.D. for N marginal means = 24.8 Kg/ha.

Crop :- Cotton (Kharij).

Ref :- 65(15).

Site :- Instt. of Plant Industry, Indore.

Type :- 'CM'.

Object :- To determine the optimum sowing date, spacing, and N levels for Cotton.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) As per treatments. (iv) (a) 3 ploughings followed by 4 *bakherings*. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. × 45 cm. (e) Two. (v) 10 Kg/ha. of N as F.Y.M. (vi) Badnawar-I (medium). (vii) Unirrigated. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1) and (2)

(1) 3 dates of sowing : D_1 = Dry sowing one week before normal sowing, D_2 = Normal sowing and D_3 = One week later than normal sowing.

(2) 3 row-spacings : S_1 = 30, S_2 = 45, and S_3 = 60 cm.

Sub-plot treatments :

All combinations of (3) and (4) + a control (C).

(3) 2 levels of N : N_1 = 30 and N_2 = 60 Kg/ha.

(4) 3 sources of N : M_1 = Urea, M_2 = A/S and M_3 = A/C

3. DESIGN :

(i) Split plot. (ii) (a) 9 main-plots/replication ; 7 sub-plots/main-plots. (b) N.A. (iii) 4. (iv) (a) 9.3 m. × 5.4 m. (b) 8.9 m. × 4.5 m. (v) One row and one plant on both sides adjusted as per treatment. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Aphides and Jassides attack, controlled by insecticides. (iii) No. of bolls/plant, yield/plant and yield of *kapas*. (iv) (a) 1965-only. (b) and (c) —. (v) Khargone and Khandwa. (vi) and (vii) Nil.

5. RESULTS :

(i) 266 Kg/ha. (ii) (a) 94.9 Kg/ha. (b) 54.6 Kg/ha. (iii) Effects of S, N, 'control vs. others' and interactions $N \times M$ and $S \times N$ are significant. (iv) Av. yield of *kapas* in Kg/ha.

Control = 237 Kg/ha.

	S_1	S_2	S_3	N_1	N_2	M_1	M_2	M_3	Mean
D_1	257	246	331	274	282	275	267	291	278
D_2	241	286	296	267	282	273	271	279	274
D_3	281	239	267	252	273	263	253	271	262
Mean	260	257	298	264	279	270	264	280	271
M_1	271	247	293	250	291				
M_2	248	261	283	261	267				
M_3	260	263	318	282	279				
N_1	260	256	276						
N_2	259	259	320						

C.D. for S marginal means = 32.6 Kg/ha.

C.D. for N marginal means = 14.6 Kg/ha.

C.D. for the body of $N \times M$ table = 25.2 Kg/ha.

C.D. for 'control vs. others' = 19.7 Kg/ha.

C.D. for N means at the same level of S = 25.2 Kg/ha.

C.D. for S means at the same level of N = 52.6 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 62(59).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'CM'.

Object :-To study the effect of different levels of N, spacings and dates of sowing on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) 11.2 Kg/ha. of N as A/S. (ii) Medium black. (iii) As per treatments. (iv) (a) 2 *bakherings*. (b) Drilling. (c) 22.4 Kg/ha. (d) As per treatments. (e) N.A. (v) Nil. (vi) A 51—9 (Narmada). (vii) Unirrigated. (viii) 2 hoeings and hand weedings. (ix) 121.9 cm. (x) 9 2.63.

2. TREATMENTS :

Main-plot treatments :

3 dates of sowing : $D_1=7$ days before normal, $D_2=$ Normal and $D_3=7$ days after normal (Normal date of sowing is 29.7.62.)

Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 spacings : $S_1=46$ and $S_2=61$ cm.

(2) 6 levels of N as A/S : $N_0=0$, $N_1=22.4$, $N_2=44.8$, $N_3=67.2$, $N_4=89.7$ and $N_5=112.1$ Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 12 sub-plots/main-plot. (iii) 4. (iv) (a) 9.1 m. \times 5.5 m. (b) 8.5 m. \times 3.7 m. (v) 30 cm. \times 91 cm. (vi) Yes.

3. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of *Kapas*. (iv) (a) 1962—only. (b) No. (c) Nil. (v) Indore (vi) and (vii) Nil.

5. RESULTS :

(i) 303 Kg/ha. (ii) (a) 204.3 Kg/ha. (b) 104.3 Kg/ha. (iii) Main effect of N is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N_0	N_1	N_2	N_3	N_4	N_5	S_1	S_2	Mean
D_1	164	233	281	337	317	446	314	279	296
D_2	157	246	253	385	441	494	334	325	329
D_3	191	191	293	257	392	379	299	269	284
Mean	171	223	276	326	383	440	316	291	303
S_1	207	210	282	364	375	457			
S_2	135	237	269	288	392	423			

C.D. for N marginal means = 60.0 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 63(82), 64(60).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'CM'.

Object :-To find out the optimum time of sowing and spacing for Cotton and to study the requirement of 'N' applied in different forms.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) N.A. (ii) Light black cotton soil. (iii) As per treatments. (iv) (a) Ploughings and *bakherings*. (b) Dibbling. (c) 9.2 Kg/ha. (d) As per treatments. (e) 3-4. (v) Nil. (vi) A-51-9. (vii) Unirrigated. (viii) Weeding and interculturing. (ix) 82 cm ; 81 cm. (x) N.A.

2. TREATMENTS :

Main-plot treatments:

All combinations of (1) and (2)

(1) 3 dates of sowing : $D_1=7$ days before normal sowing, $D_2=$ Normal sowing and $D_3=7$ days after normal sowing (normal sowing being fourth week of July).

(2) 3 spacings :- $S_1=30$, $S_2=45$ and $S_3=60$ cm.

Sub-plot treatments :

All combinations of (3) and (4)

(3) 2 sources of N : $M_1=A/S$ and $M_2=A/C$.

(4) 3 levels of N : $N_0=0$, $N_1=30$ and $N_2=60$ Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 9 main/plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.4 m. \times 7.0 m. for 63 ; 5.4 m. \times 9.4 m. for 64 (b) 4.8 m. \times 6.4 m., 4.5 m. \times 6.4 m., 4.2 m. \times 6.4 m. for S_1 , S_2 and S_3 respectively. (v) Two rows on either side. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Plant population, Yield of *Kapas*. (iv) (a) 1963--64. (b) No. (c) Nil. (v) Khargone and Indore. (vi) Nil. (vii) As the sub-plot error variances are heterogeneous, individual results are presented under 5.—Results.

5. RESULTS :

63(82)

(i) 359 Kg/ha. (ii) (a) 153.6 Kg/ha. (b) 116.4 Kg/ha. (iii) Main effects of N and interaction $M \times N$ are highly significant. Effect of S is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S_1	S_2	S_3	M_1	M_2	N_0	N_1	N_2	Mean
D_1	427	375	396	406	392	365	374	459	399
D_2	448	348	291	385	340	305	354	429	363
D_3	355	373	304	348	340	297	333	402	344
Mean	410	365	330	380	358	322	354	430	369
N_0	377	314	275	306	339				
N_1	380	374	307	352	355				
N_2	473	408	409	481	379				
M_1	424	366	349						
M_2	396	365	311						

C.D. for S marginal means=52.8 Kg/ha.

C.D. for N marginal means=38.0 Kg/ha.

C.D. for the body of $M \times N$ table=53.8 Kg/ha.

64(60)

(i) 871 Kg/ha. (ii) (a) 330.8 Kg/ha. (b) 145.8 Kg/ha. (iii) Effects of D, M, N, and interaction $D \times M$, $D \times N$ are highly significant. Effect of S is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S ₁	S ₂	S ₃	M ₁	M ₂	N ₀	N ₁	N ₂	Mean
D ₁	1033	1128	924	1045	1011	674	1036	1374	1028
D ₂	924	1038	890	1081	821	687	911	1254	951
D ₃	625	692	584	660	607	420	676	805	633
Mean	861	952	799	929	813	594	874	1144	871
N ₀	624	630	527	626	561				
N ₁	866	947	809	947	802				
N ₂	1092	1279	1061	1213	1075				
M ₁	908	1012	865						
M ₂	813	892	733						

C.D. for D or S marginal means = 113.8 Kg/ha.
 C.D. for M marginal means = 38.9 Kg/ha.
 C.D. for N marginal means = 47.6 Kg/ha.
 C.D. for D means at the same level of M = 123.3 Kg/ha.
 C.D. for M means at the same level of D = 67.4 Kg/ha.
 C.D. for D means at the same level of N = 132.2 Kg/ha.
 C.D. for N means at the same level of D = 82.5 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 64(27).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'CM'.

Object :- To study the suitable dates of sowing, spacing and their interaction with three levels of N applied through A/S and A/C.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) As per treatments. (iv) (a) 2 bakherings. (b) Dibbling
 (c) 16 Kg/ha. (d) As per treatments. (e) 2. (v) 10 Kg/ha. of N through F.Y.M. (vi) *Badnawar*—I
 (vii) Unirrigated (viii) 3 weedings. (ix) and. (x) N.A.

2. TREATMENTS :

Main-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of N : N₀=0, N₁=30 and N₂=60 Kg/ha.

(2) 2 sources of N : T₁=A/C and T₂=A/S.

Sub-plot treatments :

All combinations of (3) and (4)

(3) 3 sowing dates : D₁=Dry sowing a week before normal sowing and D₂=Normal sowing and
 D₃=One week later than normal sowing.

(4) 3 spacings : S₁=30 cm. × 22cm., S₂=45cm. × 22cm. and S₃=60cm. × 22cm.

3. DESIGN :

(i) split-plot. (ii) (a) 6 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 4.
 (iv) (a) 5.5 m. × 9.4 m. (b) 4.2 m. × 8.5 m. (v) 45 cm. × 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1964—only. (b) Yes. (c) Nil. (v) Indore and Khargone.
 (vi) and (vii) Nil.

5. RESULTS :

(i) 666 Kg/ha (ii) (a) 147.7 Kg/ha. (b) 139.9 Kg/ha (iii) Main effects of N, T, D, S, and interactions N×S and T×S are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	T ₁	T ₂	D ₁	D ₂	D ₃	S ₁	S ₂	S ₃	Mean
N ₀	479	429	477	482	403	515	525	321	454
N ₁	724	615	662	728	619	796	697	517	670
N ₂	927	824	834	978	814	1053	958	615	875
Mean	710	623	658	729	612	788	727	484	666
S ₁	799	777	789	866	709				
S ₂	826	627	706	793	681				
S ₃	504	464	478	529	447				
D ₁	694	622							
D ₂	774	684							
D ₃	662	562							

C.D. for N marginal means = 52.4 Kg/ha.
 C.D. for T marginal means = 42.8 Kg/ha.
 C.D. for D or S marginal means = 45.9 Kg/ha.
 C.D. for N means at the same level of S = 83.4 Kg/ha.
 C.D. for S means at the same level of N = 79.5 Kg/ha.
 C.D. for T means at the same level of S = 68.1 Kg/ha.
 C.D. for S means at the same level of T = 64.9 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 61(64).

Site :- Reg. Res. Stn., Khargone.

Type :- 'CM'.

Object :- To find out the effect of G.M. and N and P on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar-Groundnut. (b) Groundnut. (c) Nil. (ii) Medium black cotton soil. (iii) 2.7.61.
 (iv) (a) One summer ploughing and 3 *bakherings*. (b) Seed drilled. (c) 22 Kg/ha. (d) 41 cm. × 15 to 23 cm.
 (e) N.A. (v) Nil. (vi) *Mal jari*. (vii) Unirrigated. (viii) 2 hand weedings & 3 intercultures.
 (ix) 48.7 cm. (x) 27.11.61.

2. TREATMENTS:

8 cultural-cum-manurial treatments : T₁=46 cm. spacings between rows, T₂=61 cm. spacing between rows, T₃=T₁+44.8 Kg/ha. of N as F.Y.M., T₄=Green manuring with urid in cotton rows with 61 cm. spacing, T₅=T₄+22.4 Kg/ha. of P₂O₅ as Super, T₆=Green manuring with *sann* in cotton rows with 61 cm. spacing, T₇=T₆+22.4 Kg/ha. of P₂O₅ as Super and T₈=T₁+22.4 Kg/ha. of N.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 12.2 m. × 5.5 m. (b) 10.7 m. × 4.1 m. for T₁, T₂ and T₃ treatments and 10.7 m. × 4.3 m. for other treatments. (v) 76 cm. × 70 cm. for T₁, T₂ and T₃ treatments and 76 cm. × 61 cm. for other treatments. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1961—Only. (b) No. (c) Nil. (v) N.A. (vi) & (vii) Nil.

5. RESULTS :

(i) 301 Kg/ha. (ii) 62.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment : T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Av. yield : 232	338	292	324	294	302	291	333

Crop :- Cotton (Kharif).

Ref :- M.P. 61(65).

Site :- Reg. Res. Stn., Khargone.

Type :- 'CM'.

Object : -To find out the optimum spacing and seed rate and 'N' requirements of Cotton.

1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar-Groundnut. (b) Groudnut. (c) Nil. (ii) Medium black cotton soil. (iii) 4.7.61.
(iv) (a) One summer ploughing and 3 *bakherings*. (b) Dibblings. (c) 22 Kg/ha. (d) and (e) As per treatments. (v) Nil. (vi) A. 51-9 (vii) Unirrigated. (viii) 2 hand weedings and 3 interculturings. (ix) 118.7 cm. (x) 28.12.61.

2. TREATMENTS:

All combinations of (1), (2) and (3).

(1) 4 levels of N as A/S : N₀=0 N₁=22.4, N₂=44.8 and N₃=67.2 Kg/ha.

(2) 2 spacings between plants : S₁=15 and S₂=30 cm.

(3) 2 No. of plants per point : H₁=1 and H₂=2 plants/hole

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 6. (iv) (a) 14.6 m. × 4.9 m. (b) 13.7 m. × 4.1 m.
(v) 46 cm. × 40 cm. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1961—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 110 Kg/ha. (ii) 35.1 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of *kapas* in Kg/ha.

	S ₁	S ₂	H ₁	H ₂	Mean
N ₀	91	93	92	92	92
N ₁	116	107	113	110	112
N ₂	128	108	114	122	118
N ₃	116	123	122	108	120
Mean	113	108	110	110	110
H ₁	112	108			
H ₂	113	107			

C.D. for N marginal means = 20.3 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 61(66).

Site :- Reg. Res. Stn., Khargone.

Type :- 'CM'.

Object :- To find out the optimum spacing and seed-rate and 'N' requirement of Cotton.

1. BASAL CONDITIONS :

- (i) (a) Cotton-Jawor-Groundnut. (b) Groundnut. (c) Nil. (ii) Medium black cotton soil. (iii) 2.7.61.
 (iv) (a) One ploughing and 3 *bakherings*. (b) Seed drilled. (c) 22 Kg/ha. (d) As per treatments. (e) N.A.
 (v) Nil. (vi) *Maljari (Deshi)*. (vii) Unirrigated. (viii) 2 weedings by hand and 3 intercultures.
 (ix) 118.7 cm. (x) 29.11.61.

2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) 4 levels of N as A/S : $N_0=0$, $N_1=22.4$, $N_2=44.8$ and $N_3=67.2$ Kg/ha.

(2) 2 spacings between plants : $S_1=15$ and $S_2=23$ cm.

(3) 3 No. of plants per point : $H_1=1$, $H_2=2$ and $H_3=3$ plants/hohe.

3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 24. (b) N.A. (iii) 4. (iv) 11.0 m. \times 4.9 m. (b) 10.1 m. \times 4.1 m. (v) 46 cm. \times 40 cm. (vi) Yes.

4. GENERAL :

- (i) Satisfactory. (ii) Nil. (iii) Yield of *kapas* (iv) (a) 1961 —Only. (b) N.A. (c) Nil. (v) N.A.
 (vi) and (vii) Nil.

5. RESULTS:

- (i) 271 Kg/ha. (ii) 67.2 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	S_1	S_2	H_1	H_2	H_3	Mean
N_0	147	190	168	187	149	168
N_1	237	241	232	229	257	239
N_2	295	319	281	307	332	307
N_3	392	351	269	368	378	372
Mean	268	275	262	273	279	271
H_1	254	270				
H_2	277	269				
H_3	272	286				

C.D. for N marginal means = 38.7 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- M.P. 63(80), 64(59).

Site :- Reg. Res. Stn., Khargone.

Type :- 'CM'.

Object :- To determine the Suitable dates of sowing and spacing and their interactions with three levels of N applied through A/S and A/C.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Jowar. (c) N.A. (ii) Light black soil. (iii) As per treatments. (iv) (a) Ploughings and *bakherings*. (b) Dibbling. (c) 9 Kg/ha. ; 16 Kg/ha. (d) As per treatments. (e) 3—4. (v) Nil. (vi) *Maljori*.
 (vii) Unirrigated. (viii) Weedings and intercultrings, (ix) 73 cm ; 66 cm. (x) N.A.

2. TREATMENTS :

Main-plot treatments:

All combinations of (1) and (2).

(1) 3 dates sowings : $D_1=7$ days before normal sowings, D_2 =Normal sowing and. $D_3=7$ days after normal sowing.

(2) 3 spacings : $S_1=30$ cm. \times 22.5 cm. ; $S_2=45$ cm. \times 22.5 cm. and $S_3=60$ cm. \times 22.5 cm. .

Sub-plot treatments :

All combinations of (3) of (4).

(3) 2 Sources of N : $M_1=A/S$. and $M_2=A/C$.

(4) 3 levels of N : $N_0=0$, $N_1=30$ and $N_2=60$ Kg/ha.

3. DESIGN

(i) Split-plot. (ii) (a) 9 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.40 m. \times 9.36 m. (b) 4.50 m. \times 8.46 m. (v) 45 cms. \times 45 cms. (iv) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of *kapas*, plant population etc. (iv) (a) 1963—1964. (b) Yes. (c) Nil. (v) Indore, Khandwa. (vi) Nil. (vii) As the sub-plot error variances are heterogeneous, individual results are presented under 5. Results.

5. RESULTS :

1963

(i) 598 Kg/ha. (ii) (a) 174.0 Kg/ha. (b) 97.8 Kg/ha. (iii) Main effects of D, S and N are highly significant. Effects of interaction $M \times N$ is significant. (iv) Av. yield of *kapas* in Kg/ha.

	S_1	S_2	S_3	M_1	M_2	N_0	N_1	N_2	Mean
D_1	622	671	640	628	661	518	670	745	644
D_2	619	701	586	625	646	518	656	733	636
D_3	537	588	421	510	521	463	508	574	515
Mean	593	653	549	588	609	500	611	684	598
N_0	479	547	474	511	488				
N_1	609	672	552	597	626				
N_2	690	741	621	655	713				
M_1	595	624	543						
M_2	590	682	555						

C.D. for D or S marginal means =59.9 Kg/ha.

C.D. for N marginal means =31.9 Kg/ha.

C.D. for the body of $M \times N$ table=45.1 Kg/ha.

1964

(i) 661 Kg/ha. (ii) (a) 182.8 Kg/ha. (b) 125.2 Kg/ha. (iii) Effects of D, M, N, interactions $M \times N$ and $D \times N$ are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	S ₁	S ₂	S ₃	M ₁	M ₂	N ₀	N ₁	N ₂	Mean
D ₁	786	775	829	804	789	526	825	1039	796
D ₂	721	742	683	767	664	452	739	955	716
D ₃	502	501	408	506	434	322	473	615	470
Mean	670	673	640	692	629	433	679	870	661
N ₀	414	445	441	438	429				
N ₁	685	689	663	694	664				
N ₂	910	883	816	945	794				
M ₁	689	703	686						
M ₂	651	643	594						

C.D. for D marginal means = 62.9 Kg/ha.
 C.D. for M marginal means = 33.4 Kg/ha.
 C.D. for N marginal means = 40.9 Kg/ha.
 C.D. for the body of M × N table = 57.8 Kg/ha.
 C.D. for D means at the same level of N = 85.4 Kg/ha.
 C.D. for N means at the same level of D = 70.8 Kg/ha.

Crop :- Cotton (Kharif).

Ref:- M.P. 60(62).

Site :- Central Exptl. Farm, Ujjain.

Type :- 'CM'.

Object :-To study the effect of G.M. and N, P on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) N.A. (iv) (a) *bakhering*. (b) N.A. (c) 22 Kg/ha.
 (d) As per treatments. (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) N.A. (ix) 60.2 cm.
 (x) N.A.

2. TREATMENTS :

8 cultural-cum-manurial treatments: T₁=46 cm. spacing between rows, T₂=61 cm. spacing between rows, T₃=T₁+44.8 Kg/ha. of N of F.Y.M., T₄=T₂+G.M. with Urid in alternate rows, T₅=T₄+22.4 Kg/ha. of P₂O₅ as Super, T₆=T₂+G.M. with Sann in alternate rows, T₇=T₆+22.6 Kg/ha. of P₂O₅ as Super and T₈=T₁+22.4 Kg/ha. of N as A'S.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 12.2 m × 5.5 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Yield of *kapas*. (iv) (a) 1950 - only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 212 Kg/ha. (ii) 43.3 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Av. yield	225	156	264	231	158	166	189	306

C.D. = 63.5 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- M.P. 60(64).

Site :- Central Exptl. Farm, Ujjain.

Type :- 'CM'.

Object :—To find out a suitable spacing, seed-rate and levels of N for Cotton,

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black Cotton soil. (iii) N.A. (iv) (a) 4 *bakherings*. (b) Dibbling. (c) (d) and (e) As per treatments. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) 2 weedings. (ix) 60.3 cm. (x) N.A.

2. TREATMENTS :

Main-plot treatments

All combination of (1) and (2)

(1) 4 spacings: $S_1=46 \text{ cm} \times 15 \text{ cm.}$, $S_2=46 \text{ cm.} \times 23 \text{ cm.}$, $S_3=61 \text{ cm.} \times 15 \text{ cm.}$ and $S_4=61 \text{ cm.} \times 23 \text{ cm.}$ (2) No. of plants/hole: $H_1=1$ and $H_2=2$ plants/hole.

