NATIONAL INDEX

OF

AGRICULTURAL

FIELD

EXPERIMENTS

VOL. 5 PART 3

KERALA

1960 65

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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.

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

NEW DELHI,  
The present set of volumes forms Part III in the series of compendia of Agricultural Field Experiments being published under the project of National Index of 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 one 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) Myore, (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. Saksena, M.L. Sahni, S.L. Garg, R.K. Jain, H.G. Jain, G.V.S.R. Krishna, J.K. Kapoor, D.P. Singh, Mahender Singh, Kuldip Singh and S.S. Kautala, statistical staff of the Institute deserve special 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

New Delhi,
January 1, 1974

( I. C. A. R. )
### Regional Supervisors and Regional Staff of the National Index of Field Experiments

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Region &amp; Headquarters</th>
<th>Statistical Staff from the Institute of Agricultural Research Statistics</th>
<th>Regional Supervisor</th>
</tr>
</thead>
</table>
| 1.      | Andhra Pradesh (Hyderabad) | 1. Shri C. H. Rao  
2. Shri G. V. S. R. Krishna  
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 |
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. Kutualia | 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  
| 8.      | Mysore (Bangalore) | 1. Shri K. A. Balakrishnan  
2. Shri P. T. N. Namibiar | 1. Dr. N. P. Patil, Director of Research  
2. Shri A. Mishra, Chief Statistician |
| 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 Prades, 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  

11. Rajasthan (Jaipur)  
   1. Shri N. K. Ohri  
   2. Shri C. H. Rao  

12. Tamil Nadu (Coimbatore)  
   1. Shri P. Narayanan  
   2. Shri M. V. George  

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  

14. West Bengal (Calcutta)  
   1. Shri A. K. Mukherjee  
   2. Shri A. Sinha  

1. Shri P. S. Sahota,  
   Director of Crop Insurance  
2. Shri Darshan Singh,  
   Asst. Statistician  
3. Shri M. S. Pannu,  
   Statistician, Department of Agriculture  
4. Dr. D. Raghavarao,  
   Prof. & Head, Dept. of Maths. & Stat., P.A.U., Ludhiana  
1. Shri H. C. Kothari,  
   Dy. Director (Statistics),  
   Department of Agriculture  
1. Shri K. R. Nagaraja Rao,  
   Secretary, Research Council  
2. Dr. K. Ramakrishnan,  
   Associate Dean  
3. Dr. D. Daniel Sundaraman,  
   Principal  
1. Dr. K. Kishen, Jr. Director  
   of Agriculture (Statistics)  
2. Shri K. P. Avasthy,  
   Officer-on-Special Duty  
1. Shri S. N. Mukherjee,  
   Dy. Director of Agriculture (Statistics)
ABBREVIATIONS COMMON TO EXPERIMENTS ON ANNUAL AND PERENNIAL CROPS AND EXPERIMENTS ON CULTIVATORS’ FIELDS GIVEN IN EXPERIMENTAL DATA

Crop:—In the top left corner, is given the name of the crop on which the experiment is conducted. Within brackets alongside 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
5. H.P. — Himachal Pradesh 15. Pb. — Punjab
8. K. — Kerala 18. Tr. — Tripura
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. P. R. I. — Central Potato Research Institute.
C. R. R. I. — Central Rice Research Institute.
C. T. C. R. I. — Central Tuber Crops Research Institute.
C. T. R. L. — Cotton Technological Research Laboratory.
I. A. R. I. — Indian Agricultural Research Institute.
I. H. R. — Institute of Horticultural Research.
I. L. R. I. — Indian Lac Research Institute.
J. T. R. L. — Jute Technological Research Laboratory.
S. B. I. — Sugarcane Breeding Institute.

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

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

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

<table>
<thead>
<tr>
<th>Other abbreviations used in the Experimental Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kg</td>
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<tr>
<td>Kg/ha.</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>P</td>
</tr>
<tr>
<td>K</td>
</tr>
<tr>
<td>Amm. Phos.</td>
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<tr>
<td>A/S</td>
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<tr>
<td>A/S/N</td>
</tr>
<tr>
<td>C/A/N</td>
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<tr>
<td>A/N</td>
</tr>
<tr>
<td>A/C</td>
</tr>
<tr>
<td>C/N</td>
</tr>
<tr>
<td>Mur. Pot.</td>
</tr>
<tr>
<td>Pot. Sul.</td>
</tr>
<tr>
<td>Super.</td>
</tr>
</tbody>
</table>

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

PARTICULARS OF RESEARCH STATIONS

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

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

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

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

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

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

A. For experiments on annual crops:

(i) (a) Crop rotation followed, if any. (b) Previous crop. (c) Manuring of previous crop (State amount and kind). (ii) Soil type. (iii) Date of sowing/planting. (iv) Cultural practices: (a) Preparatory cultivation. (b) Method of sowing. (c) Seed rate. (d) Spacing. (e) No. of seedlings per hole. (f) 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. (f) Date of sowing/planting. (g) Irrigated or un-irrigated. (h) Important post-sowing/planting cultural operations such as weeding, etc. (i) Rainfall during crop season. (j) Date of harvest.

DESIGN

A. For experiments on annual crops:

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

B. For experiments on perennial crops:

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

C. For experiments on cultivators' fields:

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

A. For experiments on annual crops:

(i) General crop condition during growth (if lodged, state date of lodging). (ii) Incidence of pests and diseases and control measures taken, if any. (iii) Types of quantitative observations taken. (iv) (a) If the experiment has continued for more than one year indicate year of commencement and year of termination. (b) Whether treatments assigned to the same plots every year. (c) Reference to combined analysis, if any. (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 cultivators’ fields:

(i) General crop condition during growth. (ii) Incidence of pests and diseases and control measures taken, if any. (iii) Types of quantitative observations taken. (iv) In case of repetition in successive years. (a) Year of commencement and termination. (b) Whether treatments assigned to the same plots every year. (c) Reference to combined analysis, if any. (v) In case of repetition at other places, give names with references, if any. (vi) Abnormal occurrences such as heavy rains, drought, etc. (viii) Any other important information.
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<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Crop</th>
<th>Botanical Name</th>
<th>Assamese</th>
<th>Bengali</th>
<th>Oriya</th>
<th>Telugu</th>
<th>Tamil</th>
<th>Malayalam</th>
<th>Kannada</th>
<th>Marathi</th>
<th>Gujarati</th>
<th>Hindi</th>
<th>Punjabi</th>
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</thead>
<tbody>
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<td>Paddy</td>
<td>Oryza sativa L.</td>
<td>Dhan</td>
<td>Dhan</td>
<td>Dhano</td>
<td>Vadiu</td>
<td>Nel</td>
<td>Nellu</td>
<td>Bhatta</td>
<td>Bhat</td>
<td>Dangar</td>
<td>Dhan</td>
<td>Chawal</td>
</tr>
<tr>
<td>2</td>
<td>Red gram</td>
<td>Cajanus cajan Milsp</td>
<td>Arhar</td>
<td>Arhar</td>
<td>Harad</td>
<td>Kandulu</td>
<td>Thuvurai</td>
<td>Thuvarai</td>
<td>Thogari</td>
<td>Tur</td>
<td>Tuver</td>
<td>Harhar</td>
<td>Arhar</td>
</tr>
<tr>
<td>3</td>
<td>Black gram</td>
<td>Phaseolus mungo Var. radiatus Linn</td>
<td>Matimah</td>
<td>Mashkalai</td>
<td>Biri</td>
<td>Minumulu</td>
<td>Uzhundu</td>
<td>Uzhunnu</td>
<td>Uddu</td>
<td>Adid</td>
<td>Udad</td>
<td>Urd</td>
<td>Masha</td>
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<tr>
<td>4</td>
<td>Cowpea</td>
<td>Vigna Catenia wlp, Vigna sinensis Savl</td>
<td>Lasaramah</td>
<td>Barbadi</td>
<td>Baragadi</td>
<td>Bobbarlu</td>
<td>Thapatayaru</td>
<td>Mambayar</td>
<td>Alasande</td>
<td>Chavali</td>
<td>Chola, Choli</td>
<td>Lobia</td>
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<td>5</td>
<td>Bhindi</td>
<td>Hibiscus esculentus ; Acalypha esculentus Moench</td>
<td>Bhendi</td>
<td>Dhenrosh</td>
<td>Vendi</td>
<td>Benda</td>
<td>Bendai kai</td>
<td>Venda</td>
<td>Bende kay</td>
<td>Bhendi</td>
<td>Bhidda</td>
<td>Bhindi</td>
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<td>6</td>
<td>Sweet Potato</td>
<td>Ipomoea baratas Lam</td>
<td>Mitha aloo</td>
<td>Mithilalu</td>
<td>Kanda mola</td>
<td>Chilagadadumpa</td>
<td>Seeni Kilangu</td>
<td>Cheeni Kizangu</td>
<td>Genasu</td>
<td>Ratalu</td>
<td>Shakari</td>
<td>Shakar-Kandi</td>
<td>Shakar-Kandi</td>
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<td>Tapioca</td>
<td>Manihot utilissima ; Manihot esculenta Crantz</td>
<td>Simolu</td>
<td>Shimalalu</td>
<td>Karru Pendalamu</td>
<td>Maravalli Kizhangu</td>
<td>Kouchi Kizhangu</td>
<td>Mara cheeni</td>
<td>Marage matsu</td>
<td>Tapioca</td>
<td>—</td>
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<td>Sugarcane</td>
<td>Saccharum officinarum L.</td>
<td>Kubi</td>
<td>Akh</td>
<td>—</td>
<td>Cheruku</td>
<td>Karumbu</td>
<td>Karinbu</td>
<td>Kabbu</td>
<td>Oos</td>
<td>Shevidi</td>
<td>Ganna; Kadam; Nainakhar</td>
<td>Ganna; Eekh</td>
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<tr>
<td>9</td>
<td>Tobacco</td>
<td>Nicotiana tabacum L.</td>
<td>Dhopat</td>
<td>Tamak</td>
<td>Uapantra</td>
<td>Pogaku</td>
<td>Pugayilai</td>
<td>Pakuylia</td>
<td>Hoghoppu</td>
<td>Tambaku</td>
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<tr>
<td>10</td>
<td>Groundnut</td>
<td>Arachis hypogaea L.</td>
<td>China Badam</td>
<td>Cheena badam</td>
<td>Neiahanaga, Verusenaga</td>
<td>Nilakadalai</td>
<td>Nilaka dalai</td>
<td>Kada kalei</td>
<td>Bhirmug</td>
<td>Bhoising</td>
<td>Magasfali</td>
<td>Mungfali</td>
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</tr>
<tr>
<td>11</td>
<td>Gingelly</td>
<td>Sesamum indicum L. ; Sesamum orientale L.</td>
<td>Til</td>
<td>Til</td>
<td>Rasi</td>
<td>Nuvvulu</td>
<td>Ellu</td>
<td>Ellu</td>
<td>Yelli</td>
<td>Til, Tili</td>
<td>Tal</td>
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<tr>
<td>12</td>
<td>Pepper</td>
<td>Piper nigrum L.</td>
<td>Jaluk</td>
<td>Golmarich</td>
<td>Golmarich</td>
<td>Milaghi</td>
<td>Milaghi</td>
<td>Kuru mukku</td>
<td>Kurne asu</td>
<td>Miri</td>
<td>Mari</td>
<td>Kali mirach</td>
<td></td>
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<tr>
<td>13</td>
<td>Ginger</td>
<td>Zingiber officinale Rosc.</td>
<td>Ada</td>
<td>Ada</td>
<td>Ada</td>
<td>Allam</td>
<td>Inji</td>
<td>Inchi</td>
<td>Shunti; Aila</td>
<td>Ale</td>
<td>Adu</td>
<td>Adrakh</td>
<td>Kali mirach</td>
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GLOSSARY OF VERNACULAR NAMES OF CROPS

| GLOSSARY OF VERNACULAR NAMES OF CROPS |

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KERALA

(Salient features of experimentation)

The general information regarding the agro-climatic regions, extent of irrigation, normal cropping pattern etc., of the state of Kerala is available in the volumes of the first and second series of the N.J.F.E. already published for the periods of 1948—53 and 1954—59 respectively.

This volume includes the results of 612 experiments conducted during the period 1960-65, as against 402 experiments for the period 1954-59 and 238 for the period 1948-53. Besides, results of experiments conducted under the All India Co-ordinated Agronomic Experiments scheme 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 246 and forming 93 groups, have been presented with crop-wise type-wise distribution in Table 1 below:

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<th>C</th>
<th>CV</th>
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<td>1(3)</td>
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<td>1(3)</td>
<td>6(14)</td>
<td>9(25)</td>
<td>93(246)</td>
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N.B.: Figures in brackets 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 138 and 208 respectively, have also been presented. The distribution of all the experiments according to crop and type of treatments is given in Table 2 below:

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Out of the total experiments reported for the period 1960-65, 63% were conducted on Paddy crop, about 17% on spices like Pepper and Ginger and medicinal plants like Eucalyptus, Vanilla and Vettiver, about 12% on perennial crops like Banana, Coffee, Rubber and Coconut and remaining on cash, vegetable and pulse crops.

Manurial and manurial-cum-varietal experiments accounted for about 59.6% of the total number of experiments while cultural and cultural-cum-varietal trials accounted for about 23.4%. Experiments with irrigational treatments and those with pesticides and fungicides accounted for about 4% and 8% respectively.

The salient features of experimentation on the important crops are as follows:

**Paddy**: Paddy is the most important crop of the state. It covered about 45% of the total cropped area of the state (i.e. 1,121 thousand hectares out of 2,489 thousand hectares of total cropped area). Out of total of 612 experiments conducted as many as 385 were on paddy. Of these 59% were of purely manurial type.

About 65% of experiments on paddy were conducted under rainfed conditions. Varieties like PTB-20, PTB-2, PTB-23 and VR-19 were mostly used under rainfed conditions while PTB-32, PTB-10 and PTB-12 were the important varieties used under irrigated conditions.

Randomised Block Design was commonly adopted for experimentation. Out of 285 experiments laid out in R.B.D., 56 contained 2 or more factors among the treatments. Split-plot design and confounded designs were adopted in the case of 61 and 36 experiments respectively. 44 of the experiments laid out in different designs had 2 to 3 replicates while 244 had 4 to 5 replications. The experiments with 5 to 8 replications numbered 97. The size of net-plot varied from 6 Sq. meters to 81 Sq. meters. Several experiments with N, P\textsubscript{2}O\textsubscript{5} and K\textsubscript{2}O fertilizers have been conducted and the levels of N tried ranged upto 67 Kg/ha., while those of P\textsubscript{2}O\textsubscript{5} and K\textsubscript{2}O extended upto 50 Kg/ha. Results of experiments conducted to find out the effect of split application of N, various sources of N, P\textsubscript{2}O\textsubscript{5} and K\textsubscript{2}O, different levels of lime for correcting the acidity in the soils, micronutrients, several bulky organic manures etc. have been included in this volume.

Besides the above, results of experiments with different cultural practices like interculturing, methods of sowing/planting, plant spacings, seed rates, irrigational practices and of those to control the pests and diseases, have been included in the present volume.

**Spices**: Pepper and Ginger are the main spice crops on which 59 experiments have been reported. In all 22 experiments were reported on Pepper crop. Of these as many as 19 were with cultural treatments such as number of diggings round the vines, pruning of vines, number of vines per standard etc. Experiments were conducted both under irrigated and rainfed conditions. All the 17 experiments reported on Ginger crop were conducted under rainfed conditions. Most of these were of manurial type and cultural type.

**Fruit crops**: 47 experiments were reported on fruit crops like Banana (16), Pineapple (6) and Coconut (23). About 67% of the experiments were of manurial type, 21% of cultural type and the remaining of cultural-cum-manurial type.

Levels of N and P\textsubscript{2}O\textsubscript{5} tried in different experiments on Banana extended upto 72 Kg/ha., while that of K\textsubscript{2}O ranged upto 142 Kg/ha. Maximum levels of N, P\textsubscript{2}O\textsubscript{5} and K\textsubscript{2}O tried in the experiments were 180, 80 and 320 Kg/ha., respectively on Pineapple, and 0.5 Kg/tree 0.38 Kg/tree and 1.4 Kg/tree respectively on Coconut. Results of experiments with different dates of planting, spacings between and within plants, size of suckers on Banana and those with varying number of diggings, intercultivation operations etc. in case of Coconut are included in the present volume.
**PARTICULARS OF RESEARCH STATIONS AND SOIL ANALYSIS**

1. Central Horticultural Research Station/Agricultural Research Station, Ambalavayal.

   **A. General Information:**
   
   (i) In S. Wynad taluka of Calicut district, 100 km. from Calicut Rly. Stn. with Lat.-11°4'N, Long.-76°3' E./Alt.-1003 m. The farm is of 112 ha. in extent of which nearly 22 ha. is plain ground. The remaining area is covered by 4 small hills of 91 m. to 122 m. height. (ii) It represents hilly tract and it is rich in humus. (iii) Established in 1947. (iv) Perennial crops. (v) Research work on fruits, spices and essential oils is being undertaken.

   **B. Normal Rainfall:**

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
<td>2.8</td>
<td>2.0</td>
<td>2.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Month</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24.9</td>
<td>17.2</td>
<td>9.8</td>
<td>8.4</td>
<td>7.6</td>
<td>19.0</td>
<td>5.6</td>
</tr>
</tbody>
</table>

   (Av. fortnightly rainfall in cm. based on the data for the period 1960-65).

   **C. Irrigation and Drainage Facilities:**

   (i) No irrigation facilities are available. (ii) There is no problem of drainage. There is only lack of water.

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

   (i) Depth—1.22 m. to 1.83 m.; Colour—Light red; Structure—Laterite. (ii) Chemical analysis: N.A. (iii) Mechanical analysis: Clay—16.0%; Fine sand—50.0%; Silt—8.9%; and coarse sand—25.1%.

2. Agronomic Research Station, Chalakudi.

   **A. General Information:**

   (i) In Mukundapuram taluka of Trichur district. The field is situated about 4 km. from Chalakudy Rly. Stn. on the Chalakudy-Sholayar route and about 14 km. away and interior to the above route. The area is predominantly sandy loam and in some pockets it has red lateritic soil. (ii) It represents plain tract. (iii) Established in May, 1962. (iv) Paddy—paddy—pulses of green manure. (v) Agronomic research in irrigated areas.

   **B. Normal Rainfall:**

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.0</td>
<td>—</td>
<td>—</td>
<td>7.1</td>
<td>32.9</td>
<td>96.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Month</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>105.3</td>
<td>24.0</td>
<td>23.9</td>
<td>42.8</td>
<td>27.4</td>
<td>13</td>
<td>362.7</td>
</tr>
</tbody>
</table>

   (The period on which the figures are based, is June, 1961 to May 1967).
Plantation crops: Experiments on plantation crops included Rubber and Coffee crops numbering 14 and 12 respectively. Most of these experiments were of manural type.

The levels of N tried in the experiments on Coffee varied from 45 to 220 Kg/ha, while those of $P_2O_5$ and $K_2O$ ranged from 30 to 150 Kg/ha and 40 to 220 Kg/ha, respectively.

In the case of experiments conducted on Rubber, levels of N ranged from 0 to 67 Kg/ha, and those of $P_2O_5$ and $K_2O$ from 0 to 89 Kg/ha.
C. Irrigation and Drainage Facilities:

(i) (a) and (b): Irrigation with Chalakudy irrigation project from the inception of the station. (ii) Proper drainage system exists.

D. Soil type and Soil analysis:

(i) Depth—Shallow; Colour—Ash colour; Structure—coarse. (ii) Chemical analysis and (iii) Mechanical analysis: N.A.

E. No. of Experiments:

Paddy—8; Total=8.

3. Agronomic Research Station, Coyalmannam.

A. General Information:

(i) In Alathur taluka of Palghat district. The experimental area is situated in more or less uniform and level area with facilities for controlling the inflow and outflow of water. (ii) Sandy loam tract of Palghat district. (iii) Established in 1963. (iv) Paddy—Paddy. (v) Research includes studies on water requirement of paddy, increased fertilizer application, cropping pattern for the area and yardsticks for estimating increased production due to improved agricultural practices.

B. Normal Rainfall:

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>—</td>
<td>—</td>
<td>12.0</td>
<td>8.1</td>
<td>27.6</td>
<td></td>
</tr>
<tr>
<td>32.1</td>
<td>47.2</td>
<td>34.7</td>
<td>42.4</td>
<td>31.9</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>246.7</td>
</tr>
</tbody>
</table>

(Av. monthly rainfall in cm. based on the data for the period 1964-66)

C. Irrigation and Drainage Facilities:

(i) (a) Irrigation facilities are available. (b) N.A. (ii) No proper drainage system exists.

D. Soil type and Soil analysis:

(i) Depth—Shallow; Colour—Brown. (ii) Chemical analysis in %: Moisture—0.78; Total N—0.0734; Acid soluble silica—2.7; Total P<sub>2</sub>O<sub>5</sub>—0.068; Total K<sub>2</sub>O—0.221; Total CaO—0.0669; Fe₂O₃—8.9 and Organic carbon—0.427; pH—5.2. (iii) Mechanical analysis in %: Coarse sand—37.80; Fine sand—35.80; Silt—6.80 and Clay—12.60%.

E. No. of Experiments:

Paddy—12; Total=12.

4. Integrated Seed Development Farm/Oilseed Research Station, Eruthempathy.

A. General Information:


B. Normal Rainfall:

Information—N.A.

C. Irrigation and Drainage Facilities:

(i) (a) Irrigation facilities are available but not adequate. (b) By tanks, 4 in number. (ii) No, but the necessity is limited to an area of 3 ha. only.
D. Soil type and Soil analysis:
(i) Red loam and Black cotton soil. (ii) Chemical analysis in %; Organic carbon 7.35, P<sub>2</sub>O<sub>5</sub> 1.2 to 17.8 (Low); K<sub>2</sub>O 9.6 to 14.4 (Medium) and pH 7.0 to 10. (iii) Mechanical analysis: N.A.

E. No of Experiments:
Gingelly—2, Groundnut—5; Total=7.

5. Coffee Demonstration Farm, Kalpetta.
A. General Information:
(i) Kozhikode district, neerast Rly. Stn. is Kozhikode with Lat. between 11°30' N—11°35' N/Long. between 76°E-76°5'E. (ii) It represents typical Coffee tract. (iii) Established in 1958, (iv) Planted with Coffee Arabica and Robusta. (v) Field trials on promising Coffee varieties and agronomic and plant protection practices.

B. Normal Rainfall:
Total Annual rainfall: 250 cm, to 330 cm. Details-N.A.

C. Irrigation and Drainage Facilities:
(i) No irrigation facilities. (ii) Soils are well drained.

D. Soil type and Soil analysis:
(i) Soil type—Lateritic with loam; Depth—6.1 to 7.6 m. (ii) Chemical analysis:—Available N—Medium; P<sub>2</sub>O<sub>5</sub>—Low; K<sub>2</sub>O—Medium. (iii) Mechanical analysis:—N.A.

E. No. of Experiments:
Coffee—10; Total=10.

6. Tobacco Research Station, Kanhangad.
A. General Information:
(i) In Hovdurg taluka of Cannanore district, with Lat.-12.5°N/Long.-76°E/Alt.-Sea level. The topography of the experimental area is plain. (ii) It represents sea coastal tract. (iii) Established in 1959. (iv) May to Sept.—Paddy crop; Nov. to March—Tobacco crop. (v) The cultural, manurial and varietal types of experimental research were done.

B. Normal Rainfall:
Total annual rainfall is about 305 cm.

C. Irrigation and Drainage Facilities:
(i) Ponds are dug out and hand pot watering done. (ii) No drainage system.

D. Soil type and Soil analysis:
(i) Depth—2.44 to 3.05 m.; Colour—White; Structure—Sandy. (ii) Chemical analysis: N.A. (iii) Mechanical analysis: Top soil—Coarse sand 64%; Fine sand 28%; Silt—4%. Clay 4%. Sub-soil—Coarse sand 73%; Fine sand 19%; Silt 1%; Clay 6%.

E. No. of Experiments:
Tobacco—13; Total=15.
7. Regional Rice Research Station, Kayamkulam.

A. General Information:

(i) In Karthikappally taluka of Alleppey district, 1 Km. from Kayamkulam Rly. Stn. with Lat.-9°8’N/Long.-76°3’E/Alt.-3 m. Levelled topography. (ii) It represents tract of sandy and sandy loam soils. (iii) Year of establishment N.A. (iv) Two paddy crops and one sesameum. (v) Breeding work on rice, manurial trials and pesticidal trials.