Sub-plot treatments

4 levels of N as A/S : $N_0=0$, $N_1=22.4$, $N_2=44.8$ and $N_3=67.2 \text{ Kg/ha.}$

3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/replication ; (b) 4 sub-plots/main plot. (iii) 3. (iv) 11'0 m' \times 4'6 m. (v) 9'1 m. \times 3'7 m. (vi) 91 cm. \times 46 cm. (vii) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Yield of *kapas*. (iv) (a) 1959-60. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 332 Kg/ha. (ii) (a) 229.8 Kg/ha. (b) 129 Kg/ha. (iii) Main effects of N, S and H are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	S_1	S_2	S_3	S_4	H_1	H_2	Mean
N_0	253	345	118	227	282	190	236
N_1	288	394	157	284	359	202	281
N_2	414	570	175	418	523	266	394
N_3	405	672	210	376	539	293	416
Mean	340	495	165	326	426	238	332
H_1	456	635	212	399			
H_2	224	356	118	253			

C.D. for S marginal means=142.2 Kg/ha.

C.D. for H marginal means=100.6 Kg/ha.

C.D. for N marginal means=75.1 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- M.P. 63(85).

Site :- Instt. of Plant Industry, Indore.

Type 'D'.

Object :—To study the effect of Hormones on the yield of Cotton.

1. BASAL CONDITIONS:

- (i) (a) to (c) N.A. (ii) Black Cotton soil. (iii) 5.7.63. (iv) (a) Ploughing and *bakharings*. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. (e) 3—4. (v) 30 Kg/ha. of N+20 Kg/ha. of P_2O_5 . (vi) *Badnawar*—1. (vii) Unirrigated. (viii) Weedings and inter culturings. (ix) 86 cm. (x) 18.1.64 to 22.3.64.

2. TREATMENTS :

All combinations of (1), (2), (3)+2 Extra treatments :

- (1) 2 types of Hormones : H_1 =Alpha—Naphthalene acetic acid and H_2 =Alpha—Naphthoxy acetic acid.

- (2) 2 concentrations of Hormones : C_1 =10 pp m. and C_2 =20 pp m.

- (3) 3 times of application : T_1 =at seedling stage, T_2 =at flowering stage and T_3 = $\frac{1}{2}$ at seedling+ $\frac{1}{2}$ at flowering stage.

2 Extra treatments . E_0 =No spraying and E_1 =Water spraying.

3. DESIGN :

- (i) ~~Fact.~~ in R.B.D. (ii) 14 (2 control plots in each replication). (b) N.A. (iii) 4. (iv) 5.4 m. \times 9.4 m. (b) 4.5 m. \times 8.5 m. (v) 45 cm. \times 45 cm. (vi) Yes.

4. GENERAL :

- (i) Satisfactory. (ii) As per treatments. (iii) Yield of *kapas*, plant population etc. (iv) (a) 1963—only, (b) No. (c) Nil. (v) Khandwa, Khargone. (vi) and (vii) Nil.

5. RESULTS:

- (i) 284 Kg/ha. (ii) 89.0 Kg/ha. (iii) Effects of interactions $H \times T$, $C \times T$ and extra treatments are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

Extra treatments : E_0 =191 and E_1 =343.

	C_1	C_2	T_1	T_2	T_3	Mean
H_1	303	316	350	230	348	309
H_2	283	246	282	289	223	265
Mean	293	281	316	259	286	287
T_1	375	257				
T_2	214	304				
T_3	290	282				

C.D. for the body of $C \times T$ or $H \times T$ table=89.9 Kg/ha.

C.D. for Extra treatments =127.2 Kg/ha.

Crop :- Cotton.

Ref :- M.P. 64(46), 65(42).

Site :- Instt. of plant Industry, Indore.

Type :- 'D'

Object :-To study the effect of Harmon's on the yield of Cotton.

1. BASAL CONDITIONS :

- (i) (a) to (c) N.A. (ii) Black Cotton soil. (iii) 5.7.64 ; 25.6.65. (iv) (a) Ploughings and *bakherings*. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. \times 45 cm. (e) 3—4. (v) 30 Kg/ha. of N+20 Kg/ha. of P_2O_5 . (vi) *Badnawar*—1. (vii) Unirrigated. (viii) Weedings and inter culturings. (ix) 94 cm. ; 54 cm. (x) 6.1.65 and 22.2.65 ; 4.1.66.

2. TREATMENTS:

Main-plot treatments:

All combinations of (1), (2) and (3)+2 Extra treatments.

(1) 2 types of Hormons: H_1 =Naphthalene acetic acid and H_2 =Naphoxy acetic acid.

(2) 2 concentrations: 10 p.p.m. and C_2 =20 p.p.m.

(3) 3 times of application: T_1 =at shedding stage, T_2 =at flowering stage and T_3 = $\frac{1}{2}$ at shedding and $\frac{1}{2}$ at flowering stage.

2 Extra treatments: E_0 =Control (no spraying) and E_1 =Water spraying.

Sub-plot treatments:

2 methods of Hormons sprayings: M_1 =With wetting agent and M_2 =Without wetting agent.

3. DESIGN:

(i) Split-plot. (ii) (a) 14 main-plots/replication; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.4 m. x 9.4 m.; 9.4 m. x 3.6 m. (b) 4.5 m. x 8.5 m.; 8.5 m. x 2.7 m. (v) 45 cm. x 45 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) As per treatments. (iii) Yield of *kapas*. (iv) (a) 1963-1965 (Modified in 1963). (b) No. (c) Nil. (v) Khandwa—Kargone. (vi) Nil. (vii) Sub-plot error variances are heterogeneous, hence results for individual years are presented under 5. Results.

5. RESULTS:

64(46)

(i) 377 Kg/ha. (ii) (a) 105.1 Kg/ha. (b) 52.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

$E_0=334$ Kg/ha., $E_1=355$ Kg/ha.

	C_1	C_2	T_1	T_2	T_3	M_1	M_2	Mean
H_1	369	392	371	386	386	379	383	381
H_2	376	393	378	381	394	399	370	384
Mean	373	393	375	383	390	389	376	382
M_1	379	399	380	390	397			
M_2	366	386	369	377	382			
T_1	359	390						
T_2	373	394						
T_3	386	393						

65(42)

(i) 567 Kg/ha. (ii) (a) 179.5 Kg/ha. (b) 127.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

$E_0=577$ and $E_1=621$ Kg/ha.

	C_1	C_2	T_1	T_2	T_3	M_1	M_2	Mean
H_1	542	543	552	547	522	555	531	543
H_2	567	593	541	631	568	576	585	580
Mean	555	568	547	589	549	565	558	561
M_1	562	568	545	618	533			
M_2	547	568	549	560	564			
T_1	523	571						
T_2	616	562						
T_3	525	572						

Crop :- Cotton (Kharif).**Ref :- M.P.63(71).****Site :- Govt. Exptl. Farm, Khandwa.****Type :- 'D'.****Object :-**To study the effect of Hormons on the yield of Cotton.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) N.A. (ii) East Nimar. (iii) N.A. (iv) (a) Ploughings. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. x 45 cm. (e) —. (v) 30 Kg/ha. of N+20 Kg/ha. of P_2O_5 . (vi) A-51-9. (vii) Unirrigated. (viii) Weeding and inter culturing. (ix) and (x) N.A.

2. TREATMENTS ;

All combinations of (1), (2) and (3)+2 extra treatments.

(1) 2 types of Hormons : H_1 =Naphthalene acetic acid and H_2 =Naphthoxy acetic acid.(2) 2 concentrations : C_1 =10 p.p.m. and C_2 =20 p.p.m.(3) 3 times of application : T_1 =at shedding stage, T_2 =at flowing stage and T_3 = $\frac{1}{2}$ at shedding and $\frac{1}{2}$ at flowering stage.2 Extra treatments : E_0 =Control no spraying and E_1 =Water spraying.**3. DESIGN :**

(i) Fact in R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 5.4 m. x 9.4 m. (b) 4.5 m. x 8.5 m. (v) 45 cm x 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Insecticides sprayed. (iii) Yield of *kapas*, plant population etc. (iv) (a) 1963-65 (Modified in 1964). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 782 Kg/ha. (ii) 163.1 Kg/ha. (iii) Only the effect of interaction $C \times T$ is significant. (iv) Av. yield of *kapas* in Kg/ha.

 E_0 =668 and E_1 =834 Kg/ha.

	H_1	H_2	T_1	T_2	T_3	Mean
C_1	784	789	748	860	752	787
C_2	774	803	821	683	861	788
Mean	779	796	784	772	806	787
T_1	753	815				
T_2	759	784				
T_3	825	788				

C.D. for the body of $C \times T$ table=164.7 Kg/ha.**Crop :- Cotton (Kharif).****Ref :- M.P. 64(44). 65(39).****Site :- Govt. Exptl. Farm, Khandwa.****Type :- 'D'.****Object :-**To study the effect of Hormons on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) N.A. (ii) East Nimar. (iii) N.A.; 17.5.65. (iv) (a) Ploughings and *bakherings*. (b) Dibbling. (c) 16 Kg/ha. (d) 45 cm. × 45 cm. (e) —. (v) 30 Kg/ha. of N+20 Kg/ha. of P₂O₅. (vi) A—51—9. (vii) Unirrigated. (viii) Weeding and interculturing. (ix) 81 cm.; 57 cm. (x) N.A.

2. TREATMENTS :

Main-plot treatments.

All combinations of (1), (2) and (3)+2 Extra treatments

(1) 2 types of Hormons : H₁=Naphthalene acitic acid and H₂=Naphthoxy acetic acid.

(2) 2 concentrations : C₁=10 p.p.m. and C₂=20 p.p.m.

(3) 3 times of application : T₁=At shedding stage, T₂=At flowering stage and T₃= $\frac{1}{2}$ at shedding and $\frac{1}{2}$ at flowering stage.

2 Extra treatments : E₀=Control (no spraying) and E₁=Water spraying.

Sub-plot treatments :

2 methods of Hormons spraying : M₁=With wetting agent and M₂=Without wetting agent.

3. DESIGN :

(i) Split-plot. (ii) (a) 14 main-plot/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.4 m. × 9.4 m.; 3.6 m. × 9.4 m. (b) 4.5 m. × 8.5 m.; 2.7 m. × 8.5 m. (v) 45 cm. × 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Insecticides sprayed. (iii) Yield of *kapas*, plant population etc. (iv) (a) 1963-65 (Modified in 1964). (b) No. (c) Nil. (v) Indore, Kharagone. (vi) Sub-plot error variances are heterogeneous hence the results of individual analysis are given under 5. Results.

5. RESULTS :

64(44)

(i) 602 Kg/ha. (ii) (a) 128.3 Kg/ha. (b) 62.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

E₀=634 and E₁=566 Kg/ha.

	H ₁	H ₂	T ₁	T ₂	T ₃	M ₁	M ₂	Mean
C ₁	623	634	626	637	623	661	596	629
C ₂	548	605	568	586	576	576	5	576
Mean	586	619	597	611	599	619	587	602
M ₁	605	632	589	634	632			
M ₂	566	607	605	588	567			
T ₁	601	593						
T ₂	566	657						
T ₃	590	609						

65(39)

(i) 608 Kg/ha. (ii) (a) 74.5 Kg/ha. (b) 166.5 Kg/ha. (iii) Effects of H, HC and "between extra treatments" are significant and that of interaction C×T is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

$E_0 = 585$ and $E_1 = 675$ Kg/ha.

	C ₁	C ₂	T ₁	T ₂	T ₃	M ₁	M ₂	Mean
H ₁	629	610	627	619	614	638	602	620
H ₂	566	609	579	570	614	580	596	588
Mean	598	610	603	594	614	609	599	604
M ₁	592	626	620	589	617			
M ₂	604	594	586	600	611			
T ₁	553	653						
T ₂	611	578						
T ₃	629	599						

C.D. for H marginal means = 31.0 Kg/ha.
 C.D. for the body of H×C table = 43.4 Kg/ha.
 C.D. for the body of C×T table = 52.6 Kg/ha.
 C.D. between the extra treatments = 37.2 Kg/hh.

Crop :- Cotton (Kharif).

Ref :- M.P. 64(42), 65(37).

Site -- Reg. Res. Stn., Khargone.

Type :- 'D'.

Object .- To study the effect of Hormons on the yield of cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) N A. (ii) Light black cotton soil. (iii) 5.7.64 ; 27.7.65. (iv) (a) ploughings and *bakherings*. (b) Dibbling. (c) 9-16 Kg/ha. (d) 45 cm. × 45 cm. (e) 3-4. (v) 30 Kg/ha. of N+20 Kg/ha. of P₂O₅. (vi) Maljari. (vii) Unirrigated. (viii) Weedings and interculturings. (ix) 66 cm. ; 38 cm. (x) N.A. ; 17.11.65 & 23.12.65.

2. TREATMENTS:

Main-plot treatments :

All combinations of (1), (2) and (3)+2 control

(1) 2 types of Hormones : H₁=Naphthalene acetic acid and H₂=Naphoxy acetic acid.

(2) 2 concentrations : C₁=10 ppm and C₂=20 ppm.

(3) 3 times of application : T₁=At shedding stage, T₂=At flowerings stage and T₃=½ at shedding and ½ at flowering stage.

2 control plots are (E₀) Dry and (E₁) Water sprayed.

Sub-plot treatments :

2 methods of Hormones sprayings : M₁=With wetting agent and M₂=Without wetting agent.

3. DESIGN :

(i) Split-plot. (ii) (a) 14 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.4 m. × 5.4 m. (b) 4.5 m × 8.5 m. (v) 45 cm. × 45 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Insecticides sprayed. (iii) Yield of *kapas*. (iv) (a) 1962-65 (Modified in 1963). (b) Yes. (c) Nil. (v) Indore and Khandwa. (vi) Nil. (vii) Sub-plot error variances are heterogeneous, hence the individual results of experiments are given under 5. Results.

5. RESULTS :

64(42)

(i) 960 Kg/ha. (ii) (a) 216.4 Kg/ha. (b) 159.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

$E_0=923$ and $E_1=1005$ Kg/ha.

	C ₁	C ₂	T ₁	T ₂	T ₃	M ₁	M ₂	Mean
H ₁	890	949	873	980	906	926	913	920
H ₂	1032	963	996	1035	961	970	1025	998
Mean	961	956	934	1008	934	948	969	959
M ₁	956	939	931	958	955			
M ₂	966	972	938	1057	913			
T ₁	930	939						
T ₂	1002	1013						
T ₃	951	916						

65(37)

(i) 339 Kg/ha. (ii) (a) 62.8 Kg/ha. (b) 66.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

$E_0=353$ and $E_1=332$ Kg/ha.

	C ₁	C ₂	T ₁	T ₂	T ₃	M ₁	M ₂	Mean
H ₁	340	332	311	335	361	353	318	336
H ₂	341	340	353	326	343	334	347	340
Mean	340	336	332	331	352	344	333	338
M ₁	337	351	342	329	360			
M ₂	344	321	322	332	343			
T ₁	349	315						
T ₂	324	338						
T ₃	349	355						

Crop :- Tobacco.

Site :- (District) : Chhatarpur.

Ref :- M.P. 60(S.F.T.).

Type :- 'M'.

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

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and black. (iii) 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 P_2O_5 + 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 zones. 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 *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 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 Tobacco. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS ;

No. of trials	Control mean Kg/ha.	Average response of Tobacco in Kg/ha								
		N	P	K	S.E.	NP	NK	PK	NPK	S.E.
2	2080	400	120	570	73.0	110	-10	70	60	58.0

Crop :- Tobacco (Rabi)

Ref :- M.P. 62(S.F.T.).

Site :- (District) : Chhatarpur.

Type :- 'M'.

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) (a) to (c) N.A. (ii) Red and black. (iii) to (vi) N.A. (vii) Unirrigated. (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=35 Kg/ha. of P_2O_5 .
 N₁P₁=70 Kg/ha. of N+35 Kg/ha. of P_2O_5 .
 N₂P₁=140 Kg/ha. of N+35 Kg/ha. of P_2O_5 .
 N₂P₂=140 Kg/ha. of N+70 Kg/ha. of P_2O_5 . and
 N₂P₂K₁=140 Kg/ha. of N+70 Kg/ha. of P_2O_5 +35 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 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 an oilseed. All the three type—C experiments are conducted on a legume crop. 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_1 , A_2 and A_3 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 Tobacco. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

62(S.F.T.)

Treatment	N_1	N_2	P_1	N_1P_1	N_2P_1	N_2P_2	$N_2P_2K_1$	S.E.
Av. response of Tobacco in Kg/ha.	1127	2748	464	2451	4210	5416	6583	271.6

Control mean=8312 Kg/ha. ; No. of trials=2.

Crop :- Tobacco (desi) (*Rabi*).

Ref :- M.P.62(S.F.T.).

Site :- (District) Chhatarpur.

Type :- 'M'.

Object :- Type A_2 : 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) (a) to (c) N.A. (ii) Red and black. (iii) 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 =35 Kg/ha. of P_2O_5 .

P_2 =70 Kg/ha. of P_2O_5 .

N_1P_1 =70 Kg/ha. of N+35 Kg/ha. of P_2O_5 .

N_1P_2 =70 Kg/ha. of N+70 Kg/ha. of P_2O_5 .

N_2P_2 =140 Kg/ha. of N+70 Kg/ha. of P_2O_5 . and

$N_2P_2K_2$ =140 Kg/ha. of N+70 Kg/ha. of P_2O_5 +70 Kg/ha. of K_2O .

DESIGN :

Same as in Type A_1 on Tobacco on page 408.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of Tobacco. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

62(S.F.T.)

Treatment	N_1	P_1	P_2	N_1P_1	N_1P_2	N_2P_2	$N_2P_2K_2$	S.E.
Av. response of Potato in Kg/ha.	3993	1552	2392	4408	5723	6306	7858	484.7

Control mean=7423 Kg/ha. ; No. of trials=2.

Crop. :- Castor (Rabi).**Ref. :- M.P. 60(28), 61(124), 62(92)****Site :- Govt. Agri. Res. Stn., Jhabua.****Type :- 'M'.**

Object :—To see the response of different doses of fertilisers on the yield of Castor.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. ; 11.10.61 ; 15.10.62. (iv) (a) *Bakherings*. (b) Drilling by *duffan*. (c) 7 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) Hand weeding. (ix) N. A. (x) N.A. ; 16.2.62 and 1.3.62 ; 21.2.63 ; 5.3.63 and 21.3.63.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : $N_0=0$, $N_1=8.4$ and $N_2=16.8$ Kg/ha.(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=16.8$ Kg/ha.**3. DESIGN :**

(i) Fact in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6 for 60, 4 for 61 and 62. (iv) (a) $9.1\text{ m.} \times 5.5\text{ m.}$ for 60 ; $9.1\text{ m.} \times 5.5\text{ m.}$ for 61 and 62. (b) $9.1\text{ m.} \times 4.6\text{ m.}$ for 60 ; $7.9\text{ m.} \times 4.3\text{ m.}$ for 61 and 62. (v) 46 cm. breadth wise for 60 ; 61 c.m. \times 61 cm. for 61 and 62. (vi) Yes.

4. GENERAL :

(i) Germination poor and crop growth normal for 60 ; N.A. for others. (ii) N.A. (iii) Seed yield. (iv) (a) 1960—62. (b) No. (c) Results of combined analysis have been presented under 5 Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled results

(i) 162 Kg/ha. (ii) 55.4 Kg/ha. (65 d. f. made up of pooled error and Treatments \times year interaction). (iii) Main effect of P alone is highly significant. (iv) Av. yield of seeds in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	127	136	145	136
P_1	160	196	208	188
Mean	143	166	176	162

C.D. for P marginal means=24.1 Kg/ha.

Individual results

Treatments	N_0	N_1	N_2	Sig.	.	P_1	Sig.	G.M.	S.E./plot
Years									
1960	77	120	130	N.S.	86	132	*	109	65.2
1961	175	199	221	N.S.	179	218	*	198	44.4
1962	211	200	202	N.S.	168	241	**	205	44.4
Pooled	143	166	176	N.S.	136	188	**	162	55.4

Crop. :- Gingelly (Kharif).**Ref. :- M.P. 62(42).****Site :- Govt. Agri. Res. Farm, Chhindwara.****Type :- 'M'.**

Object :—To find out the optimum dose of N and P for Gingelly.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Wheat. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of P_2O_5 , (ii) Black soil. (iii) 1.8.62
 (iv) (a) 3 bakherings. (b) Sowing by hand. (c) 8 Kg/ha. (d) 15 cm. x 23 cm. (e) N.A. (v) 24.7 C. L./ha.
 of F. Y. M. (vi) Local white. (vii) Unirrigated. (viii) 2 weedings. (ix) 50 cm. (x) 16.11.62.

2. TREATMENTS:

All combination of (1) and (2)

(1) 3 levels of N as A/S : $N_0=0$, $N_1=8.4$ and $N_2=16.8$ Kg/ha.

(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=11.2$ Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 6.1 m. x 3.1 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Yield of seeds. (iv) (a) 1962—only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 164 Kg/ha. (ii) 42.0 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant.
 (iv) Av. yield of seeds in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	106	185	244	178
P_1	89	158	204	150
Mean	97	171	224	164

C.D. of N marginal means = 35.2 Kg/ha.

Crop :- Gingelly.

Ref :- M.P. 60(S.F.T.).

Site :- (District) : Chhatarpur.

Type :- 'M'.

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

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Red and black. (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 year 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 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 Gingelly. (iv) (a) 1960—only. (b) No' (c) Nil. (v) to (vii) N.A.

5. RESULTS :

No. of trials	Control mean Kg/ha.	Average response of gingelly in Kg/ha.								
		N	P	K	S.E.	NP	NK	PK	NPK	S.E.
2	360	170	-30	100	78.0	-90	60	20	-50	57.0

Crop :- Gingelly.

Ref :- M.P. 60(S.F.T.).

Site :- (District) : Chhatarpur.

Type :- 'M'.

Object :—Type B : To investigate the relative efficiency of different nitrogeneous fertilisers at different doses.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and black. (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

$n_1'=22.4$ 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 and

$n_2''=44.8$ Kg/ha. of N as A/S/N.