B. Normal Rainfall:

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.7</td>
<td>41.6</td>
<td>44.4</td>
<td>20.9</td>
<td>30.2</td>
<td>20.2</td>
<td>9.2</td>
<td>13.8</td>
<td>22.8</td>
<td>204.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Av. monthly rainfall in cm based on the data for the period 1960-65).

C. Irrigation and Drainage Facilities:

(i) Irrigational facility—N.A. (ii) A canal exists, but it does not provide adequate drainage facility.

D. Soil type and Soil analysis:

(i) Broad soil type: Sandy loam. (ii) Chemical analysis: Available Nitrogen 0.1% (low), Available Phosphorus 20% (medium), Available Potash 80% (low); pH Value 5.9 (normal). (iii) Mechanical analysis: N.A.

E. No. of experiments:

Paddy—83; Total=83.

8. Oil Seeds Research Station, Kayamkulam.

A. General Information:

(i) and (ii) Same as Regional Rice Research Station, Kayamkulam. (iii) Established in 1957. (iv) Paddy-paddy-sesamum. (v) Breeding of improved varieties for higher yield, resistant to diseases and pests and organic experiments to find out the most economic, cultural and manurial practices.

B. Normal Rainfall and C. Irrigation and Drainage Facilities:

Same as Regional Rice Research Station, Kayamkulam.

D. Soil type and Soil analysis:

(i) Soil type—Sandy loam. (ii) Chemical analysis: Available N 0-10% (low), Available \( P_2O_5 \) 20% (medium), Available \( K_2O \) 80% (low), pH 5-0 (normal). (iii) Mechanical analysis: N.A.

E. No. of Experiments:

Gingelly—2; Total=2.

9. Rice Research Station, Kottarakara.

A. General Information:


B. Normal Rainfall:

Information—N.A.
C. **Irrigation and Drainage Facilities**:

(i) Irrigation facilities—N.A. (ii) There is proper drainage system.

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

(i) Depth—1.83 m., Colour—Red lateritic, Structure—Loam. (ii) Chemical analysis and (iii) Mechanical analysis: Information—N.A.

E. **No. of Experiments**:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Experiments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>24</td>
</tr>
<tr>
<td>Rubber</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
</tr>
</tbody>
</table>

10. **Rubber Research Institute of India, Kottayam.**

A. **General Information**:

<table>
<thead>
<tr>
<th>Malankara estate</th>
<th>Manikkal Estate</th>
<th>Pudukad Estate</th>
<th>Vaikundam Estate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malankara</td>
<td>Mundakkayam</td>
<td>Palapilly</td>
<td>Kulaekkaram</td>
</tr>
<tr>
<td>(i) District</td>
<td>Idikki</td>
<td>Kottayam</td>
<td>Trichur</td>
</tr>
<tr>
<td>Nearest</td>
<td>Alwaye</td>
<td>Pudukad</td>
<td>Kanyakumari</td>
</tr>
<tr>
<td>Railway Station</td>
<td>Kottayam</td>
<td>Trivandrum</td>
<td>(Tamil Nadu)</td>
</tr>
<tr>
<td>Topography</td>
<td>Moderately</td>
<td>Moderately</td>
<td>Undulating</td>
</tr>
<tr>
<td></td>
<td>undulating</td>
<td></td>
<td>undulating</td>
</tr>
<tr>
<td>(ii) Type of tract</td>
<td>Kottayam, Ernakulam and Trichur Part</td>
<td>Kanyakumari Tract.</td>
<td></td>
</tr>
<tr>
<td>(iii) Established</td>
<td>1956</td>
<td>1956</td>
<td>1956</td>
</tr>
<tr>
<td>(iv) Cropping pattern</td>
<td>Rubber Plantation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) Programme of research. To study the optimum levels of Nitrogen, Phosphorus and Potassium for Rubber (Hevea brasiliensis).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations:—Latex yield, annual girth increment and bark renewal.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. **Normal Rainfall**:

| (Av. annual rainfall) | 282.3 cm. | 221.0 cm. | 247.7 cm. | 171.9 cm. |

C. **Irrigation and Drainage Facilities**:

(i) and (ii) N.A. (Rubber is grown purely as a rainfed crop)

D. **Soil type and soil analysis**.

<table>
<thead>
<tr>
<th>Laterite loam type</th>
<th>Laterite soil</th>
<th>Laterite clay</th>
<th>Lateritic gravelly loam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad soil</td>
<td>0.140%</td>
<td>N.A.</td>
<td>0.111%</td>
</tr>
<tr>
<td>Chemical analysis:</td>
<td>0.162%</td>
<td>2.33 mg./100 gm.</td>
<td>0.73 mg./100 gm. soil</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>0.13 mg./100 gm.</td>
<td>100 gm. soil</td>
<td>4.71 mg.</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>15.75 mg.</td>
<td>10.22 mg.</td>
<td>14.00 mg.</td>
</tr>
<tr>
<td>Potassium</td>
<td>2.30 mg./100 gm.</td>
<td>100 gm. soil</td>
<td></td>
</tr>
<tr>
<td>(iii) Mechanical analysis:</td>
<td>N.A.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

E. **Number of Experiments**:

| Rubber | 14 | Total | 14 |
11. Regional Coconut Research Station, Kamarakom.

A. General Information:
   (i) In Kottayam taluka of Kottayam district, 110 Km. from Kottayam Rly. Stn. Consists of
       lands alternated by channels. (ii) It represents the backwater area of Kuttanad. (iii) Established
       in 1958. (iv) Perennial coconut palms alone were cultivated on single row land and double
       row lands. (v) Research on the Agronomical and other aspects of cultivation of coconut
       palms.

B. Normal Rainfall:
   2.7 — 4.5 4.5 39.0 47.5 28.9 24.2 17.4 4.0 9.0 18.8 200.5

(Av. monthly rainfall in cm. based on the data for the year 1965)

C. Irrigation and Drainage Facilities:
   (i) No irrigations are done as the water level is only 0.6 m. to 0.9 m. below soil level,
       (ii) Channels act as drainage.

D. Soil type and Soil analysis:
   (i) Broad Soil type: Clayey, Depth—1.2 m. Colour—Black,
   (ii) Chemical analysis: pH.—5.2, Loss on ignition—0.2%, CaO.—0.009%, P_{2}O_{5}—
       0.009%, K_{2}O—0.004%.
   (iii) Machanical analysis: N.A.

E. No. of Experiments:
   Coconut—18 ; Total=18.

12. Banana Research Station, Mannuthy/Banana & Pineapple Research Station, Kannara/Banana Research Station Trichur.

A. General Information:
   (i) In Trichur taluka of Trichur district, 22.7 Km. from Trichur Rly. Stn. with Lat.—10°
       N./Long.—76° E./Alt.—90 m. The topography of the experimental area is slightly sloping terraced
       land. (ii) Irrigated land tract. (iii) Established in 1962. (iv) Experiments on Banana
       and Pineapple repeated in site. (v) To evolve improved varieties and fix up improved
       cultural and manurial practices for banana and pineapple.

B. Normal Rainfall:
   1 2 1 2 1 2 1 2 1 2 1 2 1 2
   — — — — 0.4 0.2 1.1 1.7 1.9 6.3 9.8 3.3 10.7 7.8

   1 2 1 2 1 2 1 2 1 2 1 2
   7.0 5.4 5.5 4.2 2.5 6.0 2.4 0.8 1.3 0.4 79.9

(Av. fortnightly rainfall in cm. based on the data for the period 1964-65).

C. Irrigation and Drainage Facilities:
   (i) Lift irrigation from river. (ii) Drainage provided.

D. Soil type and Soil analysis:
   (i) Soil type-Black loam, Colour-Gray, Structure-Loamy.
   (ii) Chemical analysis:

<table>
<thead>
<tr>
<th></th>
<th>Organic Carbon %</th>
<th>Av. P_{2}O_{5} in Kg/ha.</th>
<th>Av. K_{2}O in Kg/ha.</th>
<th>pH.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>0.38</td>
<td>20</td>
<td>72</td>
<td>5.7</td>
</tr>
<tr>
<td>Subsoil</td>
<td>25</td>
<td>24</td>
<td>72</td>
<td>6.2</td>
</tr>
</tbody>
</table>

   (ii) Machanical analysis: N.A.

E. No. of Experiments:
   Pineapple—6, Banana—15 ; Total=21.
13. Regional Rice Research Station, Mannuthy.

A. General Information:

(i) In Trichur taluka of Trichur district with Lat.-10.5° N./Long.-76.2° E./Alt.-20.5 m. The lands are situated at slightly higher level than the usual double crop lands. Two crops are being raised at present with the help of irrigation from the Peechi irrigation system. (ii) It represents central portion of the middle lateritic belt. (iii) Established in 1957. (iv) The normal cropping pattern consists of raising a medium duration first crop which is usually sown by broadcast followed by a transplanted medium duration second crop. Season:—First crop:—April-August; 1nd crop:—Sept.—January. (v) To evolve improved varieties of rice suitable for cultivation in the central portion of the middle lateritic region of Kerala with special reference to high yield, resistance to lodging and pests and diseases. (2) To fix up optimum manurial and cultural schedules for the rice crop of this tract.

B. Normal Rainfall:

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
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<td>1 2</td>
<td>1 2</td>
<td>1 2</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>0.7</td>
<td>1.6</td>
<td>0.2</td>
<td>1.9</td>
<td>1.9</td>
<td>3.3</td>
</tr>
<tr>
<td>Aug.</td>
<td>9.1</td>
<td>25.6</td>
<td>31.3</td>
<td>24.9</td>
<td>46.6</td>
<td>39.1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>28.1</td>
<td>13.8</td>
<td>15.0</td>
<td>12.1</td>
<td>16.5</td>
<td>18.1</td>
<td>9.3</td>
</tr>
</tbody>
</table>

(Av. fortnightly rainfall in cm, based on the data for the period 1960-65).

C. Irrigation and Drainage Facilities:

(i) & (b) Irrigation water is available from Peechi. Irrigation system from July to Dec.; Since 1954. (ii) Yes. (Floods occur sometimes during the south-west monsoon season.)

D. Soil type and Soil analysis:

(i) Broad soil type: N.A. Depth-30 to 45 cm., Colour-Reddish brown. (ii) Chemical analysis: Available N-0.65% (medium), available P<sub>2</sub>O<sub>5</sub>-29.0 Kg./ha. (medium), available K<sub>2</sub>O-41.6 Kg./ha. (Low), pH 5.3, T.S.S. conductivity mm. hos./cm. 0.2 (Normal). (iii) Mechanical analysis: (Analysed in 1964 at the depth of 22 cm.): Coarse sand-41.7%, Fine sand-12.2%, Silt-5.2%, Clay-49.1%.

E. No. of Experiments:

Paddy—83; Total=83.

14. Tuber Research Station, Mannuthy.

A. General Information:

(i) and (ii) Same as Regional Rice Research Station, Mannuthy. (iii) Year of establishment, N.A.; since 1963 under I C.A.R. (iv) Sweet Potato and Tapioca are the main crops. (v) Agronomic experiments on tuber crops.

B. Normal Rainfall and C. Irrigation and Drainage Facilities:

Same as Regional Rice Station, Mannuthy.

D. Soil type and Soil analysis:

Information—N.A.

E. No. of Experiments:

Sweet Potato—7, Tapioca—2; Total=9.

15. Regional Rice Research Station, Moncompu.

A. General Information:

(i) In Kuttanad taluka of Alleppey district, 16 Km. from Changanachery Rly. Stn. with Lat-9° N./Long.-76° E./Alt.-1.9 m. It is Coastal area and the fields are in uniformly levelled condition. (ii) Low lying paddy area of Kuttanad tract. (iii) Established in 1940. (iv) One
crop of paddy raised during the second crop season (Aug.-Sept. to Feb.-March). (v) Evolving varieties suitable to the tract (Breeding) and finding out solutions to the various problems related to Rice culture of the tract. (Agronomical, Entomological and Pathological).

B. Normal Rainfall:

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
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<tbody>
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<td>1-5</td>
<td>0-3</td>
<td>1-8</td>
<td>2-5</td>
<td>0-6</td>
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<table>
<thead>
<tr>
<th>Month</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
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<td>2</td>
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<td></td>
<td>40-3</td>
<td>25-2</td>
<td>23-4</td>
<td>13-9</td>
<td>20-4</td>
<td>15-3</td>
<td>2-2</td>
</tr>
</tbody>
</table>

(Av. fortnightly rainfall in cm, based on the data for the period 1960-65).

C. Irrigation and Drainage Facilities:

(i) (a) and (b) Irrigation is made possible by canals. (ii) There is a proper drainage system.

D. Soil type and Soil analysis:

(i) Broad soil types: Alluvial clay soil, Depth—Deep. Colour—Greyish Black, Structure—Continuous structure. (ii) Chemical analysis: Organic Carbon-0.97%, available P<sub>2</sub>O<sub>5</sub>-2.2 Kg/ha., available K<sub>2</sub>O-44.8 Kg/ha., pH-4.5. (iii) Mechanical analysis: Clay 57-8%, Silt-22.0%, Fine sand-17.4%, Sand-2.5%.

E. No. of Experiments:


16. Regional Coconut Research Station, Neyyattinkara.

A. General Information:

(i) In Neyyattinkara taluka of Trivandrum district, 18 Km. from Trivandrum Central Rly, Stn. with Lat.-Between 8° and 9° N./Long.-77° E./Alt.-92 M. The entire area is not in one level, therefore the area is terraced. The soil is deep red loam. Water table is very low. (ii) Deep red loamy soil tract. (iii) Established in 1963. (iv) The crop of the station is coconut only and the normal cropping pattern consists of giving a general digging of the soil once in a year with the onset of the south west monsoon. The application of fertilizers is generally in circular trenches taken round the tree about 1.5 m. from the base of the tree which is also done along with digging. (v) The programme of work in the station consists of conducting manurial and cultural and inter-cropping experiments to solve problems confronting the coconut cultivation of region.

B. Normal Rainfall:

188 cm, in 1971. Details-N.A.

C. Irrigation and Drainage Facilities:

(i) No irrigation facilities are available at present. (ii) As the entire area has been well terraced and divided into plots and no rain water from outside the area is divided into the plots, no separate drainage system is required.
D. Soil type and Soil analysis:

(i) Broad soil types—Loamy; Depth—1-5 m., Colour—Red.

(ii) Chemical analysis:

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Organic Carbon</th>
<th>Available P&lt;sub&gt;2&lt;/sub&gt;O&lt;sub&gt;5&lt;/sub&gt;</th>
<th>Available K&lt;sub&gt;2&lt;/sub&gt;O</th>
<th>pH</th>
<th>TSS</th>
<th>Bag No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>number.</td>
<td>%</td>
<td></td>
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<tr>
<td>5906</td>
<td>0.17</td>
<td>4</td>
<td>20</td>
<td>5-9</td>
<td>0.1</td>
<td>I B I</td>
</tr>
<tr>
<td>5907</td>
<td>L</td>
<td>L</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5908</td>
<td>0.23</td>
<td>4</td>
<td>20</td>
<td>5-9</td>
<td>0.1</td>
<td>2 B 2</td>
</tr>
<tr>
<td>5909</td>
<td>L</td>
<td>L</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5910</td>
<td>0.20</td>
<td>6</td>
<td>Tr.</td>
<td>5-8</td>
<td>0.1</td>
<td>3 B 4</td>
</tr>
<tr>
<td>5911</td>
<td>L</td>
<td>L</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5912</td>
<td>0.22</td>
<td>10</td>
<td>16</td>
<td>5-9</td>
<td>0.1</td>
<td>6 B 6</td>
</tr>
<tr>
<td>5913</td>
<td>L</td>
<td>L</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5914</td>
<td>0.22</td>
<td>10</td>
<td>25</td>
<td>5-9</td>
<td>0.1</td>
<td>9 R 3</td>
</tr>
</tbody>
</table>

Rating of Organic Carbon relates to Nitrogen. L—Low; M—Medium; N—Normal, Tr.—Traces.

(iii) Mechanical analysis: N.A.

E. No. of Experiments:

Lemongrass—16, Vettiver—8; Total—24.
A. General Information:

(i) In Ottappalam taluka of Palghat district, 1 Km. from Pattambi Rly. Stn. with Lat.-10°4’ N. (Long. -76°12’ E. Alt. 25.4 m. The experimental area comprised of Palliyallands where only one crop of paddy is cultivated, double crop paddy lands where two crops of paddy are raised and in some areas a third crop over and above the two crops is raised (ii) It represents Lateritic loam tract. (iii) Established in 1927. (iv) In Palliyal lands only one crop of paddy is raised in the rainy season from June to Sept. This is followed by a green manure crop. In the double crop lands, two crops of paddy are raised. A portion of the land will be put under pulses after the harvest of second crop. In a small area a third crop of paddy is also raised from Feb. to April (v) (a) To evolve improved varieties of paddy suitable for all tracts of Kerala with special reference to high yield, resistance to pests, diseases and lodging. (b) Agronomic trials to fix up optimum manurial and cultural schedules. (c) Plant protection trials to control various diseases, pests and weeds in paddy crop.

B. Normal Rainfall:

<table>
<thead>
<tr>
<th></th>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>44.5</td>
<td>31.3</td>
<td>28.1</td>
<td>15.2</td>
<td>12.5</td>
<td>9.3</td>
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<td>15.2</td>
<td>14.9</td>
<td>9.3</td>
<td>9.0</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>3.5</td>
<td>1.3</td>
<td>287.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Av. fortnightly rainfall in cm. based on the data for the period 1960-65).

C. Irrigation and Drainage Facilities:

(i) (a) and (b): Irrigation facilities available to a limited extent from tanks for the third crop. Irrigation facilities available from the beginning of the farm in 1927. (ii) There is proper drainage system.

D. Soil type and Soil analysis:

(i) Depth—Shallow soils, Colour—Red, Structure—Lateritic loam. (ii) Chemical analysis:

<table>
<thead>
<tr>
<th></th>
<th>Wet Land</th>
<th>Dry Land</th>
<th>Wet Land</th>
<th>Dry Land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Moisture</td>
<td>2.32</td>
<td>2.17</td>
<td>0.210</td>
<td>0.292</td>
</tr>
<tr>
<td>Organic matter</td>
<td>10.06</td>
<td>9.35</td>
<td>0.269</td>
<td>0.407</td>
</tr>
<tr>
<td>Sand</td>
<td>57.40</td>
<td>58.40</td>
<td>0.046</td>
<td>0.050</td>
</tr>
<tr>
<td>Iron Oxide</td>
<td>11.52</td>
<td>10.73</td>
<td>0.120</td>
<td>0.198</td>
</tr>
<tr>
<td>Alumina</td>
<td>16.78</td>
<td>18.57</td>
<td>0.0062</td>
<td>0.0113</td>
</tr>
<tr>
<td>Lime</td>
<td>0.001</td>
<td>0.018</td>
<td>0.0036</td>
<td>0.0114</td>
</tr>
<tr>
<td>Magnesia</td>
<td>0.068</td>
<td>0.085</td>
<td>pH. value</td>
<td>7.4</td>
</tr>
</tbody>
</table>

(iii) Mechanical analysis:

<table>
<thead>
<tr>
<th></th>
<th>Wet Land</th>
<th>Dry Land</th>
<th>Wet Land</th>
<th>Dry Land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Moisture</td>
<td>2.33</td>
<td>2.17</td>
<td>7.6</td>
<td>7.34</td>
</tr>
<tr>
<td>Fine gravel and sand</td>
<td>11.07</td>
<td>10.40</td>
<td>20.32</td>
<td>21.08</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>18.44</td>
<td>19.25</td>
<td>22.40</td>
<td>29.80</td>
</tr>
</tbody>
</table>

E. No. of Experiments:

Paddy—121; Total=121.
19. Agricultural Research Station, Pillilode.

A. General Information:

(ii) In Hosdrug taluka of Kannanore district, 2.4 Km. from Nileshwar Rly. Stn. with Lat.-11° 15' N./Long.-75° 10' E./Alt.-8.23 m. Well laid out levelled plots with even fertility gradient. The plots bounding the eastern portion is inunduated during south-west monsoon, which is drained out by a network of drainage channels. (iii) Red sandy loam in the coastal tract of Northern Kerala (Malabar area). (iii) Established in 1916. (iv) Coconut-subsidiary crops raised annually in non experimental plots. (v) Coconut improvement by breeding and selection and formulation of improved agronomic practices for coconut cultivation by field experiments.

B. Normal Rainfall:

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0.8</td>
<td>0.2</td>
<td>0.1</td>
<td>0.6</td>
<td>0.6</td>
<td>1.1</td>
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<tr>
<td></td>
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<td>2</td>
<td>3</td>
<td>3.3</td>
<td>4.6</td>
<td>42.0</td>
</tr>
<tr>
<td></td>
<td>6.0</td>
<td>2</td>
<td>45.6</td>
<td>6.2</td>
<td>0.5</td>
<td>374.8</td>
</tr>
</tbody>
</table>

(Av. fortnightly rainfall in cm. based on the data for the period 1960-65).

C. Irrigation and Drainage Facilities:

(i) (a) and (b) Facilities exist to irrigate a portion of the farm. (ii) Open drains.

D. Soil type and Soil analysis:

(i) Depth-3.5 to 7 m., Colour-Red, Structure-Loose porous soil. (ii) Chemical analysis: Moisture: 0.6% to 1.11%; Loss on ignition: 1.74% to 3.00%; Insolubles: 80.1% to 98.1%; Lime: 0.02% to 0.06%; Potash: 0.12% to 0.75%; Total P₃O₅: 0.43% to 0.92%; total Nitrogen: 0.029% to 0.049%; pH: 5.5 to 6.4. (iii) Mechanical analysis: N.A.

E. No. of Experiments:

Coconut-4; Total=4.

20 Pulse Research Station, Sasthamcottah.

A. General Information to D. Soil type and Soil analysis:

Information: N.A.

E. No. of Experiments:

Red gram-1, Black gram-1, Cow pea-1, Mixed Cropping-1; Total=4.


A. General Information:

(i) In Taliparamba taluka of Kannanore district, 17 Km. from Pappinimari Rly. Stn. with Lat.-12.2° N./Long.-74.5° E./Alt.-45 M. The experimental area is undulated and situated in slightly slopey areas in some cases and levelled land in other cases. Where the land is slopey, terracing of the land has been done. (ii) Red laterite tract of the sub-mountain region of
Canannore district and is representative of the conditions of West Coast. (iii) Established in 1905. (iv) Perennial crops like Mango, Jack, Coconut, Pepper, Cocoa, Nutmeg, Calve Cinnamon etc. and seasonal crops like Pineapple, Banana, Chillies, vegetables, Paddy, Gingelly, Horsegram etc. are grown. Paddy is grown during the South West monsoon season. Chillies and vegetables are grown both in the South-West monsoon season and as irrigated crop in summer season as well. (v) Research work on the following aspects of fruit crops are undertaken. (1) Root-stock trials on mango. (2) Hybridization work on Mango and selection of hybrids. (3) Jack root stock trial. (4) Sapota rootstock trials.

**B. Normal Rainfall:**

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall (cm)</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall (cm)</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>2.1</td>
<td>2.4</td>
<td>8.7</td>
</tr>
</tbody>
</table>

(Av. fortnightly rainfall in cm. based on the data for the period 1960-65).

**C. Irrigation and Drainage Facilities:**

(i) (a) and (b): Irrigation facilities are available for wet land from the inception of the farm from a river. The young plants and nurseries are irrigated by means of wells. (ii) There are drainage channels provided in the areas where ever necessary.

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

(i) Depth—1.8 to 2.7 m., Colour—Red, Structure—Gravelly in most areas and sandy loam in wet land. (ii) Chemical analysis and (iii) Mechanical analysis: N.A

**E. No. of Experiments:**

Paddy—1 : Total—1.

**22. Pepper Research Station, Taliparamba.**

**A. General Information:**

(i) In Taliparamba taluka of Cannanore district, 23 Km. from Pappinissery Rly. Stn. with Lat.—12.2° N./Long.—between 74° 5′ E. and 77° 22′ E./Alt.—30.3m. The topography is lateritic hill tops with undulating slopes. (ii) Partially hilly. (iii) Established in Dec., 1949. (iv) Only the perennial crop Pepper is cultivated in the station. The rooted cuttings of pepper vine are planted to the standards of Ery-thrina Indica. After a period of three years growth the planted cuttings may start to bear fruit. The longevity of the vine may extend from 15 to 30 years. (v) The scheme is proposed to investigate the botanical and agronomical aspects of the pepper crop with a view to improve its cultivation in Kerala State.

**B. Normal Rainfall:**

Same as Agriculture Research Station, Taliparamba.

**C. Irrigation and Drainage Facilities:**

(i) (a) and (b): No irrigation facilities are available. Pepper is a rainfed crop. (ii) Proper drainage system exists.
D. Soil type and Soil analysis:
   (i) Broad soil types: Laterite: Depth—61 cm to 122 cm; Colour—Red; Structure—Well drained sandy loam. 
   (ii) Chemical analysis: Total Calcium CaO. 0.145%, Total Potash (K$_2$O) 3.392%, Available K$_2$O 0.0145%, Total Phosphoric acid (P$_2$O$_5$) 0.215%, Available P$_2$O$_5$ 0.0145%, N 0.321%. 
   (iii) Mechanical analysis: Moisture 6.23%, Clay 68.16%, Silt 6.29%, Fine sand 7.99%, Coarse sand 12.71%, Loss on ignition 20.82.

E. No. of Experiments:
   Pepper—9; Total=9.

23. Sugarcane Research Station, Thiruvala.

A. General Information:
   (i) In Alleppey district, 8 Km. from Tiruvalla Rly. Stn. with Lat.—9° N./Long.—76° E./ Alt.—3 m. The general topography of the experimental area is even. 
   (ii) It represents Laterite loam tract. 
   (iii) Established in 1956. 
   (iv) Sugarcane after sugarcane (two cane crops—fallow—sugarcane).

B. Normal Rainfall:

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<td>1</td>
<td>1</td>
<td>315.1</td>
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<tr>
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<td>2.1</td>
<td>0.5</td>
<td>2.7</td>
<td>4.2</td>
<td>1.5</td>
<td>4.7</td>
<td>7.0</td>
<td>8.3</td>
<td>11.0</td>
<td>23.6</td>
<td>25.6</td>
<td>19.0</td>
<td></td>
</tr>
</tbody>
</table>

   (Av. fortnightly rainfall in cm. based on the data for the period 1960-65).

C. Irrigation and Drainage Facilities:
   (i) (a) Irrigation during summer months since 1956, (b) Electric pump set for pumping water from river Manimala. 
   (ii) No proper drainage system.

D. Soil type and Soil analysis:
   (i) Soil type—Laterite Loam, Colour—Reddish Brown, Depth—Deep. 
   (ii) Chemical analysis: Total N 0.126%, P$_2$O$_5$ 0.163%, K$_2$O 0.163%, Humus 0.38%, CaO 0.42%, pH 6.4. 
   (iii) Mechanical analysis: N.A.

E. No. of Experiments:
   Sugarcane—7; Total=7.

24. Tapioca Research Station, Thiruvala.

A. General Information:
   (i) Same as Sugarcane Research Station, Thiruvala. 
   (ii) and (iii) N.A. 
   (iv) Tapioca is the main crop. 
   (v) Agronomic experiments on Tapioca.

B. Normal Rainfall:
   Same as Sugarcane Research Station, Thiruvala,

C. Irrigation and Drainage Facilities and D. Soil type and Soil analysis:
   Information: N.A.
25. Vettiver Sub-Station, Thiruvambadi.

A. General Information to D. Soil type and Soil analysis:
Information—N.A.

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

26. Pepper Research Station/Ginger Research Station, Thodupuzha.

A. General Information:
(i) In Thodupuzha taluka of Ernakulam district, 68 Km. from Alwaye Rly. Stn. with Lat.—10° N./Long.—77°E./Alt.—152.4 m. The topography is undulating with greater portion facing south. The farm is situated on the southern slope of a hill. (ii) Hilly tract. (iii) Established in 1957. (iv) Pepper and Oil palm are perennials while Ginger is annual. (v) Botanical and Agronomic experiments on Pepper, Ginger and Oil palm.

B. Normal Rainfall:

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.2</td>
<td>4.3</td>
<td>10.6</td>
<td>21.0</td>
<td>36.0</td>
<td>58.9</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Month</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
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<th>Nov</th>
<th>Dec</th>
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<tr>
<td></td>
<td>87.6</td>
<td>61.4</td>
<td>50.0</td>
<td>48.2</td>
<td>20.4</td>
<td>6.7</td>
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(Av. monthly rainfall in cm. based on the data for the period 1960–65).

C. Irrigation and Drainage Facilities:
(i) Nil. (ii) No proper drainage system.

D. Soil type and soil analysis:
(i) Board soil types—Lateritic; Depth—Varying from place to place; Colour—Red and dark; Structure—Granular. (ii) Chemical analysis: Organic Carbon—90 to 165, Available \( \text{P}_2\text{O}_5 \) to 2 Kg/ha. Available \( \text{K}_2\text{O} \) to 48 Kg/ha. pH—5.2 to 5.4. (iii) Mechanical analysis: N.A.

E. No. of Experiments:
Ginger—33; Pepper—13; Total=46.

27. Tapioca Research Station, Trivandrum.

A. General Information:
(i) Trivandrum district. Lat. 9° 30' N/Long.77° E/Alt.—53.3 m. Land levelled to different terraces of width 18 to 21 m. (ii) Laterite tract. (iii) Established in 1944. (iv) Tapioca cultural and manurai aspects and chemical analysis of tapioca tubers.

B. Normal Rainfall:

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>2.0</td>
<td>1.6</td>
<td>3.9</td>
<td>11.6</td>
<td>22.3</td>
<td>11.8</td>
<td>20.0</td>
<td>12.1</td>
<td>11.5</td>
<td>27.2</td>
<td>17.8</td>
<td>6.3</td>
<td>144.8</td>
</tr>
</tbody>
</table>

(Av. monthly rainfall in cm, the period on which the data based, is not available).
C. Irrigation and Drainage Facilities:

(i) (a) Facilities not available (b) Drainage is not necessary.

D. Soil type and Soil analysis:

(i) Sandy soil to a depth of 91 to 153 cm, of pale red to reddish brown colour and loose gravelly structure. (ii) Chemical analysis (in %): Moisture—2.84; Insoluble minerals—71.34; Total N—0.094; Total P2O5—0.47; Total K2O—0.065; CaO—0.043; Available P2O5—0.0003; Available K2O—0.0004; pH—7.0. (iii) Mechanical analysis: Sand—33.79%; Fine sand—19.97%; Clay—33.95%; Silt—6.65%; Moisture—3.06%.

E. No. of Experiments:

Tapioca—2; Total—2.

28. Agricultural College & Research Institute, Vellayani.

A. General Information:

(i) In Trivandrum taluka of Trivandrum district, 13 km. from Trivandrum Central Rly. Stn. with Lat.—8° 22' N/ Long.—76° 57' E./Alt.—29.9 M. The farm is situated on a hillock surrounded on 3 sides by the Vellayani fresh water lake. (ii) Middle tract. (iii) Established in 1955. (iv) Major crop in the farm include perennial trees like Coconut, Areca nut, Jack, Rubber, Mango, fruit plants such as Sapota, Guava, Banana, Lemons, Pine-apple, tuber crops like Tapioca, Yams, Sweets Potato. Annuals like Cowpea, Groundnut, vegetables, and Paddy. Paddy is mainly cultivated as a third season crop in the kayal lands. (v) The farm does not have any research programme. Research work is undertaken by the various divisions by the Heads of divisions concerned.

B. Normal Rainfall:

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
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<tr>
<td></td>
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<td>0.4</td>
<td>2.4</td>
<td>0.8</td>
<td>0.1</td>
</tr>
<tr>
<td>July</td>
<td>1 2</td>
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<td>1 2</td>
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<tr>
<td></td>
<td>11.1</td>
<td>10.8</td>
<td>10.7</td>
<td>5.6</td>
<td>7.2</td>
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<td>3.0</td>
<td>7.9</td>
<td>9.4</td>
<td>18.0</td>
<td>18.1</td>
<td>16.2</td>
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</table>

(Av. fortnightly rainfall in cm. based on the data for the period 1960—65).

C. Irrigation and Drainage Facilities:

(i) Proper irrigation facilities are not available at present. However, work on rehabilitating the irrigation system is in progress. (ii) The lands have proper drainage facilities.

D. Soil type and Soil analysis:

(i) Broad Soil type—Red loam and laterite soil, Depth—Varies from 0.9 to 9.0 m., Colour—Red, Structure—Loam as well as gravelly. (ii) Chemical analysis: and (iii) Mechanical analysis: N.A.

E. No. of Experiments:

Paddy—25, Bhindi—2; Total—27.
EXPERIMENTAL DATA
29. Rice Research Station, Vythila

A. General Information:


B. Normal Rainfall:

Average monthly rainfall is 137 cm. (Average based on 1971-72 rainfall data).

C. Irrigation and Drainage facilities:

(i) Nil. (ii) Not adequate.

D. Soil type and Soil analysis:

(ii) Chemical analysis: Organic Carbon 0.20% to 1.40%. Available P$_2$O$_5$ Traces to 4.4 Kg/ha. Available K$_2$O—880 Kg/ha. (iii) Mechanical analysis: N.A.

E. No. of Experiments:

Paddy—1; Total=1.
Crop: Paddy ('Kharif').


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

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 3303 Kg/ha. of G.M.+112 Kg/ha. of A/S. (ii) Sandy loam. (iii) N.A./5 to 7.7.1960. (iv) (a) 6 ploughings and levellings. (b) Transplanting. (c) 75 Kg/ha. (d) 25 cm. x 15 cm. (e) 2. (v) Nil. (vi) W.N.D-2 (late). (vii) Unirrigated. (viii) 2 weedings. (ix) 168 cm. (x) 5 to 7.12.1960.

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 P₀O₄ as Super: P₀ = 0, P₁ = 16.8 and P₂ = 33.6 Kg/ha.
   (3) 3 levels of K₂O as Mur. Pot.: K₀ = 0; K₁ = 16.8 and K₂ = 33.6 Kg/ha.
   Complete dose of P₀O₄, K₂O and half dose of N applied at the time of planting, half dose of N one month after planting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 2. (iv) (a) and (b) 6'4 m. x 5.1 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Case worm attack noticed. B.H.C. 10% was dusted. (iii) Yield of grain. (iv) (a) 1960-62 (Treatments modified in 1961). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 3049 Kg/ha. (ii) 333.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
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<td>2860</td>
<td>3091</td>
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<td>2952</td>
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<tr>
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</tbody>
</table>

Crop: Paddy ('Kharif').


Object: To study the effect of different levels of N, P and K on Paddy.
1. BASAL CONDITIONS:
(i) (a) N.A. (b) Paddy. (c) 2242 Kg/ha. of G.L. and 112 Kg/ha. of C/A/N for 61(1); 5604 Kg/ha. of G.L. +112 Kg/ha. of Super +56 Kg/ha. of A/S for 62(81). (ii) N.A./24.6.1961; N.A./22.6.1962. (iv) (a) Ploughings and levelling. (b) Transplanting. (c) Ballet. (d) 25 cm. x 15 cm. (e) 2 to 3. (v) 4483 Kg/ha. for 61(1); 5604 Kg/ha. for 62(81). (vi) W.N.D. — 2 (late) for 61(1); N.A. for 62(81). (vii) Unirrigated. (viii) 2 wecdings. (ix) 236 cm. for 61(1); 312·3 cm. for 62(81). (x) 27.11.1961; 25.11.1962.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N: N1 = 16.8; N2 = 33.6 and N3 = 50.4 Kg/ha. as A/S.
(2) 3 levels of P: P1 = 16.8; P2 = 33.6 and P3 = 50.4 Kg/ha. as Super.
(3) 3 levels of K: K1 = 16.8; K2 = 33.6 and K3 = 50.4 Kg/ha. as Mur. Pot.
Full dose of P2O5 and K2O and half dose of N applied at planting. Half dose of N applied one month before flowering.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) 6·4 m. x 3·1 m. for 61(1); 6·1 m. x 3·1 m. for 62(81). (b) 6·3 m. x 2·9 m. for 61(1); 5·8 m. x 2·7 m. for 62(81). (v) 8 em. x 8 em. for 61(1); 15 em. x 15 em. for 62(81). (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—1962 (Treatments modified in 1961). (b) No. (c) Results of combined analysis for 1961 and 62 are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments xyears interaction is absent.

5. RESULTS:
(i) 3395 Kg/ha. (ii) 387·4 Kg/ha. (based on 174 d.f. made up of various components of Treatments xyears interaction and pooled error). (iii) Main effect of P alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
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<td>3405</td>
<td>3458</td>
<td>3312</td>
<td>3406</td>
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<td>3354</td>
<td>3421</td>
<td>3367</td>
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<td>3379</td>
<td>3372</td>
<td>3351</td>
<td>3379</td>
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<td></td>
</tr>
<tr>
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<td>3424</td>
<td>3418</td>
<td>3281</td>
<td>3424</td>
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<td>N3</td>
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<td>3468</td>
<td>3459</td>
<td>3403</td>
<td>3468</td>
<td></td>
</tr>
</tbody>
</table>

C.D. for P marginal means = 126·6 Kg/ha.

Crop :- Paddy (Kharif).
Object :- To study the effect of different phosphatic fertilizers on Paddy crop.

Ref :- K. 60(1).
Type :- 'M'.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 3363 Kg/ha. of G.L. +112 Kg/ha. of N as A/S/N. (ii) Sandy loam. (iii) N.A./ 13 to 15.6.1960. (iv) (a) 6 ploughings and levelling. (b) Transplanting. (c) Ballet. (d) 15 cm. x 15 cm. (e) 2. (v) Nil. (vi) W.N. : D = 1 (late). (vii) Irrigated. (viii) 1 wecding. (ix) 16·7 cm. (x) 3 and 4.11.1960.
2. TREATMENTS:

16 manurial treatments:

- Mₐ = Control (no manure)
- M₁ = G.L. at 8406 Kg/ha.
- M₂ = Lime at 3363 Kg/ha.
- M₃ = Super at 50'4 Kg/ha. of P₂O₅
- M₄ = Hyper phos. at 50'4 Kg/ha. of P₂O₅
- M₅ = B.M. at 50'4 Kg/ha. of P₂O₅
- M₆ = G.L. at 8406 Kg/ha. + Super at 50'4 Kg/ha. of P₂O₅
- M₇ = Lime at 3363 Kg/ha. + Hyper phos. at 50'4 Kg/ha. of P₂O₅
- M₈ = G.L. at 8406 Kg/ha. + B.M. at 50'4 Kg/ha. of P₂O₅
- M₉ = G.L. at 8406 Kg/ha. + Super at 50'4 Kg/ha. of P₂O₅
- M₁₀ = Lime at 3363 Kg/ha. + Super at 50'4 Kg/ha. of P₂O₅
- M₁₁ = Lime at 50'4 Kg/ha. of P₂O₅
- M₁₂ = G.L. at 8406 Kg/ha. + Hyper phos. at 50'4 Kg/ha. of P₂O₅
- M₁₃ = G.L. at 8406 Kg/ha. + B.M. at 50'4 Kg/ha. of P₂O₅
- M₁₄ = G.L. at 8406 Kg/ha. + Lime at 50'4 Kg/ha. of P₂O₅
- M₁₅ = G.L. at 8406 Kg/ha. + Lime at 3363 Kg/ha. + B.M. at 50'4 Kg/ha. of P₂O₅

3. DESIGN:

(i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) 4·3 m x 4·3 m. (v) Nil. (vi) Yes.

4. GENERAL:

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

5. RESULTS:

(i) 3956 Kg/ha. (ii) 364·4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mₐ</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
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<tr>
<td>Av. yield*</td>
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<td>3394</td>
<td>3861</td>
<td>4266</td>
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<td>3736</td>
<td>3986</td>
</tr>
<tr>
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<td>M₇</td>
<td>M₈</td>
<td>M₉</td>
<td>M₁₀</td>
<td>M₁₁</td>
<td>M₁₂</td>
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<td>Av. yield</td>
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<td>4110</td>
<td>4017</td>
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<td>4172</td>
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Crop: Paddy \((Ra双眼)


Ref: K. 62(111).

Type: -M'.

Object: To find out the effect of phosphate manufactured by different processes on the yield of Paddy.

1. BASAL CONDITIONS:

- (i) (a) Paddy—Paddy. (b) Paddy. (c) 5604 Kg/ha. of G.L. +112 Kg/ha. of A/S. (ii) Sandy loam. (iii) N.A./19.1.1963. (iv) (a) 6 ploughings. (b) Transplanting. (c) 75 Kg/ha. (d) 25 cm x 15 cm. (e) 2. (v) 5004 Kg/ha. of G.L. (vi) N.A. (vii) Unirrigated. (viii) 1 weeding was given with Japanese rotary hoe. (ix) 36 cm. (x) 17.5.1963.

2. TREATMENTS:

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

(1) 3 types of fertilizers: \( P₁ = \text{Super}, P₂ = \text{O.D.D.A.}, \text{and} P₃ = \text{P.E.C.} \)

(2) 3 levels of fertilizers:

- \( L₁ = 13·5 \text{ Kg/ha. of N+11'8 Kg/ha. of P₂O₅} \)
- \( L₂ = 26·9 \text{ Kg/ha. of N+23'5 Kg/ha. of P₂O₅} \)
- \( L₃ = 33·8 \text{ Kg/ha. of N+47'1 Kg/ha. of P₂O₅} \)

(3) 3 methods of placement:

- \( M₁ = \text{Broadcast}, M₂ = 6'4 \text{ cm. below the seed} \)
- \( M₃ = \text{Pellet application.} \)

Fertilizers applied at planting. Pellet application was done 2 weeks after planting, N applied as A/S, whenever Super is used as P₂O₅ in the treatments.

3. DESIGN:

(i) Fact. in R.B.D. (ii) 27. (b) N.A. (iii) 2. (iv) 8·5 m x 2·4 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962 only (b) No. (c) Nil. (v) to (vii) N.A.
5. RESULTS:
(i) 1975 Kg/ha. (ii) 456.8 Kg/ha. (iii) Main effect of L is highly significant and that of P is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
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<th>P_1</th>
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<th>P_3</th>
<th>M_1</th>
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<td>2023</td>
<td>1858</td>
<td>1975</td>
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C.D. for L or P marginal means = 313.0 Kg/ha.

Crop: Paddy (Rabi).
Type: 'M'.
Object: To find out the suitability of growing a green manure crop along with Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy for 62 (48); Nil for 63 (75). (c) 4483 Kg/ha. of C.M. + 112 Kg/ha. of Super + 112 Kg/ha. of A/S + 56 Kg/ha. of Mur. Pot. for 62 (48); Nil for 63 (48). (ii) Sandy loam. (iii) 18.4.62; 8.4.63. (iv) (a) 2 ploughings and 1 levelling for 62 (48); 3 ploughings, 2 borrowings, and planting for 63 (75). (b) Line sowing for 62 (48) and dibbling for other. (c) 75 Kg/ha. (d) 15 cm. x 15 cm. (e) 10. (f) 112 Kg/ha. of Super + 56 Kg/ha. of Mur. Pot. + 56 Kg/ha. of A/S for 62 (48); 120 Kg/ha. of Super for other. (g) PTB-31 (early) for 62 (48); PTB-23 for other. (h) Unirrigated. (vii) 2 intercultivations and 2 weedings for 62 (48). N.A. for other. (ix) N.A. (x) 6.8.62; 28.7.63.

2. TREATMENTS:
5 treatments: T_1 = Paddy alone, T_2 = Four rows of Sesbania on the borders, T_3 = Two rows of Dhaincha on the borders and T_4 = Two rows of Dhaincha on the borders. G.M. applied to the next Paddy crop.

3. DESIGN:
(i) R.B.D. (ii) 5 (b) N.A. (iii) 4. (iv) (a) 9'1 m. x 9'1 m. for 62 (48); 9'1 m. x 6'1 m. for other. (b) 9'1 m. x 9'1 m. for 62 (48); 9'1 m. x 6'1 m. for other. (v) Nil for 62 (48), 63 (75). (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-63. (b) No. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:
(i) 1269 Kg/ha. (ii) 643.8 Kg/ha. (based on 4 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1634</td>
<td>1212</td>
<td>1584</td>
<td>909</td>
<td>1007</td>
</tr>
</tbody>
</table>
**Crop:** Paddy (Kharif)  
**Site:** Rice Res. Sta., Kayamkulam  
**Object:** To determine the optimum dose of lime for Paddy.

### BASAL CONDITIONS:
1. (a) Nil.  
2. Sandy loam.  
3. 18.4.61; 17.4.62; 8.4.63.  
4. (a) 4 ploughings, levelling and harrowing for 61(3).  
5. Nil.  
6. 15 cm. x 15 cm.  
7. 75 Kg/ha. for 61 (3), 62 (47); 100 Kg/ha. for 63 (74).  
8. 15 cm. x 15 cm.  
9. 168 Kg/ha. for 61 (3); 56 Kg/ha. for 63 (74).  
10. PTB-23 for 61 (3), 63(74); PTB-31 for 62 (47).  
11. Unirrigated.  
12. 2 intercultivations, 2 weedings for 61 (3); 62 (47); N.A. for 63 (74).  
13. (i) Normal.  
15. 4483 Kg/ha. of C.M.+112 Kg/ha. of Super+56 Kg/ha. of Mur. Pot. for 61 (3).  
16. N.A.  
17. 30 cm. x 30 cm. for 61 (3); Nil for others.  
18. Yes.

### TREATMENTS:
1. 5 levels of lime:  
   - L₀ = 0,  
   - L₁ = 560,  
   - L₂ = 1121,  
   - L₃ = 1631 and  
   - L₄ = 2802 Kg/ha.

### DESIGN:
1. R.B.D.  
2. (a) 5.  
3. 6·7 m. x 3·tm. for 61(3); 6·tm. x 3·tm. for 62 (47) and 63 (74).  
4. 6·1 m. x 2·4 m. for 61 (3); 6·1 m. x 3·1 m. for 62 (47) and 63 (74).  
5. 30 cm. x 30 cm. for 61(3); Nil for others.  
6. Yes.
4. GENERAL:
(i) Satisfactory. (ii) Nil for 61 (3), 62 (47); Mole cricket attack which in controlled by R.H.C. 10% spraying. (iii) Yield of grain and straw. (iv) (a) 1961-63. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatments × years interaction is absent. The results of individual years are presented under 5: Results.

5. RESULTS:

61(3)
(i) 2617 Kg/ha. (ii) 520'0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
<th>L₄</th>
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<tr>
<td>Av. yield</td>
<td>2750</td>
<td>2517</td>
<td>2425</td>
<td>2669</td>
<td>2723</td>
</tr>
</tbody>
</table>

62(47)
(i) 2289 Kg/ha. (ii) 245'9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
<th>L₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2084</td>
<td>2320</td>
<td>2228</td>
<td>2271</td>
<td>2544</td>
</tr>
</tbody>
</table>

63(74)
(i) 1526 Kg/ha. (ii) 219'6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
<th>L₄</th>
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<td>Av. yield</td>
<td>1525</td>
<td>1582</td>
<td>1561</td>
<td>1340</td>
<td>1624</td>
</tr>
</tbody>
</table>

Crop: Paddy (Rabi).

Site: Rice Res. Stn., Kayamkulam.

Ref: K. 61(4), 63(89).

Type: ‘M’.

Object: To find out the optimum dose of lime for Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy—Sesamum. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 1.7.61/3.9.61; N.A./26.8.63. (iv) (a) 4 ploughings and 2 puddlings. (b) Transplanting. (c) 50 Kg/ha. for 61(4) and 75 Kg/ha. for 63(89). (d) 23 cm. × 15 cm. (e) 3. (v) 4483 Kg/ha. of C.M.+168 Kg/ha. of A/S+56 Kg/ha. of Mur. Pot. for 61(4). 5000 Kg/ha. of C.M.+125 Kg/ha. of Super+60 Kg/ha. of Mur. Pot. for 63(89). (vi) U.R.—19 (late). (vii) Unirrigated. (viii) 2 puddings for 61(4). N.A. for 63(89). (ix) 90 cm.; 99 cm. (x) 15 1.62; 6 1.64.

2. TREATMENTS:
5 levels of lime: L₀=0, L₁=560, L₂=1121, L₃=1681 and L₄=2802 Kg/ha. Lime applied to soil one week before planting.