3. DESIGN :

Same as in Type A on Gingelly on page 411.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of Gingelly. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

No. of trials	Control mean in Kg/ha.	Average response of Gingelly in Kg/ha.						S.E. of response
		n_1	n_1'	n_1''	n_2	n_2'	n_2''	
2	340	170	130	130	270	210	60	N.A.

Crop :- Groundnut (Kharif).

Ref :- M.P. 62(86).

Site :- Govt. Agri. Res. Farm, Bahadari.

Type :- 'M'.

Object :- To study the effect of N and P_2O_5 on the yield of Groundnut.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) 25.7.62. (iv) (a) 2 *bakherings*. (b) Drilling by hand. (c) 45 Kg/ha. (d) Rows 46 cm. apart. (e) N.A. (v) Nil. (vi) A.K. 12-24. (vii) Unirrigated. (viii) Weeding by hand. (ix) N.A. (x) 10.11.62.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 2 levels of N as A/S : $N_0=0$ and $N_1=11.2$ Kg/ha.

(2) 4 levels of P_2O_5 as super : $P_0=0$, $P_1=8.4$, $P_2=16.8$ and $P_3=25.2$ Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 4.6 m. \times 10.7 m. (b) 3.7 m. \times 9.1 m. (v) 46 cm. \times 76 cm. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of pods. (iv) (a) to (c) N.A. (v) (a) to (vii) Nil.

5. RESULTS:

(i) 1315 Kg/ha. (ii) 526.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	P_0	P_1	P_2	P_3	Mean
N_0	1330	972	1249	1262	1203
N_1	1270	1599	1488	1352	1427
Mean	1300	1286	1368	1307	1315

Crop :- Groundnut (Kharif).

Ref :- M.P. 60(114), 61(117)

Site :- Institute of Plant Industry, Indore.

Type :- 'M'.

Object :- To study the effect of N and P on the yield of Groundnut.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) 23.6.60.; 21.6.61. (iv) (a) 2 *bakherings*. (b) Drilling. (c) 50 Kg/ha. (d) 3. (e) N.A. (v) Nil. (vi) A-K-12-24. (vii) Unirrigated. (viii) 2 weedings and 3 interculturings; 1 weeding. (ix) 82 cm.; N.A. (x) 5.10.60; 7.10.61.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 4 levels of P_2O_5 as Super : $P_0=0$, $P_1=8.4$, $P_2=16.8$ and $P_3=25.2$ Kg/ha.

(2) 2 levels of N as A/S : $N_0=0$ and $N_1=11.2$ Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.7 m. \times 4.6 m. (b) 9.1 m. \times 3.7 m. (v) 76 cm. \times 46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of pods. (iv) (a) 1960—61. (b) No. (c) Nil. (v) Khargone and Khandwa. (vi) Nil. (vii) As error variances are heterogeneous and Treatments \times years interaction is absent, results of individual years have been presented under 5.—Results.

5. RESULTS:

60(114)

(i) 1915 Kg/ha. (ii) 168.4 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of pods in Kg/ha.

	P ₀	P ₁	P ₂	P ₃	Mean
N ₀	1848	1814	1856	1814	1833
N ₁	2026	1992	1933	2034	1996
Mean	1937	1903	1894	1924	1915

C.D. for N marginal means=123.8 Kg/ha.

61(117)

(i) 1179 Kg/ha. (ii) 76.0 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of pods in Kg/ha.

	P ₀	P ₁	P ₂	P ₃	Mean
N ₀	1018	1051	1152	1289	1128
N ₁	1289	1221	1051	1356	1229
Mean	1153	1136	1101	1322	1179

C.D. for N marginal means=55.9 Kg/ha.

Crop :- Groundnut (Kharif).

Ref :- M.P. 60(26).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'MP'.

Object :-To study the effect of N and P on the yield of Groundnut.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Moong*. (c) Nil. (ii) Sandy loam soil with particles of stone. (iii) 22.6.60. (iv) (a) 2 *bakherings*. (b) Drilling by *duffar*. (c) 69 Kg/ha. (d) Rows 46 cm. apart. (e) N.A. (v) 49.4 C.L./ha. of F.Y.M. applied before sowing. (vi) N.A. (vii) Unirrigated. (viii) 2 intercultures and 2 hand weedings. (ix) 57 cm. (x) 4.10.61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of N as A/S : N₀=0 and N₁=16.8 Kg/ha.

(2) 4 levels of P₂O₅ as Super : P₀=0, P₁=8.4, P₂=16.8 and P₃=25.2 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 2.7 m. \times 10.7 m. (b) 1.8 m. \times 9.1 m. (v) 46 cm. \times 76 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of pods. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1966 Kg/ha. (ii) 180.9 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of pods in Kg/ha.

	P ₀	P ₁	P ₂	P ₃	Mean
N ₀	1744	1822	1904	1708	1794
N ₁	1791	2022	2332	2406	2138
Mean	1768	1922	2118	2057	1966

C.D. for N marginal means—133.0 Kg/ha.

Crop :- Groundnut (Kharif).

Ref :- M.P. 60(66).

Site :- Govt. Exptl. Farm, Khandwa.

Type :- 'M'.

Object :- To study the effect of N and P on the yield of Groundnut.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Jowar. (c) N.A. (ii) Medium black. (iii) 6.7.60. (iv) (a) Bakheriug. (b) Seed drilled by duffon. (c) 67 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) A.K. 12—24. (viii) Unirrigated. (viii) Weeding and hoeing. (ix) 65 cm. (x) 18/19.10.60.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 levels of P₂O₅ as Super : P₀=0, P₁=8.4, P₂=16.8 and P₃=25.2 Kg/ha.

(2) 2 levels of N as A/S : N₀=0 and N₁=11.2 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) 21.3 m. × 18.3 m. (iii) 4. (iv) (a) 4.6 m. × 10.7 m. (b) 3.7 m. × 9.4 m. (v) 46 cm. × 76 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of pods. (iv) (a) 1960—only. (b) and (c) —. (v) Khargone and Indore (vi) and (vii) Nil.

5. RESULTS :

(i) 1616 Kg/ha. (ii) 228.4 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of pods in Kg/ha.

	P ₀	P ₁	P ₂	P ₃	Mean
N ₀	1254	1611	1830	1594	1572
N ₁	1492	1661	1763	1729	1661
Mean	1373	1635	1797	1661	1616

C.D. for P marginal means=237.5 Kg/ha.

Crop :- Groundnut (*Kharif*).

Ref :- M.P. 60(167).

Site :- Reg. Res. Stn., Khargone.

Type :- 'M'.

Object :-To study the effect of N and P on the yield of Groundnut.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) 25.7.60 (iv) (a) 2 *bakherings*. (b) Drilling. (c) 50 Kg/ha. (d) 30 cm. x 30 cm. (e) N.A. (v) Nil. (vi) A.K. 12—24. (vii) Unirrigated. (viii) and (ix) N.A. (x) 10.11.60.

2. TREATMENTS:

Same as in Expt. No. 60 (66) on page 415.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4.0 m. x 9.1 m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Pods weight. (iv) (a) 1960—only. (b) and (c) —. (v) Khandwa and Indore. (vi) and (vii) Nil.

5. RESULTS :

(i) 1643 Kg/ha. (ii) 268.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	P ₀	P ₁	P ₂	P ₃	Mean
N ₀	1633	1678	1571	1571	1613
N ₁	1693	1617	1655	1723	1672
Mean	1663	1648	1613	1647	1643

Crop :- Groundnut (*Kharif*).

Ref :- M.P. 60(61).

Site :- Central Exptl. Farm, Ujjain.

Type :- 'M'.

Object :-To study the effect of Boron and Manganese on Groundnut.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Black cotton soil. (iii) N.A. (iv) (a) *Bakhering*. (b) to (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) N.A. (ix) 60 cm. (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)+a control (No fertilizer)

(1) 2 levels of Boron: B₀=0 and B₁=4.5 Kg/ha. of Borax.

(2) 2 levels of Manganese: M₀=0 and M₁=4.5 Kg/ha. of Manganese Sulphate.

Except in the case of control, all the other treatments were applied over a basal dose of 5.6 Kg/ha. of N+22.4 Kg/ha. of P₂O₅+11.2 Kg/ha. of K₂O.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/49.4 ha. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) N.A. (iii) Yield of pods. (iv) (a) 1960—only. (b) and (c) —. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 330 Kg/ha. (ii) 153.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

Control = 186 Kg/ha.

	M ₀	M ₁	Mean
B ₀	364	341	353
B ₁	378	380	379
Mean	371	361	366

Crop :- Groundnut (*Kharif*).

Ref.:- M.P. 62(S.F.T.).

Site :- (District) : Chhindwara.

Type :- 'M'.

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) (a) to (c) N.A. (ii) Shallow black. (iii) to (vi) N.A. (vii) Unirrigated. (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, 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 case 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. (vi) Yes.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of pods. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of pods in Kg/ha.	425	695	384	721	1005	1225	1533	145.9

Control mean=1687 Kg/ha.; No of trials=4.

Crop :- Groundnut (*Kharif*).

Ref :- M.P. 60(24).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'MV'.

Object :—To find out the effect of different levels of fertilizer on Groundnut varieties.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Gram. (c) Nil. (ii) Mar. No. 1. (iii) 9.7.60. (iv) (a) 3 *barkherings*. (b) Dibbling. (c) 46 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) 2 hand weedings. (ix) N.A. (x) 9.11.60.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 varieties : V₁=R-4, V₂=B.C. 1704, V₃=AK 12-24 and V₄=Gangapun.

(2) 3 levels of fertilizers : M₀=0, M₁=22.4 Kg/ha. of P₂O₅ as Super and M₂=11.2 Kg/ha. of N as A/S + 22.4 Kg/ha. of P₂O₅ as Super.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 91 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Crop damaged by animals. (iii) Yield of pods. (iv) (a) 1960-63 (Treatments modified in 1961). (b) No. (c) Nil. (v) Bhand. (vi) and (vii) Nil.

5. RESULTS :

(i) 307 Kg/ha. (ii) 83.0 Kg/ha. (iii) Main effect of M is highly significant. and main effect of V is significant. (iv) Av. yield of pods in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	Mean
M ₀	259	201	246	206	228
M ₁	288	286	375	240	297
M ₂	458	351	443	331	396
Mean	335	279	355	259	307

C.D. for V marginal means=69.0 Kg/ha.

C.D. for M marginal means=59.7 Kg/ha.

Crop :- Groundnut (*Kharif*).

Ref :- M.P. 61(3), 62(12), 63(22).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'MV'.

Object :- To study the effect of different levels of fertilizers on Groundnut varieties.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Groundnut; Gram; Fallow. (c) As per treatments; N.A.; Nil. (ii) Mar No. 1 for 61 and 62 and sandy loam for 63. (iii) 5.7.61; 21, 24.7.62; 19.7.63. (iv) (a) 1-3 *bahkarings*. (b) Dibblings. (c) 45 Kg/ha. (d) 46 cm. x 15 cm. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) 1-3 weedings and earthing. (ix) N.A. (x) 28.10.61, 14, 20.10.62; 22/ 27.10.63.

2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) 4 Varieties: $V_1=R-4$, $V_2=E.C. 1704$, $V_3=Gangapuri$ and $V_4=A.K. 12-24$.(2) 2 levels of N as A/S: $N_0=0$ and $N_1=11.2$ Kg/ha.(3) 2 levels of P_2O_5 as Super: $P_0=0$ and $P_1=22.4$ Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) 11.05 m. x 4.57 m. in 61 and 62; 10.97 m. x 4.57 m. in 63. (b) 10.13 m. x 3.66 m. in 61 and 62; 10.06 m. x 3.96 m. in 63. (v) 46 cm. x 46 cm. in 61 and 62; 46 cm. x 30 cm. in 63. (vi) Yes.

4. GENERAL

(i) Satisfactory in 61, good in 62, normal in 63. (ii) Nil. (iii) Yield of pods. (iv) (a) 1960-63 (Treatments modified in 1961). (b) No. (c) Results of combined analysis presented under 5. Results. (v) Jora and Bhind. (vi) Nil for 61 and 62, there was continuous rains from August to September in 63. (vii) Error variances are heterogeneous and Treatments x years interaction is absent.

5. RESULTS:

Pooled results

(i) 381 Kg/ha. (ii) 189.1 Kg/ha. (based on 114 d. f. made up of pooled error and various components of Treatments x years interaction). (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	V_1	V_2	V_3	V_4	P_0	P_1	
N_0	362	362	300	456	344	397	370
N_1	382	446	370	368	376	407	392
Mean	372	404	335	412	360	402	381
P_0	317	425	322	412			
P_1	428	383	349	447			

Individual results.

Treatments.	V_1	V_2	V_3	V_4	Sig.	N_0	N_1	Sig.
Years								
1961	306	357	283	298	N.S.	272	350	N.S.
1962	267	357	397	382	N.S.	348	353	N.S.
1963	544	498	326	556	*	490	472	N.S.
Pooled	372	404	335	412	N.S.	370	392	N.S.

P ₀	P ₁	Sig.	G.M.	S.E./plot
290	332	N.S.	311	167.6
307	394	N.S.	351	227.0
483	479	N.S.	481	171.7
360	402	N.S.	381	189.1

Crop :- Groundnut (Kharif).

Ref. :- M.P. 60(9).

Site :- Govt. Agri. Farm, Bhind.

Type 'MV'.

Object :-To find out a suitable variety and fertilizer combination for Groundnut.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Sandy loam. (iii) 28-30 7.60. (iv) (a) 4 *bakharings*, 2 ploughings and levelling. (b) Dibbling. (c) —. (d) 46 cm. × 15 cm. (e) 2 kernals/hole. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) Weeding and earthing. (ix) and (x) N.A.

2. TREATMENTS :

All Combinations of (1) and (2)

(1) 4 varieties: V₁=Gangapuri, V₂=E.C. 1704, V₃=A.K. 12-24 and V₄=R-4.

(2) 3 levels of fertilizers: M₀=0, M₁=22.4 Kg/ha. of P₂O₅ as Super, M₂=11.2 Kg/ha. of N+22.4 Kg/ha. of P₂O₅ as Super.

3. DESIGN :

(i) Fact in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 7.3 m. (b) 3.7 m. × 6.4 m. (v) 46 cm. × 46 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Mild attack of *Tikka* disease. (iii) Yield of pods. (vii) (a) 1960-64 (Treatments modified in 1961 and 1963). (b) No. (c) Nil. (v) Baroda and Jora. (vi) and (vii) Nil.

5. RESULTS :

(i) 1636 Kg/ha. (ii) 462.5 Kg/ha. (iii) Main effect of V is highly significant. (iv) Av. yield of pods in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	Mean
M ₀	9	2013	1826	1671	1617
M ₁	1185	1564	1409	1814	1493
M ₂	885	2013	2024	2265	1797
Mean	1010	1863	1753	1917	1636

C.D. for V marginal means=384.4 Kg/ha.

Crop :- Groundnut (Kharif).

Ref :- M.P. 61(134), 62(9).

Site :- Govt. Agri. Farm, Bhind.

Type :- 'MV'.

Object :-To find out a suitable variety and fertilizer combination for Groundnut.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) N.A.; Wheat. (c) N.A. (ii) Sandy loam. (iii) 5.8.61; 2, 3.8.62. (iv) (a) 3 *barkherings* and 1 ploughing. (b) Dibbling. (c) 45 Kg/ha. (d) 46 cm. × 15 cm. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 1 weeding by *khurpi*. (ix) N.A. (x) 5.10.61 to 1.12.61; 7 to 12.12.62.

2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) 3 varieties : $V_1=R-4$, $V_2=Gangapuri$ and $V_3=A.K. 12-24$.

(2) 2 levels of N as A/S : $N_0=0$ and $N_1=11.2$ Kg/ha.

(3) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=22.4$ Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 11.1 m. × 4.6 m. (b) 10.2 m. × 4.0 m. (v) 46 cm. × 30 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) N.A.; attack of white Ants in 62 for which 10 % B.H.C. was dusted. (iii) Yield of pods. (iv) (a) 1960-64 (Treatments modified in 1961 and 1963). (b) No. (c) Results of combined analysis presented under 5. Results. (v) Jora and Baroda. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS:

Pooled results:

(i) 953 Kg/ha. (ii) 522.2 Kg/ha. (based on 75 d.f. made up of pooled error and Treatments × years interaction). (iii) Main effects of P and V are highly significant. Main effect of N is significant. (iv) Av. of yield pods in Kg/ha.

	V_1	V_2	V_3	P_0	P_1	Mean
N_0	1050	836	549	654	970	812
N_1	1468	1166	648	855	1332	1094
Mean	1259	1001	598	755	1151	953
P_0	1048	756	460			
P_1	1470	1246	736			

C.D. for N or P marginal means = 212.7 Kg/ha.

C.D. for V marginal means = 260.4 Kg/ha.

Individual results

Treatment	V_1	V_2	V_3	Sig.	N_0	N_1	Sig.	P_0	P_1
Years									
1961	1252	989	614	*	815	1088	N.S.	770	1133
1962	1265	1013	583	**	808	1099	N.S.	739	1168
Pooled	1259	1001	598	**	812	1094	*	755	1151

Sig.	G.M.	S.E./plot
*	952	598.4
**	954	509.2
	953	522.2

Crop :- Groundnut (*Kharif*).

Ref :- M.P. 63(30), 64(1).

Site :- Govt. Agri. Farm, Bhind.

Type :- 'MV'.

Object :-To find out a suitable variety and fertilizer combination for Groundnut.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 18, 19.7.63 ; 28/29.7.64. (iv) (a) 1-2 ploughing and *bakherings*. (b) Line sowing by hand. (c) 45 Kg/ha. (d) 46 cm. x 15 cm. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) 1 earthing and 2 weedings. (ix) N.A. (x) 25.11.63 to 7.12.63 ; 6 to 12.12.64.

2. TREATMENTS :

All combinations of (1). (2) and (3)

(1) 4 varieties: $V_1=R-4$, $V_2=E.C. 1704$, $V_3=Gangapuri$ and $V_4=A.K. 12-24$.

(2) 2 levels of N as A/S: $N_0=0$ and $N_1=11.2$ Kg/ha.

(3) 2 levels of P_2O_5 as Super: $P_0=0$ and $P_1=22.4$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) 11.0 m. x 4.6 m. (b) 10.1 m. x 4.1 m. (v) 46 cm. x 25 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Some plants were attacked by Termite in 63. (iii) Yield of pods. (iv) (a) 1960-64 (Treatments modified in 1961 and 1963. (b) No. (c) Nil. (v) Baroda and Jora. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:

Pooled results

(i) 856 Kg/ha. (ii) 239.5 Kg/ha. (based on 72 d.f. made up of pooled error and Treatments x years interaction). (iii) Main effect of N, P and V are highly significant. (iv) Av. yield of pods in Kg/ha.

	V_1	V_2	V_3	V_4	P_0	P_1	Mean
N_0	893	769	448	980	710	834	772
N_1	1133	1035	492	1098	858	1022	940
Mean	1013	902	470	1039	784	928	856
P_0	948	841	432	915			
P_1	1078	963	508	1163			

C.D. for N or P marginal means = 85.3 Kg/ha.

C.D. for V marginal means = 170.6 Kg/ha.

Individual results

Treatment	V_1	V_2	V_3		Sig.	N_0	N_1		Sig.	P_0	P_1
Years											
1963	984	837	458	988	**	735	899	*	*	734	900
1964	1041	968	482	1090	**	810	980	**	**	835	955
Pooled	1013	902	470	1039	**	772	940	**	**	784	928

Sig.	G.M.	S.E./plot
*	817	222.5
*	895	4.6
**	856	209.5

Crop :- Groundnut (Kharif).

Ref :- M.P. 65(13).

Site :- Govt. Agri. Farm, Bhind.

Type :- 'MV'.

Object :-To find out a suitable variety and fertilizer combination for Groundnut.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Barley. (c) N.A. (ii) Sandy loam. (iii) 6 to 8.8.65. (iv) (a) 2 *bakherings* and ploughings. (b) Line sowing by hand. (c) 44.8 Kg/ha. (d) 46 cm. × 15 cm. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings and earthings. (ix) N.A. (x) 2 to 14.12.65.

2. TREATMENTS:

All combinations of (1), (2) and (3)

- (1) 4 varieties: $V_1=R-4$, $V_2=E.C.-1704$, $V_3=Gangapuri$ and $V_4=A.K. 12-24$.
 (2) 2 levels of N as A/S: $N_0=0$ and $N_1=11.2$ Kg/ha.
 (3) 2 levels of P_2O_5 as Super: $P_0=0$ and $P_1=22.4$ Kg/ha.

3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) 4.6 m. × 11.1 m. (b) 4.0 m. × 10.2 m. (v) 45 cm. × 30 cm. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of pods. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

- (i) 1324 Kg/ha. (ii) 240.1 Kg/ha. (iii) Main effects V, N, P and interaction $N \times P$ are highly significant. (iv) Av. yield of pods in Kg/ha.

	V_1	V_2	V_3	V_4	P_0	P_1	e
N_0	1095	1244	713	1389	1097	1123	1110
	1435	1970	1111	1638	1323	1754	1538
Mean	1265	1607	912	1513	1210	1439	1324
P_0	1236	1398	788	1418			
P_1	1294	1816	1036	1609			

C.D. for N or P marginal means = 141.5 Kg/ha.
 C.D. for V marginal means = 200.1 Kg/ha.
 C.D. for body of $N \times P$ table = 200.1 Kg/ha.

Crop :- Groundnut (*Kharif*).

Ref :- M.P. 61(127), 62(97).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'MV'.

Object :—To find out the best variety and fertility dose for Groundnut.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 18.6.61 ; N.A. (iv) (a) 3 *barkherings*. (b) Drilling by hand. (c) 45 Kg/ha. (d) 46 cm. between lines. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) and (ix) N.A. (x) 7.10.61 ; N.A.

2. TREATMENTS:

Main-plot treatments :

All combinations of (1), (2) and (3)

(1) 2 levels of N as A/S : $N_0=0$ and $N_1=11.2$ Kg/ha.(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=22.4$ Kg/ha.(3) 2 levels of K_2O as Mur. Pot. : $K_0=0$ and $K_1=22.4$ Kg/ha.

Sub-plot treatments :

3 varieties : $V_1=A.K. 12-24$, $V_2=R-4$ and $V_3=Spazish$ improved.