3. DESIGN:
(i) R.B.D. (a) 5. (b) N.A. (iii) 5. (iv) (a) 6'1 m. × 3'1 m. (b) 5'2 m. × 2'4 m. (e) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Negligible. (iii) Yield of grain and straw. (iv) (a) 1961—63 (62 N.A). (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS:
(i) 3593 Kg/ha. (ii) 260'8 Kg/ha. (based on 36 d.f. made up of Treatments × years interaction and pooled error.) (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Kharif).


Ref: K. 60(4), 61(6).

Type: 'M'.

Object: To study the effect of different levels of N on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil for 60(4); Paddy—Paddy—Sesamum for other. (b) Paddy for 60(4); Sesamum for other. (c) 4483 Kg/ha. of C.M. + 56 Kg/ha. of Mur. Pot. for 60(4); N.A. for other. (ii) Sandy loam. (iii) 12.4.60; 12.4.61. (iv) (a) Ploughing for 60(4); 4 ploughings and 2 harrowings for other. (b) Dibbling. (c) 75 Kg/ha. (d) 15 cm. x 15 cm. (e) 7. (v) 168 Kg/ha. of B.M. + 224 Kg/ha. of wood ash for 60(4); 33.6 Kg/ha. of P2O5 as Super + 33.6 Kg/ha. of K2O as Mur. Pot. for other. (vi) Kochuvithu (early). (vii) Unirrigated. (viii) 2 intercultivations and 2 weedings. (ix) 148 cm.; N.A.

2. TREATMENTS:
   4 levels of N: N0 = 0, N1 = 16.8, N2 = 33.6 and N3 = 50.4 Kg/ha.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4 for 60(4); 6 for 61(6). (iv) (a) 7.5 m. x 5.9 m. for 60(4); 7.5 m. x 5.9 m. for 61(6). (b) 7.5 m. x 5.9 m. for 60(4); 7.0 m. x 5.5 m. for 61(6). (v) Nil for 60(4); 24 cm. along length for 61(6). (vi) Yes.

4. GENERAL:
   (i) Normal for 60(4); Satisfactory for other. (ii) Nil. (iii) Tiller counts. height measurement and yield of grain. (iv) (a) 1958—61. (b) No. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present. Expts. No. 58(3) and 59(7) have also been included while giving combined results.

5. RESULTS:
   (i) 1405 Kg/ha. (ii) 228.1 Kg/ha. (based on 9 d.f. made up of Treatments x years interaction). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1286</td>
<td>1334</td>
<td>1464</td>
<td>1518</td>
</tr>
<tr>
<td>C.D.</td>
<td>155.6 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).


Ref: K. 61(21), 62(45), 63(73).

Type: 'M'.

Object: To study the effect of different sources and levels of N on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy—Sesamum for 61(21); Nil for others. (b) Sesamum for 61(21); Paddy for others. (c) N.A. for 61(21), 63(73); 4483 Kg/ha. of C.M. + 112 Kg/ha. of A/S + 56 Kg/ha. of Mur. Pot. for 62(45). (ii) Sandy loam. (iii) 11.4.61; 17.4.62; 9.4.63. (iv) (a) 4 ploughings, 2 harrowings for 61(21); Ploughing and levelling for 62(45): 1 ploughing with iron plough, 2 ploughings with local plough, 1 planking, 2 harrowings for 63(73). (b) Dibbling. (c) 75 Kg/ha. (d) 15 cm. x 15 cm. (e) 10. (v) 168 Kg/ha. of Super + 56 Kg/ha. of Mur. Pot. for 61(21); 168 Kg/ha. of Super for 62(45); 120 Kg/ha. of Super for 63(73). (vi) P.T.B.—23 (early) for 61(21) and 63(73); P.T.B.—31 for 62(45). (vii) Unirrigated. (viii) 2 intercultivations for 61(21); 2 intercultivations and 2 weedings for 62(45); N.A. for other. (ix) N.A. (x) 8.8.61; 4.8.62; 25.7.63.
2. TREATMENTS:

All combinations of (1) and (2)

(1) 2 levels of N : \( N_1 = 36.6 \) and \( N_2 = 50.4 \) kg/ha.

(2) 4 sources of N : \( S_1 = A/S \), \( S_2 = A/C.M. \), \( S_3 = A/S \) and C.M. in 2 : 1 ratio and \( S_4 = A/S \) and C.M. in 1 : 2 ratio.

N applied through soil, half as basal dressing and half one month after sowing.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4 for 61(21), 3 for others. (iv) (a) 6.7 m. \times 3.1 m. for 61(21); 4.6 m. \times 4.3 m. for 62(45); (b) 6.1 m. \times 2.4 m. for 61(21); 4.6 m. \times 4.3 m. for 62(45); and (a) and (b) 6.1 m. \times 3.7 m. for 63(73). (v) 30 cm. \times 30 cm. for 61(21); Nil for others. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil for 61(21), 62(45); Attack of Helminthosporium for 63(73) and Fytolan sprayed. (iii) Yield of grain. (iv) (a) 1961—65. (b) No. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments \times years interaction is absent.

5. RESULTS:

(i) 2429 kg/ha. (ii) 370.9 kg/ha. (based on 63 d.f. made up of various components of Treatments \times years interaction and pooled error). (iii) None of the effects is significant. (iv) Av. yield of grain in kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( S_1 )</th>
<th>( S_2 )</th>
<th>( S_3 )</th>
<th>( S_4 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( N_1 )</td>
<td>2493</td>
<td>2401</td>
<td>2363</td>
<td>2263</td>
<td>2380</td>
</tr>
<tr>
<td>( N_2 )</td>
<td>2402</td>
<td>2491</td>
<td>2459</td>
<td>2563</td>
<td>2479</td>
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<tr>
<td>Mean</td>
<td>2448</td>
<td>2446</td>
<td>2411</td>
<td>2413</td>
<td>2429</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).

Ref :- K. 64(102), 65(13).

Site :- Rice Res. Stn., Kayamkulam.

Type :- 'M'.

Object :- To find out the comparative efficiency of different sources of N for the first crop Paddy.

1. BASAL CONDITIONS:

(i) Nil. (b) Second crop Paddy. (a) 4942 kg/ha. of G.M. + 124 kg/ha. of Super + 62 kg/ha. of Mur. Pot. + 124 kg/ha. of A/S. (ii) Sandy loam. (iii) 13.4.64, 27.4.65. (iv) (a) 4 ploughings, levelling and harrowing. (b) Dibbling. (c) N.A. (d) 15 cm. \times 15 cm. (e) N.A. (v) 124 kg/ha. of Super + 62 kg/ha. of Mur. Pot. (vi) P.T.B.—23. (vii) Unirrigated. (viii) Intercultures. (ix) N.A. (a) 3.8.64; 11.8.65.

2. TREATMENTS:

5 sources to supply 44.8 kg/ha. of N : \( S_5 = 0, S_1 = A/S, S_2 = A/N, S_3 = C/A/N \) and \( S_4 = Urea \).

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) 13.7 m. \times 4.6 m. (iii) 4. (iv) (a) and (b) 4.6 m. \times 4.6 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Yes. (iii) Yield of grain. (iv) to (vii) N.A.

5. RESULTS:

64(102)

(i) 1282 kg/ha. (ii) 217.4 kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in kg/ha.
Treatment  |  S_6  |  S_7  |  S_8  |  S_9  |  S_10 |
Av. yield  |  899  |  1545 |  1076 |  1334 |  1558 |

C.D. = 334.9 Kg/ha.

(i) 2056 Kg/ha.  (ii) 251.2 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

Treatment  |  S_6  |  S_7  |  S_8  |  S_9  |  S_10 |
Av. yield  |  1686 |  2224 |  1949 |  2093 |  2224 |

Crop: - Paddy (Rabi).  
Ref: - K. 62(114), 63(77), 64(70).  
Type: - 'M'.

Object: - To study the effect of different sources of N on Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy-Paddy-Sesamum for 62(114), 63(77); Paddy-Paddy for 64(70).  (b) Paddy.  (c) N.A. for 62(114); As per treatments for others.  
(ii) Sandy loam.  
(iii) N.A./Aug., 62; N.A./28.8.63; N.A./31.8.64.  
(iv) (a) 2 tractor ploughings, 2 country ploughings for 62(114); 4 to 6 ploughings for others.  
(b) Transplanting.  
(c) 50 Kg/ha. for 62 (114), 64(70); 75 Kg/ha. for 63(77); 18 cm. x 15 cm. for 62(114), 64(70); 23 cm. x 15 cm. for 63(77).  
(d) 2 for 62(114); 7 for 63(77); 3 for 64(70).  
(e) 140 Kg/ha. of Super for 62(114); 125 Kg/ha. of Super for 63(77); 500 Kg/ha. of C.M.+125 Kg/ha. of Super + 60 Kg/ha. of Muri.  
(f) January, 63; 2.1.64; 14.1.65.

2. TREATMENTS:

5 sources of N at 44.8 Kg/ha. : S_6 = Control (no application), S_1 = A/S, S_2 = A/S/N, S_3 = C/A/N and S_4 = Urea.

N applied through soil, half dose as basal dressing and half one month after planting.

3. DESIGN:

(i) R.B.D.  
(ii) (a) 5.  
(b) N.A.  
(iii) 4.  
(iv) (a) and (b) 4.6 m. x 4.6 m.  
(v) Nil.  
(vi) Yes.

4. GENERAL:

(i) Satisfactory.  
(ii) Nil.  
(iii) Yield of grain.  
(iv) (a) 62 to 64.  
(b) Yes.  
(c) Results of combined analysis given under 5. Results.  
(v) and (vi) Nil.  
(vii) Error variances are homogeneous and Treatment - year interaction is absent.

5. RESULTS:

(i) 2818 Kg/ha.  
(ii) 206.5 Kg/ha. [Based on 44 d.f. made up of pooled error and treatments x years interaction].  
(iii) Treatment differences are highly significant.  
(iv) Av. yield of grain in Kg/ha.

Treatment  |  S_6  |  S_7  |  S_8  |  S_9  |  S_10 |
Av. yield  |  2483 |  2978 |  2875 |  2798 |  2954 |

C.D. = 170.0 Kg/ha.
Crop :- Paddy (Rabi).

Site :- Reg. Rice Res. Sta., Kayamkulam.

Object :- To study the effect of different sources and levels of N on Paddy.

1. BASAL CONDITIONS:

(i) Paddy-Paddy-Sesamum. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 1.7.61/5.6.61 ; N.A./Aug., 62. (iv) 4 ploughings and 2 puddlings. (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm. x 15 cm. (e) 3. (v) 168 Kg/ha. of Super +56 Kg/ha. of Mur. Pot. (vi) UR-19(late). (vii) Unirrigated. (viii) 2 weedings. (ix) 50 cm.; N.A. (x) 11.1.62 ; January, 63.

2. TREATMENTS:

All combinations of (1) and (2)

(i) 2 levels of N: N1 = 33.6 and N2 = 50.4 Kg/ha.

(ii) 4 sources of N : S1 = A/S, S2 = C.M., S3 = A/S and C.M. in 2 : 1 ratio, S4 = A/S and C.M. in 1 : 2 ratio.

N applied through soil, half as basal dressing and half one month after sowing.

3. DESIGN:

(i) Fact. in R.B.D. (ii) 8. (b) N.A. (iii) 4 for 61(22) and 3 for 62(113). (iv) (a) 4 x 4.6 m. x 4.6 m. for 61(22) ; N.A. for 62(113). (b) 4 x 4.0 m. x 4.0 m. for 61(22) ; 6 x 3.7 m. for 62(113). (v) 30 cm. x 30 cm. for 61(22) ; N.A. for 62(113). (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1961-62. (b) No. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments X years interaction is absent.

5. RESULTS:

(i) 3473 Kg/ha. (ii) 295.8 Kg/ha. [based on 42 d.f. made up of various components of Treatments X years interaction and pooled error]. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>3210</td>
<td>3439</td>
<td>3436</td>
<td>3458</td>
<td>3386</td>
</tr>
<tr>
<td>N2</td>
<td>3716</td>
<td>3502</td>
<td>3515</td>
<td>3511</td>
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<td>Mean</td>
<td>3.63</td>
<td>3470</td>
<td>3476</td>
<td>3484</td>
<td>3473</td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 159.6 Kg/ha.

---

Crop :- Paddy (Rabi).

Site :- Reg. Rice Res. Sta., Kayamkulam.

Object :- To find out the efficiency of Nitrophosphate complex fertilizers on Paddy.

1. BASAL CONDITIONS:

(i) Paddy-Paddy-Sesamum. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 1.7.61/9.9.61 ; N.A./11.9.62 ; N.A./28.8.63. (iv) 4 ploughings and 1 to 2 puddlings. (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm. x 15 cm. (e) 2 to 3. (v) Nil. (vi) UR-19(late). (vii) Unirrigated. (viii) 2 weedings. (ix) 50 cm.; N.A.; 99 cm. (x) 16.6.62 ; 15.1.63 ; 2.1.64.
2. TREATMENTS:

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

(1) 3 types of fertilizers: P₁=Super, P₂=ODDA and P₃=PEC.
(2) 3 levels of fertilizers: L₁=13·5 Kg/ha. of N + 11·8 Kg/ha. of P₂O₅, L₂=26·9 Kg/ha. of N + 33·8 Kg/ha. of P₂O₅ and L₃=53·6 Kg/ha. of N + 47·1 Kg/ha. of P₂O₅.
(3) 3 methods of application: M₁=Broadcast, M₂=6 cm. below seed and M₃=Pellet application.

N applied as A/S when Super is applied in treatments. A/S and Super applied at planting and other treatments one month after planting.

3. DESIGN:

(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 2. (iv) (a) 6·1 m. x 2·7 m. (b) 5·5 m. x 2·1 m. for 61(7), 6·1 m. x 2·7 m. for 62(70); 5·9 m. x 2·6 m. for 63(80). (v) 30 cm. x 30 cm. for 61(7); Nil for 62(70); 12 cm. x 8 cm. for 63(80). (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil for 61(7); Cupravit sprayed for 62(70); Mild attack of stem borer controlled by spraying Endrin for 63(80). (iii) Yield of grain. (iv) (a) 1961-63. (b) No. (c) Nil. (v) and (vi) Nil.

(vii) Since the error variances are heterogeneous and Treatments x years interaction is absent, the individual results have been presented under 5. Results.

5. RESULTS:

61(7)

(i) 3708 Kg/ha. (ii) 584·7 Kg/ha. (iii) Main effects of L and M are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
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C.D. for L or M marginal means=400·7 Kg/ha.

62(70)

(i) 2718 Kg/ha. (ii) 400·4 Kg/ha. (iii) Main effect of L alone is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for L marginal means=274·5 Kg/ha.
Crop: Paddy (Rabi).

Object: To study the residual effect of nitrophosphate complex fertilizers applied to previous paddy crop on succeeding crop of paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) Sandy loam. (iii) 10.4 kg/ha. (iv) (a) Ploughing. (b) Dibbling. (c) 15 cm x 15 cm. (d) 10. (v) 2242 kg/ha. of C.M.+56 kg/ha. of Mur. Pot. (vi) PTB-31 (early). (vii) Unirrigated. (viii) 2 intercultivations and 2 weedings. (ix) N.A. (x) 2.8.62.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 types of fertilizers: P1 = Super, P2 = ODDA and P3 = PEC.
(2) 3 levels of fertilizers: L0 = 0, L1 = 25.9 kg/ha. of P2O5, L2 = 53.8 kg/ha. of P2O5 and L3 = 75 kg/ha. of P2O5.
(3) 3 methods of application: M0 = Broadcast, M1 = 6 cm below seed and M2 = Pellet application.
N applied as A/S wherever Super is used as P2O5 in the treatments. A/S and Super applied at planting and other treatments one month after planting.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 2. (b) 2. (iii) 6. 4. 3. (iv) Nil. (v) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1952-N.A. (b) Yes. (c) N.A. (v) 2.8.62.

5. RESULTS:
(i) 1823 kg/ha. (ii) 228.9 kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in kg/ha.
Crop: Paddy (Rabi).


Object: To study the effect of different phosphates on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy—Sesamum. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 1.761/8.961. (iv) 2 ploughings and 2 puddlings. (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm. x 15 cm. (e) 3. (v) 90 Kg/ha. of Mur. Pot.+168 Kg/ha. of A/S. (vi) UR-18 (late). (vii) Unirrigated. (viii) 2 weedings. (ix) 90 cm. (x) 16.162.

2. TREATMENTS:
   7 manurai treatments: M₀ = 280 Kg/ha. of Super, M₁ = 280 Kg/ha. of lime, M₂ = 149 Kg/ha. of Rock Phos., M₃ = M₁ + M₂, M₄ = 195 Kg/ha. of Super + Rock Phos. in 1:1 ratio and M₅ = 560 Kg/ha. of Super+Ash in 1:1 ratio.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 6. (iv) (a) 61 m. x 3.8 m. (b) 5.6 m. x 3.4 m. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961 only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   (i) 3838 Kg/ha. (ii) 1844 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Crop: Paddy (Rabi).


Object: To find out the comparative merits of the phosphatic fertilizers.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) 40 Kg/ha. of N +40 Kg/ha. of K₂O +40 Kg/ha. of P₂O₅. (ii) Sandy loam. (iii) N.A. (iv) 8.65. (v) 4 ploughings. (b) Transplanting. (c) to (e) N.A. (v) 40 Kg/ha. of N +40 Kg/ha. of K₂O+P₂O₅ as per treatments. (vi) P.T.B.—4 (late). (vii) Unirrigated. (viii) 2 hand weedings and 1 interculturing with Japanese hoe. (ix) 95.5 cm. (x) 20.1.66.
2. TREATMENTS:
All combinations of (1) and (2) with controls (3 plots)
(1) 2 levels of P₂O₅: P₁ = 30 and P₂ = 60 Kg/ha, of P₂O₅.
(2) 8 forms of P₂O₅: S₁ = Super, S₂ = Rock Phosphate, S₃ = Fused Magnesium Phosphate, S₄ = De-florinated Rock Phosphate, S₅ = Multi Phosphate, S₆ = Hyper Phosphate, S₇ = Nitro Phosphate, S₈ = Basic Slag.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 21. (b) 126 m. x 7 m. (iii) 5. (iv) 7 m. x 6 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Two sprayings with Endrin and Bordeaux Mixture were given. (iii) Yield of grain. (iv) (a) 1964-65 (modified in 65). (b) Yes. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 2424 Kg/ha. (ii) 3606 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Paddy in Kg/ha.

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Crop: Paddy (Rabi).
Type: 'M'.

Object: To study the effect of different levels and sources of P on Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy-Paddy. (b) Paddy, (c) 33.6 Kg/ha. of N as A/S-33.6 Kg/ha. of P₂O₅ as Super-33.6 Kg/ha. of K₂O as Mur. Pot. (ii) Sandy loam. (iii) N.A./8.9.64. (iv) (a) 4 puddling and 1 planking. (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm. x 15 cm. (e) 3. (f) 4412 Kgf/ha. of C.M. + 44.8 Kg/ha. of N as urea + 33.6 Kg/ha. of K₂O as Mur. Pot. (vi) PTB - 4 (late). (vii) Unirrigated. (viii) 1 weeding by Rotary Weeder and 1 hand weeding. (ix) 90 cm. (x) 23.1.65.

2. TREATMENTS:
All combinations of (1) and (2) with control (2 plots)
(1) 2 levels of P₂O₅: P₁ = 33.6 and P₂ = 67.2 Kg/ha.
(2) 6 sources of P₂O₅: S₁ = Super, S₂ = Rock Phosphate, S₃ = Hyper Phosphate, S₄ = Nitro Phosphate, S₅ = Fused Magnesium Phosphate and S₆ = Basic Slag.

Treatments were applied at planting.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 8 m. x 8 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1964-modify. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 2424 Kg/ha. (ii) 3606 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.
Control = 2204 Kg/ha.

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Crop :- Paddy (Kharif).

Site :- Reg. Rice Res. Sta., Kayamkulam.

Type :- 'M'.

Object :- To find out the optimum time of application of A/S for Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy—Sesamum for 61(18); Nil for 64(46) and 63(72); N.A. for 64(109). (b) Sesamum for 61(18), Paddy for 62(46), 63(72) and 64(109). (c) N.A. for 61(18) and 63(72); 4483 Kg/ha. of C.M. + 112 Kg/ha. of each A/S and Super and 56 Kg/ha. of Mur. Pot. for 62(46); 4942 Kg/ha. of C.M. + 124 Kg/ha. each of A/S and Super and 62 Kg/ha. of Mur. Pot. for 64(109).
   (iv) (a) 4 ploughings, 2 harrowings for 61(18); Ploughing and planking for 62(46); 3 ploughings, 2 harrowings and planking for 63(72); 4 ploughings, 2 harrowings and planking for 64(109). (b) Dibbling. (c) 75 Kg/ha.
   (v) 168 Kg/ha. of Super + 56 Kg/ha. of Mur. Pot. for 61(18) and 62(46); 120 Kg/ha. of Super for 63(72); 124 Kg/ha. of Super + 62 Kg/ha. of Mur. Pot. for 64(109).
   (vi) PTB - 23. (vii) Un-irrigated. (viii) 2 intercultivations and 2 weedings. (ix) N.A. for 61(18), 62(46) and 63(72); 121 cm. for 64(109).

2. TREATMENTS:
   6 times of application of N : M9 = Control (no application), M1 = Full dose as basal dressing, M2 = 3/4 as basal and 1/2 as top dressing, M3 = 1/2 as basal and 3/4 as top dressing and M4 = Full dose as top dressing.
   N at 44·8 Kg/ha. applied as A/S.

3. DESIGN :
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 6:7:3:1 m. for 61(18); 6:1 m. x 3:7 m. for others. (b) 6:1 m. x 2:4 m. for 61(18); 6:1 m. x 3:7 m. for others. (v) 30 cm. x 30 cm. for 61(18); Nil for others. (vi) Yes.

4. GENERAL :
   (i) Satisfactory. (ii) Nil for 61(18), 62(46) and 64(109) but 2 sprayings of Endrex mixed with Fytolan as a prophylactic measure done for 64(109); Helminthosporium attack controlled by Fytolan spraying for 63(72).
   (iii) Yield of grain. (iv) (a) 1961-64. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Since error variances are heterogeneous and Treatments x years interaction is absent, results of individual years are presented below.

5. RESULTS :

61(18)
   (i) 3276 Kg/ha. (ii) 2804 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
   Treatment | M4 | M1 | M2 | M3 | M4 | M4 |
   Av. yield  | 3309 | 3374 | 3347 | 3305 | 3274 | 3049 |

62(46)
   (i) 2015 Kg/ha. (ii) 2815 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Bādi).


Type: 'M'.

Object: To find out the optimum time of application of A/S for Paddy.

1. **BASAL CONDITIONS:**
   - (a) Paddy-Paddy-Sesamum. (b) Paddy. (c) N.A. for 61(19) and 63(84); 36.6 Kg/ha. each of N as A/S and P, and K2O as Mur. Pot. was applied for 64(63). (ii) Sandy loam. (iii) 1.7.61/4.9.61; N.A./28.8.63; N.A./29.6.64. (iv) (a) 4 ploughings and 2 puddlings for 61(19) and 62(112); 4 ploughings for 63(64); 6 puddlings and ploughing for 61(63). (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm. x 15 cm. (e) 1. (v) 5604 Kg/ha. of C.M. + 168 Kg/ha. of Super + 56 Kg/ha. of Mur. Pot. for 61 (19) and 62 (112); 135 Kg/ha. of Super + 60 Kg/ha. of Mur. Pot. for 63 (64); Nil for 64 (63). (vi) U.R.-19. (vii) Unirrigated. (viii) 2 weedings for 61 (19), 62 (112) and 64 (63); N.A. for 63 (64). (ix) 93 em.; 90 em.; 99.4 em.; 98 em. (x) 12.1.62; Jan., 63; 20.1.64; 15.1.65.

2. **TREATMENTS:**
   - 6 times of application of N: M0=Control, M1=Full dose as basal dressing. M2= 3/4 as basal + 1 as top dressing, M3= 1 as basal + 1 as top dressing, M4= 3/4 as basal + 3/4 as top dressing and M5=Full dose as top dressing. N at 44.8 Kg/ha. applied as A/S.

3. **DESIGN:**
   - (i) R.B.D. (ii) 6. (b) N.A. (iii) 4. (iv) (a) 6.1 m. x 3.1 m. for 61(19); 6.1 m. x 3.7 m. for 62(112), 63(64) and 64(63). (b) 5.5 m.m. x 2.4 m. for 61(19); 6.1 m. x 3.7 m. for 62(112) and 64(63) and 6.0 m. x 3.5 m. for 63(64). (v) 30 cm. x 30 cm. for 61(19); Nil for 62(112) and 64(63); 4 cm. x 8 cm. for 63(64). (vi) Yes.

4. **GENERAL:**
   - (i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 196-64. (b) No. (c) Results of combined analysis given under 5 Results. (v) and (vi) Nil. (viii) Error variances are homogeneous and Treatments X years interaction in present.

5. **RESULTS:**
   - (i) 3101 Kg/ha. (ii) 3271 Kg/ha. (based on 15 d.f. made up of Treatments X years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Rabi).

Object:— To study the effect of different levels of N, P and K on Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5004 Kg/ha. of C.M. + 168 Kg/ha. of Bone meal + 168 Kg/ha. N as Urea. (ii) Sandy loam. (iii) 24.6.60/13.8.60. (iv) (a) 2 ploughings, puddling and levelling. (b) Transplanting. (c) 30 Kg/ha. (d) 23 cm. x 15 cm. (e) 3. (v) 448 Lt & 16 Kg of C.M. (vi) UR-19 (late). (vii) Unirrigated. (viii) 2 hand weedicings and intercultivation. (ix) 80 cm. (x) 5.1.01.

2. TREATMENTS:
   All combinations of (1), (2) and (3).
   (1) 2 levels of N as A/S: N\textsubscript{1} = 33.6 and N\textsubscript{2} = 67.2 Kg/ha.
   (2) 3 levels of P\textsubscript{0} as Super: P\textsubscript{0} = 0, P\textsubscript{1} = 16.8 and P\textsubscript{2} = 33.6 Kg/ha.
   (3) 3 levels of K\textsubscript{0} as Mur. Pot.: K\textsubscript{0} = 0, K\textsubscript{1} = 16.8 and K\textsubscript{2} = 33.6 Kg/ha.
   Fertilizers applied to soil at planting.

3. DESIGN:
   (i) 3\times 3 partially confd. (ii) (a) 6 plots/block and 3 blocks/treatment. (b) N.A. (iii) 4. (iv) (a) 9.6 m \times 4.9 m. (b) 9.1 m \times 4.6 m. (v) 23 cm. \times 15 cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Helminthosporium attack; Cupravit sprayed. (iii) Grain and straw yield (iv) (a) 1959-NA. (b) Yes. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 2667 Kg/ha. (ii) 2047 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

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2. TREATMENTS:

7 manurial treatments: 

- \( M_1 = 44.8 \text{ Kg/ha. of N as C.M.} \)
- \( M_2 = 44.8 \text{ Kg/ha. of N as A/S} \)
- \( M_3 = 33.6 \text{ Kg/ha. of P, O} \)
- \( M_4 = M_2 + 33.6 \text{ Kg/ha. of K, O} \)
- \( M_5 = 33.6 \text{ Kg/ha. of P, O} \)
- \( M_6 = 33.6 \text{ Kg/ha. of K, O} \)
- \( M_7 = \text{Super, K, O as Mur. Pot.} \)

P, O as Super, K, O as Mur. Pot., C.M. and half the quantity of A/S applied as basal and the other half dose of A/S one month after sowing.

3. DESIGN:

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) and (b) 8 m. × 5 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Endex was sprayed 2 times. Flytolan was sprayed twice. (iii) Yield of grain and straw. (iv) (a) 1964-N.A. (b) Yes. (c) N.A. (d) to (vii) N.A.

5. RESULTS:

(i) 1757 Kg/ha. (ii) 252.3 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

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<td>2213</td>
<td>2631</td>
</tr>
<tr>
<td>C.D.</td>
<td>374.8</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Crop: Paddy (Rabi).

Ref: K. 64(67), 65(64).

Site: Rice Res. Stn., Kayamkulam. Type: 'M'.

Object: To find out the effect of N, P, K and lime on the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Paddy. (c) As per treatments. (ii) Sandy loam. (iii) 1.9.64; 30.8.65. (iv) (a) 6 ploughings, puddling and 1 planking. (b) Transplanting. (c) 50 Kg/ha. (d) 23 em. × 15 cm. (e) 3. (f) As per experimental schedule. (vi) U.R.-19. (vii) Unirrigated. Two rounds of hand weeding interculturing with Japanese hoe one round. (ix) 98.0 cm. for 64 (67) 95.0 for 65. (x) 15.1.65, 12.1.66.

2. TREATMENTS:

All combinations of (1), (2), (3) and (4).

- (1) 2 sources of N: \( S_1 = 40 \text{ Kg/ha. as A/S} \) and \( S_2 = 30 \text{ Kg/ha. as A/S} + 10 \text{ Kg/ha. as C.M.} \)
- (2) 2 levels of P, O as S/P: \( P_1 = 20 \text{ and } P_2 = 40 \text{ Kg/ha.} \)
- (3) 2 levels of K, O as Mur. Pot.: \( K_1 = 20 \text{ Kg/ha.} \) and \( K_2 = 40 \text{ Kg/ha.} \)
- (4) 2 levels of lime: \( L_1 = 0 \text{ and } L_2 = 300 \text{ Kg/ha.} \)

3. DESIGN:

(i) 2\(^{nd}\) fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) and (b) 61 m. × 46 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Biton and Endrin were sprayed as prophylactic measure against disease and pests. (iv) (a) N.A. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) The exp. is contd. beyond 1965. Hence the results of individual years are given below.

5. RESULTS:

64(67)

(i) 3062 Kg/ha. (ii) 244.0 Kg/ha. (iii) Main effects of S, P and K are highly significant. (iv) Table of means and differential response in Kg/ha.
Differential response

<table>
<thead>
<tr>
<th>Factor</th>
<th>Mean response</th>
<th>S1</th>
<th>S2</th>
<th>P1</th>
<th>P2</th>
<th>K1</th>
<th>K2</th>
<th>L1</th>
<th>L2</th>
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</thead>
<tbody>
<tr>
<td>S</td>
<td>171.6</td>
<td>—</td>
<td>—</td>
<td>193.0</td>
<td>150.2</td>
<td>186.0</td>
<td>157.2</td>
<td>188.5</td>
<td>154.7</td>
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<tr>
<td>P</td>
<td>238.9</td>
<td>260.3</td>
<td>217.5</td>
<td>—</td>
<td>—</td>
<td>182.0</td>
<td>295.8</td>
<td>238.0</td>
<td>239.8</td>
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<tr>
<td>K</td>
<td>303.9</td>
<td>289.5</td>
<td>318.3</td>
<td>247.0</td>
<td>360.8</td>
<td>—</td>
<td>—</td>
<td>350.0</td>
<td>257.8</td>
</tr>
<tr>
<td>L</td>
<td>54.9</td>
<td>71.8</td>
<td>38.0</td>
<td>54.0</td>
<td>55.8</td>
<td>101.0</td>
<td>8.8</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

C.D. of S, for K mean response = 122.9 Kg/ha.

(i) 253.6 Kg/ha. (ii) 329.6 Kg/ha. (iii) Main effects of S and L are significant. (iv) Table of mean and differential response.

C.D. of S or L mean response = 166.0 Kg/ha.

**Crop:** Paddy (Kharif).  
**Site:** Reg. Rice Res. Sta., Kayamkulam.  
**Ref:** K. 65(53).  
**Type:** 'M'.

Object: To compare acid soluble Phosphate with Super Phosphate.

1. **BASAL CONDITIONS:**
   (i) (a) No. (b) Paddy. (c) As per treatments. (ii) Sandy loam. (iii) 1.5.65/N.A. (iv) (a) to (e) N.A. (v) As per treatments. (vi) P.T.B.—23. (vii) Unirrigated. (viii) 2 intercultures and 2 hand weedings. (ix) 108 cm.  
2. **TREATMENTS:**
   All combinations of (1) and (2) with control (5 plots)
   (1) 2 levels of P<sub>2</sub>O<sub>5</sub>: P<sub>1</sub> = 30 and P<sub>2</sub> = 60 Kg/ha.
   (2) 8 forms of P<sub>2</sub>O<sub>5</sub>: F<sub>1</sub> = Super, F<sub>2</sub> = Rock phosphate, F<sub>3</sub> = Fused Magnesium Phosphate, F<sub>4</sub> = Deflorinated Rock Phosphate, F<sub>5</sub> = Multi-Phosphate, F<sub>6</sub> = Hyper Phosphate, F<sub>7</sub> = Nitro-Phosphate and F<sub>8</sub> = Basic slag.
3. **DESIGN:**
   (i) Fact. in R.B.D. (ii) (a) 21. (b) N.A. (iii) S. (iv) (a) and (b) 7 m x 6 m. (v) Nil. (vi) Yes.
4. **GENERAL:**
   (i) Normal. (ii) Nil. (iii) Yield of Paddy. (iv) (a) 1965 — cond. (b) and (e) N.A. (v) to (vii) N.A.
5. RESULTS:
   (i) 1866 Kg/ha.  (ii) 268.6 Kg/ha.  (iii) Main effect of P is significant. (iv) Av. yield of grain in Kg/ha.

Control=1857 Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
<th>F7</th>
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<tbody>
<tr>
<td>F1</td>
<td>1938</td>
<td>2038</td>
<td>1757</td>
<td>1900</td>
<td>1724</td>
<td>1700</td>
<td>1576</td>
<td>1814</td>
</tr>
<tr>
<td>F2</td>
<td>1991</td>
<td>1942</td>
<td>2048</td>
<td>1710</td>
<td>1956</td>
<td>1843</td>
<td>1833</td>
<td>2005</td>
</tr>
<tr>
<td>Mean</td>
<td>1964</td>
<td>2000</td>
<td>1902</td>
<td>1805</td>
<td>1855</td>
<td>1771</td>
<td>1705</td>
<td>1943</td>
</tr>
</tbody>
</table>

C.D. for F marginal means=239.2 Kg/ha.

Crop :- Paddy (Rabi).
Site :- Reg. Rice Res. Sta., Kayamkulam.
Type :- 'M'.

Object:—To study the effect of different levels of N, P and on Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy—Sesamum. (b) Paddy.  (c) N.A.  (ii) Sandy loam.  (iii) 1.7.61/8, 9.61.  (iv) (a) 4 ploughings and 2 puddlings. (b) Transplanting. (c) 50 Kg/ha.  (d) 23 cm.x15 cm.  (e) 3.  (v) 4483 Kg/ha. of C.M.  (vi) U.R.—19 (late).  (vii) Unirrigated.  (viii) 2 weedings. (ix) 12.1.62.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N as A/S: N1=16·8, N2=33·6 and N3=50·4 Kg/ha.
   (2) 3 levels of P2O5 as Super: P1=16·8, P2=33·6 and P3=50·4 Kg/ha.
   (3) 3 levels of K2O as Mur. Pot.: K1=16·8, K2=33·6 and K3=50·4 Kg/ha.

Treatments applied to soil at planting.

3. DESIGN:
   (i) Fact., in R.B.D.  (ii) (a) 27. (b) N.A.  (iii) 4.  (iv) (a) 6.1 m.x2.7 m. (b) 5.5 m.x2.1 m.  (v) 30 cm. x30 cm.  (vi) Yes.

4. GENERAL
   (i) Satisfactory.  (ii) Nil.  (iii) Grain and straw yield. (iv) 1961—N.A.  (b) and (c) Nil.  (v) to (vii) N.A.

5. RESULTS:
   (i) 4976 Kg/ha.  (ii) 503.9 Kg/ha.  (iii) Main effect of P is highly significant and that of N is significant. (iv) Av. grain yield in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>Mean</th>
</tr>
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<td>4934</td>
<td>5277</td>
<td>4828</td>
<td>4946 5170 4923 5013</td>
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<tr>
<td>N3</td>
<td>5063</td>
<td>5374</td>
<td>4902</td>
<td>5240 5013 5086 5113</td>
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<tr>
<td>Mean</td>
<td>4892</td>
<td>5207</td>
<td>4829</td>
<td>4929 4989 5010 4976</td>
</tr>
</tbody>
</table>

C.D. of N or P marginal means=235.9 Kg/ha.
Crop: Paddy (Kharif).
Site: Rice Res. Sta., Kayamkulam.
Object: To find out the effect of continuous application of N, P and K on the soil fertility and yield of Paddy.

1. BASAL CONDITIONS:
   (i) Nil. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 29:4:65. (iv) (a) 6 ploughings and 2 levellings, (b) 23. (v) Unirrigated. (vi) 2 interculturings and 2 weedings.

2. TREATMENTS:
   7 manurial treatments:
   - T1: 40 Kg/ha. of N as C.M.
   - T2: 40 Kg/ha. of N as S/P
   - T3: 40 Kg/ha. of N as A/S+30 Kg/ha. of S/P
   - T4: 40 Kg/ha. of N as A/S+30 Kg/ha. of K2O
   - T5: 40 Kg/ha. of N as S/P+30 Kg/ha. of K2O
   - T6: 40 Kg/ha. of N as A/S+30 Kg/ha. of S/P
   - T7: 40 Kg/ha. of N as A/S+30 Kg/ha. of S/P

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 8 m. x 5 m. (v) Yes. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Blitox and Endrin were sprayed against diseases and pests. (iii) Yield of grain.

5. RESULTS:
   - Av. yield of grain in Kg/ha.

Crop: Paddy (Rabi).
Object: To study the effect of continuous application of N, P and K on Paddy.

1. BASAL CONDITIONS:
   (i) Nil. (b) Paddy. (c) As per treatments. (ii) Sandy loam. (iii) 3.9.64. (iv) (a) 6 ploughings, puddings and planking. (b) Transplanting (c) 50 Kg/ha. (d) 23 cm. x 15 cm. (e) 3. (f) Nil. (vi) P.T.B.—4 (Medium). (vii) Unirrigated. (viii) Weedings. (ix) 98 cm. (x) 21:1:65.

2. TREATMENTS: and 3. DESIGN:
   Same as in Expt. No. 64(95) on page 17.

4. GENERAL:
   (i) Satisfactory. (ii) Blitox and Endrin were sprayed against diseases and pests. (iii) Yield of grain.

5. RESULTS:
   - Av. yield of grain in Kg/ha.
Crop: Paddy (Rabi).  
Ref: K. 65(102).  
Type: ‘M’.

Object: To find out the effect of continuous application of N both as organic and inorganic along with phosphatic acid and potash as the soil fertility and yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) N.A./25.8.65 (iv) (a) 6 ploughings and 2 levelings. (b) to (c) N.A. (v) As per treatments. (vi) P.T.B.—134 (late). (vii) Unirrigated. (viii) 2 hand weeding and 1 interculturing with Japanese hoe. (ix) 95·5 cm. (x) 19.1.66.

2. TREATMENTS:
   7 manurial treatments: $M_1=$40 Kg/ha. of C.M., $M_2=$40 Kg/ha. of N as A/S, $M_3=M_2+30$ Kg/ha. of P$_4$O$_5$ as Super, $M_4=M_3+30$ Kg/ha. of K$_2$O as Mur. Pot., $M_5=$40 Kg/ha. of P$_4$O$_5$ as Super+$30$ Kg/ha. of K$_2$O as Mur. Pot., $M_6=M_5+30$ Kg/ha. of K$_1$O as Mur. Pot. and $M_7=M_6+30$ Kg/ha. of N as A/S+$10$ Kg/ha. of N as A/S+$30$ Kg/ha. of P$_4$O$_5$ as Super+$30$ Kg/ha. of K$_2$O as Mur. Pot. 
   Entire dose of C.M., Super and Mur. Pot. and $\frac{1}{2}$ dose of A/S applied as basal and $\frac{1}{2}$ A/S as too dressing.

3. DESIGN:
   (i) R.B.D. (ii) 7. (b) 35 m.$\times$8 m. (iii) 4. (iv) (a) and (b) 8 m.$\times$5 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Incidence of blight was noticed. Bordeaux mixture was sprayed. (iii) Yield of grain. (iv) (a) 1965—N.A. (b) Yes. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1802 Kg/ha. (ii) 344·5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Crop: Paddy (Rabi).  
Ref: K. 64(99).  
Type: ‘M’.

Object: To find out the effect of soil application of minor elements on Paddy.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) 4940 Kg/ha. of C.M.+$124$ Kg/ha. of A/S+$124$ Kg/ha. of Super+$62$ Kg/ha. of Mur. Pot. (ii) Sandy loam. (iii) 28.4.64. (iv) (a) 4 ploughings, levelling and harrowing. (b) Behind the plough. (c) 75 Kg/ha. (d) 15 cm.$\times$15 cm. (e) 7. (f) 124 Kg/ha. of Super+$124$ Kg/ha. of A/S+$62$ Kg/ha. Mur. Pot. (vi) P.T.B.—23 (early). (vii) Unirrigated. (viii) 2 intercultural and weeding. (ix) 121 cm.$\times$5.8.64.
2. TREATMENTS:

4 micronutrient treatments: T₀ = Control (no application), T₁ = 11.2 Kg/ha. of Mn. Sul, T₂ = 5.6 Kg/ha. of Fe. Sul. and T₃ = 2.2 Kg/ha. of Molybdic acid.

Micronutrients sprayed 5 days before sowing the seeds and incorporated in the soil.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) and (b) 8 m. x 5 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Endrex and Fytolan were sprayed as precautionary measure. (iii) Yield of grain. (iv) (a) 1964—contd. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

(i) 2427 Kg/ha. (ii) 2448 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2552</td>
<td>2417</td>
<td>2406</td>
<td>2333</td>
</tr>
</tbody>
</table>

Crop: Paddy (Rabi).
Object: To find out the effect of soil application of minor elements on Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) 33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of P₂O₅ as Super+33.6 Kg/ha. of K₂O as Mur. Pot. (ii) Sandy loam. (iii) 5.9.64. (iv) (a) 6 ploughings. (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm. x 15 cm. (e) 3. (f) 5000 Kg/ha. of C.M.+125 Kg/ha. of Super+60 Kg/ha. of Mur. Pot.+50 Kg/ha. of Urea. (v) P.T.B.—4 (Medium). (vi) Unirrigated. (vii) Weeding. (viii) 980 cm. (v) 21.1.65.

2. TREATMENTS:

4 micro-nutrient treatments: T₀ = Control (no application), T₁ = 11.2 Kg/ha. of Mn. Sul, T₂ = 5.6 Kg/ha. of Fe. Sul. and T₃ = 2.2 Kg/ha. of Molybdic acid.

Micronutrients sprayed 5 days before sowing the seeds and incorporated in the soil.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) and (b) 8 m. x 5 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Blitox and Endrin were sprayed against diseases and pests respectively. (iii) Yield of grain. (iv) (a) 1964—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

(i) 2261 Kg/ha. (ii) 1416 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
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</thead>
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<tr>
<td>Av. yield</td>
<td>2313</td>
<td>2296</td>
<td>2167</td>
<td>2267</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).
Object: To find out the effect of soil application of minor elements on Paddy.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 28.4.65. (iv) (a) Ploughing. (b) Dibbling. (c) to (e) N.A. (vi) 38.6 Kg/ha. each of N, P2O5 and K2O. (v) P.T.B.—23. (vii) Unirrigated. (viii) 2 interculture and 2 hand weeding. (ix) 108 cm. (x) 4.8.65.

2. TREATMENTS:
   8 micronutrient treatments: T0=Control, T1=10 Kg/ha. of Mn as Mn.Sul, T2=5 Kg/ha. of Fe as Fe.Sul, T3=2 Kg/ha. of Mo as Sod, Molybdate, T4=50 Kg/ha. of Silicate as Sod. Silicate, T5=100 Kg/ha. of Mg. as Mg.Sul, T6=10 Kg/ha. of B as Borax and T7=25Kg/ha. of Cu as Cu.Sul.

3. DESIGN:
   (i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) and (b) 8 m. x 5 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of Paddy. (iv) (a) 1965 — N.A. (b) Yes. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   (i) 2061.9. (ii) 133.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
   Treatment T0 T1 T2 T3 T4 T5 T6 T7
   Av. yield 2042 2031 2198 2073 2260 1916 2094 1875

Crop :- Paddy.  
Object :-To study the effect of soil application of minor elements on Rice.

Ref :- K. 65(51).  
Type :- 'M'.

Crop :- Paddy.  
Object :-To study the effect of soil application of minor elements on Rice.
Crop :- Paddy (Rabi).

Site :- Reg. Rice Res. Sta., Kayamkulam.

Object :- To find out the efficiency of Eupatorium manure as a complete fertilizer for Paddy.

1. BASAL CONDITIONS:
   (i) Paddy—Paddy — Sesamum.  (b) Paddy.  (c) N.A.  (ii) Sandy loam.  (iii) N.A./28.8.64.  (iv) (a) 4 ploughings and 2 puddlings.  (b) Transplanting.  (c) 50 Kg/ha.  (d) 23 cm. x 23 cm.  (e) N. (v) Nil.  (vi) UR—19 (late).  (vii) Unirrigated.  (viii) 2 weedings.  (ix) N.A.  (x) 18.1.62.

2. TREATMENTS:
   3 manurial treatments : M<sub>0</sub>—Control (no manure), M<sub>1</sub>=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>0</sub> as Super+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot., and M<sub>2</sub>=560 Kg/ha. of Eupatorium manure.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 3.  (b) N.A.  (iii) 7.  (iv) (a) 3 7 m. x 2 3 m.  (b) 3·2 m. x 1·8 m.  (v) 23 cm. x 23 cm.  (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  (ii) Nil.  (iii) Yield of grain.  (iv) (a) 1961—only.  (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:
   (i) 3977 Kg/ha.  (ii) 506·2 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

   Treatment  | M<sub>0</sub>  | M<sub>1</sub>  | M<sub>2</sub>
   ----------|---------|---------|---------
   Av. yield  | 3849    | 3854    | 4227    

Crop :- Paddy (Rabi).


Object :- To find out the suitability of growing a G.M. crop along with first crop Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy.  (b) Paddy.  (c) 33.6 Kg/ha. of N as A/S+33·6 Kg/ha. of P<sub>0</sub> as Super+33.6 Kg/ha. of K<sub>2</sub>O Mur. Pot.  (ii) Sandy loam.  (iii) N.A./28.8.64.  (iv) (a) 6 ploughings and 1 planking.  (b) Transplanting.  (c) 50 Kg/ha.  (d) 23 cm. x 15 cm.  (e) 3.  (v) 5000 Kg/ha. of C.M.+ 125 Kg/ha. of Super +60 Kg/ha. of Mur. Pot. + 50 Kg/ha. of Urea (vi) UR—19 (late).  (vii) Unirrigated.  (viii) 2 interculturings with Japanese rice and 1 hand weeding.  (ix) 98·0 cm.  (x) 14.1.65.

2. TREATMENTS:
   3 manurial treatments : T<sub>1</sub>=No sesbania grown with paddy in previous season, T<sub>1</sub>=4 rows of sesbania grown with previous paddy crop on borders and T<sub>2</sub>=Two rows of sesbania grown with previous paddy crop on borders.

   Sesbania as G.M. ploughed in the same plots in which it was grown.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 3.  (b) N.A.  (iii) 6.  (iv) 9·1 m. x 6·1 m.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) Nil.  (iii) Yield of grain.  (iv) (a) 1964 only.  (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:
   (i) 2683 Kg/ha.  (ii) 304·9 Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Rabi).

Site: Rice Res. Stn., Kottarakara.

Object: To find out the effect of nitrophosphate complex fertilizers on Paddy.

1. BASAL CONDITIONS:
   (iv) (a) 1 digging, 4 ploughings with country plough, 2 plankings and levelling. (b) Transplanting. (c) 40 Kg/ha.
   (d) 25 cm. x 15 cm. (e) 2. (v) 5504 Kg/ha. of C.M. (vi) PTB—20 (medium). (vii) Irrigated.
   (viii) 2 hand weedicings and 1 weeding with Japanese weeder. (ix) N.A. (x) 19.1.1962.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 types of phosphatic fertilizers: P₁=Single Super, P₂=ODDA—Nitrophos (20-20-0) and P₃=PEC Nitrophos (16-14-0).
   (2) 3 levels of fertilizers: L₁=13·5 Kg/ha. of N + 11·8 Kg/ha. of P₂O₅, L₂=35·9 Kg/ha. of N + 23·5 Kg/ha. of P₂O₅ and L₃=53·8 Kg/ha. of N + 47·1 Kg/ha. of P₂O₅.
   N applied as A/S whenever Super is used. Treatments applied as basal dressing at planting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 3. (iv) 7·9 m. x 5·1 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. Crop lodged on 7.1.1962. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961 to 1961; (v) modified in 1962. (b) No. (c) Nil. (d) Nil. (e) to (vii) Nil.