3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/replication ; sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 12.2 m. \times 2.4 m. (b) 11.0 m. \times 1.8 m. (v) 61 cm. \times 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of pods. (iv) (a) 1961—62. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As sub-plot error variances are heterogeneous, results of individual years have been presented under 5—Results.

5. RESULTS :

61(127)

(i) 737 Kg/ha. (ii) (a) 179.6 Kg/ha. (b) 169.6 Kg/ha. (iii) Main effects of N, P and K are highly significant. Interaction $N \times K$ and $P \times K$ are significant. (iv) Av. yield of pods in Kg/ha.

	V_1	V_2	V_3	P_1		K_0	K_1	Mean
N_0	31	372	427	447	730	522	655	589
N_1	520	575	578	759	1012	655	1116	835
Mean	417	473	502	603	871	588	886	737
K_0	291	419	435	536	677			
K_1	543	527	569	670	1065			
P_0	330	401	409					
P_1	504	545	596					

C.D. for N, P or K marginal means=122.5 Kg/ha.

C.D. for the body of $N \times K$ or $P \times K$ table=173.2 Kg/ha.

62(97)

(i) 383 Kg/ha. (ii) (a) 94.6 Kg/ha. (b) 99.7 Kg/ha. (iii) Main effect of P and K are highly significant. Main effect of N is significant. (iv) Av. yield of pods in Kg/ha.

	V ₁	V ₂	V ₃	P ₀	P ₁	K ₀	K ₁	Mean
N ₀	376	302	364	285	410	309	386	348
N ₁	436	403	415	343	494	357	480	418
Mean	406	353	389	314	452	333	433	383
K ₀	322	330	348	243	423			
K ₁	490	376	431	384	481			
P ₀	297	286	357					
P ₁	545	419	422					

C.D. for N, P or K marginal means = 65.5 Kg/ha.

Crop :- Groundnut. (Kharif).

Ref :- M.P. 62(16), 63(44), 64(18), 65(1).

Site :- Govt. Agri. Farm, Jora.

Type :- 'MV'.

Object :- To find out the suitable variety and optimum dose of fertilizers for groundnut.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) N.A. in 62 to 64; Groundnut in 65. (c) N.A. (ii) Sandy loam. (iii) 20.7.62 16.7.63; 21.7.64; 20.7.65. (iv) (a) 1 Ploughing in 62; 2 ploughings in 63 and 64 while 3 ploughing in 65. (b) Drilling by *Desi* plough in 62; Drilling in 63 and 64 while line sowing by hand in 1965. (c) 67 Kg/ha. (d) 46 cm. x 15 cm. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated in 62 and 65 and Irrigated in 63 and 64. (viii) 1 to 2 weedings by *khurpi*; earthing in 65 also done. (ix) 38 cm.; N.A., 42 cm. (x) 4.11.62, 19.11.63; 29.11.64 and 18.11.65.

2. TREATMENTS:

All combinations of (1), (2) and (3)

(1) 4 varieties: V₁=R-4, V₂=E.C. 1704, V₃=Gangapuri and V₄=A.K. 12-24.

(2) 2 levels of N as A/S: N₀=0 and N₁=11.2 Kg/ha.

(3) 2 levels of P₂O₅ as Super: P₀=0 and P₁=22.4 Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) 11.1 m. x 4.6 m. (b) 10.2 m. x 4.0 m. (v) 45 cm. x 30 cm. (vi) 42 cm. x 33 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of pods. (iv) (a) 1962-65. (b) No. (c) Results of combined results presented under 5-Results. (v) Bhind and Baroda. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:

Pooled results.

(i) 1252 Kg/ha. (ii) 727.7 Kg/ha. (based on 36 d. f. made up of various components of Treatments x years interaction). (iii) Main effect of V alone is highly significant. (iv) Av. yield of pods in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	P ₀	P ₁	Mean
N ₀	1543	1384	790	1157	1252	1185	1218
N ₁	1254	1724	856	1358	1278	1292	1285
Mean	1398	1554	823	1257	1265	1239	1252
P ₀	1507	1459	722	1374			
P ₁	1290	1599	924	1140			

C.D. for V marginal means=301.5 Kg./ha.

Individual results.

Treatments	V ₁	V ₂	V ₃	V ₄	Sig.	N ₀	N ₁
Years							
1962	815	968	565	921	**	863	771
1963	1731	1789	784	1588	**	1481	1465
1964	2467	2948	1717	2015	**	2111	2463
1965	582	412	226	505	**	419	443
Pooled	1398	1554	823	1257	**	1218	1285

Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
N.S.	771	864	N.S.	817	216.6
N.S.	1568	1378	**	1473	184.1
**	2291	2283	N.S.	2287	201.5
N.S.	432	430	N.S.	431	141.3
N.S.	1265	1239	N.S.	1252	727.7

Crop :- Groundnut (Kharif).

Ref. :- M.P. 64(25).

Site :- Govt. Agri. Farm, Jora.

Type :- 'MV'.

Object :- To find out the best variety of Groundnut and optimum dose of fertilizers.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 15.7.64. (iv) (a) 2 plonhings. (b) Drilling. (c) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 3 weedings. (ix) 97.7 cm. (x) 22.11.64.

2. TREATMENTS :

All combinations of (1), (2) and (3).

- (1) 4 varieties : V₁=R-4, V₂=E.C. 1704, V₃=Gangapuri and V₄=A.K. 12-24.
- (2) 2 levels of N : N₀=0 and N₁=11.2 Kg/ha.
- (3) 2 levels of P₂O₅ : P₀=0 and P₁=22.4 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) 4.5 m. × 10.8 m. (b) 3.9 m. × 9.9 m. (v) 30 cm. × 45 cm. (vi) Ycs.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of pods. (iv) (a) 1964—only. (b) and (c) —. (v) Bhind and Baroda. (vi) and (vii) Nil.

5. RESULTS :

(i) 490.4 Kg/ha. (ii) 122.2 Kg/ha. (iii) Main effect of V is highly significant and interaction $V \times N$ is significant. (iv) Av. yield of pods in Kg/ha.

	V ₁	V ₂	V ₃	V ₄	P ₀	P ₁	Mean
N ₀	591.3	587.0	237.4	444.6	444.6	485.6	465.1
N ₁	453.2	647.2	358.2	604.3	520.1	511.5	515.8
Mean	522.3	617.2	297.8	524.4	482.3	498.5	490.4
P ₀	582.7	543.9	276.2	526.6			
P ₁	461.8	690.6	319.4	522.3			

C.D. for V marginal means = 101.9 Kg/ha.

C.D. for $V \times N$ table = 144.1 Kg/ha.

Crop :- Groundnut (Kharif).

Ref :- M.P. 61(122), 62(90).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'CM'.

Object :- To find out the optimum seed rate and fertilizers combination for Groundnut.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 11.6.61 ; 22.7.62. (iv) (a) 3 ploughings. (b) Line sowing. (c) As per treatments. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) A.K. 12-24. (vii) Unirrigated. (viii) and (ix) N.A. (x) 1.10.61 ; 16.10.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 seed rates : R₁=67, R₂=90 and R₃=112 Kg/ha.

(2) 4 levels of fertility : M₀=0, M₁=11.2 Kg/ha. of N, M₂=11.2 Kg/ha. of N+22.4 Kg/ha. of P₂O₅ and M₃=Twice M₂.

N applied as A/S and P₂O₅ as Super.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 6.1 m' × 2.4 m. (b) 4.9 m. × 1.8 m. (v) 61 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of Pods. (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 experiments have been presented under 5.—Results.

5. RESULTS :

61(122)

(i) 952 Kg/ha. (ii) 229.9 Kg/ha. (iii) Main effect of R alone is significant. (iv) Av. yield of pods in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
R ₁	606	688	1046	983	831
R ₂	1049	900	1062	1083	1024
R ₃	785	965	1164	1214	1032
Mean	813	851	1091	1093	9 62

C.D. for R marginal means=165.6 Kg/ha.

62(90)

(i) 706 Kg/ha. (ii) 150.4 Kg/ha. (iii) Main effects of R and M are significant. (iv) Av. yield of pods in Kg/ha.

	M ₀	M ₁	M ₂	M ₃	Mean
R ₁	427	783	679	696	646
R ₂	609	662	679	783	683
R ₃	791	714	766	888	790
Mean	609	720	708	789	706

C.D. for R marginal means=108.3 Kg/ha.

C.D. for M marginal means=125.0 Kg/ha.

Crop :- Groundnut (Kharif).

Ref :- M.P. 60(168).

Site :- Reginal Res. Stn., Khargone.

Type :- 'CM'.

Object :-To find out the optimum seed rate and fertilizer dose for Groundnut.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) 21.7.60. (iv) (a) 3 *bakherings*. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) A.K. 12-24. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 18.11.60.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 seed rates : R₁=67, R₂=90 and R₃=112 Kg/ha.

(2) 3 levels of fertility : M₀=0, M₁=11.2 Kg/ha. of N+11.2 Kg/ha. of P₂O₅, and M₂=11.2 Kg/ha. of N+22.4 Kg/ha. of P₂O₅.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 9.1 m.×11.0 m. (b) 7.3 m.×9.1 m. (v) 91 cm.×91 cm. (vi) Yes.

4. GENERAL :

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

5. RESULTS :

(i) 1650 Kg/ha. (ii) 149.6 Kg/ha. (iii) Main effects of R and M are highly significant. (iv) Av. yield of pods in Kg/ha.

	M ₀	M ₁	M ₂	Mean
R ₁	1356	1627	1839	1607
R ₂	1636	1889	1856	1794
R ₃	1509	1577	1560	1549
Mean	1500	1698	1752	1650

C.D. for M or R marginal means = 126.1 Kg/ha.

Crop :- Linseed (Rabi).

Ref :- M.P. 60(17).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'M'.

Object :- To study the effect of different levels of N and P on the yield of Linseed.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram. (c) Nil. (ii) Mar. No. 1. (iii) 2.11.60. (iv) (a) 3 *barkherings*. (b) and (c) N.A. (d) 30 cm. between lines. (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 28.3.61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N: N₀=0, N₁=8.4 and N₂=16.8 Kg/ha.

(2) 2 levels of P₂O₅: P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 11.1 m. × 4.6 m. (b) 10.1 m. × 4.0 m. (v) 46 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Crop damaged by white Ants in replication 4th and 5th. (iii) Seed yield, height of plants, tiller count and Av. number of plants. (iv) (a) 1060—only. (b) N.A. (c) Nil. (v) Jora. (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 381 Kg/ha. (ii) 120.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	445	384	378	402
P ₁	361	383	338	361
Mean	403	383	358	381

Crop :- Linseed (Rabi).

Ref :- M.P. 62(98), 63(23).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'M'.

Object :- To study the effect of N and P on the yield of Linseed.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram. (c) Nil. (ii) Sandy loam. (iii) 21.10.62 ; 25.10.63. (iv) (a) 3 *bakherings*. (b) Drilled with *Nari* plough. (c) 11 Kg/ha. (d) 30 cm. (e) N.A. (v) Nil. (vi) M 397. (vii) Irrigated. (viii) 1 hand weeding. (ix) Nil. (x) 7 to 18.4.63 ; 9 to 20.4.64.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 4 levels of N as A/S : N_0 , $N_1=8.4$, $N_2=16.8$ and $N_3=25.2$ Kg/ha.

(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=11.2$ Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) 4.9 m. \times 10.7 m. (b) 4.3 m. \times 9.1 m. (v) 76 cm. \times 30 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) N.A. (iii) Seed yield. (iv) (a) 1962—63. (b) No. (c) Results of combined analysis given under 5.—Results. (v) Jora. (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS:

Pooled results

(i) 329 Kg/ha. (ii) 94.4 Kg/ha. (with 77 d.f. made up of pooled error and Treatments \times years interaction). (iii) Main effect of P is highly significant. (iv) Av. yield of seed in Kg/ha.

	N_0	N_1	N_2	N_3	Mean
P_0	348	367	359	375	362
P_1	303	317	296	266	295
Mean	325	342	327	321	329

C.D. for P marginal means = 38.4 Kg/ha.

Individual results:

Treatments	N_0	N_1	N_2	N_3	Sig.	P_0	P_1	Sig.	G.M.	S.E. /plot
Years										
1960	324	337	316	294	N.S.	348	286	N.S.	317	107.6
1961	327	348	339	350	N.S.	377	305	**	341	87.1
Pooled	325	342	327	321	N.S.	362	295	**	329	94.4

Crop :- Linseed (*Rabi*).

Ref. :- M.P. 63(15).

Site :- Govt. Agri. Farm, Jora.

Type :- 'M'.

Object :- To study the effect of different levels of N and P on the yield of Linseed.

1. BASAL CONDITIONS:

(i) (a) to (c) Nil. (ii) Sandy Loam. (iii) 8.11.63. (iv) (a) One ploughing by *deshi* plough. (b) Drilling. (c) 11.2 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) H 397. (vii) Irrigated. (viii) One weeding and hoeing. (ix) Nil. (x) 21.3.64.

2. TRETMENTS:

All combinations of (1) and (2)

(1) 4 levels of N as A/S: $N_0=0$, $N_1=8.4$, $N_2=16.8$ and $N_3=25.2$ Kg/ha.

(2) 2 levels of P_2O_5 as Super: $P_0=0$ and $P_1=11.2$ Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) 4.9 m. \times 10.7 m. (b) 4.3 m. \times 9.1 m.
(v) 90 cm. \times 30 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Seed and fodder yield. (iv) (a) 1963—only. (b) No. (c) Nil. (v) Baroda and Kathulia. (vi) and (vii) Nil.

5. RESULTS:

(i) 1644 Kg/ha. (ii) 191.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N_0	1	N_2	N_3	Mean
P_0	1717	1580	1589	1666	1638
P_1	1516	1589	1773	1721	1650
Mean	1617	1585	1681	1694	1644

Caop. :- Linseed (Rabi).

Ref. :- M.P. 63(33).

Site :- Agri. Res. Farm, Kathulia.

Type :- 'M'.

Object :- To study the effect of different levels of N and P on the yield of Linseed.

1. BASAL CONDITIONS:

(i) (a) Paddy. (b) Paddy. (c) N.A. (ii) Clayey and clayey loam. (iii) 12.10.63 (iv) (a) Ploughings.
(b) Line sowing. (c) 11.2 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) Hy. 397.
(vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 4.3.64.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 4 levels of N as A/S: $N_0=0$, $N_1=8.4$, $N_2=16.8$ and $N_3=25.2$ Kg/ha.

(2) 2 levels of P_2O_5 as Super: $P_0=0$ and $P_1=11.2$ Kg./ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) 10.4 m. \times 4.9 m. (b) 9.8 m. \times 4.3 m.
(v) 30 cm. \times 30 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) N.A. (iii) Yield of linseed. (iv) (a) 1963 only. (b) No. (c) Nil. (v) Jora, and Baroda.
(vi) and (vii) Nil.

5. RESULTS:

(i) 586 Kg/ha. (ii) 40.8 Kg/ha. (iii) Main effects of N, P and interaction $N \times P$ are highly significant.
(iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	524	569	622	580	574
P ₁	647	551	612	584	598
Mean	586	560	617	582	586

C.D. for N marginal means = 33.9 Kg/ha.

C.D. for P marginal means = 23.8 Kg/ha.

C.D. for the body of N×P table = 48.0 Kg/ha.

Crop :- Linseed (Rabi).

Ref :- M.P. 60(88), 61(152).

Site :- Govt. Agri. Res. Stn., Khargone.

Type :- 'M'.

Object:—To study the effect of different levels of N and P on the yield of Linseed.

1. BASAL CONDITIONS:

(i) (a) to (c) Nil. (ii) Black cotton soil. (iii) N.A. (iv) (a) 4 harrowings. (b) Drilled. (c) 34 Kg/ha. (d) 38 cm. between rows. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N₀=0 N₁=8.4 and N₂=16.8 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN :

(i) Fact in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 10.2 m.×4.0 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Very poor. (ii) N.A. (iii) Seed yield. (iv) (a) 1960—61. (b) No. (c) Results of combined analysis are Presented under 5. Results. (v) Reora and Ujjain. (vi) Nil. (vii) Error variances are homogeneous and Treatments×years interaction is absent.

5. RESULTS :

Pooled results :

(i) 201 Kg/ha. (ii) 70.4 Kg/ha. (based on 55 d.f. made up of pooled error and Treatments×years interaction). (iii) Main effect of N is highly significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	151	195	243	196
P ₁	129	247	241	206
Mean	140	21	242	201

C D. for N marginal means=40.7 Kg/ha.

Individual results :

Treatments	N ₀	N ₁	N ₂	Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
Years									
1960	141	222	246	*	198	207	N.S.	203	69.4
1961	140	220	239	**	194	204	N.S.	199	70.7
Pooled	140	221	242	**	196	206	N.S.	201	70.4

Crop :- Linseed (*Rabi*).

Ref. :- M.P. 60(86), 61(53), 62(33).

Site :- Govt. Agri. Res. Farm, Labhandi.

Tye :- 'M'.

Object :- To study the effect of different levels of N and P on the yield of Linseed.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Linseed, (c) As per treatments (ii) Kankar. (iii) 11.10.60 ; 18.11.61 ; 12.10.62. (vi) (a) 2 ploughings by *deshi* plough. (b) Drilled by *Nari*. (c) 18 Kg/ha. (d) 30 cm. × 15 cm. (e) N.A. (v) Nil. (vi) No 55. (vii) Unirrigated. (viii) Nil. (ix) 5.7 cm.; 2.1 cm.; 7.8 cm. (x) N.A.; N.A.; 9.3.63.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N₀=0, N₁=8.4 and N₂=16.8 Kg/ha.(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 11.1 m. × 4.6 m.; 13.7 m. × 3.1 m.; (b) 1/247 ha.; 12.2 m. × 2.4 m. (v) N.A.; 76 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) The crop was attacked by Rust for 60(86) ; N.A. for others. (iii) Seed yield. (iv) (a) 1960—62. (b) No. (c) Nil. (v) Poowerkheda, Khargon, Ujjain, and Baroda. (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is absent, hence results of individual analysis are presented under 5. Results.

5. RESULTS :

60(86)

(i) 98 Kg/ha. (ii) 69.8 Kg/ha. (iii) Main effect of N is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	68	147	103	106
P ₁	42	100	131	91
Mean	55	123	117	98

C.D. for N marginal means = 58.7 Kg/ha.

61(53)

(i) 295 Kg/ha. (ii) 53.3 Kg/ha. (iii) Main effects of N is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	212	318	308	279
P ₁	251	327	356	311
Mean	232	322	332	295

C.D. for N marginal means=44.8 Kg/ha.

62(33)

(i) 261 Kg/ha. (ii) 130.5 Kg/ha. (iii) Main effect of P is highly significant (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	306	289	383	326
P ₁	136	168	283	196
Mean	221	229	333	261

C.D. for P marginal means=89.6 Kg/ha.

Crop :- Linseed (Rabi).

Ref :- M.P. 60(80), 61(44), 62(26).

**Site :- Central Agri. Res. Farm,
Narbibagh.**

Type :- 'M'.

Object :-To study the effect of different levels of N and P on the yield of Linseed.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Linseed. (c) As per treatments. (ii) Medium black. (iii) 14.10.60 ; 27.11.61 ; 5.11.62.
(iv) (a) 2-3 *bakharings*. (b) Seed drilled by *deshi* plough. (c) 22 Kg/ha. (d) 23 cm. between rows for 60 and 61 ; 30 cm. between rows for 62. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) Nil.
(ix) N.A. (x) 25.3.61 ; 23.4.62 ; 7.4.63.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N₀=0, N₁=8.4 and N₂=16.8 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 11.1 m. × 4.6 m. for 60, 61 and 13.7 m. × 3.1 m. for 62. (b) 10.2 m. × 4.0 m. for 60, 61 and 12.2 m. × 2.4 m. for 62. (v) 42 cm. × 30 cm. for 60, 61 and 76 cm. × 30 cm. for 62. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of seed. (iv) (a) 1960-62. (b) No. (c) Results of combined analysis are presented under 5.—Results. (v) Baroda, Khargone, Powerkheda and Ujjain. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS:

Pooled results

(i) 744 Kg/ha. (ii) 138.9 Kg/ha. (with 10 d.f. made up of Treatments \times years interaction). (iii) Main effect of P is highly significant. N effect is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	627	720	726	691
P ₁	733	810	847	796
Mean	680	765	786	744

C.D. for P marginal means = 59.6 Kg/ha.

C.D. for N marginal means = 72.9 Kg/ha.

Individual results

Treatment	N ₀	N ₁	N ₂	Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
Years									
1960	880	961	1086	**	902	1050	**	976	91.0
1961	686	760	727	N.S.	677	772	**	724	95.1
1962	474	575	547	*	495	568	*	532	88.0
Pooled	680	765	786	*	691	796	**	744	138.9

Crop :- Linseed (Rabi).

Ref :- M.P. 60(53), 61(30).

Site :- Govt. Exptl. Farm, Powerkheda.

Type :- 'M'.

Object :- To study the effect of different levels of N and P on the yield of Linseed.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Linseed. (c) As per treatments. (ii) Morand. (iii) 17.10.60 ; 14.11.61. (iv) (a) Crossed *bakhering*. (b) Line sowing. (c) 17 Kg/ha. (d) and (e) N.A. (v) Nil. (vi) EB-3 (medium). (vii) Unirrigated. (viii) Nil. (ix) 5.7 cm. ; 27.7 cm. (x) 16.3.61 ; 30.3.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N₀=0, N₁=8.4 and N₂=16.8 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 4.6 m. \times 11.1 m. ; 3.1 m. \times 13.7 m. (b) 4.0 m. \times 10.2 m. ; 2.4 m. \times 12.2 m. (v) 30 cm. \times 42 cm. ; 30 cm. \times 76 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of seeds. (iv) (a) 1960-61. (b) No. (c) Results of combined analysis presented under 5.—Results. (v) Vidisha and Khargone. (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is present.