5. RESULTS:
   (i) 3901 Kg/ha. (ii) 401·8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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Crop: Paddy (Rabi).

Site: Rice Res. Stn., Kottarakara.

Object: To study the effect of different methods of application of nitrophosphate complex fertilizers on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy-Paddy. (b) Paddy. (c) 4942 Kg/ha. of C.M. for 63 (105); N.A. for others. (ii) Laterite and porous. (iii) 3.6/12.10.62, 18.9.63/31.10.63 and 18.9.64/28.10.64 respectively. (iv) (a) 3 diggings and levelling. (b) Transplanting. (c) 40 Kg/ha. (d) 25 cm. x 15 cm. (e) 2. (v) Nil. (vi) PTB-20. (vii) Unirrigated. (viii) 1 hand weeding. (ix) N.A. (x) 19.1.63; 25.1.64; 11.2.65.
2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 types of fertilisers: 
\( P_1 = \text{Super} \), \( P_2 = \text{DDA Nitrophos} \) (20-20-0) and \( P_3 = \text{PEC Nitrophos} \) (16-16-0)
(2) 3 levels of manure: 
\( L_1 = 13.5 \text{ Kg/ha. of } N+11.8 \text{ Kg/ha. of } P_1 \), 
\( L_2 = 26.9 \text{ Kg/ha. of } N + 23.5 \text{ Kg/ha. of } P_2 \), and 
\( L_3 = 53.8 \text{ Kg/ha. of } N + 47.1 \text{ Kg/ha. of } P_3 \)
(3) 3 methods of application: 
\( M_1 = \text{Broadcast} \), \( M_2 = 6.4 \text{ cm. below seed} \) and \( M_3 = \text{Pellet} \) application.
N applied as A/S, P~05 as Super. Treatments applied as basal dressing at planting.

3. DESIGN:
(i) 3^rd confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) 6'1 m. x 2'7 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Stem borer attack. Endrin sprayed in 63 (105); Nil for others. (iii) Yield of grain. (iv) (a) 1961-64 (Treatments modified in 1962). (b) No. (c) Results of combined analysis are presented under 5. (v) and (vi) Nil. (vii) Error variances are heterogeneous Treatments x years interaction is present.

5. RESULTS:
(i) 2431 Kg/ha. (ii) 533.4 Kg/ha. (based on 28 d.f. made up of various components of treatments with years (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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Crop : Paddy (Rabi).
Site : Rice Res. Sta., Kottarakara.
Ref :- K. 63(104), 64(77).
Type :- \(‘M’\).
Object :- To study the residual effects of different methods of application of nitro-phosphate complex fertilizers applied to previous paddy crop.

1. BASAL CONDITIONS:
(i) (a) Paddy-Paddy. (b) Paddy. (c) As per treatments. (ii) Laterite. (iii) 7.10.63 and 5.9.64. (iv) (a) 3 mammuthi digging, and 1 levelling. (b) Transplanting. (c) 40 Kg/ha. (d) 25 cm x 15 cm. (e) 2. (v) N.A. (vi) PTB-30. (vii) Unirrigated. (viii) 2 weeding. (ix) N.A. (x) 20.2.64 and 11.2.63.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 types of fertilizer: 
\( P_1 = \text{Single super} \), \( P_2 = \text{ODDA} \) (30-20-0) and \( P_3 = \text{PEC} \) (16-16-0),
(2) 3 levels of manure: 
\( L_1 = 12 \text{ Kg/ha. of } N+10.5 \text{ Kg/ha. of } P \), 
\( L_2 = 24 \text{ Kg/ha. of } N + 21 \text{ Kg/ha. of } P \), and 
\( L_3 = 48 \text{ Kg/ha. of } N + 42 \text{ Kg/ha. of } P \),
(3) 3 methods of application: 
\( M_1 = \text{Broadcasting} \), \( M_2 = 8 \text{ cm. below seed} \) and \( M_3 = \text{Pellet} \) application.

3. DESIGN:
(i) 3^rd confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) 4'6 m. x 3'7 m. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Normal for 63 (104); Good for 64 (77). (ii) Nil. (iii) Yield of grain. (iv) (a) 1952-contd (data for 1965 N.A.). (b) Yes. (c) N.A. (v) and (vi) N.A. (vii) Expt. contd. beyond 1965. Hence results of individual years are presented below.

4. RESULTS:

63 (104)

(i) 1148.9 Kg/ha. (ii) 215.0 Kg/ha. (iii) Effects due to interaction N X M are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
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<th>N3</th>
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C.D. for the body of N X M table = 255.2 Kg/ha.

64 (77)

(i) 2899 Kg/ha. (ii) 327.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

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Crop :- Paddy (*First crop*).

Ref.:- K. 64 (86).

Site :- Rice Res. Stn., Kottarakara.

Type :- 'M'.

Object :- To study the effect of different methods of application of different nitro-phosphate complex fertilizers on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy-Paddy. (b) Paddy. (c) N.A. (ii) Lateritic loam. (iii) 15.5.61/23.6.64. (iv) (a) 3 *mammi th* digging and 1 levelling. (b) Transplanting. (c) 40 Kg/ha. (d) 23 cm. x 15 cm. (e) 2. (v) Nil. (vi) PTB-24 (medium). (vii) Unirrigated. (viii) 2 hand weedicings. (ix) N.A. (x) 17.9.64.
2. TREATMENTS
All combinations of (1), (2) and (3).
(1) 3 types of fertilizers: P1 = Super; P2 = GPCA (28-20-0) and P3 = PSC (16-14-0).
(2) 3 levels of fertilizers: L1 = 13.4 Kg/ha of N+11.8 Kg/ha of P, L2 = 26.9 Kg/ha of N+23.5 Kg/ha of P and L3 = 31.8 Kg/ha of N+47.1 Kg/ha of P.
(3) 3 methods of application: M1 = Broadcast, M2 = 6.3 cm. below seed and M3 = Pellets application.

3. DESIGN:
(i) 3rd conf. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) 6.1 m. x 2.7 m.
(v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal, slight lodging at harvest. (ii) 2 spraying with Endrin against hispa and case worm. (iii) Grain yield. (iv) (a) 1964 only. (b) Yes. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1461 Kg/ha. (ii) 355.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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Crop :- Paddy ('Kharij').
Site :- Rice Res. Sta., Kottarakara.
Object :- To find out the optimum dose of N, P and K for Paddy crop.

1. BASAL CONDITIONS:
(i) (a) No. (b) Paddy. (c) N.A. (ii) Clayey loam. (iii) 16.5.65/28.6.65. (iv) (a) to (e) N.A. (v) As per treatments. 3/5th of N as basal and 2/5th of N in top dressing one month before flowering. (vi) Nil.
(vii) Unirrigated. (viii) N.A. (ix) 99 cm. (x) 22.9.65.

2. TREATMENTS:
All combinations of (1), (2) and (3).
(1) 3 levels of N: N1 = 30, N2 = 40 and N3 = 50 Kg/ha.
(2) 2 levels of P: P1 = 15 and P2 = 30 Kg/ha.
(3) 2 levels of K: K1 = 15 and K2 = 30 Kg/ha.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 4.9 m. x 4.3 m. (b) 4.7 m. x 4.3 m. (v) 8 cm. x 8 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) No. (iii) Yield of grain. (iv) (a) 1965-confid. (b) Yes. (c) N.A. (v) to (vii) N.A.
RESULTS:

(i) 1756 Kg/ha. (ii) 282.7 Kg/ha. (iii) Main effects of N and P are significant. (iv) Av. yield grain in Kg/ha.

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C.D. for N marginal means = 203.5 Kg/ha.
C.D. for P marginal means = 166.2 Kg/ha.

Crop: Paddy (Rohi).
Site: Rice Res. Stn., Kottarakara.
Object: To find out the optimum manural dose for Paddy in the tract.

1. BASAL CONDITIONS:
   (i) (a) Nil, (b) Paddy, (c) N.A. (ii) Lateritic. (iii) 28.8.65/2.10.65. (iv) and (v) N.A. (vi) PFB-20 (medium). (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) 28.1.66.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N: N_1 = 30, N_2 = 40, N_3 = 50 Kg/ha.
   (2) 2 levels of P_2O_5: P_1 = 15, P_2 = 15 Kg/ha.
   (3) 2 levels of K_2O: K_1 = 15, K_2 = 30 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 12, (b) N.A. (iii) 4. (iv) 4.7 m x 4.1 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Stem borer attack controlled by 0.1% Endrin. (iii) Tiller counts, height of the plant and grain yield. (iv) (a) 1963-64. (b) Yes. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   (i) 4167 Kg/ha. (ii) 218.5 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N marginal means = 155.7 Kg/ha.
Crop: Paddy (Rabi).  
Site: Rice Res. Stn., Kottarakara.  
Ref: K. 63(102).  
Type: 'M'.

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

1. BASAL CONDITIONS:
   (i) (a) Paddy-Paddy. (b) Paddy. (c) 942 Kgf/ha. of C.M.  
   (ii) Lateritic. (iii) 7.10.63/14.11.63. (iv) (a) 3 mammoth diggings and levelling.  
   (b) Transplanting. (c) 40 Kg/ha. (d) 15 cm. x 15 cm. (e) 2. (v) Nil.  

2. TREATMENTS:
   (1) 3 levels of N: N₁ =33.6, N₂ =44.8 and N₃ =56.0 Kgf/ha.  
   (2) 2 levels of P₂O₅: P₁ =16.8 and P₂ =33.6 Kg/ha.  
   (3) 2 levels of K₂O: K₁ =16.8 and K₂ =33.6 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) 4 6 m. x 4.0 m.  
   (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Stem borer attack, Endrin applied. (iii) Yield of grain.  
   (iv) (a) 1963-66 (treatments modified in 1964). (b) Yes. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 1883 Kgf/ha. (ii) 1971 Kgf/ha. (iii) Main effect of N alone is significant.  
   (iv) Av. yield of grain in Kg/ha.

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C.D. for N marginal means=140.8 Kg/ha.

Crop: Paddy (Rabi).  
Site: Rice Res. Stn., Kottarakara.  
Ref: K. 64(74).  
Type: 'M'.  

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

1. BASAL CONDITIONS:
   (i) (a) Paddy-Paddy. (b) Paddy. (c) As per treatments.  
   (ii) Lateritic and porous. (iii) 18.9.64/27.10.64. (iv) (a) 3 mammoth diggings and levelling.  
   (b) Transplanting. (c) 40 Kg/ha. (d) 25 cm. x 15 cm. (e) 2. (v) Nil.  
   (vi) PTB-20 (medium). (vii) Unirrigated. (viii) Hand weedings. (ix) N.A.  
   (x) 10 2 65.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N: N₁ =33.6, N₂ =44.8 and N₃ =56.0 Kg/ha.  
   (2) 2 levels of P₂O₅: P₁ =16.8 and P₂ =33.6 Kg/ha.  
   (3) 2 levels of K₂O: K₄ =0 and K₅ =16.8 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 12. (b) 53'0 m. x 4.6 m. (iii) 4 (iv) 4 6 m. x 4.0 m.  
   (v) Nil. (vi) Yes.
4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—66 (modified in 64). (b) Yes. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 3265 Kg/ha. (ii) 425 Kg/ha. (iii) Effect due to Interaction N x K is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>N_3</th>
<th>N_4</th>
<th>K_2</th>
<th>K_4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P_1</td>
<td>3046</td>
<td>3436</td>
<td>3381</td>
<td>3330</td>
<td>3245</td>
<td>3288</td>
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<tr>
<td>P_2</td>
<td>3180</td>
<td>3257</td>
<td>3288</td>
<td>3245</td>
<td>3238</td>
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<tr>
<td>Mean</td>
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<td>3346</td>
<td>3335</td>
<td>3288</td>
<td>3242</td>
<td>3265</td>
</tr>
</tbody>
</table>

C.D. for the body of N x K table—431.8 Kg/ha.

Crop :- Paddy (Kharif).
Site :- Rice Res. Stn., Kottarakara.
Type :- 'M'.

Object :- To find out the optimum dose and method of application of Nitrophosphate Complex fertiliser on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy-Paddy. (b) Paddy. (c) N.A. (ii) Lateritic and porous. (iii) 9.6.63/13.7.63. (iv) (a) Ploughing by wooden plough and 3 diggings. (b) Transplanting. (c) 40 Kg/ha. (d) 25 cm x 15 cm. (e) 2. (v) 4942 Kg/ha. of C.M+161 Kg/ha. of Super+62 Kg/ha. of Mur. Pot.+111 Kg/ha. of A/S.
   (vi) PTB-24.125 days. (vii) Unirrigated. (viii) and (ix) Nil. (x) 10.10.63.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 types of fertilisers : P_1 = Super, P_2 = ODDA Nitrophos (20-20-0) and P_3 = PEC Nitrophos (16-14-0).
   (2) 3 levels of fertilisers : L_1 = 13.5 Kg/ha. of N + 44.5 Kg/ha. of P, L_2 = 26.9 Kg/ha. of N + 23.5 Kg/ha. of P, L_3 = 53.8 Kg/ha. of N + 47.1 Kg/ha. of P.
   (3) 3 methods of application : M_1 = Broadcast, M_2 = 6.4 cm below seed and M_3 = Pellets application.
   N applied as A/S, P_105 as Super. Treatments were applied as basal dressing at planting.

3. DESIGN:
   (i) 3³ confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) 10-7 sq. m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Mild attack of paddy hispa. Dusting with B H.C. 10% at 25 Kg/ha. (iii) Yield of grain.
   (iv) (a) 1962—64. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 1448 Kg/ha. (ii) 214 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P_1</th>
<th>P_2</th>
<th>P_3</th>
<th>P_4</th>
<th>M_1</th>
<th>M_2</th>
<th>M_3</th>
<th>Mean</th>
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<td>1486</td>
<td>1552</td>
<td></td>
<td>1345</td>
<td>1476</td>
<td>1552</td>
<td>1458</td>
</tr>
<tr>
<td>L_2</td>
<td>1465</td>
<td>1386</td>
<td>1394</td>
<td></td>
<td>1417</td>
<td>1394</td>
<td>1434</td>
<td>1415</td>
</tr>
<tr>
<td>L_3</td>
<td>1395</td>
<td>1424</td>
<td>1599</td>
<td></td>
<td>1301</td>
<td>1523</td>
<td>1394</td>
<td>1473</td>
</tr>
<tr>
<td>Mean</td>
<td>1398</td>
<td>1432</td>
<td>1515</td>
<td></td>
<td>1421</td>
<td>1464</td>
<td>1460</td>
<td>1448</td>
</tr>
</tbody>
</table>

Ref :- K. 63(98).
Crop :- Paddy (Kharif).

Site :- Rice Res. Sta., Kottarakara.

Type :- 'M'.

Object : To find out the optimum time of application of A/S on Paddy.

1. BASAL CONDITIONS :
   (i) (a) Paddy-Paddy. (b) Paddy. (c) N.A.
   (ii) Lateritic. (iii) 9.6.63/20.7.63; 16.5.63/26.6.63.
   (iv) (a) 2 ploughings by wooden plough. (b) Transplanting.
   (c) 40 Kg/ha. (d) 25 cm x 15 cm. (e) 2.
   (v) 4942 Kg/ha. of C.M. + 161 Kg/ha. of Super.+62 Kg/ha. of Mur. Pot.
   (vi) P.T.B. = 24 (115 days). (vii) Unirrigated.
   (viii) N.A. (ix) N.A. for 63; 99 1 cm. for 65. (x) N.A.; 22.9.65

2. TREATMENTS :
   6 split-applications of 19.8 Kg/ha. of N as A/S: T1 = Control (No N), T2 = Full dose as basal dressing, T3 = 3/4 dose as basal and 1/4 as top dressing, T4 = 1/4 dose as basal and 3/4 as top dressing, T5 = Full dose as top dressing.

   N broadcasted at planting and top dressing one month before flowering.

3. DESIGN :
   (i) R.B.D. (ii) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 32.54 sq. m. (v) Nil. (vi) Yes.

4. GENERAL :
   (i) N.A.; Slightly lodged during 64. (ii) Mild attack of Rice hispa. Dusting with B.H.C. 10% at 25 Kg/ha.
   (iii) Yield of grain. (iv) (a) 1963-66 (Expt. for 64 = N.A). (b) Yes. (c) Nil. (v) N.A. (vi) N.A. (vii) As the Expt. is cond. beyond 1965, results of individual years are given below.

5. RESULTS:

   63(99)
   (i) 957 Kg/ha. (ii) 268.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

          Treatment      T1    T2    T3    T4    T5
          Av. yield     984  682  1219  851  893  1110

65(19)
   (i) 1639 Kg/ha. (ii) 325.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. grain yield in Kg/ha.

          Treatment      T1    T2    T3    T4    T5
          Av. yield     1546 1922 1789 1884 1580 1415

Crop :- Paddy (Second Crop).

Site :- Rice Res. Sta., Kottarakara.

Type :- 'M'.

Object : To find out the optimum time of application of A/S on Paddy.

1. BASAL CONDITIONS :
   (i) (a) Paddy-Paddy. (b) Paddy. (c) 4942 Kg/ha. of C.M. + 161 Kg/ha. of Super.+62 Kg/ha. of Mur. Pot. for 63; As per treatments for 64. (ii) Lateritic and porous. (iii) 9.10.63/14.11.63; 11.9.64/22.10.64.
   (iv) (a) 3 manmuthi diggings and 1 levelling. (b) Transplanting. (c) 40 Kg/ha. (d) 25 cm x 15 cm. (e) 2.
   (v) 4942 Kg/ha. of C.M. + 161 Kg/ha. of Super.+62 Kg/ha. of Mur. Pot. (vi) P.T.B. = 20 (medium). (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 17.2.64; 8.2.65.

2. TREATMENTS :
   6 split-applications of 19.8 Kg/ha. of N as A/S: T1 = Control, T2 = Full dose as basal dressing, T3 = 1/4 dose as basal dressing, 1/4 as top dressing, T4 = 1/4 dose as basal and 3/4 as top dressing, T5 = 1/4 dose as basal and 3/4 as top dressing, T6 = Full dose as top dressing.

   N broadcast at planting and top dressing one month before flowering.
3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 32.5 sq. m. for 63; (a) 7.8 m. x 4.4 m. and (b) 7.6 m. x 4.3 m. for 64. (v) Nil for 63; 8 cm. x 8 cm. for 64. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Mild attack of Rice hispa for 63, dusting with B.H.C. 10% at 25 Kg/ha.; Nil for 64. (iii) Yield of grain. (iv) (a) 1963-66 (expt. for 65—N.A). (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Expt. is continued beyond 1965. Therefore results of individual years are presented below.

5. RESULTS:

**63(97)**
(i) 2125 Kg/ha. (ii) 379.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1999</td>
<td>2214</td>
<td>2076</td>
<td>2307</td>
<td>2007</td>
</tr>
</tbody>
</table>

**64(75)**
(i) 3023 Kg/ha. (ii) 481.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3091</td>
<td>2922</td>
<td>2952</td>
<td>2837</td>
<td>3337</td>
</tr>
</tbody>
</table>

**Crop** - Paddy (Kharif')
**Site** - Rice Res. Stn., Kottarakara

Object: - To find out the optimum level of lime for Paddy.

1. BASAL CONDITIONS.
(i) (a) Paddy—Paddy. (b) Paddy. (c) N.A. (ii) Lateritic and porous. (iii) 9.6.63/20.7.63. (iv) (a) Ploughing by wooden plough, 3 diggings and levelling. (b) N.A. (c) 40 Kg/ha. (d) 25 cm. x 15 cm. (e) 2. (v) 4942 Kg/ha. of C.M.+161 Kg/ha. of Super+62 Kg/ha. of Mur. Pot.+111 Kg/ha. of A.S. (vii) P.T.B.—24 (medium). (viii) Unirrigated. (viii) and (ix) N.A. (x) 5.10.63.

2. TREATMENTS:
5 levels of lime: L0=0, L1=284, L2=568, L3=741 and L4=1112 Kg/ha. Lime applied as basal dressing.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) and (b) 23.16 sq. m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Minor attack of Rice hispa. Dusting with B.H.C. 10% at 25 Kg/ha. (iii) Yield of grain. (iv) (a) 1963—65 (modified in 65). (b) N.A. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 2074 Kg/ha. (ii) 175.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L0</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2025</td>
<td>2034</td>
<td>2175</td>
<td>2106</td>
<td>2031</td>
</tr>
</tbody>
</table>
Crop : Paddy (Kharif).
Site : Rice Res. Stn., Kottarakara.

Object :—To assess the quantity of lime required for Paddy crop in the tract.

1. BASAL CONDITIONS :
   (i) (a) No. (b) Paddy. (c) C.M. at 4942 Kg/ha., S/P. at 161 Kg/ha. and Mur. Pot. at 62 Kg/ha. (ii) Clayey loam. (iii) 16.5.65. (iv) (a) Digging 3 times and levelling 2 times. (b) to (c) N.A. (v) Basal application of C.M. at 4942 Kg/ha., Super at 161 Kg/ha. and Mur. Pot. at 62 Kg/ha. Top dressing of A/S at 50.4 Kg/ha. one month before flowering. (vi) P.T.B.—24 (medium duration). (vii) Unirrigated. (viii) Hand weeding and intercultivation with Rotary Weeder. (ix) 99 em. (x) 17.6.65.

2. TREATMENTS :
   5 levels of lime : L₀ =0, L₁ =115, L₂ =230, L₃ =300 and L₄ =450 Kg/ha.

3. DESIGN :
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 8'0 m x 3'3 m. (b) 7'9 m x 3'2 m. (v) 8 cm. x 8 cm. (vi) Yes.

4. GENERAL :
   (i) Satisfactory. (ii) No. (iii) Tiller counts, height of plants, general performance of crop, straw weight and yield of grain. (iv) (a) 1963—55. (b) Yes. (c) N.A. (v) to (vii) N.A.

5. RESULTS :
   (i) 2571 Kg/ha. (ii) 217.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
<th>L₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2544</td>
<td>2523</td>
<td>2536</td>
<td>2604</td>
<td>2640</td>
</tr>
</tbody>
</table>

Crop : Paddy (Rabi).
Site : Rice Res. Stn., Kottarakara.

Object :—To find out the optimum level of lime for Paddy.

1. BASAL CONDITIONS :
   (i) (a) Paddy——Paddy. (b) Paddy. (c) 4942 Kg/ha. of C.M. (ii) Lateritic and porous. (iii) 10.9 1963/30.10.63 : 5.9.64/13.10.64. (iv) (a) 3 mammathy diggings. (b) Transplanting. (c) 40 Kg/ha. (d) 25 cm. x 15 cm. (e) 2. (v) 4942 Kg/ha. of C.M.+161 Kg/ha. of Super+62 Kg/ha. of Mur. Pot.+111 Kg/ha. of A/S. (vi) P.T.B.—20. (vii) Unirrigated. (viii) 2 weedicings. (ix) N.A. (x) 22.1.64 ; 1.2.65.

2. TREATMENTS :
   Same as in Expt. n. 63(97) on page 34.

3. DESIGN :
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) 23 16 Sq. m. (v) Nil. (vi) Yes.

4. GENERAL :
   (i) Normal, slight lodging. (ii) Stem borer attack. Enzin sprayed. (iii) Yield of grain. (iv) (a) 1963—66 (65—N.A.). (b) Yes. (c) Nil. (v) to (vii) Nil.
5. RESULTS:

63(101)

(i) 2041 Kg/ha. (ii) 190.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1_2</th>
<th>1_3</th>
<th>1_4</th>
<th>1_5</th>
<th>1_6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1912</td>
<td>2072</td>
<td>2104</td>
<td>2088</td>
<td>2031</td>
</tr>
</tbody>
</table>

64(73)

(i) 3270 Kg/ha. (ii) 270.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1_2</th>
<th>1_3</th>
<th>1_4</th>
<th>1_5</th>
<th>1_6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3122</td>
<td>3315</td>
<td>3251</td>
<td>3272</td>
<td>3391</td>
</tr>
</tbody>
</table>

Crop: Paddy (Rabi).
Site: Rice Res. Stn., Mannuthy.
Object: To find out the effect of dry leaf and G.L. application on Paddy.

1. BASAL CONDITIONS:

   (i) (a) Nil. (b) Paddy. (c) 5604 Kg/ha. of C.M.+33.6 Kg/ha. of P₁₀+33.6 Kg/ha. of K₂₀. (ii) Lateritic. (iii) 3.9.64; 30.8.65. (iv) (a) 6 ploughings, puddling and levelling. (b) Transplanting. (c) 34 to 45 Kg/ha. (d) 25 cm. x 15 cm. (e) 2. (f) 5604 Kg/ha. of C.M.+22.4 Kg/ha. of N+33.6 Kg/ha. of P₁₀+33.6 Kg/ha. of K₂₀ for 64(9) and 5000 Kg/ha. of C.M.+30 Kg/ha. of N+30 Kg/ha. of P₁₀+30 Kg/ha. K₂₀ for 65(42). (v) PTB-12 (Medium). (vi) Irrigated. (vii) N.A. (ix) 299 cm.; 203 cm. (x) 8.2.65; 21.1.66.

2. TREATMENTS:

   4 manural treatments: M₀ = Control (no manure), M₁ = 500 Kg/ha. of G.L., M₂ = 500 Kg/ha. of Dry leaf and M₃ = 500 Kg/ha. of Dry leaf applied after powdering the leaf.

3. DESIGN:

   (i) R.B.D. (ii) 4. (b) N.A. (iii) 6. (iv) (a) and (b) 9 m. x 3 m. (v) Nil. (vi) Yes.

4. GENERAL:

   (i) Satisfactory. (ii) Sprayed Endrin against stem borer and Cupravit sprayed against stem borer. (iii) Tiller counts, height measurements and yield of grain and straw. (iv) to (vi) N.A. (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:

   (i) 2614 Kg/ha. (ii) 242.6 Kgfha. (based on 3 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1_2</th>
<th>1_3</th>
<th>1_4</th>
<th>1_5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2512</td>
<td>2693</td>
<td>2676</td>
<td>2576</td>
</tr>
</tbody>
</table>
Crop: Paddy (Kharif).  
Ref: K. 64(2), 65(41).

Site: Rice Res. Sta., Mannuthy.  
Type: ‘M’.

Object: To find out the effect of soil application of micronutrients for increasing yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) 3363 Kg/ha. of G.L. + 44.8 Kg/ha. of N + 33.6 Kg/ha. of P2O5 + 33.6 Kg/ha. of K2O. (ii) Lateritic. (iii) Nov. 7, 1964 to Dec. 31, 1965. (iv) (a) 6 ploughings. (b) Transplanting. (c) 34 to 45 Kg/ha. (d) 25 cm. x 15 cm. (e) 2. (v) 44.8 Kg/ha. of N + 33.6 Kg/ha. of P2O5 + 33.6 Kg/ha. of K2O. (vi) P.T.B.—32. (vii) Irrigated. (viii) 2 weedings. (ix) 195 em., 145 em. (x) 20.10.64, 2.10.65.

2. TREATMENTS:
   8 micronutrient treatments: T0 = Control, T1 = 10 Kg/ha. of MnSul., T2 = 5 Kg/ha. of FeSul., T3 = 2 Kg/ha. of Molybdic acid, T4 = 50 Kg/ha. of Sod. Silicate, T5 = 100 Kg/ha. of Mg Carbonate, T6 = 10 Kg/ha. of Borax dissolved in warm water, T7 = 25 Kg/ha. of CuSul. dissolved in warm water.

3. DESIGN:
   (i) R.B.D. (ii) (a) 8. (b) 27.5 m. x 9.0 m. (ii) 4. (iv) (a) 3.0 x 9.0 m. (b) 2.8 m. x 9.9 m. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Endrin sprayed against stem borer. (iii) Grain yield. (iv) (a) 1964—65. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatments x years interaction is absent. Hence the results of individual years are given below.

5. RESULTS:
64(2)
(i) 3094 Kg/ha. (ii) 294.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M7</th>
<th>M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3205</td>
<td>2958</td>
<td>3236</td>
<td>2999</td>
<td>3255</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65(41)
(i) 2175 Kg/ha. (ii) 145.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M7</th>
<th>M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2215</td>
<td>2150</td>
<td>2130</td>
<td>2130</td>
<td>2215</td>
<td>2005</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy (Rabi).  
Ref: K. 65(39).

Site: Rice Res. Sta., Mannuthy.  
Type: ‘M’.

Object: To find out the effect of soil application of micronutrients for increasing yield of Rice.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) 40 Kg/ha. of N as A/S + 30 Kg/ha. of P2O5 and K2O. (ii) Lateritic. (iii) Jan. 1, 1965 to Dec. 31, 1965. (iv) (a) 6 ploughings. 1 hand weeding. (b) to (e) N.A. (vi) 20 Kg/ha. of N as A/S and 30 Kg/ha. each of P2O5 and K2O. (vi) P.T.B.—12 (Medium). (vii) Irrigated. (viii) Hand weeding once, using rotary weeder. (ix) 17.1.1966.

2. TREATMENTS:
   8 micronutrient treatments: T0 = Control (no micronutrient), T1 = 10 Kg/ha. of MnSul., T2 = 5 Kg/ha. of FeSul., T3 = 2 Kg/ha. of Molybdic acid, T4 = 50 Kg/ha. of Sod. Silicate, T5 = 100 Kg/ha. of Mg Carbonate, T6 = 10 Kg/ha. of Borax and T7 = 25 Kg/ha. of CuSul.
3. DESIGN:
(i) R.B.D. (ii) (a) 8. (b) 18.8 m. × 14.3 m. (iii) 4. (iv) (a) 3.0 m. × 9.0 m. (b) 2.9 m. × 8.8 m. (v) 8 cm. × 8 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Case worm, Gall fly and stem borer was attacked and controlled by spraying Endrin 0.1%. Helmintosporium noticed and sprayed Bitox. (iii) Grain and straw yield recorded. (iv) (a) 1965-66. (b) Yes. (c) N.A. (v) Rice Res. Stn., Kayamkulam. (vi) and (vii) N.A.

5. RESULTS:
(i) 2541 Kg/ha. (ii) 197.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>234</td>
<td>254</td>
<td>246</td>
<td>256</td>
<td>256</td>
</tr>
</tbody>
</table>

Crop = Paddy (Kharif).
Type = 'M'.

Object: To study the effect of sowing G.M. crops with Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy-paddy. (b) Paddy. (c) 2242 Kg/ha. of C.M. + 168 Kg/ha. of Super+56 Kg/ha. of Mur. Pot.+112 Kg/ha. of A/S for 62(88); 5604 Kg/ha. of C.M.+33.6 Kg/ha. of each of P105 and K205 for 63(122); N.A. for 64(16). (ii) Laterite. (iii) 3.5; 6.2; 13.5; 63. (iv) (a) 6 ploughings. (b) Broadcast. (c) 67 Kg/ha. for 62(88); 90 Kg/ha. for others. (d) and (e) N.A. (v) 2242 Kg/ha. of C.M.+168 Kg/ha. of Super+56 Kg/ha. of Mur. Pot. for 62(88); 5604 Kg/ha. of C.M.+33.6 Kg/ha. of each of P105 and K205 for 63(122); 300 Kg/ha. of C.M.+40 Kg/ha. of N+30 Kg/ha. of P105+30 Kg/ha. of K205 for 64(16). (vi) PTB-32 (medium). (vii) Unirrigated for 62(88), 63(122) and irrigated for 64(16). (viii) 2 hand weedicings. (ix) 237 cm.; 252 cm.; 195 cm. (x) 20.9.62; 21.9.63; 18.9.64.

2. TREATMENTS:
5 treatments: T1=Paddy alone, T2=Sesbania sown on border, T3=Sesbania sown by broadcast, T4=Dhaincha sown on border, T5=Dhaincha sown by broadcast.

Sesbania and Dhaincha are used as G.M. for this Paddy crop. The green material is pulled out and transplanted in situ when there is standing water in the plot about 40 to 45 days after sowing.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 7.6 m. × 4.6 m. for 62(88), 63(122), 64(16). (b) 7.5 m. × 4.3 m. for 62(88), 63(122); 7.6 m. × 4.6 m. for 64(16). (v) 8 cm. × 12 cm. for 62(88), 63(122); Nil for other. (vi) Yes.

4. GENERAL:
(i) Satisfactory, but the crop lodged after the flowering was completed in 64(16) only. (ii) Rice bug and grass hopper attack in 62(88) controlled by dusting B.H.C. 10%; case worm and leaf roller attack in 63(122) controlled by spraying Endrin; BHC dusted against rice bug in 64(16). (iii) Grain yield. (iv) (a) 1962-64. (b) No. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nill. (vii) Error variances are homogeneous and Treatments × years interaction is present.

5. RESULTS:
(i) 2541 Kg/ha. (ii) 197.7 Kg/ha. (based on 8 d.f. made up of Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2893</td>
<td>2989</td>
<td>3015</td>
<td>3230</td>
<td>2785</td>
</tr>
</tbody>
</table>
Crop: - Paddy (Kharif).

Ref: - K. 61(25), 62(82), 63(126).


Type: - 'M'.

Object: - To find out the optimum time of application of A/S to transplanted Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy.  (b) Paddy.  (c) 560 Kg/ha. of C.M. for 61(25); 2242 Kg/ha. of C.M.+112 Kg/ha. of Super+56 Kg/ha. of Mur. Pot. for 61(83); 5601 Kg/ha. of C.M.+33.6 Kg/ha. of each of K,O and P,O for 63(126). (ii) Laterite. (iii) 18.5.1961; 16.6.1951; 16.5.1962/N.A.; 25.5.1963; 6.7.1963. (iv) (a) 6 ploughings for 61(25); 6 ploughings and puddlings for others. (b) Transplanting. (c) 34 to 45 Kg/ha. (d) 25 cm. x 15 cm. (e) 3. (v) Same as in (i) (c) above. (vi) P.T.B.—32 (medium). (vii) Unirriged for 61(25); Irrigated for others. (viii) 2 weeding for 61(25); 2 hand weeding and intercultivation for others. (ix) N.A.; 237 cm.; 252 cm. (x) 21.9.1961; 5.10.1962; 27.9.1963.

2. TREATMENTS:
   6 split—application of 44.8 Kg/ha. of N as A/S: M₁=Control (no N), M₂=Full dose as basal dressing, M₃=Half as basal dressing and half one month before flowering. M₄=3/4 as basal dressing and 1/4 one month before flowering. M₅=1/4 as basal dressing and 3/4 one month before flowering and M₆=Full dose as top dressing.

N broadcast as basal and top dressed one month before flowering.

3. DESIGN:
   (i) R.B.D.  (ii) 6.  (b) N.A.  (iii) 4.  (iv) (a) 6⅓ m.×7.6 m. for 61(25); 4⅔ m.×7.6 m. for 62(82), 63(126). (b) 5⅔ m.×7.5 m. for 61(25); 4⅔ m.×7.5 m. for 62(82), 63(126). (v) One row around the plot. (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  (ii) Gall fly, case worm, stem borer attack controlled by spraying Endrin. (iii) Yield of grain. (iv) (a) 1961—63. (b) No.  (c) Nil.  (v) (a) Pattambi and Kayamkulam. (b) Nil.  (vi) Nil.  (vii) Since the error variances are heterogenous and Treatment x years interaction is absent individual years results are presented below.

5. RESULTS:

61(25)
(i) 1295 Kg/ha.  (ii) 1128 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1352</td>
<td>1287</td>
<td>1267</td>
<td>1313</td>
<td>1299</td>
<td>1254</td>
</tr>
</tbody>
</table>

62(82)
(i) 1923 Kg/ha.  (ii) 1134 Kg/ha.  (iii) Treatment differences are significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
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<td>Av. yield</td>
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<td>1934</td>
<td>1965</td>
<td>1998</td>
<td>2023</td>
<td>1894</td>
</tr>
<tr>
<td>C.D. = 178.4 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

63(126)
(i) 2071 Kg/ha.  (ii) 240.0 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1900</td>
<td>2078</td>
<td>2225</td>
<td>1894</td>
<td>2016</td>
<td>2326</td>
</tr>
</tbody>
</table>
Crop :- Paddy (Rabi).


Obect :- To find out the optimum time of application of A/S to transplanted Paddy crop.

1. BASAL CONDITIONS:

(i) (a) Paddy—Paddy. (b) Paddy. (c) 5604 Kg/ha. of C.M. for 61(26); 2242 Kg/ha. of C.M.+ 112 Kg/ha. of Super+56 Kg/ha. of Mur. Pot. for 62(83); 5604 Kg/ha. of C.M.+33.6 Kg/ha. of each of P₂O₅ and K₂O for 63(127). (ii) Laterite. (iii) 4.9.1961:5.10.1961 ; 5.9.1962:21.1.1963 ; 5.9.1963:6.10.1963. (iv) (a) 6 ploughings for 61(26); 6 ploughings and 1 to 6 puddlings for 62(83), 63(127). (b) Transplanting. (c) 34 to 45 Kg/ha. (d) 25 cm. x 15 cm. (e) 3. (v) Same as in (i) (c) above. (vi) PTB-10 for 61(26); PTB-12 for others. (vii) Irrigated. (viii) 2 weedings for 61(26); 1 to 2 hand weedings and 1 interculture for 62(83), 63(127). (ix) 49 em.; 63 em.; 252 em. (x) 6.12.1961 ; 21.1.1963 ; 4.1.1964.

2. TREATMENTS:

Same as in exp. no. 61(27), 62(86), 63(125) given below.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 6'1 m. x 7'6 m. for 61(26); 4'6 m. x 7'6 m. for others. (b) 5'8 m. x 7'5 m. for 61(26); 4'3 m. x 7'5 m. for others. (v) One row around. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Attack of gall fly, case worm, stem borer which is controlled by spraying Endrex for 61(26) and Endrin for others. (iii) Yield of grain. (iv) (a) 1961—63. (b) No. (c) Results of combined analysis are given under 5. Results. (v) (a) Pattambi and Kayamkulam. (b) Nil. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction in present.

5. RESULTS:

(i) 1659 Kg/ha. (ii) 184·2 Kg/ha. (based on 10 d.f. made up of 6 Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1404</td>
<td>1607</td>
<td>1705</td>
<td>1715</td>
<td>1676</td>
<td>1758</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).


Obect :- To find out the optimum time of application of A/S to dry sown Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy—Paddy. (b) Paddy. (c) 5604 Kg/ha. of C.M. for 61(27); 2242 Kg/ha. of C.M.+ 112 Kg/ha. of Super+56 Kg/ha. of Mur. Pot. for 62(86); 5604 Kg/ha. of C.M.+33.6 Kg/ha. of each of P₂O₅ and K₂O for 63(125). (ii) Laterite. (iii) 20.5.1961: 1.5.1962 ; 12.5.1963. (iv) (a) 6 ploughings. (b) Broadcast. (c) 90 Kg/ha. (d) and (e) N.A. (v) 560 Kg/ha. of C.M. for 61(27); 2242 Kg/ha. of C.M.+ 112 Kg/ha. of Super+56 Kg/ha. of Mur. Pot. for 62(86); 5604 Kg/ha. of C.M.+33.6 Kg/ha. of each of P₂O₅ and K₂O for 63(125). (vi) P.T.B.—32 (medium). (vii) Unirrigated for 61(27), 63(125); Irrigated for 62(86). (viii) 2 weedings for 61(27), 63(125); 2 hand weedings and 2 hoeings by Japanese hoe for 62(86). (ix) N.A. for 61(27); 237 cm.; 252 em. (x) 7.9.1961 ; 14.9.1962 ; 17.9.1963.

2. TREATMENTS:

6 split—applications of 44·8 Kg/ha. of N as A/S : M₀=Control (no application), M₁=Full dose as basal dressing, M₂=Half as basal dressing and half one month before flowering, M₃=3/4 as basal dressing and 1/2 month before flowering, M₄=1 as basal dressing and 3/4 one month before flowering and M₅=Full dose as top dressing.

N broadcast as basal and top dressed one month before flowering.
3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 6·1 m. × 7·6 m. for 61(27); 4·6 m. × 7·6 m. for 62(86); 6·6 m. × 7·6 m. 63(125). (b) 5·8 m. × 7·5 m. for 61(27); 4·3 m. × 7·5 m. for 62(86); 4·6 m. × 7·6 m. for 63(125). (v) 8 cm. × 7 cm.; 12 cm. × 7 cm.; Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory but lodging was noticed during the post-flowering stage for 62(95). (ii) Gall fly and case worm attack controlled by spraying Endrin for 61(27) and 63(125); Rice bug attack in 62(86) controlled by dusting B.H.C. 10%. (iii) Yield of grain. (iv) (a) 1961—63. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) (a) Kayamkulam and Pattambi. (b) Nil. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS:
(i) 2055 Kgl./ha. (ii) 284·5 Kg/ha. (based on 10 d.f. made up of Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1950</td>
<td>2089</td>
<td>1981</td>
<td>2048</td>
<td>2083</td>
<td>2181</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif). Ref :- K. 61(34), 62(95), 63(118).
Site :- Reg. Rice Res. Stn., Mannuthy. Type :- 'M'
Object :- To study the effect of different levels of N, P and K alone in combination on Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy-Paddy. (b) Paddy. (c) 5604 Kg/ha. of C.M. for 61(34) and 63(118); 2242 Kgj/ha. of G.L. for 62(95). (ii) Laterite. (iii) 18.5.1961/21.6.1961; 24.5.1962/7.7.1962; 10.6.1963/18.7.63. (iv) (a) 4 ploughings for 61(34); 6 ploughings, 1 levelling for 62(95); 6 ploughings and 6 puddlings for 63(118). (b) Transplanting. (c) 34 to 45 Kg/ha. (d) 25 cm. × 15 cm. (e) 3. (v) Same as in (i) (c) above. (vi) PTB-32 (medium). (vii) Same as in (i) (c) above. (viii) N.A. for 61(34); 1 hand weeding and intercultivation for 62(95); Working Japanese hoe and hand weeding for 63(118). (ix) N.A.; 204 cm.; 252 cm. (x) 28.9.1961; 30.9.1962; 11, 12, 10.1963.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N as A/S: N₁ =16·8, N₂ =33·6 and N₃ =50·4 Kg/ha.
(2) 3 levels of P₂O₅ as Super: P₁ =16·8, P₂ =33·6 and P₃ =50·4 Kg/ha.
(3) levels of K₂O as Mur. Pot.: K₁ =16·8, K₂ =33·6 and K₃ =50·4 Kg/ha.
Half dose of N and full dose of P₂O₅ and K₂O applied as basal dressing. Rest half dose of N was applied as top dressing one month before flowering.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) 3·0 m. × 6·1 m. (b) 2·8 m. × 5·9 m. (v) 12 cm. × 8 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory but lodging was noticed during the post-flowering stage for 62(95). (ii) At tuck of case worm and gall fly for 61(34) and 62(95) were controlled by spraying Endrin; case worm, leaf roller and stem borer attack for 63(118) were controlled by spraying Endrin. (iii) Yield of grain. (iv) (a) 1961—63. (b) No. (c) Nil. (v) (a) Pattambi, Kayamkulam and Moncompu. (b) Nil. (vi) Nil. (vii) Since the error variances are homogeneous and Treatments × years interaction is absent, individual years results are presented below.

5. RESULTS:
61(34)
(i) 2150 Kg/ha. (ii) 240·0 Kg/ha. (iii) Main effect of N is highly significant and that of K is significant. (iv) Av. yield of grain in Kg/ha.
C.D. for N or K marginal means=112·8 Kg/ha.

(i) 1737 Kg/ha. (ii) 233·8 Kg/ha. (iii) Main effect of N and interaction P×K are significant. (iv) Av. yield of grain in Kg/ha.

### Table 63(95)

<table>
<thead>
<tr>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>K&lt;sub&gt;3&lt;/sub&gt;</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>1601</td>
<td>1648</td>
<td>1724</td>
<td>1483</td>
<td>1749</td>
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<td>1789</td>
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<td>1709</td>
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<td>1799</td>
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<td>1794</td>
<td>1829</td>
<td>1800</td>
<td>1808</td>
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</tr>
<tr>
<td>Mean</td>
<td>1746</td>
<td>1729</td>
<td>1735</td>
<td>1744</td>
<td>1704</td>
<td>1763</td>
<td>1737</td>
</tr>
</tbody>
</table>

C.D. for N marginal means =110·0 Kg/ha.
C.D. for the body of P×K table=190·4 Kg/ha.

### Table 63(18)

(i) 2209 Kg/ha. (ii) 383·2 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>K&lt;sub&gt;3&lt;/sub&gt;</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1932</td>
<td>2128</td>
<td>2012</td>
<td>2048</td>
<td>1997</td>
<td>2027</td>
<td>2024</td>
<td></td>
</tr>
<tr>
<td>2323</td>
<td>2153</td>
<td>2153</td>
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<td>2328</td>
<td>2333</td>
<td>2515</td>
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</tr>
<tr>
<td>Mean</td>
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<td>2270</td>
<td>2148</td>
<td>2213</td>
<td>2181</td>
<td>2212</td>
<td>2209</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=180·2 Kg/ha.
Crop: = Paddy (Rabi).

Ref: = K. 61(24), 62(96), 63(119).


Type: = 'M'.

Object: = To study the effect of different levels of N, P and K alone and in combination on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy-Paddy. (b) Paddy. (c) 3604 Kg/ha. of C.M. for 61(24) and 63(119); 2242 Kg/ha. of G.L. for 62(96). (ii) Laterite. (iii) 20.9.61/12.10.61; 29.8.62/20.10.62; 25.9.63/25.10.63. (iv) (a) 4 ploughings for 61(24); 6 ploughings and levelling for 62(96); 6 ploughings and 6 puddings for 63(119). (b) Transplanting. (c) 34 to 45 Kg/ha. (d) 25 cm. x 15 cm. (e) 2 to 3. (v) Same as in (i) (c) above. (vi) P.T.B.—10 (early) for 61(24) and 63(119); P.T.B.—12 for 62(96). (vii) Irrigated. (viii) 1 hand weeding and working Japanese hoe once. (ix) 49 cm.; 63 cm.; 80 cm. (x) 27.12.61; 6.1.63; 10.12.63.

2. TREATMENTS:
   Same as in exp. No. 63(24), 62(96), 63(119) first crop on page 41.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4 for 61(24) and 62(96); 3 for 63(119). (iv) (a) 30 m. x 6.1 m. (b) 2.8 m. x 5.9 m. (v) 12 cm. x 8 cm. (vi) Yes.

4. GENERAL:
   (i) Good for 61(24) and 62(96) but lodging occurred during post-flowering stage for 62(96); Poor for 63(119); case worm and gall fly attack in 61(24) controlled by spraying Endrex; Leaf roller and stem borer attack for 62(96); case worm, leaf roller and stem borer attack for 63(119) controlled by Endrin spray. (iii) Yield of grain. (iv) (a) 1561—63. (b) N.A. (c) Results of combined analysis given under 5. Results. (v) Pattambi. Kayamkulam and Kottarakara. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1642 Kg/ha. (ii) 147.8 Kg/ha. (based on 36 d.f. made up of interactions of various components of treatments with years). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
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<td>1582</td>
<td>1631</td>
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</tr>
</tbody>
</table>

C.D. for N marginal means = 81.7 Kg/ha.

Crop: = Paddy (Kharif).

Ref: = K. 64(14), 65(30).


Type: = 'M'.

Object: = To study the effect of different combinations of N, P and K on Paddy.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 40 Kg/ha. of N +30 Kg/ha. of P₂O₅ +30 Kg/ha. of K₂O. (ii) Laterite. (iii) 11.6.64/16.7.64; 14.5.65/18.6.65. (iv) (a) 6 ploughings, Puddling and levelling. (b) Transplanting. (c) 34 to 45 Kg/ha. (d) 25 cm.×15 cm. (e) 2. (v) Nil. (vi) P.T.B.—32 (Medium). (vii) Irrigated. (viii) 2 weedings. (ix) 300 cm., 145 cm.; (x) 2.10.64.

2. TREATMENTS:
7 manuriial treatments : T₁=40 Kg/ha. of N as A/S; T₂=40 Kg/ha. of N as G.L.; T₃=T₁+30 Kg/ha. of P₂O₅ as Super; T₄=T₂+30 Kg/ha. of K₂O as Mur. Pot.; T₅=30 Kg/ha. of N as A/S+20 Kg/ha. of N as G.L. +T₄; T₆=T₃+T₅; T₇=20 Kg/ha. of N as A/S+20 Kg/ha. of N as G.L. +T₂.