5. RESULTS:

Pooled results

(i) 632 Kg/ha. (ii) 79.9 Kg/ha. (with 5 d.f. made up of Treatments×years interaction). (iii) None of the effect is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	627	626	661	638
P ₁	578	627	676	627
Mean	602	626	669	632

Individual results :

Treatments	N ₀	N ₁	N ₂	Sig.	P ₀	P ₁
Years						
1960	653	607	646	N.S.	651	620
1961	522	646	692	**	625	634
Pooled	602	626	669	N.S.	638	627

Sig.	G.M.	S.E./plot
N.S.	635	87.3
N.S.	630	71.8
N.S.	632	79.9

Crop :- Linseed (Rabi).

Ref :- M.P. 62(117), 64(23).

Site :- Govt. Exptl. Farm, Powerkeda.

Type :- 'M'.

Object :—To study the effect of different levels of N and P on the yield of Linseed.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Linseed. (c) As per treatments. (ii) Loamy to clayey black. (iii) 19.10.62 ; 21.10.64. (iv) (a) Cross *bakherings*. (b) Line sowing by *Nari*. (c) 17 Kg/ha. (d) N.A. (e) Nil. (v) Nil. (vi) EB -3. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 23.3.63 ; 16.3.65.

2. TREATMENTS:

All combinations of (1) and (2)

- (1) 3 levels of N as A/S : N₀=0, N₁=8.4 and N₂=16.8 Kg/ha.
 (2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 4.6 m.×11.1 m. ; 3.1 m.×13.7 m. (b) 4.0 m.×10.1 m. ; 2.4 m.×12.2 m. (v) 46 cm.×46 cm. ; 30 cm.×76 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Seed yield. (iv) (a) 1962—64 (1963 N.A.) (b) No. (c) Results of combined analysis are presented under 5.—Results. (v) Baroda, Bhilsa, Khargone, Powerkeda, Vidisha and Ujjain. (vi) Nil. (vii) Error variances are heterogeneous and Treatments×years interaction is present.

5. RESULTS:

Pooled results

(i) 628 Kg/ha. (ii) 112.1 Kg/ha. (with 5 d.f. made up of Treatments \times years interaction). (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	586	613	647	615
P ₁	578	646	697	640
Mean	582	630	672	628

Individual results

Treatments	N ₀	N ₁	N ₂	Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
Years									
1962	616	615	637	N.S.	609	634	N.S.	623	76.6
1964	548	644	707	**	622	644	N.S.	633	36.0
Pooled	582	630	672	N.S.	615	640	N.S.	628	112.1

Crop :- Linseed (Rabi).

Ref :- M.P. 60(146), 61(150).

Site :- State Mechanised Farm, Reora (Satna).

Type :- 'M'.

Object :- To study the effect of N and P on the yield of Linseed.

1. BASAL CONDITIONS :

(i) (a) to (c) Nil. (ii) Black cotton. (iii) 1.11.60; 25.11.61. (iv) (a) 4 harrowings. (b) Broadcasting. (c) 20 Kg/ha. (d) and (e) Nil. (v) Nil. (vi) T-1193. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) First week of March 61; 21.3.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of N as A/S : N₀=0 and N₁=16.8 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) 11.9 m. \times 4.3 m.; 12.2 m. \times 4.3 m. (b) 10.7 m. \times 3.0 m.; 10.7 m. \times 3.1 m. (v) N.A.; 76 cm. \times 61 cm. (v) Yes.

4. GENERAL :

(i) Poor. (ii) Nil. (iii) Seed yield. (iv) (a) 1960-61. (b) No. (c) Results of combined analysis are presented under 5.—Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS :

Pooled results

(i) 376 Kg/ha. (ii) 79.2 Kg/ha. (with 45 d.f. made up of pooled Error and Treatments \times years interaction). (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	P ₀	P ₁	Mean
N ₀	352	370	361
N ₁	376	406	391
Mean	364	388	376

Individual results

Treatments	N ₀	N ₁	Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
Years								
1960	276	320	N.S.	289	307	N.S.	298	86.6
1961	447	463	N.S.	440	470	N.S.	455	71.9
Pooled	361	391	N.S.	364	388	N.S.	376	79

Crop :- Linseed (Rabi).**Ref. :- M.P. 62(70).****Site :- State Mechanised Farm, Reora.****Type :- 'M'.**

Object :—To Study the effect of N and P on the yield of Linseed.

1. BASAL CONDITIONS :

(i) (a) to (c) Nil. (ii) Medium Black. (iii) 18.10.62 (iv) (4) harrowings. (b) Braodcasting (c) 20 Kg/ha. (d) and (e) Nil. (v) Nil. (vi) Z—97. (vii) Unirrigated (viii) and (ix) Nil. (x) First week of March, 63.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N₀=0, N₁=8.4 and N₂=16.8 Kg/ha.(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN :

(i) Fact in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 13.7 m.×3.7 m. (b) 12.2 m.×3.0 m. (v) 75 cm.×35 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of Seed. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 30.3 Kg/ha. (ii) 53.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	289	310	279	293
P ₁	299	310	331	313
Mean	294	310	305	303

Crop :- Linseed (Rabi).**Ref. :- M.P. 60(153).****Site :- Govt. Seed and Demons. Farm, Sagar.****Type :- 'M'.****Object :-** To study the effect of different levels of N and P on the yield of Linseed.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Black soil of kankars. (iii) 22.11.60. (iv) (a) to (e) N.A. (v) and (vi) N.A. (vii) Unirrigated. (viii) and (ix) N.A. (x) 3.4.61.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of N as A/S: $N_0=0$ and $N_1=22.4$ Kg/ha.(2) 2 levels of P_2O_5 as Super $P_0=0$ and $P_1=22.4$ Kg/ha.**3. DESIGN :**(i) Fact. in R.B.D. (ii) (a) 4. (b) N.A. (iii) 2. (iv) (a) and (b) 6.1 m. \times 15.2 m. (v) Nil. (vi) Yes.**4. GENERAL :**

(i) Poor. (ii) Nil. (iii) Yield of Seed. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 472 Kg/ha. (ii) 21.9 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of seed in Kg/ha.

	N_0	N_1	Mean
P_0	323	582	453
P_1	381	600	491
Mean	352	591	472

C.D. for N marginal means=49.0 Kg/ha.

Crop :- Linseed (Rabi).**Ref :- M.P. 60(90).****Site :- Govt. Agri. Farm, Seoni.****Type :- 'M'.****Object :-** To study the effect of N and P on the yield of Linseed.**1. BASAL CONDITIONS :**(i) (a) Nil. (b) Wheat. (c) 738 Kg/ha. of G.N.C. (ii) Morand-I. (iii) 7.11.60. (iv) (a) 5 *bacharings*. (b) Seed drilled. (c) 22 Kg/ha. (d) 23 cm. \times 23 cm. (e) N.A. (v) 25 C.L./ha. of F.Y.m. (vi) E.B.—55. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 27.3.61.**2. TREATMENTS :**

Same as in expt. No. 60(153) given above.

3. DESIGN :(i) Fact. in R.B.D. (ii) (a) 4. (b) N.A. (iii) 3. (iv) (a) 10.7 m. \times 5.3 m. (b) 10.1 m. \times 5.0 m. (v) 30 cm. \times 15 cm. (vi) Yes.**4. GENERAL :**

(i) Satisfactory. (ii) N.A. (iii) Yield of seed. (iv) (a) No. (b) and (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 314 Kg/ha. (ii) 42.9 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of seed in kg/ha.

	N ₀	N ₁	Mean
P ₀	244	300	272
P ₁	302	410	356
Mean	273	355	314

C.D. for N or P marginal means=60.5 Kg/ha.

Crop :- Linseed (Rabi).

Ref :- M.P. 60(58).

Site :- Central Exptl. Farm, Ujjain.

Type :- 'M'.

Object :—To find out the effect of different manures on Linseed.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Linseed. (c) As per treatments. (ii) Black cotton soil. (iii) 22.10.60. (iv) (a) 3 *bakherings*. (b) Seed drilled by *duffan*. (c) 13.5 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) E.B.—3. (vii) Unirrigated. (viii) N.A. (ix) 0.8 cm. (x) 30.3.61.

2. TREATMENTS:

Same as in expt. No. 60(153) on page 439.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 12.2 m. × 4.3 m. (b) 10.7 m. × 3.1 m. (v) 76 cm. × 60 cm. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) N.A. (iii) Seed yield. (iv) (a) 1959—60. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 111 Kg/ha. (ii) 25.8 Kg/ha. (iii) Main effect of N is highly significant. (iv) Av. yield of seed in Kg/ha.

	P ₀	P ₁	Mean
N ₀	50	56	53
N ₁	153	187	170
Mean	101	121	111

C.D. for N marginal means=29.2 Kg/ha.

Crop :- Linseed (Rabi).

Ref :- M.P. 60(57), 61(111), 62(1).

Site :- Central Exptl. Farm, Ujjain.

Type :- 'M'.

Object :-To study the effect of different levels of N and P on the yield of Linseed.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Linseed. (c) As per treatments. (ii) Black cotton soil. (iii) 12.10.60 ; 19.11.61 ; 2.11.62
(iv) (a) 3 *bakherings*. (b) Seed drilled by *duffan*. (c) 13 Kg/ha. (d) 30 cm. between rows. (e) N.A.
(v) Nil. (vi) E.B.—3. (vii) Unirrigated. (viii) N.A. (ix) 0.8 cm. ; 6.3 cm. ; 0.8 cm. (x) 31.3.61 ; 26.3.62 ;
7.3.63.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : $N_0=0$, $N_1=8.4$ and $N_2=16.8$ Kg/ha.

(2) 2 levels of P_2O_5 as Super ; $P_0=0$ and $P_1=11.2$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 11.1 m. \times 4.6 m. for 60 ; N.A. for 61 and 62.
(b) 10.2 m. \times 4.0 m. for 60 ; 12.2 m. \times 2.4 m. for 61 and 62. (v) 43 cm. \times 30 cm. for 60 ; N.A. for 61 and
62. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Seed yield. (iv) (a) 1959—62. (b) No. (c) Results of combined analysis
are presented under 5.—Results. (v) Khargone, Powerkheda, Vidisha and Ujjain. (vi) Nil. (vii) Expt.
No., 59(57) is also taken in the pooled analysis. Error variances are heterogeneous and Treatments \times years
interaction is present.

5. RESULTS :

Pooled results :

(i) 437 Kg/ha. (ii) 111.0 Kg/ha. (with 15 d.f. made up of Treatments \times years interaction). (iii) None of
the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	403	430	437	423
P_1	429	456	469	451
Mean	416	443	453	437

Individual results

Treatments	N_0	N_1	N_2	Sig.	P_0	P_1	Sig.	G.M.	S.E./plot
Years									
1960	298	297	291	N.S.	308	283	**	295	31.1
1961	491	475	493	N.S.	482	482	N.S.	482	49.4
1962	490	556	599	**	496	601	**	548	68.1
Pooled	416	443	453	N.S.	423	451	N.S.	437	111.0

Crop :- Linseed (Rabi).

Ref :- M.P. 60(43), 61(27), 62(84).

Site :- Govt. Exptl. Farm, Vidisha.

Type :- 'M'.

Object :- To study the effect of N and P on the yield of Linseed.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Heavy clay. (iii) 16.10.60 ; 26.11.61 ; 3.11.62. (iv) (a) 2 *bakherings*. (b) Line sowing. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) R.R.—204 for 60 and 61, Hy—60 for 62. (vii) Unirrigated. (viii) 9.0 cm. ; 17.3 cm. ; N.A. (x) 27 3.62 ; 7.4.62 ; 18.3.63.

2. TREATMENTS :

All combinations of (I) and (2)

(1) 3 levels of N as A/S : $N_0=0$, $N_1=8.4$ and $N_2=16.8$ Kg/ha.

(2) 2 levels of P_2O_5 as Super : $P_0=0$ and $P_1=11.2$ Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (ix) (a) 4.6 m. \times 11.0 m. (b) 4.0 m. \times 10.1 m. (v) 30 cm. \times 46 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil (iii) Seed yield. (iv) (a) 1960—62. (b) and (c) No. (v) Baroda, Khargone. and Powerkheda. (vi) Nil. (vii) Error variances are heterogeneous and Treatments \times years interaction is absent, hence results of individual analysis are presented under 5. —Results.

5. RESULTS :

60(43)

(i) 549 Kg/ha. (ii) 170.0 Kg/ha (iii) Main effect of P alone is highly significant. (iv) Av. yield of seed in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	671	664	641	659
P_1	420	496	401	439
Mean	545	580	521	549

C.D. for P marginal means = 116.8 Kg/ha.

61(27)

(i) 443 Kg/ha. (ii) 81.7 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of seed in Kg/ha.

	N_0	N_1	N_2	Mean
P_0	358	433	547	446
P_1	377	463	480	440
Mean	368	448	514	443

C.D. for N marginal means = 68.7 Kg/ha.

62(84)

(i) 560 Kg/ha. (ii) 121.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	527	577	577	560
P ₁	482	605	594	560
Mean	505	591	586	560

Crop :- Linseed.

Ref :- M.P. 60(S.F.T).

Site :- (District) Durg, Raipur and Shahdol.

Type :- 'M'.

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

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red. (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

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, 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 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 linseed. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

District	No. of trials	Control mean Kg/ha.	Average response of Linseed in Kg/ha.								
			N	P	K	S.E.	NP	NK	pK	NPK	S.E.
Durg	2	90	20	20	40	11.0	—	40	—	—	14.0
Raipur	2	70	20	30	30	20.0	10	20	20	10	10.0
Shahdol	2	280	60	50	30	4.0	—	—30	—30	10	3.0

Crop :- Linseed.**Ref :- M.P. 60(S.F.T.).****Site :- (District) Raipur and Shahdol.****Type :- 'M'.**

Object :—Type B : To investigate the relative efficiency of different nitrogenous fertilisers at different doses.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red. (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, $N_1' = 22.4$ 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 and $N_2'' = 44.8$ Kg/ha. of N as A/S/N.**3. DESIGN :**

Same as in Type A on Linseed on page 443.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of linseed. (iv) (a) 1960—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

District	No. of trials	Control mean in Kg/ha.	Average response of Linseed in Kg/ha.						S.E. of response
			N_1	N_1'	N_1''	N_2	N_2'	N_2''	
Raipur	2	100	20	30	20	20	40	50	21.0
Shahdol	2	190	200	270	190	290	210	250	42.0

Crop :- Linseed (Rabi).**Ref :- M.P. 62(S.F.T.).****Site :- (District) Rewa and Chhatarpur.****Type :- 'M'.**

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) (a) to (c) N.A. (ii) Red and black for Chhatarpur and red and yellow for Rewa. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:

8 manurial treatments :

O = Control (no manure),

 $N_1 = 25$ Kg/ha. of N, $N_2 = 50$ Kg/ha. of N, $P_1 = 25$ Kg/ha. of P_2O_5 , $N_1P_1 = 25$ Kg/ha. of N + 25 Kg/ha. of P_2O_5 , $N_2P_1 = 50$ Kg/ha. of N + 25 Kg/ha. of P_2O_5 , $N_2P_2 = 50$ Kg/ha. of N + 50 Kg/ha. of P_2O_5 ,and $N_2P_2K_1 = 50$ 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 50–100 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 on 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 Linseed. (iv) (a) to (c) No (v) to (vii) Nil.

5. RESULTS :

Rewa

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E
Av. response of Linseed in Kg/ha.	103	154	128	36	150	97	163	54.2

Control mean=833 Kg/ha. ; No. of trials=5.

Chhatarpur

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of Linseed in Kg/ha.	148	308	189	310	280	293	521	104.8

Control mean=650 Kg/ha. ; No. of trials=7.

Crop :- Linseed (Kharif).

Ref :- M.P. 64(S.F.T.)

Site :- (District) : Rewa, Raigarh, Raipur, Bilaspur and Durg.

Type :- 'M'.

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) (a) to (c) N.A. (ii) Red and yellow. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN :

Same as in Type A₁ on Linseed (Rabi) on page 444.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of Linseed. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS :

Rewa

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of linseed in Kg/ha.	180	202	27	197	150	301	383	20.3

Control mean=471 Kg/ha. ; No. of trials=3.

Raigarh

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of linseed in Kg/ha	49	98	148	197	197	148	247	139.7

Control mean=247 Kg/ha. ; No. of trials=2.

Raipur

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of linseed in Kg/ha.	105	229	124	260	395	512	593	64.0

Control mean=272 Kg/ha. ; No. of trials=5.

Bilaspur

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of linseed in Kg/ha.	119	193	97	276	280	358	453	43.1

Control mean=436 Kg/ha. ; No. of trials=5.

Durg

Treatment	N ₁	N ₂	P ₁	N ₁ P ₁	N ₂ P ₁	N ₂ P ₂	N ₂ P ₂ K ₁	S.E.
Av. response of linseed in Kg/ha.	417	598	193	670	929	548	989	225.1

Control mean=640 Kg/ha. ; No. of trials=3.

Crop :- Linseed (Kharif).

Ref :- M.P. 64(S.F.T.).

Site :- (District) : Bilaspur, Durg, Raigarh, Raipur, Ujjain, Raisen and Rewa.

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) (a) to (c) N.A. (ii) Red and yellow for Bilaspur, Raigarh and Rewa, red for Durg and Raipur, medium black for Ujjain and deep black for Raisen. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

8 manurial treatments :

O=Control (no manure),

N₁=25 Kg/ha. of N,

P₁=25 Kg/ha. of P₂O₅,

P₂=50 Kg/ha. of P₂O₅,

N₁P₁=25 Kg/ha. of N+25 Kg/ha. of P₂O₅,

N₁P₂=25 Kg/ha. of N+50 Kg/ha. of P₂O₅,

N₂P₂=50 Kg/ha. of N+50 Kg/ha. of P₂O₅ and

N₂P₂K₁=50 Kg/ha. of N+50 Kg/ha. of P₂O₅+50 Kg/ha. of K₂O.

3. DESIGN :

Same as in Type A₁ on Linseed (Rabi) on page 444.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of Linseed. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

Bilaspur

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₁ P ₂ K ₂	S.E.
Av. response of linseed in Kg/ha.	163	65	178	176	268	405	443	49.8

Control mean=456 Kg/ha. ; No. of trials=7.

Durg

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of linseed in Kg/ha.	349	396	583	240	600	762	939	260.8

Control mean=720 Kg/ha. ; No. of trials=2.

Raigarh

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of linseed in Kg/ha.	49	98	98	197	98	98	345	144.6

Control mean=247 Kg/ha. ; No. of trials=2.

Raipur

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of linseed in Kg/ha.	123	62	203	291	322	447	553	39.0

Control mean=232 Kg/ha. ; No. of trials=5.

Ujjain

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	F ₂ P ₂	N ₁ P ₂ K ₂	S.E.
Av. response of linseed in Kg/ha.	-9	-1	4	12	16	12	29	42.9

Control mean=98 Kg/ha. ; No. of trials=2.

Raisen

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of linseed in Kg/ha.	24	10	37	47	44	103	154	10.4

Control mean=1071 Kg/ha. ; No. of trials=3.

Rewa

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of linseed in Kg/ha.	44	49	42	69	93	247	370	19.2

Control mean=439 Kg/ha. ; No. of trials=3.

Crop :- Linseed (Rabi).**Ref :- M.P. 62(S.F.T.).****Site :- (District) : Rewa and Chhatarpur.****Type :- 'M'.**

Object :—Type A₁ : 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) (a) to (c) N.A. (ii) Red and yellow for Rewa and red and black for Chhatarpur. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

Same as in Type A₂ on Linseed (*Kharif*) on page 446.

3. DESIGN :

Same as in Type A, on Linseed (*Rabi*) on page 444.

4. GENERAL :

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

5. RESULTS :**Rewa**

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of linseed in Kg/ha.	50	19	93	107	74	191	263	71.6

Control mean=882 Kg/ha. ; No. of trials=5.

Chhatarpur

Treatment	N ₁	P ₁	P ₂	N ₁ P ₁	N ₁ P ₂	N ₂ P ₂	N ₂ P ₂ K ₂	S.E.
Av. response of linseed in Kg/ha.	292	187	240	314	228	368	381	20.9

Control mean=556 Kg/ha. ; No. of trials=5.

Crop :- Linseed (Kharif).**Ref :- M.P. 64(S.F.T.).****Site :- (District) : Bilaspur, Raigarh, Durg, Raipur, Raisen and Rewa.****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) (a) to (c) N.A. (ii) Red and yellow for Rewa, Bilaspur and Raigarh ; red for Durg and Raipur and deep black for Raisen. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :**8 manurial treatments :**

O=Control (no manure).

N₁=25 Kg/ha. of N.

K₁=25 Kg/ha. of K₂O.

K₂=50 Kg/ha. of K₂O.

N₁K₁=25 Kg/ha. of N+25 Kg/ha. of K₂O.

N₁K₂=25 Kg/ha. of N+50 Kg/ha. of K₂O.

N₂K₂=50 Kg/ha. of N+50 Kg/ha. of K₂O and

N₁P₁K₁=25 Kg/ha. of N+25 Kg/ha. of P₂O₅+25 Kg/ha. of K₂O.

3. DESIGN:

Same as in Type A₁ on Linseed (*Rabi*) on page 444.

4. GENERAL:

(i) and (ii) N.A. (iii) Yield of Linseed. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS:

Bilaspur

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of linseed in Kg/ha.	121	28	111	220	291	370	362	66.7

Control mean=432 Kg/ha ; No. of trials=5.

Raigarh

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of linseed in Kg/ha.	—	197	-98	296	197	395	296	49.4

Control mean=197 Kg/ha. ; No. of trials=2.

Durg

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response in linseed in Kg/ha.	349	490	530	363	706	738	971	170.8

Control mean=678 Kg/ha. ; No. of trials=3.

Raipur

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of linseed in Kg/ha.	107	95	197	244	318	442	576	47.8

Control mean=226 Kg/ha. ; No. of trials=5.

Raizen

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of linseed in Kg/ha.	9	19	50	48	65	94	120	22.2

Control mean=1080 Kg/ha. ; No. of trials=2.

Rewa

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of linseed in Kg/ha.	-9	-4	-19	39	76	140	59	32.0

Control mean=494 Kg/ha. ; No. of trials=3.

Crop :- Linseed (*Rabi*).

Ref :- M.P. 62(S.F.T.).

Site :- (District) : Rewa and Chhatarpur.

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.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and yellow for Rewa and red and black for Chhatarpur. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS :

Same as in Type A₂ on Linseed (*Kharif*) on page 448.

3. DESIGN:

Same as in Type A₁ on Linseed (*Rabi*) on page 443.

4. GENERAL :

(i) and (ii) N.A. (iii) Yield of Linseed. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS:

Rewa

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of linseed in Kg/ha.	115	42	74	131	59	181	197	68.7

Control mean=777 Kg/ha. ; No. of trials=5.

Chhatarpur

Treatment	N ₁	K ₁	K ₂	N ₁ K ₁	N ₁ K ₂	N ₂ K ₂	N ₁ P ₁ K ₁	S.E.
Av. response of linseed in Kg/ha.	166	195	201	467	369	271	334	56.1

Control mean= 599Kg/ha. ; No. of trials=5.

Crop :- Linseed (*Rabi*).

Ref. :- M.P. 64(11).

Site :- Govt. Agri. Farm, Baroda.

Type :- 'MV'.

Object :—To Study the effect of N and P on different varieties of Linseed.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 30.10.64. (iv) (a) 2 *Bakherings*. (b) Line sowing. (c) 9 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 1 hand weeding. (ix) N.A. (x) 14 and 15.4.65.

2. TREATMENTS :

Main-plot treatments :

3 varieties : V₁=H 394, V₂=S.P.S.—5 and V₃=N.P.R.R—9.

Sub-plot treatments :

All combinations of (1) and (2)

(1) 4 levels of N as A/S : N₀=0, N₁=11.2, N₂=22.4 and N₃=33.6 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=22.4 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) 4.9 m. × 9.1 m. (b) 4.0 × 8.5 m. (v) 46 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Seed yield. (iv) (a) 1964-65 [Modified in 1965]. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 775 Kg/ha. (ii) (a) 156.9 Kg/ha. (b) 162.8 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant. (iv) Av. yield of seed in Kg/ha.

	V ₁	V ₂	V ₃	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	743	669	801	630	697	849	776	738
P ₁	835	779	819	693	764	861	926	811
Mean	789	724	810	662	730	855	851	775
N ₀	673	603	709					
N ₁	753	698	738					
N ₂	890	768	907					
N ₃	840	827	886					

C.D. for N marginal means=93.8 Kg/ha.

C.D. for P marginal means=66.3 Kg/ha.

Crop :- Linseed (Rabi).

Ref. :- M.P. 65(11).

Site :- Govt. Agri. Farm, Baroda.

Type 'MV'.

Object :- To find out a suitable variety and fertiliser dose for the yield of Linseed.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Linseed. (c) N.A. (ii) Clayey loam. (iii) 18/19.11.65. (iv) (a) 2 *bakherings* by *deshi bakhar*. (b) Line sowing by *Nari*. (c) 15.7 Kg/ha. (d) 30.5 cm. between lines. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) One mulching by small spade. (ix) N.A. (x) 16.4.66.

2. TREATMENTS:

Main-plot treatments :

3 varieties of linseed : V₁=H 397, V₂=H 660 and V₃=N.P. R.R. 9.

Sub-plot treatments :

All combinations of (1) and (2)

- (1) 4 levels of N as A/S : N₀=0, N₁=11.2, N₂=22.4 and N₃=33.6 Kg/ha.
- (2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=22.4 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) 4.9 m. × 9.1 m. (b) 4.3 m. × 8.2 m. (v) 30.5 cm. on either side and 45.7 cm. on each end. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of seed. (iv) (a) 1964-1965 [Modified in 1965]. (b) Yes. (c) Nil. (v) Jora and Bhind, (vi) and (vii) N.A.

5. RESULTS :

- (i) 383 Kg/ha. (ii) (a) 111.0 Kg/ha. (b) 74.0 Kg/ha. (iii) Main effects of N and P are highly significant.
 (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	P ₀	P ₁	Mean
V ₁	313	352	404	395	323	409	366
V ₂	281	349	370	423	316	396	356
V ₃	365	427	489	425	362	491	427
Mean	319	376	421	414	334	432	383
P ₀	277	336	369	352			
P ₁	361	416	473	476			

C.D. for N marginal means=42.3 Kg/ha.

C.D. for P marginal means=30.1/Kg/ha.

Crop :- Linseed (*Radi*).

Site :- Govt. Agri. Farm, Bhind.

Ref :- M.P.64(3).

Type :- 'MV'.

Object :- To study the effect of N and P on different varieties of Linseed.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 11 to 13.11.64. (iv) (a) 2 *bakherings* and one ploughing. (b) Line sowing by *deshi Nari*. (c) 16 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 *Khurpis*. (ix) N.A. (x) 6 and 14.65.

2. TREATMENTS :

Main-plot treatments

All combinations of (1) and (2)

(1) 4 levels of N as A/S : N₀=0, N₁=11.2, N₂=22.4 and N₃=33.6 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=22.4 Kg/ha.

Sub-plot treatments :

3 varieties : V₁=H-397, V₂=H-603 and V₃=H-660.

3. DESIGN :

- (i) Split-plot (ii) (a) 8 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 4.9 m. × 9.1 m. (b) 4.0 m. × 8.5 m. (v) 46 cm. × 30 cm. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of seed. (iv) (a) 1964—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS

(i) 1239 Kg/ha. (ii) (a) 349.3 Kg/ha. (b) 266.1 Kg/ha. (iii) Main effect of V alone is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	P ₀	P ₁	Mean
V ₁	1247	1118	1587	1484	1338	1380	1359
V ₂	1158	1007	1173	1354	1075	1271	1173
V ₃	1066	1110	1192	1373	1160	1210	1185
Mean	1157	1078	1317	1404	1191	1287	1239
P ₀	1132	1007	1268	1357			
P ₁	1182	1149	1366	1450			

C.D. for V marginal means—133.9 Kg/ha.

Crop :- Linseed (Rabi).

Ref :- M.P. 64(200), 65(17).

Site :- Govt. Agr. Farm, Jora.

Type :- 'MV'.

Object —To find out the most suitable variety and doses of fertilizer for Linseed.

1. BASAL CONDITIONS

(i) (a) N.A. (b) Sannhemp. (c) N.A. (ii) Sandy loam. (iii) N.A.; 21.10.65. (iv) (a) 3 ploughings. (b) Drilled in lines. (c) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated, (viii) 2 weedings. (ix) 42 cm. (x) 6 and 7.4.65; 5.3.66.

2. TREATMENTS

All combinations of (1), (2) and (3)

(1) 3 varieties : V₁=Hy-397, V₂=NPS-5 and V₃=NPRR-204.

(2) 4 levels of N : N₀=0, N₁=10, N₂=20 and N₃=30 Kg/ha.

(3) 2 levels of P₂O₅ : P₀=0 and P₁=20 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 24. (b) N.A. (iii) 4. (iv) (a) 4.8 m. × 9.0 m.; 4.8 m. × 9.0 m. (b) 4.2 m. × 7.8 m. 3.9 m. × 7.4 m. (v) 30 cm. × 60 cm.; 45 cm. × 80 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of linseed. (iv) (a) 1964—contd. (b) Yes. (c) Nil. (v) Bhind and Baroda. (vi) N.A. (vii) As the experiment is continued beyond 1965 individual results are presented under 5.—Results.

5. RESULTS:

1964

(i) 683 Kg/ha. (ii) 168.6 Kg/ha. (iii) Main effect of V alone is significant. (iv) Av. yield of linseed in Kg/ha.

	P ₀	P ₁	N ₀	N ₁	N ₂	N ₃	Mean
V ₁	608	610	637	614	645	542	609
V ₂	744	637	717	671	625	748	691
V ₃	723	773	744	733	786	729	748
Mean	692	673	(9)	673	685	673	683
N ₀	722	677					
N ₁	669	677					
N ₂	727	643					
N ₃	649	697					

C.D. for V marginal means=84.2 Kg/ha.

1965

(i) 1426 Kg/ha. (ii) 363.2 Kg/ha. (iii) Main effects of N and P are significant. (iv) Av. yield of linseed in Kg/ha.

	P ₀	P ₁	N ₀	N ₁	N ₂	N ₃	Mean
V ₁	1436	1615	1460	1308	1598	1737	1525
V ₂	153	138	1355	1173	1373	1585	1373
V ₃	1358	1401	1247	1269	1395	1607	1379
Mean	1351	1501	1354	1252	1455	1643	1426
N ₀	1325	1383					
N ₁	1178	1325					
N ₂	1311	1600					
N ₃	1538	1697					

C.D. for N marginal means=209.4 Kg/ha.

C.D. for P marginal means=148.1 Kg/ha.

Crop :- Linseed (Rabi).

Site :- Govt. Agri. Farm, Jora.

Ref :- M.P. 65(8).

Type :- 'MV'.

Object :- To find out a suitable variety and fertilizer dose for Linseed.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 21.10.65. (iv) (a) One ploughing by *Deshi* plough. (b) Drilling. (c) 11.2 Kg/ha. (d) 30.5 cm. between lines. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) One weeding and hoeing. (ix) N.A. (x) 30.3.66.

2. TREATMENTS:

Main-plot treatments:

All combinations of (1) and (2)

(1) 4 levels of N as A/S: N₀=0, N₁=11.2, N₂=22.4 and N₃=36.6 Kg/ha.

(2) 2 levels of P₂O₅ as Super: P₀=0 and P₁=22.4 Kg/ha.

Sub-plot treatments:

3 varieties of linseed: V₁=HY-397, V₂=NPRR-9 and V₃=NPRR-204.

3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 4.9 m. × 9.1 m. (b) 4.3 m. × 7.9 m. (v) 30.5 cm. on either side and 61.0 cm. on each end. (vi) Yes.

4. GENERAL:

(1) Good. (ii) Nil. (iii) Seed yield. (iv) (a) 1965—only. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) Nil.

5. RESULTS :

(i) 652 Kg/ha. (ii) (a) 180.4 Kg/ha. (b) 171.5 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	N ₃	P ₀	P ₁	Mean
V ₁	617	595	551	532	553	595	574
V ₂	695	651	565	724	700	617	659
V ₃	721	710	761	706	700	748	724
Mean	678	652	626	654	651	653	652
P ₀	700	648	628	628			
P ₁	655	655	623	680			

C.D. for V marginal means = 86.3 Kg/ha.

Crop :- Linseed (Rabi).

Ref :- M.P. 60(79).

Site :- Central Agri. Res. Farm, Nabibagh.

Type :- 'C'.

Object :—To find out the optimum date of sowing for Linseed.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Linseed. (c) Nil. (ii) Medium black. (iii) As per treatments. (iv) (a) 3 *bakhering* by *bakhar*. (b) Seed drilled by *deshi* plough. (c) 22 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 29.3.61.

2. TREATMENTS:

4 dates of sowing : D₁ = 16.10.60, D₂ = 26.10.60, D₃ = 5.11.60 and D₄ = 15.11.60.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) and (b) 12.2 m. × 3.6 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of seed. (iv) (a) 1959—60. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) The dates of sowing are different during 1959. But the interval is the same, hence expts. are not pooled.

5. RESULTS :

(i) 290 Kg/ha. (ii) 54.1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of seed in Kg/ha.

Treatment	D ₁	D ₂	D ₃	D ₄
Av. yield	357	317	311	174

C.D. = 56.2 Kg/ha.

Crop :- Linseed (Rabi).**Ref :- M.P. 60(52).****Site :- Govt. Exptl. Farm, Powarkheda.****Type :- 'C'.**

Object :- To find out a optimum date of sowing for Linseed.

1. BASAL CONDITIONS :(i) (a) Nil. (b) Linseed. (c) Nil. (ii) Morand. (iii) As per treatments. (iv) (a) *Bakharing*. (b) Line sowing. (c) 17 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) N-3. (vii) Unirrigated. (viii) Nil. (ix) 5.7 cm. (x) 16.3.61.**2. TREATMENTS :**2 dates of sowing ; $D_1=21.10.60$ and $D_2=30.10.60$.**3. DESIGN:**(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 6. (iv) (a) 3.6 m. \times 12.2 m. (b) 2.9 m. \times 11.4 m. (v) 30 cm. \times 40 cm. (vi) Yes.**4. GENERAL :**

(i) Satisfactory. (ii) N. A. (iii) Seed yield. (iv) (a) 1959—1960. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) The expt. was started in 1959 and failed.

5. RESULTS :

(i) 478 Kg/ha. (ii) 62.1 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of seed in Kg/ha.

Treatment	D_1	D_2
Av. yield	470	486

Crop :- Linseed (Rabi).**Ref :- M.P. 63(61).****Site :- Govt. Agri. College Farm, Rewa.****Type :- 'IM'.**

Object :- To find out suitable doses of N and P with and without irrigation for good growth, yield and quality of Linseed.

1. BASAL CONDITIONS :(i) (a) Nil. (b) and (c) Nil. (ii) Clay loam. (iii) 22.9.63. (iv) (a) 6 ploughings followed by plankings. (b) Broadcasting and mixed with *desi* plough. (c) 22.4 Kg/ha. (d) and (e) —. (v) Nil. (vi) No. 1193-2 (T_1). (vii) As per treatments. (viii) One weeding. (ix) 3.13 cms. (x) April 1964.**2. TREATMENTS :****Main-plot treatments :**2 levels of Irrigation : $I_0=$ Unirrigated and $I_1=$ Irrigated.**Sub-plot treatments :**3 levels of N as A/S : $N_0=0$, $N_1=22.4$ and $N_2=44.8$ Kg/ha.**Sub-sub-plot treatments :**3 levels of P as Super : $P_0=0$, $P_1=22.4$ and $P_2=44.8$ Kg/haN applied as broadcast at sowing and P_2O_5 applied as drilling at sowing. One general irrigation was given to all plots for proper germination on 22.10.63.**3. DESIGN :**(i) Split-plot. (ii) (a) 2 main plots/replication ; 3 sub plots/main plot. (b) 35.0 m. \times 13.4 m. (iii) 4. (iv) (a) 6.1 m. \times 3.1 m. (b) 5.5 m. \times 2.4 m. (v) 30 cm. around the sub-sub-plot. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Seed and straw yield, No of seeds/capsul, wt. of seed/plant. (iv) (a) 1963-64 [Modified in 1964]. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 873 Kg/ha. (ii) (a) 150.7 Kg/ha. (b) 240.0 Kg/ha. (c) 247.3 Kg/ha. (iii) Main effects of I and N are significant (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	Mean
I ₀	722	870	828	731	895	793	806
I ₁	857	1100	861	853	861	1103	939
Mean	789	985	844	792	878	948	873
P ₀	780	847	748				
P ₁	787	961	885				
P ₂	800	1145	898				

C.D. for I marginal means = 112.9 Kg/ha.

C.D. for N marginal means = 150.9 Kg/ha.

Crop :- Linseed (Rabi).

Ref :- M.P. 64(37).

Site :- Govt. Agri. College Farm, Rewa.

Type :- 'IM'.

Object :- To find out the suitable doses of N and P with and without irrigation for good growth, yield and quality of Linseed.

1. BASAL CONDITIONS :

(i) (a) Ni fl. (b) *Jowar*. (c) N.A. (ii) Clay loam. (iii) 28.11.64. (iv) (a) 6 ploughings followed by plankings. (b) Drilling by cotton seed driller. (c) 24.7 Kg/ha. (d) and (e) N.A. (v) Nil. (vi) No. 1193-2. (vii) As per treatments. (viii) One weeding. (ix) 2.4 cm. (x) 28.3.65.

2. TREATMENTS:

Main-plot treatments :

3 levels of irrigations : I₀=0, I₁=1 and I₂=2 irrigations.

Sub-plot treatments :

3 levels of N as A/S : N₀=0, N₁=22.4 and N₂=44.8 Kg/ha.

Sub-sub-plot treatments :

3 levels of P₂O₅ as Super : P₀=0, P₁=22.4 and P₂=44.8 Kg/ha.

N applied as broadcast at sowing and P₂O₅ was applied as drilling at sowing.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot ; 3 sub-sub-plots/sub-plot. (b) 36.0 m. × 20.7 m. (iii) 3. (iv) (a) 6.1 m. × 3.1 m. (b) 5.5 m. × 2.4 m. (v) 30 cm. around the sub-sub-plot. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Seed and straw yield, No. of seeds/capsul, weight of seed/plant. (iv) (a) 1963-64 (Modified in 1964). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

(i) 820 Kg/ha. (ii) (a) 353.8 Kg/ha. (b) 200.9 Kg/ha. (c) 79.7 Kg/ha (iii) Main effect of P is highly significant and that of I and N are significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	P ₀	P ₁	P ₂	Mean
I ₀	494	584	615	529	605	556	563
I ₁	707	968	1075	897	961	892	917
I ₂	739	929	1270	900	1021	1018	980
Mean	647	827	987	775	862	822	820
P ₀	618	786	922				
P ₁	670	858	1058				
P ₂	652	834	980				

C.D. for I marginal means=267.2 Kg/ha.

C.D. for N marginal means=119.2 Kg/ha.

C.D. for P marginal means=44.1 Kg/ha.

Crop :- Niger (*Kharif*).

Ref :- M.P. 60(99), 61(139), 62(45).

Site :- Govt. Agri. Res. Farm, Chhindwara. Type :- 'M'.

Object :—To find out the optimum dose of N and P for Niger.

1. BASAL CONDITIONS :

(i) (a) Niger—Wheat for 60, 61 ; Nil. for 62, (b) Wheat. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅ for 60 and 62. ; N.A. for 61. (ii) Sandy ; Morand ; black soil. (iii) 4.9.60 ; 1.9.61 ; 1.8.62. (iv) (a) 2 *bakherings*. (b) Drilling for 60, 61 ; hand sowing for 62. (c) 8 Kg/ha. for 60, 62 ; 5 to 8 Kg/ha. for 61. (d) 10 cm. × 10 cm. (e) —. (v) Nil. (vi) Uttak mund for 60 ; Jagni No. 5 for 61, 62. (vii) Unirrigated. (viii) Nil. (ix) 16 cm. ; N.A. ; 60 cm. (x) 10.1.61 ; 20.11.61 ; 13.12.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N₀=0, N₁=8.4 and N₂=16.8 Kg/ha.

(2) 2 levels of P₂O₅ as Super. : P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 9'1 m. × 3'1 m. for 60 ; 6'1 m. × 3'1 m. for 61 and 62. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Poor ; Good ; Satisfactory. (ii) Nil. (iii) Seed yield. (iv) (a) 1960—62. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) Jhabua and Kathulia. (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is present.

5. RESULTS:

Pooled results

(i) 303 Kg/ha. (ii) 135.8 Kg/ha. (based on 10 d.f. made up of Treatments × years interaction). (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	202	303	348	284
P ₁	315	304	344	321
Mean	259	304	346	303

Individual results

Treatments	N ₀	N ₁	N ₂	Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
Years									
1960	65	65	44	N.S.	51	65	N.S.	58	40.5
1961	361	417	498	**	396	455	N.S.	425	90.3
1962	349	429	496	**	406	444	N.S.	425	83.0
Pooled	259	304	346	N.S.	284	321	N.S.	303	133.8

Crop :- Niger (Kharif).

Ref :- M.P. 60(29).

Site :- Govt. Agri. Res. Stn., Jhabua.

Type :- 'M'.

Object :- To study the response of N and P doses to Niger.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) Nil. (ii) Sandy loam with big stones. (iii) 27.7.6. (iv) (a) *Bakherings* and ploughing cross wise. (b) Line sowing. (c) 7 Kg/ha. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) Interculture with *desi dora* and hand weeding. (ix) 57 cm. (x) 24.10.60.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N₀=0, N₁=8.4 and N₂=16.8 Kg/ha.

(2) 2 levels of P₂O₅ as Super ; P₀=0 and P₁=16.8 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 3.7 m. × 9.1 m. (b) 3.1 m. × 7.6 m. (v) 30 cm. × 75 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Seed yield. (iv) (a) 1960—only. (b) and (c) —. (v) Chhindwara. (vi) and (vii) Nil.

5. RESULTS :

(i) 196 Kg/ha. (ii) 33.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	195	180	190	188
P ₁	203	217	195	205
Mean	199	198	192	195

Crop :- Niger (Kharif).

Ref :- M.P. 61(122), 62(76).

Site :- Govt. Res. Stn., Kathulia.

Type :- 'M'.

Object :- To find out the effect of N and P on the yield of Niger.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Clayey and clayey loam. (iii) 20.7.61 ; 26.7.62 (iv) (a) 2 ploughings and *bakherings* ; 2 ploughings. (b) Line sowing. (c) 7 Kg/ha. (d) 30 cm, between lines. (e) —. (v) Nil. (vi) Ottackmund. (vii) Unirrigated, (viii) and (ix) N.A. (x) 18.10.61 ; 20.10.62.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N₀=0, N₁=8.4 and P₂=16.8 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=11.2 Kg/ha.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 4.9 m. × 8.5 m. ; 4.6 m. × 7.0 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Seed yield. (iv) (a) 1951-62. (b) No. (c) Results of combined analysis have been presented under 5 Results. (v) Chhindwara. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results

(i) 198 Kg/ha. (ii) 98.6 Kg/ha. (based on 5 d.f. made up of Treatments × years interaction). (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N ₀	N ₁	N ₂	Mean
P ₀	207	177	189	191
P ₁	211	217	183	205
Mean	211	198	186	198

Individual results

Treatment	N ₀	N ₁	N ₂	Sig.	P ₀	P ₁	Sig.	G.M.	S.E./plot
Years									
1961	236	241	218	N.S.	209	255	*	232	53.7
1962	185	152	154	N.S.	173	154	N.S.	164	68.7
Pooled	211	198	186	N.S.	191	205	N.S.	198	98.6

Crop :- Ginger (Kharif).**Ref :- M.P. 60(112).****Site :- Govt. Agri. Res. Farm, Chhindwara.****Type :- 'D'.**

Object :—To find out the best soil and seed treatment for higher yield of Ginger and for controlling soft-rot disease.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Vegetables. (c) Nil. (ii) *Sehra*. (iii) 6.6.60. (iv) (a) 1 ploughing and 2 *bakherings*. (b) Planting. (c) 922 Kg/ha. (d) 30 cm. × 15 cm. (e) N.A. (v) 24.7 C.L./ha. of F.Y.M. (vi) Local. (vii) Irrigated. (viii) 4 weedings and earthing. (ix) 48 cm. (x) 24.12.60.

2. TREATMENTS :

(i) 4 soil and seed treatments : T_0 =Control, T_1 =Cereson wet, T_2 =Coppeson and T_3 =Diathane.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) and (b) 2.7 m. × 2.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of Ginger. (iv) (a) 1960—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS ;

(i) 1693 Kg/ha. (ii) 483 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of ginger in Kg/ha.

Treatment	T_0	T_1	T_2	T_3
Av. yield	1430	1695	1469	2176

Crop :- Ginger (Kharif).**Ref :- M.P. 60(105), 61(81).****Site :- Govt. Agri. Res. Farm, Chhindwara.****Type :- 'D'.**

Object ;—To find out the best soil treatment for soft-rot disease of Ginger.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Vegetables. (c) Nil; 22.4 Kg/ha. of N and 22.4 Kg/ha. of P_2O_5 . (ii) *Sehra*. (iii) 6.6.60 ; 1.6.60. (iv) (a) 1 ploughing and 2 *bakherings*. (b) Planting. (c) 923 Kg/ha. (d) 30 cm. × 15 cm. (e) N.A. (v) 24.7 C.L./ha. of F.Y.M. (vi) Local. (vii) Irrigated. (viii) 4 weedings. (ix) 97 cm. ; 110 cm. (x) 24.12.60—9.2.62.

2. TREATMENTS :

4 fungicidal treatments ; T_0 =Control, T_1 =Soil treated with 0.1% Cereson wet, T_2 =Soil treated with 0.3% Diathane and T_3 =Soil treated with 0.3% Coppesan.

Fungicides applied at sowing and repeated after 20 days of sowing.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) and (b) 2.7 m. × 2.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Ginger yield. (iv) (a) 1960—61. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and treatments into years interaction is absent.

5. RESULTS :

Pooled results

(i) 2855 Kg/ha. (ii) 706.5 Kg/ha. (based on 21 d.f. made up of pooled error and Treatments \times years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of Ginger in Kg/ha.

Treatment	T ₀	T ₁	T ₂	T ₃
Av. yield	2353	2785	2916	3366

Individual Results :

Treatments	T ₀	T ₁	T ₂	T ₃	Sig.	G.M.	S.E/plot
Years							
1960	1374	1694	1997	1695	N.S.	1690	526.0
1961	3332	3875	3834	5037	N.S.	4019	755.4
Pooled	2353	2785	2916	3366	N.S.	2855	706.5

Crop :- Ginger (Kharif).

Ref :- M.P. 60(103), 61(86).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'D'.

Object :- To find out the best seed treatment for soft-rot disease of Ginger.

1. BASAL CONDITIONS :

(i) (a) Potato—Ginger ; Nil. (b) Potato ; Vegetables. (c) N.A. ; 22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅
(ii) *Sehra*. (iii) 6.6.60 ; 1.6.61. (iv) (a) 1 ploughing and 2 *bakherings*. (b) Planting. (c) 922 Kg/ha.
(d) 30 cm. \times 15 cm. (e) N.A. (v) 24.7 C.L./ha. of F.Y.M. (vi) Local. (vii) Irrigated. (viii) 4 weedings
and earthing ; 4 weedings. (ix) 97 cm. ; 55 cm. (x) 24.12.60 ; 9.2.62.

2. TREATMENTS :

4 fungicidal treatments : T₀=Control, T₁=0.1 % Ceresan wet, T₂=0.3 % Diathane and T₃=0.3% Coppesen.
Seeds were treated for 20 minutes with these fungicides.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) and (b) 2.7 m \times 2.7 m. (v) Nil, (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Ginger yield. (iv) (a) 1960—61. (b) No. (c) Results of combined analysis have
been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and
Treatments \times years interaction is absent.

RESULTS :

Pooled results

(i) 3694 Kg/ha. (ii) 1117.1 Kg/ha. (based on 21 d.f. made up of pooled error and Treatments \times years
interaction). (iii) Treatment differences are not significant. (iv) Av. yield of Ginger in Kg/ha.

Treatment	T ₀	T ₁	T ₂	T ₃
Av. yield	3137	3991	3893	3757

Individual results

Treatments	T ₀	T ₁	T ₂	T ₃	Sig.	G.M.	S.E./plot
Years							
1960	3679	4882	4417	4454	N.S.	4358	1238.0
1961	2595	3100	3369	3059	N.S.	3031	1141.0
Pooled	3137	3991	3893	3757	N.S.	3694	1117.1

Crop :- Ginger (Kharif).

Ref :- M.P. 60(106), 61(85).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'D'.

Object :- To find out the best soil and seed-treatment for soft-rot disease of Ginger.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Vegetables. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of P₂O₅. (ii) Light *Sehra*. (iii) 6.6.60; 1.6.61. (iv) (a) 1 ploughing and 2 *bakherings*. (b) Planting. (c) 922 Kg/ha. (d) 30 cm. × 15 cm. (e) N.A. (v) 24.7 C.L./ha of F.Y.M. (vi) Local. (vii) Irrigated. (viii) 4 weedings and earthings. (ix) 97 cm; 55 cm. (x) 24.12.60; 9.2.61.

2. TREATMENTS :

4 fungicidal treatments T₀=Control, T₁=Soil treated with 0.3 % Diathane before sowing and monthly throughout rains, T₂=Seed treated with 0.1 % Cereson wet and T₃=Seed treated with 0.1 % Cereson and soil treated with 0.3 % Diathane before sowing and monthly throughout rains.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) and (b) 2.7 m. × 2.7 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Ginger yield. (iv) (a) 1960-61. (b) No. (c) Results of combined analysis have been presented under 5. - Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS:

Pooled results

(i) 2636 Kg/ha. (ii) 580.5 Kg/ha. (based on 2 d.f. made up of pooled error and Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of Ginger in Kg/ha.

Treatment	T ₀	T ₁	T ₂	T ₃
Av. yield	2434	2661	2952	2496

Individual results

Treatments	T ₀	T ₁	T ₂	T ₃	Sig.	G.M.	S.E./plot
Years							
1960	1516	1487	1486	1195	N.S.	1421	491.7
1961	3351	3834	4417	3797	N.S.	3850	634.0
Pooled	2434	2661	2952	2496	N.S.	2636	580.5

Crop :- Ginger (Kharif).**Ref :- M.P. 61(99).****Site :- Govt. Agri. Res. Farm, Chhindwara.****Type :- 'D'.****Object :-** To study the effect of fungicidal spraying against leaf-spot disease of Ginger.**1. BASAL CNNDITIONS :**

(i) (a) Nil. (b) Vegetables. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of P_2O_5 . (ii) *Sehra*. (iii) 1.6.61.
 (iv) (a) 1 ploughing and 2 *bakherings*. (b) Planting. (c) 922 Kg/ha. (d) 30 cm. × 15 cm. (e) N.A.
 (v) 24.7 C.L./ha. of F.Y.M. (vi) Local. (vii) Irrigated. (viii) 4 weedings. (ix) 110 cm. (x) 9.2.62.

2. TREATMENTS :

3 fungicidal treatments: T_0 =Control (2 plots), T_1 =Spraying of 0.3 % Cereson every month and
 T_2 =Spraying of 0.3 % Diathane every month.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) and (b) 2.7 m. × 2.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Ginger yield. (iv) (a) 1961—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1222 Kg/ha. (ii) 279.4 Kg/ha. (iii) Control vs. others is highly significant. (iv) Av. yield of Ginger in Kg/ha.

Treatment	T_0	T_1	T_2
Av. yield	994	1431	1469

C.D. for control vs. others = 316.0 Kg/ha.

Crop :- Ginger (Kharif).**Ref :- M.P. 62(51).****Site :- Govt. Agri. Res. Farm, Chhindwara.****Type :- 'D'.****Object :-** To find out the best seed-treatment for soft-rot disease of Ginger.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Vegetables. (c) 24.7 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N+22.4 Kg/ha. of P_2O_5 .
 (ii) *Sehra*. (iii) 15.6.62. (iv) (a) 1 ploughings and 2 *bakherings*. (b) Planting. (c) 922 Kg/ha.
 (d) 30 cm. × 15 cm. (e) N.A. (v) 24.7 C.L./ha. of F.Y.M. (b) Local. (vii) Irrigated. (viii) 4 weedings.
 (ix) 42 cm. (x) 30.1.63.

2. TREBTMENTS :

5 fungicidal treatments: T_0 =Control, T_1 =Diathane 0.3 %, T_2 =Cupravit 0.3 %, T_3 =Cereson wet 0.1 %
 and T_4 =0.3 % P.C.N.B.

The rhizome seeds were dipped for 20 minutes in fungicidal solutions, dried in shade and then planted.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 2.7 m. × 2.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Ginger yield. (iv) (a) 1962—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 4080 Kg/ha. (ii) 661 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Ginger in Kg/ha.

Treatment	T ₀	T ₁	T ₂	T ₃	T ₄
Av. yield	3987	4540	4430	3455	3987

Crop :- Ginger (Kharif).

Ref :- M.P. 62(58).

Site :- Govt. Agri. Res. Farm, Chhindwara.

Type :- 'D'.

Object :—To study the effect of fungicidal seed-treatments for Ginger.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Vegetables. (c) 24.7 C.L./ha. of F.Y.M. (ii) *Sehra*. (iii) 1.5.62. (iv) (a) 1 ploughing and 2 *bakherings*. (b) Planting. (c) 922 Kg/ha. (d) 30 cm. × 15 cm. (e) —. (v) 24.7 C.L./ha. of F.Y.M. (vi) Local. (vii) Irrigated. (viii) 4 weedings. (ix) 84 cm. (x) 31.1.63.

2. TREATMENTS :

4 fungicidal seed-treatments : T₀=Control, T₁=Diathane, T₂=Cupravit and T₃=P.C. N.B.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 12. (iv) (a) and (b) 2.7 m. × 2.7 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Ginger yield. (iv) (a) 1962—only. (b) and (c) —. (v) to (vii) Nil.

5. RESULTS :

(i) 1162 Kg/ha. (ii) 368.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Ginger in Kg/ha.

Treatment	T ₀	T ₁	T ₂	T ₃
Av. yield	1107	1041	1384	1118

Crop :- Onion (Rabi).

Ref :- M.P. 62(128), 63(65)

Site :- Govt. Agri. College Farm, Rewa.

Type :- 'M'.

Object :—To study the effect of application of N and P on the yield of Onion.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy ; Fallow. (c) N.A. ; Nil. (ii) Clay loam. (iii) 14.11.62 ; 30.11.63. (iv) (a) 7 ploughings/harrowings by mould-board soil turning/*Desi* plough followed by planking. (b) Transplanting. (c) —. (d) 23 cm. × 10 cm. (e) One. (v) Nil for 62 ; 247 Q/ha. of F.Y.M. applied before transplanting and mixed well in the soil for 63. (vi) Patna Red. (vii) Irrigated. (viii) Gap filling, 4 weedings and 5 to 6 hoeings. (ix) 27.7 cm. ; 0.5 cm. (x) 16.4.63 ; 30.4.64.

2. TREATMENTS :

All the the combinations of 1 and (2)

(1) 4 levels of N : N₀=0, N₁=56, N₂=112 and N₃=167 Kg/ha.

(2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=112 K/ha.

N as A/S in 62 and C/A/N in 63. Full P₂O₅, full N₁ and $\frac{1}{2}$ of N₂ and N₃ was applied before transplanting.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) 21.3 m. × 3.1 m. ; 26.2 m. × 3.7 m. (iii) 4. (iv) (a) 3.1 m. × 1.8 m. ; 3.7 m. × 2.4 m. (b) 2.9 m. × 1.8 m. ; 3.4 m. × 2.0 m. (v) One row on either side in both the years and 9.4 cm. in 62 and 15 cm. in 63 at both ends. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Spraying with 0.03% Parathion to control onion Thrips was done. (iii) Growth of plants, weight of plant and bulb, size of bulb, yield of bulb and grading of bulbs. (iv) (a) 1962—63. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years intreraction is a bsent.

5. RESULTS :

Pooled results

(i) 375.1 Q/ha. (ii) 59.6 Q/ha. (based on 49 d.f. made up of pooled error and Treatments × years interaction). (iii) Main effect of N is highly significant and that of P is significant. (iv) Av. yield of Onion in Q/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
P ₀	224.2	334.3	424.3	445.3	357.1
P ₁	241.2	377.7	474.1	479.2	393.1
Mean	232.7	356.0	449.2	462.3	375.1

C.D. for N marginal means = 42.3 Q/ha.

C.D. for P marginal means = 29.9 Q/ha.

Individual results

Treatments	N ₀	N ₁	N ₂	N ₃	Sig.	P ₀	P ₁
Years							
1962	266.7	389.5	437.9	456.1	**	362.5	412.6
1963	198.6	322.5	560.6	468.5	**	315.6	373.5
Pooled	232.7	356.0	449.2	462.3	**	357.1	393.1

Sig.	G.M.	S.E./plot
*	387.5	58.3
N.S.	362.5	57.3
*	375.1	59.6

Crop :- Onion (Rabi).

Ref :- M.P. 64(35).

Site :- Govt. Agri. College Farm, Rewa.

Type :- 'C'.

Object :- To study the effect of different dates and methods of planting on the growth and yeild on Onion.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Jowar. (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) 6 ploughings by mould-board/desi plough followed by planking and harrowing. (b) Transplanting after pruning as per treatments. (c) —. (d) 15 cm. × 10 cm. (e) One. (v) 89.6 Kg/ha. of N as A/S+154 Kg/ha. of P₂O₅ as Super. (vi) Early Grano. (vii) Irrigated. (viii) Weeding and hoeing. (ix) 5 cm. (x) 27.5.65.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 Dates of planting : $D_1=28.12.64$, $D_2=12.1.65$ and $D_3=27.1.65$.

(2) 4 Methods of planting : $M_0=Un-pruned$, $M_1=Top$ pruning, $M_2=Root$ pruning and $M_3=Top$ and root both pruned.

3rd Top or root or both were pruned. Seedling were 50 days old at transplanting.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) 13.8 m. \times 8.4 m. (iii) 4. (iv) (a) 3.0 m. \times 2.7 m. (b) 2.7 m. \times 2.4 m. (v) 15 cm. around the plot. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Ht. of plant, diameter of neck and bulb and yield of bulbs. (iv) (a) 1964-65 [Modified in 1965]. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 316.5 Q/ha. (ii) 5.91 Q/ha. (iii) Main effects of D and M are highly significant. (iv) Av. yield of Onion in Q/ha.

	M_0	M_1	M_2	M_3	Mean
D_1	485.6	580.8	393.0	483.7	485.7
D_2	247.3	202.9	254.0	252.1	239.1
D_3	269.0	231.6	222.3	176.3	224.8
Mean	334.0	338.4	289.8	304.0	316.5

C.D. for D marginal means = 4.26 Q/ha.

C.D. for M marginal means = 4.90 Q/ha.

Crop :- Onion (*Rabi*).

Ref. :- M.P. 65(32).

Site :- Govt. Agri. College Farm, Rewa.

Type :- 'C'.

Object :- To study by the effect of dates and methods of planting and age of seedlings on the growth and yield of Onion.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) As per treatments. (iv) (a) 6 ploughings by mould board plough followed by planking and harrowings. (b) Transplanting after pruning as per treatments. (c) —. (d) 10 cm. \times 10 cm. (e) One. (v) 134.4 Kg/ha. of N + 167 Kg/ha. of P_2O_5 + 224 Kg/ha. of K_2O . (vi) Pusa red. (vii) Irrigated. (iii) Weeding and hoeing. (ix) 2.3 cm. (x) 2.6.66.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 2 dates of planting : $D_1=1.12.65$ and $D_2=1.1.66$

(2) 2 age of seedlings : $S_1=4$ and $S_2=8$ weeks old seedlings.

(3) 2 types of pruning : $P_1=Top$ pruning and $P_2=Top$ and root pruning.

Pruning was done just before transplanting.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) 8.5 m \times 13.1 m. (iii) 4. (iv) (a) 3.7 m. \times 3.1 m. (b) 3.4 m. \times 2.7 m. (v) 15 cm. around the plot. (vi) Yes.

4 GENERAL :

(i) Good. (ii) Nil. (iii) Ht. of plant, diameter of neck and bulb and yield of bulbs. (iv) (a) 1964-65. [Modified in 1965]. (b) No. (c) Nil, (v) to (vii) Nil.

5 RESULTS :

(i) 357.6 Q/ha. (ii) 9.56 Q/ha. (iii) Main effects of D and S and interaction D×S are highly significant. (iv) Av. yield of Onion in Q/ha.

	D ₁	D ₂	S ₁	S ₂	Mean
P ₁	427.3	291.1	327.2	391.2	359.2
P ₂	422.4	289.8	324.3	387.8	356.0
Mean	424.8	290.4	325.7	389.5	357.6
S ₁	387.4	264.1			
S ₂	462.2	316.8			

C.D. for D or S marginal means=7.03 Q/ha.

C. D. for body of D×S table=9.94 Q/ha.

Crop :- Jowar Fodder (Kharif).

Ref :- M.P. 63(62), 64(38).

Site :- Govt. Agri. College Farm, Rewa.

Type :- 'GM'.

Object :-To study the effect of various levels of N and seed-rates on the growth and yield of *Jowar Fodder*.

1. BASAL CONDITIONS :

(1) (a) *Jowar (chari)*—Wheat. (b) Wheat. (c) N.A. (ii) Clay loam. (iii) 5.7.63 ; 24.6.64. (iv) (a) 3 ploughings by Tractor/Subash/Victory *deshi* plough followed by planking. (b) Broadcasting. (c) As per treatments. (d) and (e) —. (v) Nil. (vi) Local. (vii) and (viii) Nil. (ix) 76 cm ; 79 cm. (x) 18.9.63 ; 23.9.64.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 levels of N as A/S : N₀=0, N₁=28, N₂=56 and N₃=84 Kg/ha.

(2) 3 seed rates : S₁=22.4, S₂=44.8 and S₃=67.2 Kg/ha.

A/S applied at sowing.

3. DESIGN :

(i) Fact. in R. B. D. (ii) (a) 12. (b) 13.7 m. × 22.0 m. ; 12.8 m. × 22.0 m. (iii) 4. (iv) (a) 6.1 m. × 3.1 m. (b) 5.5 m. × 2.4 m. (v) 30 cm. around the plot. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil (iii) Yield of green fodder, height of plant, no. of nodes/plant no of leaves/plant. (iv) (a) 1963-64. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As error variances are heterogeneous and Treatments×years interaction is absent, results of individual years have been presented under 5.—Results.

5. RESULTS :

63(62)

(i) 54.6 Tonnes/ha. (ii) 9.1 Tonnes/ha. (iii) Main effect of N is highly significant and Main effect of S is significant (iv) Av. yield of green fodder in Tonnes/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
S ₁	42.3	41.1	55.5	56.2	48.8
S ₂	40.0	56.1	69.0	67.4	58.1
S ₃	54.3	56.5	57.0	59.2	56.8
Mean	45.5	51.2	60.5	60.9	54.6

C.D. for N marginal means=7.55 Tonnes/ha.

C.D. for S marginal means=6.55 Tonnes/ha.

64(38)

(i) 56.3 Tonnes/ha. (ii) 8.07 Tonnes/ha. (iii) Main effects of N and S are highly significant. (iv) Av. yield of green fodder in Tonnes/ha.

	N ₀	N ₁	N ₂	N ₃	Mean
S ₁	33.0	55.9	56.1	61.8	52.1
S ₂	46.4	56.5	71.5	70.6	61.3
S ₃	38.5	58.1	60.0	66.3	55.5
Mean	39.3	56.8	62.5	66.3	56.3

C.D. for N marginal means=6.71 Tonnes/ha.

C.D. for S marginal means=5.82 Tonnes/ha.

Crop :- Citrus.

Site :- Govt. Agri. College Farm, Rewa.

Ref :- M.P. 64(34).

Type :- 'D'.

Object:—To study the role of hormones in rooting of Citrus cuttings.

1. BASAL CONDITIONS :

(i) N.A. (ii) (a) Clay loam. (b) N.A. (iii) N.A. (iv) As per treatments. (v) to (x) N.A. (xi) 63.3 cm. (xii) N.A.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 species : S₁=Eurekalime, S₂=Kadilime and S₃=Rough lamon.

(2) 5 hormones : H₁=N.A.A., H₂=I.B.A., H₃=I.A.A., H₄=Seradix and H₅=No treatment.

Method : 0.5 gm. of each hormone was taken and dissolved in 95% alcohol to form a solution. This solution was mixed in 100 gm. of talcum powder to form a thick paste. Then it was dried under shade. Dry powder so formed was free from lumps. Plant material : Hard homogeneous cuttings of uniform size were taken from S₁, S₂, and S₃ treatments. Cutting were from mother plant of about 8 years.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 15. (b) N.A. (iii) 4. (iv) and (v) N.A. (vi) Yes.

4. GENERAL :

(i) and (ii) N.A. (iii) No of cuttings rooted, av. no. of roots/cutting, av. length of roots/cutting, callus formation and total no. of cuttings sprouted. (iv) (a) 1964—only. (b) —. (v) to (vii) Nil.

5. RESULTS :

(i) 43.1 %. (ii) 11.9 %. (iii) Main effects of M and S are highly significant. (iv) Av. percentage of cuttings rooted.

Treatment	H ₁	H ₂	H ₃	H ₄	H ₅	Sig	C.D.
Av. %	41.2	57.5	45.0	41.0	31.0	**	9.8
Treatment	S ₁	S ₂	S ₃	Sig	C.D.		
Av. %	41.8	35.0	52.5	**	7.6		

Crop :- Guava.

Ref :- M.P. 63(59).

Site :- Govt. Agri. College Farm, Rewa.

Type :- 'M'.

Object :— To study the effect of micro-nutrients with different doses of N on the developments, yield and quality of Guava.

1. BASAL CONDITIONS :

(i) Orchard of the College, 2 ploughings, weeding, making of *thalas* and irrigation channels. (ii) (a) Light sandy loam. (b) N.A. (iii) and (iv) N.A. (v) N.A., square system of planting, spacing 3.1 m. x 3.1 m. (vi) N.A. (vii) 1.4 Kg/tree of P₂O₅, applied in two instalments at an interval of one week. (viii) Weeding. (ix) Nil. (x) Irrigated. (xi) 78 cm. (xii) Jan./Feb., 1964.

2. TREATMENTS :

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

(1) 2 levels of N as A/S : N₁=0.2 and N₂=0.5 Kg/tree.

(2) 4 spraying micro-nutrients : M₁=0.6 % Ferrous sulphate, M₂=0.6 % copper sulphate, M₃=0.6 % Zinc sulphate and M₄=0.3 % Borax.

Micro-nutrients were applied in 2 doses at an interval of 15 days 1st before and 2nd after bud formation.

3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 3. (iv) (a) N.A. (b) One tree/plot. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) No. of flowers, yield of fruits/tree and chemical analysis of fruits. (iv) (a) 1963-only. (b) —. (v) to (vii) Nil.

5. RESULTS :

(i) 14.01 Kg/tree. (ii) 0.42 Kg/tree. (iii) Main effect of M is significant. (iv) Av. yield of fruits in Kg/tree.

Control=12.66 Kg/ha.

	M ₁	M ₂	M ₃	M ₄	Mean
N ₁	13.30	17.56	13.01	10.45	13.58
N ₂	14.67	18.50	13.69	12.32	14.81
Mean	13.98	18.03	13.35	11.38	14.18

C.D. fo. M marginal means=0.52 Kg/ha.

Crop :- Guava.**Ref :- M.P. 65(31).****Site :- Govt. Agri. College Farm, Rewa.****Type 'M'.**

Object:—To study the effect of micro-nutrients with different doses of N on the developments, yield and quality of Guava.

1. BASAL CONDITIONS :

(i) Orchard of the College, 2 plantings, weeding, making *thalas* and channeles. (ii) (a) Light sandy loam. (b) N.A. (iii) and (iv) N.A. (v) N.A. ; square system of planting ; spacing 3.0 m. × 3.0 m. (vi) N.A. (vii) 1.4 Kg/tree of P_2O_5 , in two instalments at an interval of 15 days 1st before and 2nd after bud formation. (viii) Weeding. (ix) Nil. (x) Irrigated. (xi) 52.6 cm. (xii) Jan. to March, 66.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 levels of N as A/S : $N_0=0$, $N_1=0.91$, $N_2=1.36$ and $N_3=1.81$ Kg/tree.

(2) 2 sprays of micro-nutrients : M_0 =Control (no spray) and M_1 =Spraying with micro-nutrients mixture.

The mixture contains copper, Zinc, Iron and Borax. 500 gm. Zinc Sulphate and 150 gm. each of Copper Sulphate, Ferrous Sulphate and Borax were mixed and 4-gm. of this mixture was dissolved in one liter of water. 2 sprays—1st before appearance and 2nd after opening of buds.

3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) N.A. (b) One tree/plot. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Fruit yield. (iv) (a) Yes, 1965 -only. (v) to (vii) Nil.

5. RESULTS :

(i) 44.58 Kg/tree. (ii) 2.5 Kg/tree. (iii) Main effects of N, M and interaction $N \times M$ are highly significant. (iv) Av. yield of fruits in Kg/tree.

	N_0	N_1	N_2	N_3	Mean
M_0	29.50	33.90	50.45	51.09	41.24
M_1	33.60	48.83	54.54	54.70	47.92
Mean	31.55	41.37	52.50	52.89	44.58

C.D. for N marginal means = 3.14 Kg/tree.

C.D. for M marginal means = 2.23 Kg/tree.

C.D. for body of table = 4.46 Kg/tree.

Crop :- Wheat and Gram (Rabi).**Ref :- M.P. 61(169), 62(134), 63(77).****Site :- Govt. Agri. Res. Stn., Adhartal.****Type :- 'X'.**

Object:—To study the economics of mixed sowing of Wheat and Gram with and without fertilizers under *Haveli* (bunded) conditions.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) Nov., 61, Nov., 62 and Nov., 63. (iv) (a) and (b) N.A. (c) 100 to 112 Kg/ha. (d) Rows 30 cm. apart. (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) N.A. (ix) 197 cm.; 94 cm.; 126 cm. (x) N.A.

2. TREATMENTS :

Main-plot treatments :

4 levels of fertilizers : F_0 =Control, F_1 =16.8 Kg/ha. of N as A/S, F_2 =22.4 Kg/ha. of P_2O_5 as Super and F_3 =16.8 Kg/ha of N as A/S+22.4 Kg/ha. of P_2O_5 as Super.

Sub-plot treatments :

6 crop mixtures : C_1 =Wheat alone, C_2 =Gram alone, C_3 = $\frac{1}{2}$ Wheat + $\frac{1}{2}$ Gram, C_4 = $\frac{1}{3}$ Wheat + $\frac{1}{3}$ Gram, C_5 = $\frac{1}{4}$ Wheat + $\frac{1}{4}$ Gram and C_6 =Full wheat + $\frac{1}{4}$ gram.

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) N.A. (v) N.A. (vi) Yes.

4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1961 63. (b) N.A. (c) Nil. (v) and (vi) Nil. (vii) Neither the plot-wise yield data nor the complete results were available.

5. RESULTS :

Av. money value of produce in Rs./ha.

Treatment	C_1	C_2	C_3	C_4	C_5	C_6	Sig.	F_0	F_1	F_2	F_3
Years											
1961	376	270	430	422	439	367	*	290	454	379	415
1962	343	162	318	336	340	360	*	292	273	278	397
1963	181	145	181	195	193	210	*	176	195	167	198

Sig.	S.E./main-plot	S.E./Sub-plot	G.M.
*	162.6	92.6	384
*	81.3	54.6	310
*	33.2	44.2	184

Crop :- Cotton, Groundnut and Tur (*Kharif*).

Ref :- M.P. 64(56).

Site :- Institute of Plant Industry, Indore.

Type :- 'X'.

Object :- To study the effect of mixed cropping on the yield of Cotton and to find out the economics of produce.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Linsced. (c) N.A. (ii) Black cotton soil. (iii) 30.6.64. (iv) (a) Ploughings and *bakharings*. (b) Dibbling. (c) 9.1 Kg/ha for Cotton. (d) As per treatments (e) 3 to 4 cotton seeds/hole. (v) N.A. (vi) Cotton Badnawar - 1, Tur -1.P.I.-6, Groundnut—AK-12-24. (vii) Unirrigated. (viii) 3 to 4 weedings and interculturings. (ix) 94 cm. (x) 15.1.65, 15.3.65, 8.3.65.

2. TREATMENTS :

10 crop mixtures : T_1 =Cotton alone, rows 45 cm. apart, T_2 =Cotton and Groundnut 1:1, rows 30 cm. apart, T_3 =Cotton and Groundnut 1:1, rows 37.5 cm, apart, T_4 =Cotton and Groundnut 1:1, rows 45 cm. apart, T_5 =Cotton and Tur 3:1, T_6 =Cotton and Groundnut 3 : 1, T_7 =Cotton and Groundnut 6:2, T_8 =Cotton and Tur 6:2, T_9 =Groundnut alone and T_{10} =Tur alone.

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 10.8 m. × 7.0 m. (b) 43.2 Sq. metres. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) Nil. (iii) Yield of *Kapas*, Groundnut pods and *Tur* grain. (iv) (a) 1964—only. (b) and (c) (v) Khargone. (vi) and (vii) Nil.

5. 5. RESULTS :

(i) 280 Rs/ha. (ii) 79.5 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. money value of produce in Rs/ha.

Treatment	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀
Av. produce	160	342	279	354	300	270	297	327	261	203

C.D.=92.5 Rs/ha.

Crop :- Cotton, Groundnut, Tur and Maize (Kharif).

Ref :- M.P. 65(29).

Site :- Institute of Plant Industry, Indore.

Type :- 'X'.

Object :--To study the effect of mixed cropping on the yield of Cotton and to find out the economics of produce.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Linseed. (c) N.A. (ii) Heavy black cotton soil. (iii) 29.6.65. (iv) (a) Ploughing and *bakherings*. (b) Dibbling. (c) 9 to 16 Kg/ha. for cotton. (d) As per treatments. (e) 3 to 4 cotton seed/hole. (v) Nil. (vi) Cotton—Badnawar ; Groundnut AK -12—24. (vii) Unirrigated. (viii) 3 to 4 weedings and interculturings. (ix) 54 cm. (x) 20.1.66.

2. TREATMENTS :

12 crop mixtures : T₁=Cotton alone, rows 45 cm. apart, T₂=Cotton and Groundnut 1 : 1, rows 30 cm. apart, T₃=Cotton and Groundnut 1 : 1, rows 37.5 cm. apart, T₄=Cotton and Groundnut 1 : 1, rows 45 cm. apart, T₅=Cotton and *Tur* 3 : 1. T₆=Cotton and Groundnut 3 : 1 T₇=Cotton and Groundnut 6 : 2, T₈=Cotton and *tur* 6 : 2, T₉=Cotton and Maize 2 : 1, T₁₀=Groundnut alone, T₁₁=*Tur* alone and T₁₂=Maize alone.

3. DESIGN :

(i) R B.D. (ii) (a) 12 (b) N.A. (iii) 4. (iv) (a) and (b) 10.8 m. × 7.0 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Insecticides sprayed. (iii) Yield of *Kapas*, Groundnut pods, *Tur* and Maize grain. (iv) (a) 1965—N.A. (b) No. (c) Nil. (v) Khargone. (vi) and (vii) Nil.

5. RESULTS :

(i) 242 Rs/ha. (ii) 64.6 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. money value of produce in Rs/ha.

Treatment	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Av. produce	204	278	390	316	195	261	317	230
	T ₉	T ₁₀	T ₁₁	T ₁₂				
	102	396	145	75				

C.D.=93.0 Rs/ha.

Crop :- Cotton, Groundnut and Tur (Kharif).

Ref :- M.P. 63(81).

Site :- Regional Res. Stn., Khargone.

Type :- 'X'.

Object :- To study the effect of mixed cropping on the yield of Cotton and to find out the economics of produce.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Light black Cotton soil. (iii) N.A. (iv) (a) *Bakherings* and ploughings. (b) Dibbling for cotton. (c) 16 Kg/ha. for cotton. (d) Plants 45 cm. apart and rows as per treatments. (e) 3 to 4 cotton seeds/hole. (v) Nil. (vi) Groundnut - AK -12-24, Cotton - Maljari, Tur - local. (vii) Unirrigated (viii) 3 to 4 weedings and interculturings. (ix) 73 cm. (x) N.A.

2. TREATMENTS :

8 crop mixtures : T_1 = Cotton alone, T_2 = Cotton and Groundnut 1 : 1, T_3 = Cotton and Tur 3 : 1, T_4 = Cotton and Groundnut 3 : 1, T_5 = Cotton and Groundnut 6 : 2, T_6 = Cotton and Tur 6 : 2, T_7 = Groundnut alone and T_8 = Tur alone.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 7.2 m. x 6.1 m. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Yield of *Kapas*, Groundnut pods and Tur grain. (iv) (a) 1963 - only. (b) and (c) -. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1033 Rs/ha. (ii) 150.8 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. money value of produce in Rs/ha.

Treatment	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
Av. produce	1259	1080	1056	1332	1194	1112	505	728

C.D. = 176.8 Rs/ha.

Crop :- Cotton, Groundnut and Tur (Kharif).

Ref :- M.P. 64(58).

Site :- Regional Res. Stn., Khargone.

Type :- 'X'.

Object :- To study the effect of mixed cropping on the yield of Cotton and to find out the economics of produce.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Light black cotton soil. (iii) 2.7.64. (iv) (a) Ploughings and *bakherings*. (b) Dibbling for cotton. (c) 16 Kg/ha. for cotton. (d) Plants 45 cm. apart and rows as per treatments. (e) 3 to 4 cotton seeds/hole. (v) Nil. (vi) Cotton - Maljari, Groundnut AK -12-24, Tur - local. (vii) Unirrigated. (viii) Weeding and interculturing. (ix) 66 cm. (x) N.A.

2. TREATMENTS :

10 crop mixtures ; T_1 = Cotton alone, rows 45 cm. apart, T_2 = Cotton and Groundnut 1 : 1, rows 37.5 cm. apart, T_3 = Cotton and Groundnut 1 : 1, rows, 37.5 cm. apart, T_4 = Cotton and Groundnut 1 : 1, rows 45 cm. apart, T_5 = Cotton and Tur 3 : 1, T_6 = Cotton and Groundnut 3 : 1, T_7 = Cotton and Groundnut, 6 : 2, T_8 = Cotton and Tur 6 : 2, T_9 = Groundnut alone and T_{10} = Tur alone.

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 10.8 m. x 7.0 m. (b) 7.2 m. x 6.1 m. (v) 180 cm. x 45 cm. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of *Tur* grain, cotton, *Kapas* and Groundnut pods. (iv) (a) 1964—only. (b) and (c) —. (v) Indore. (vi) and (vii) Nil.

5. RESULTS:

- (i) 638 Rs/ha. (ii) 114.2 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. money value of produce in Rs/ha.

Treatment	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀
Av. produce	637	786	830	645	601	577	494	532	546	732

C.D.=132.8 Rs/ha.

Crop :- Cotton, Groundnut, Tur and Maize (*Khavif*).

Ref :- M.P. 65(28).

Site :- Reg. Res. Stn., Khargone.

Type :- 'X'.

Object: —To study the effect of mixed cropping on the yield of Cotton and to find out the economics of produce

1. BASAL CONDITIONS :

- (i) (a) to (c) N.A. (ii) Light black cotton soil. (iii) 1.7.65. (iv) (a) Ploughings and *bakherings*. (b) Dibbling for cotton. (c) 16 Kg/ha. for cotton. (d) Plants 45 cm. apart and rows as per treatments. (e) 3 to 4 cotton seeds/hole. (v) N.A. (vi) Cotton—Maljari. (vii) Unirrigated. (viii) Weeding and interculturing. (ix) 38 cm. (x) Cotton—1.12.65, Groundnut—29.10.65, *Tur*—30.12.65.

2. TREATMENTS :

12 crop mixtures: T₁=Cotton alone, rows 45 cm, apart, T₂=Cotton and Groundnut 1 : 1, rows 30 cm. apart, T₃=Cotton and Groundnut 1 : 1, rows 37.5 cm. apart, T₄=Cotton and Groundnut 1 : 1 rows 45 cm. apart, T₅=Cotton and *Tur* 3 : 1, T₆=Cotton and Groundnut 3 : 1 T₇=Cotton and Groundnut 6 : 2, T₈=Cotton and *Tur* 6 : 2, T₉=Cotton and Maize 2 : 1 T₁₀=Groundnut alone. T₁₁=*Tur* alone and T₁₂=Maize alone.

3. DESIGN :

- (i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10.8 m. × 7.0 m. (b) 9.9 m. × 6.1 m. (v) 45 cm. × 45 cm. (vi) Yes.

4. GENERAL :

- (i) Poor. (ii) Insecticides sprayed. (iii) Yield of *Kapas*, Groundnut pods, *Tur* and Maize grain. (iv) (a) 1965—only. (b) and (c) —. (v) Indore. (vi) and (vii) Nil.

5. RESULTS :

- (i) 122 Rs/ha. (ii) 39.7 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. money value of produce in Rs/ha.

Treatment	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Av. produce	177	74	91	174	165	129	159	154
	T ₉	T ₁₀	T ₁₁	T ₁₂				
	141	108	47	51				

C.D.=57.2 Rs/ha.

Crop :- Wheat, Gram, Peas and Toria (Rabi).

Ref :- M.P. 60(139), 61(103).

Site :- Govt. Soil Cons. Res. Stn., Phanda.

Type :- 'X'.

Object :-—To study the effect on the yield of Wheat when sown alone and with a mixture of legume.

1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black cotton soil. (iii) 9.10.60 ; 24.11.61. (iv) (a) One ploughing and 4 *bakherings*. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. × 8 cm. (e) N.A. (v) Nil. (vi) Wheat—HY—65. (vii) Unirrigated. (viii) Nil. (ix) 3 cm. ; 5 cm. (x) 9.3.61 ; 9.4.62.

2. TREATMENTS :

6 crop mixtures : C₁=Wheat alone, C₂=Wheat in rotation with Gram, C₃=Gram alone, C₄=Wheat and Gram in the ratio of 3 : 2, C₅=Peas in the ratio of 3 : 2 and C₆=Wheat and Toria in the ratio of 3 : 2.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 11.3 m. × 6.3 m. (b) 10.1 m. × 5.0 m. (v) 61 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959—61. (b) No. (c) Results of combined analysis have been presented under 5. Results. (v) N.A. (vi) Nil. (vii) Expt. no. 59(116) has also been included while combining the results. Error variances are heterogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results :

(i) 261 Rs/ha. (ii) 106.9 Rs/ha. (based on 5 d.f. made up of Treatments × years interaction. (iii) Treatment differences are significant. (iv) Av. money value of produce in Rs/ha.

Treatment	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆
Av. produce	315	325	125	278	264	258

C.D.=112.1 Rs/ha.

Individual results

Treatments	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	Sig.	G.M.	S.E./plot
Years									
1960	172	176	113	164	147	184	*	159	26.8
1961	419	469	127	368	361	284	**	338	57.2
Pooled	315	325	125	278	264	258	*	261	106.9

Crop :- Rotation with Paddy (Kharif and Rabi).

Ref :- M.P. 60(87), 61(59), 62(39).

Site :- Govt. Agri. Res. Stn., Raipur.

Type :- 'R'.

Object :-—To find out the economics of growing late Paddy alone as against medium Paddy followed by Utera crops.

1. BASAL CONDITIONS :

(i) (a) and (b) As per treatments. (c) N.A. (ii) Kanhar for 60 dorsa for 61, 62. (iii) Paddy (16.7.60), *Lakh*, *Urid* and Linseed (7.11.60), Wheat and Gram (3.12.63) for 60 ; Paddy (N.A.), *Lakh* (27.10.61), *Urid* Linseed, Wheat and gram (2.11.61) for 61 ; Paddy (26.6.62), *Lakh* (30.10.62), *Urid*, Linseed (6.11.62), Wheat and Gram (11.11.62) for 62. (iv) (a) 3 ploughings and levellings. (b) Broadcasting for Paddy. (c) 90 Kg/ha. for Paddy. (d) and (e) —. (v) 7 C.L./ha. of F.Y.M. (vi) Medium Paddy—116 ; late Paddy—Luchai × Gurmetia × Burma for 60 ; cross B—2 for others. (vii) Irrigated. (viii) Biasi operation and one hand weeding for Paddy. (ix) 88 cm. ; 143 cm. ; 64 cm. (x) Paddy—16.11.60 ; 3.11.61 ; 21.11.62, others crops—N.A. N.A., 6—8.3.63.

2. TREATMENTS :

8 crops: C₀=Medium Paddy alone, C₁=Medium Paddy followed by *Lakh*, C₂=Medium Paddy followed by *Urid*, C₃=Medium Paddy followed by Linseed, C₄=Medium Paddy followed by Wheat with out manure, C₅=Medium Paddy followed by Wheat with manure 22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P₂O₅ as Super, C₆=Medium Paddy followed by Gram and C₇=Late Paddy followed by *Lakh*.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) —. (iii) 6. (iv) (a) 4.9 m. × 10.7 m. (b) 4.3 m. × 9.1 m. (v) 30 cm. × 76 cm. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1960—62. (b) No for 60, yes for others (c) Results of combined analysis have been presented under 5.—Results. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is present.

5. RESULTS :

Pooled results

(i) 597 Rs/ha. (ii) 179.1 Rs/ha. (based on 14 d.f. made up of Treatments × years interaction). (iii) Treatment differences are significant. (iv) Av. money value of produce in Rs/ha.

Treatment	C ₀	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇
Av. produce	501	597	577	517	661	689	550	688

C.D.=128.1 Rs/ha.

Individual results :

Treatments	C ₀	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	Sig	G.M.	S.E./plot
Years											
1960	467	499	581	518	587	569	556	618	**	549	66.4
1961	719	932	833	751	961	1003	765	1118	**	885	102.2
1962	316	360	316	283	436	496	329	329	**	358	43.7
Pooled	501	597	577	517	661	689	550	688	*	597	179.1

LIST OF PUBLICATIONS
OF
**NATIONAL INDEX OF AGRICULTURAL
FIELD EXPERIMENTS**

Volume No.	Region	Part 1 (1948-53)		Part 2 (1954-59)	
		No. of pages	Price per copy (Excl. postage)	No. of pages	Price per copy (Excl. postage)
1.	Andhra Pradesh	386	Rs. 12.00	510	Rs. 12.80
2.	Assam	87	Rs. 4.00	152	Rs. 6.80
3.	Bihar	303	Rs. 9.75	933	Rs. 21.85
4.	Gujarat	185	Rs. 6.75	444	Rs. 9.25
5.	Kerala	204	Rs. 7.25	292	Rs. 8.05
6.	Madhya Pradesh	357	Rs. 11.25	554	Rs. 13.70
7.	Tamil Nadu	436	Rs. 13.25	466	Rs. 11.70
8.	Maharashtra	886	Rs. 25.00	1035	Rs. 24.25
9.	Mysore	467	Rs. 14.00	866	Rs. 20.45
10.	Orissa	70	Rs. 3.50	213	Rs. 6.30
11.	Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir	672	Rs. 19.50	799	Rs. 19.20
12.	Rajasthan	84	Rs. 4.00	213	Rs. 6.20
13.	Uttar Pradesh	1274	Rs. 35.75	1724	Rs. 42.10
14.	West Bengal	226	Rs. 7.75	297	Rs. 8.15
15.	Central Institutes	348	Rs. 11.00	666	Rs. 16.50
Complete set (excluding postage)			Rs. 184.75		Rs. 227.30

For copies, please write to :

The Chief Administrative Officer,

INSTITUTE OF AGRICULTURAL RESEARCH STATISTICS

(I. C. A. R.)

Library Avenue, New Delhi-110012

Swan Press of Lahore, Delhi-6.