3. DESIGN:
(i) R.B.D. (ii) 7. (iii) 4. (iv) (a) 6·0 m.×3·0 m. (b) 5·5 m.×2·7 m. (v) 25 cm.×15 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Endrin sprayed against stem borer and Cupravit against stalk brown disease. (iii) Yield of grain. (iv) (a) 1964—condit. (b) N.A. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
64(14)
(i) 2855 Kg/ha. (ii) 302·2 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
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<td>3013</td>
<td>3249</td>
<td>3159</td>
<td>1431</td>
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<tr>
<td>C.D. =449 0 Kg/ha.</td>
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</tbody>
</table>

65(2)
(i) 2581 Kg/ha. (ii) 220·1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
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<td>Av. yield</td>
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<td>2874</td>
<td>2843</td>
<td>2760</td>
<td>1565</td>
<td>2569</td>
<td>2775</td>
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<tr>
<td>C.D. =3270 Kg/ha.</td>
<td></td>
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Crop :- Paddy (Kharif).


Object :- To study the effect of different methods of application of Nitrophosphate complex fertilizers on Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments+2242 Kg/ha. of C.M. for 62(93); As per treatments+5004 Kg/ha. of C.M. for 63(112); As per treatments for 64(18). (ii) Laterite soil. (iii) 16.5.62/N.A.; 25.5.63; 4.7.63; 22.5.64/3.7.64. (iv) (a) 6 ploughings. (b) Transplanting (c) 34 to 45 Kg/ha. (d) 25 cm.×15 cm. (e) 3. (f) 2242 Kg/ha. of C.M. for 62(93); 5004 Kg/ha. of C.M. for 63(112); Nil for 64(18). (vi) P.T.B.—32 (Medium). (vii) Irrigated. (viii) 2 hand weedings and working Japanese hoe for 63(112); 2 intercultivations and weedings for 63(112); weedings for other. (ix) 237 cm.; 252 cm.; 241 cm. (x) 24, 25·9.62 23, 26·9.63; 29·9.64.
2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 types of phosphates: \( P_1 = \text{Super}, \) \( P_2 = \text{Nitrophos} \) produced by O.D.D.A. process and \( P_3 = \text{Nitrophos} \) produced by PEC process.
(2) 3 levels of fertilizers: \( L_1 = 13.5 \text{ Kg/ha.} \) of \( \text{N} + 11.8 \text{ Kg/ha.} \) of \( \text{P}_2\text{O}_5 \), \( L_2 = 26.9 \text{ Kg/ha.} \) of \( \text{N} + 23.8 \text{ Kg/ha.} \) of \( \text{P}_2\text{O}_5 \), \( L_3 = 53.8 \text{ Kg/ha.} \) of \( \text{N} + 47.1 \text{ Kg/ha.} \) of \( \text{P}_2\text{O}_5 \).
(3) 3 methods of application: \( M_1 = \text{Broadcast}, \) \( M_2 = 64 \text{ cm. below surface} \) and \( M_3 = \text{Pellet application} \). \( N \) applied as A/S wherever Super is used. Half the quantity of nitrogenous fertilizers applied as top dressing one month prior to flowering. All other manures applied as basal dressing.

3. DESIGN:
(i) 3 partially confd. (ii) (a) 9 plots/block. 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 3·8 m. \times 12·2 m. for 62(93), 63(112) and 64(18). (b) 3·7 m. \times 12·0 m. for 62(93) and 63(112); 3·5 m. \times 11·7 m. for 64(18). (v) 8 cm. \times 12 cm. for 62(93) and 63(112); 15 cm. \times 25 cm. for 64(18). (vi) Yes.

4. GENERAL:
(i) Satisfactory but crop lodged after flowering for 64(18). (ii) Gall fly, rice bug, stem borer attack for 62(91): case worm, leaf roller, stem borer attack for 63(112), controlled by spraying Endrin; Nil for 64(18). (iii) Yield of grain. (iv) (a) 1962–64. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) Since error variances are heterogeneous and Treatments \times years interaction is absent, individual years results are presented below.

5. RESULTS:
62(93)
(i) 2438 Kg/ha. (ii) 414.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( P_1 )</th>
<th>( P_2 )</th>
<th>( P_3 )</th>
<th>( M_1 )</th>
<th>( M_2 )</th>
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<td>( L_3 )</td>
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<th>( M_2 )</th>
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<td>2311</td>
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</tbody>
</table>

63(112)
(i) 2405 Kg/ha. (ii) 357·3 Kg/ha. (iii) Main effect of \( P \) alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( P_1 )</th>
<th>( P_2 )</th>
<th>( P_3 )</th>
<th>( M_1 )</th>
<th>( M_2 )</th>
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<td>2346</td>
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<tr>
<td>( L_2 )</td>
<td>2471</td>
<td>2468</td>
<td>2296</td>
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<td>2213</td>
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<td>2347</td>
<td>2495</td>
<td>2405</td>
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C.D. for \( P \) marginal means=244·8 Kg/ha.
Crop: Paddy (Rabi).
Object: To study the effect of different methods of application of Nitrophosphate complex fertilizers on Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy. (b) Paddy. (c) 5604 Kg/ha. of C.M.+112 Kg/ha. of A/S+112 Kg/ha. of Super+56 Kg/ha. of Pot. Sul. for 61(33); As per treatments+2242 Kg/ha. of C.M. for 62(94); As per treatments+5604 Kg/ha. of C.M. for 63(113).
(ii) Laterite. (iii) 28.9.61/l, 2.10.61; 5.9.62/N.A.; 5.9.63, 4.10.63.
(iv) (a) 6 ploughings. (b) Transplanting. (c) 25 to 35 Kg/ha. for 61(33); 34 to 45 Kg/ha. for others. (d) 25 cm. x 15 cm. (e) 3. (v) 5604 Kg/ha. of C.M. for 61(33) and 63(113); 2242 Kg/ha. of C.M. for 62(94). (vi) P.T.B.—10 (early) for 61(33); P.T.B.—12 (medium) for others. (vii) Irrigated. (viii) N.A. for 61(33); 2 hand weedings and working Japanese hoe once for 62(94); 2 intercultivations and 1 hand weeding for 63(113). (ix) 49 em.; 63 em.; 25 em. (x) 17.1.62; 18.1.62; 1, 2.1.64.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(2) 3 levels of fertilizers: L1=13.5 Kg/ha. of N+11.8 Kg/ha. of P2O5. L2=25.9 Kg/ha. of N+23.8 Kg/ha. of P2O5 and L3=34.8 Kg/ha. of N+47.1 Kg/ha. of P2O5.
(3) 3 methods of application: M1=Broadcast, M2=4 cm. below seed and M3=Pellets application. N applied as A/S whenever Super is used. Half the quantity of nitrogenous fertilizers applied as top dressing one month prior to flowering. All others manures applied as basal dressing.

3. DESIGN:
(i) 3^2 partially confd. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 3/8 m. x 12.2 m. (b) 3.7 m. x 12 m. (v) 8 cm. x 12 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Case worm, gall fly and stem borer attack controlled by spraying Endrin twice. (iii) Yield of grain. (b) (a) 1961—63. (b) Yes. (c) Results of combined analysis given under 5. Results. (v) Pattambi, Ambalavayal and Kayarnkulam. (b) Nil. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:
(i) 1966 Kg/ha. (ii) 1936 Kg/ha. (based on 114 d.f. made up of pooled error and interactions of various components of treatment with years). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.
Crop :- Paddy (Kharif).
Ref. :- K. 61(29), 62(84), 63(120).
Site :- Reg. Rice Res. Stn., Mannuthy. Type :- 'M'.

Object :- To find out the efficacy of reinforced cattle manure with P on paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy-Paddy. (b) Paddy. (c) 5604 Kg/ha. of C.M. for 61 (29) ; 2242 Kg/ha. of C.M. for 62 (84) ;
   33.6 Kg/ha. of each of N as A/S and K₂O as Mur. Pot. applied for 63 (120). (ii) Laterite.
   (iii) 18.5.61/27, 28.6.61 ; 24.5.62/N.A. ; 10.6.63/20.7.63. (iv) (a) 6 ploughings for 61(29), 62 (84) ;
   6 ploughings and 6 puddings for 63 (120). (b) Transplanting. (c) 34 to 45 Kg/ha.
   (d) 25 cm. x 15 cm. (e) 3. (v) 5604 Kg/ha. of C.M.+112 Kg/ha. of Super as 56 Kg/ha. of Mur. Pot. for
   61 (29) ; 2242 Kg/ha. of C.M. for 62 (84) ; 33.6 Kg/ha. of N as A/S +33.6 Kg/ha. of K₂O as Mur. Pot.
   for 63(120). (vii) 5604 Kg/ha. of C.M.+112 Kg/ha. of Super as 56 Kg/ha. of Mur. Pot. for
   61 (29). (v) PTB-32 (medium). (vi) Unirrigated for 61 (29); Irrigated for others. (viii) Nil for 61 (29);
   2 hand weedings and working Japanese hoe once for 62(84); Working intercultivation, once hand weeding.
   (iv) N.A.; 237 cm. ; 252 cm. (x) 3.10.61 ; (x) 10.11.62 ; 14.10.63.

2. TREATMENTS:
   4 manurial treatments: M₁=112 Q/ha. of C.M., M₂=M₁+50.4 Kg/ha. of P₂O₅ as Super, M₃=112 Q/ha.
   of reinforced C.M. and M₄=50·4 Kg/ha. of P₂O₅ as Super.
   Manures applied as basal dressing by broadcast.

3. DESIGN:
   (i) R.B.D (ii) (a) 4. (b) 18.9 m. x 40·2 m. (iii) 6. (iv) (a) 5·2 m. x 9·1 m. (b) 5·0 m. x 8·9 m. (v) 8 c.m.
   x 8 cm. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Case worm, gall-fly and stem borer attack for 61 (29), Endrex sprayed twice ; Gallfly,
   case warm, rice bug and stem borer attack controlled by spraying. Endrin sprayed for 62 (84) and 63(120).
   (iv) (a) 1961-63. (b) No. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Nil. (vii) Error
   variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:
   (i) 1900 Kg/ha. (ii) 169·9 Kg/ha. (based on 51 d.f. made up of pooled error and treatments x years
   interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
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<td>1838</td>
<td>1805</td>
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</tr>
</tbody>
</table>

C.D. = 113.7 Kg/ha.
Crop: Paddy (Rabi).  


Type: 'M'.

Object:——To find out the efficacy of reinforced cattle manure with P on Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy-Paddy.  
(b) Paddy.  
(c) 5604 Kg/ha. of C.M. of C.M. for 61 (30): 2242 Kg/ha. of C.M. for 62 (85): 336 Kg/ha. of N as A/S+336 Kg/ha. of K₂O as Mur. Pot. for 63 (121).  
(ii) Laterite.  
(iii) N.A.; 5.9.62; 25.9.63; 25.10.63.  
(iv) (a) 6 ploughings for 61 (30), 62 (85); 6 ploughings and 6 puddlings.  
(b) Transplanting.  
(c) 34 to 45 Kg/ha. of C.M. +112 Kg/ha. of A/S+56 Kg/ha. of K₂O for 61 (30): 2242 Kg/ha. of C.M. for 62 (85): 336 Kg/ha. of N as A/S+336 Kg/ha. of K₂O as Mur. Pot. for 63 (121).  
(v) PTB-10 (early) for 61 (30), 63 (121); PTB-12 for 62 (85).  
(vi) Irrigated.  
(vii) Weeding.  
(viii) Nil for 61 (30); 2 hand weedings and working Japanese hoe once for 62 (85); one hand weeding and working intercultivation once for 63 (121).  
(ix) 49 em. x 50 em.  

2. TREATMENTS:

4 manurial treatments: M₁ = 112 Kg/ha. of C.M., M₂ = M₁ + 50.4 Kg/ha. of P₂O₅ as Super, M₃ = 50.4 Kg/ha. of reinforced C.M. and M₄ = 50.4 Kg/ha. of P₂O₅ as Super.  
Manures applied as basal dressing by broadcast.

3. DESIGN:

(i) R.B.D.  
(ii) (a) 4.  
(b) 18.9 m. x 40.2 m.  
(iii) 6 for 61 (30), 62 (85); 8 for 63 (121).  
(iv) (a) 5.2 m. x 9.1 m.  
(b) 50 m. x 8.9 m.  
(v) 8 em. x 12 em.  
(vi) Yes.

4. GENERAL:

(i) Satisfactory for 61 (30), 62 (85): poor for 63 (121).  
(ii) Case worm, gall fly, and stem blight attack for 61 (30): Endrex sprayed twice; Gall fly, case worm, rice bug blight attack controlled by spraying Endrine for others.  
(iii) Yield of grain.  
(iv) (a) 1961-63.  
(b) No.  
(c) Results of combined analysis given under 5. Results.  
(v) N.A.  
(vi) Nil; (vii) Error variances are homogeneous and Treatments × years interaction is absent.

5. RESULTS:

(i) 1082 Kg/ha.  
(ii) 151.6 Kg/ha. (based on 48 d.f. made up of pooled error and Treatments × years interaction).  
(iii) Treatment differences are highly significant.  
(iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
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<td>1144</td>
<td>1073</td>
<td>969</td>
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<tr>
<td>C.D.</td>
<td>105 0 Kg/ha.</td>
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</table>
3. DESIGN:
(i) Fact in R.B.D. (ii) 21. (b) N.A. (iii) 5. (iv) (a) and (b) 5 m. x 6 m. (v) Nil. (vii) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Sprayed Endrin against stem borer. (iv) (a) 1964-contd. (b) N.A. (c) Nil. (v) and
(vi) N.A. (vii) Expt. contd. before 1965. Hence the results of individual years are given below.

5. RESULTS:

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
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<tbody>
<tr>
<td>1964</td>
<td>P1</td>
<td>1723</td>
<td>1567</td>
<td>1820</td>
<td>1537</td>
<td>1560</td>
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<td>1883</td>
<td>1557</td>
<td>1674</td>
</tr>
<tr>
<td></td>
<td>P2</td>
<td>1737</td>
<td>1520</td>
<td>1840</td>
<td>1707</td>
<td>1460</td>
<td>1723</td>
<td>1757</td>
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<tr>
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<td>1730</td>
<td>1544</td>
<td>1830</td>
<td>1622</td>
<td>1510</td>
<td>1733</td>
<td>1820</td>
<td>1574</td>
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C.D. for S marginal means = 207.2 Kg/ha.

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
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<td>3087</td>
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<td>P2</td>
<td>3305</td>
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<td>3225</td>
<td>2847</td>
<td>2980</td>
<td>2861</td>
<td>3025</td>
<td>2744</td>
<td>3054</td>
<td>2992</td>
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</tbody>
</table>

Crop :- Paddy (Kharif).

Site :- Rice Res. Sta., Mannuthy.

Type :- 'M'.

Object :- To find out the effect of N, P and lime on Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy-Paddy. (b) Paddy. (c) 500 Kg/ha. of C.M. + 33.6 Kg/ha. of P,O, + 33.6 Kg/ha. of K,O.
(ii) Lateritic. (iii) 11.6.64/14.7.64, 1.6.65/2.7.65. (iv) (a) 6 ploughings and puddling. (b) Transplanting. (c) 34 to 45 Kg/ha. (d) 25 cm. x 15 cm. (e) 2. (v) 600 Kg/ha. of C.M. + 33.6 Kg/ha. of P,O, + 33.6 Kg/ha. of K,O. (vi) PTB-32. (vii) Irrigated. (viii) Weedings. (ix) 51 cm., 204 cm. (x) 11.10.64, 5.10.65.

2. TREATMENTS:
All combinations of (1), (2) and (3).
(1) 2 levels of N as A/S : N1 = 30 and N2 = 40 Kg/ha.
(2) 2 levels of P,O, as Super : P1 = 20 and P2 = 40 Kg/ha.
(3) 2 levels of lime : L1 = 0 and L2 = 30 Kg/ha.
Half dose of N and full dose of P,O, and lime as basal dressing at planting. Half dose of N as top dressed one month before flowering.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) and (b) 9-0 m. x 3-8 m. (v) Nil. (vi) Yes.
4. GENERAL:
   (i) Satisfactory. (ii) Endrin sprayed against stem borer and Copper fungicides against stock borer disease. (iii) Yield of grain. (iv) (a) 1964-65. (b) Nil. (c) Nil. (vi) N.A. (vii) Error variances are heterogeneous and Treatments x years interaction is absent. Hence the results of individual years are presented below.

5. RESULTS:

64(4)
   (i) 2700 Kg/ha. (ii) 3080 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
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<td>P2</td>
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<td>2641</td>
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<tr>
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</tr>
<tr>
<td>Mean</td>
<td>2692</td>
<td>2708</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

65(23)
   (i) 2311 Kg/ha. (ii) 176.5 Kg/ha. (iii) Main effect of N and the interactions N x P and N x L are significant. (iv) Av. yield of Paddy in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
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<td>P2</td>
<td>2500</td>
<td>2215</td>
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<tr>
<td>Mean</td>
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<td>2200</td>
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<table>
<thead>
<tr>
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</tr>
<tr>
<td>L5</td>
<td>2323</td>
<td>2383</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2361</td>
<td>2358</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 129.8 Kg/ha.
C.D. for the body of N x P or N x L table = 183.5 Kg/ha.

Crop :- Paddy (Rabi).
Site :- Rice Res. Sta., Mannuthy.
Object :- To find out the effect of N, P and lime on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) 5604 Kg/ha. of C.M.+3.6 Kg/ha. of P.O4+3.6 Kg/ha. of K2O.
   (ii) Lateritic. (iii) 29.8.64/27.10.64; 30.8.65/06.10.65. (iv) (a) 6 ploughings and puddling. (b) Transplanting.
   (c) 34 to 45 Kg/ha. (d) 25 cm x 15 cm. (e) 2. (f) 5604 Kg/ha. of C.M.+3.6 Kg/ha. of K2O+3.6 Kg/ha. of P.O4.
   (vi) PTB—12. (vii) Irrigated. (viii) Weeding once. (ix) 300 cm.; 204 cm. (x) 10.2.65; 22.1.66.

2. TREATMENTS:
   All combinations of (1), and (2) and (3)
   (1) 2 levels of N as A/S: N1=30 and N2=40 Kg/ha.
   (2) 2 levels of P.O4 as Super: P1=20 and P2=40 Kg/ha.
   (3) 2 levels of lime: L4=0 and L5=30 Kg/ha.
3. DESIGN:
(i) Fact. in R.B.D.  (ii) (a) 8.  (b) N.A.  (iii) 4.  (iv) (a) 9.0 m. x 3.8 m.  (b) 8.7 m. x 3.4 m.  (v) Yes.  (vi) Yes.

4. GENERAL:
(i) Satisfactory, lodged slightly.  (ii) Sprayed Badrin for stem borer and case worm.  Sprayed Pytolam for blight.  (iii) Yield of grain: (iv) (a) 1964--65.  (b) Yes.  (c) N.A.  (v) and (vi) N.A.  (vii) Error variances are heterogeneous and Treatments x years interaction is absent.  Hence the results are presented for individual years.

5. RESULTS:
64(5)
(i) 2274 Kg/ha.  (ii) 156.6 Kg/ha.  (iii) Main effect of N alone is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
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<td>2299</td>
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<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
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<td>2083</td>
<td>2240</td>
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<td>Mean</td>
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</table>

C.D. for N marginal means=115.1 Kg/ha.

65(29)
(i) 2545 Kg/ha.  (ii) 304.1 Kg/ha.  (iii) No effect is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>L&lt;sub&gt;0&lt;/sub&gt;</th>
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<th>Mean</th>
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<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>L&lt;sub&gt;1&lt;/sub&gt;</td>
<td>2661</td>
<td>2489</td>
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</tbody>
</table>

Crop :- Paddy (Kharif).
Site :- Rice Res. Stn., Mannuthy.
Object :-To find out effect of dry leaf and G.L. application on Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil.  (b) Paddy.  (c) 5004 Kg/ha. of C.M. +33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> +33.6 Kg/ha. of N +33.6 Kg/ha. of K<sub>2</sub>O.  (ii) Lateritic.  (iii) 30.5.64, 21.5.65.  (iv) (a) 6 tuggings puddling+leveling.  (b) Transplanting.  (c) 34 to 45 Kg/ha.  (d) 25 cm. x 15 cm.  (e) 2.  (f) 5504 Kg/ha. of C.M. +33.6 Kg/ha. of N +33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> +33.6 Kg/ha. of K<sub>2</sub>O.  (v) PTOB=32 (medium).  (vi) Irrigated.  (vii) Weedings.  (ix) 300 cm., 204 cm.  (x) 10.10.64, 29.9.65.

2. TREATMENTS:
M<sub>0</sub>=0, M<sub>1</sub>=5000 Kg/ha. of G.L., M<sub>2</sub>=Dry leaf of drying 5000 Kg/ha. of G.L. and M<sub>4</sub>=M<sub>2</sub> but powdered.
3. DESIGN:
(i) R.B.D. (ii) 4. (b) N.A. (iii) 6 (iv) (a) and (b) 9'0 x 5'0 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Endrin for stem borer. (iii) Yield of grain and straw. (iv) (a) 1964-65. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatment x years interaction is absent. Hence the results of individual years are given below.

5. RESULTS:

64(8)
(i) 1898 Kg/ha. (ii) 116·7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1841</td>
<td>1867</td>
<td>1933</td>
<td>1952</td>
</tr>
</tbody>
</table>

65(27)
(i) 2506 Kg/ha. (ii) 272·8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2415</td>
<td>2634</td>
<td>2476</td>
<td>2501</td>
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</tbody>
</table>

Crop :- Paddy (Rabi).
Type :- 'M'.

Ref :- K. 64(24), 65(44).

Object :- To study the effect of magnesium and Sodium Silicate with and without magnesium carbonate on Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 33·6 Kg/ha. of N as C/A/N+44·8 Kg/ha. of P2O5 as Super +33·6 Kg/ha. as Mur. of Pot. (ii) Alluvial clay. (iii) 5.10.64/4.11.64; 7.10.65/6.11.65. (iv) (a) Digging and levelling. (b) Transplanting. (c) 50 cm.x 15 cm. (d) 2. (v) 33·6 Kg/ha. of N as Urea+44·8 Kg/ha. of P2O5 as Super+33·6 Kg/ha. of K2O as Mur. Pot. (vi) Irrigated. (vii) 2 weedings. (ix) 68 cm.; 42·7 cm. (x) 18.1.65; 23.1.66.

2. TREATMENTS:
8 manurial treatments: M5 =Control, M1 =25 Kg/ha. of Silica as Sod. Silicate, M2 =50 Kg/ha. of Silicate as Sod. Silicate, M4 =25 Kg/ha. of Magnesium as Mg. Carbonate, M5=M1 +M2, M6=M2+M3, M9=25 Kg/ha. of Silicate as Mg. Silicate+M4 and M10 =50 Silica as of Mg Silicate+M5. Treatments applied as basal dressing.

3. DESIGN:
(i) R.B.D. (ii) 8. (b) 39 0 m.x 9.5 m. (iii) 4. (iv) (a) 9·5 m.x 4·9 m. (b) 9·1 m.x 4·6 m. (v) One row. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Slight attack of stem borer. Endrex sprayed. (iii) Yield of grain. (iv) (a) 1964—contd. (b) N.A. (c) Nil. (v) to (vii) N.A.

5. RESULTS:

64(24)
(i) 3232 Kg/ha. (ii) 376·2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M7</th>
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<td>3307</td>
<td>3877</td>
<td>3021</td>
<td>2958</td>
<td>3202</td>
<td>3195</td>
<td>3168</td>
</tr>
</tbody>
</table>
(i) 3198 Kg/ha.  (ii) 371.7 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
<th>M₇</th>
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<tr>
<td>Av. yield</td>
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<td>3511</td>
<td>2999</td>
<td>3404</td>
<td>3259</td>
<td>3189</td>
<td>2919</td>
<td>2992</td>
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Crop : Paddy (Rabi).

Site : Rice Res. Stn., Moncompu.

Object : To study the effect of different sources of N on Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil.  (b) Paddy.  (c) 33.6 Kg/ha. of C/A/N + 44.8 Kg/ha. of P₂O₅ as Hyper Phos. + 33.6 Kg/ha. of K₂O as Mur. of Pot.  (ii) Alluvial clay.  (iii) 9.10.64/5.11.64 ; 6.10.65/N.A.  (iv) (a) Digging and levelling.  (b) Transplanting.  (c) 50 Kg/ha.  (d) 15 cm. x 15 cm.  (e) 2.  (f) 44.8 Kg/ha. of P₂O₅ as Hyper Phos. + 33.6 Kg/ha. of K₂O as Mur. of Pot. before planting.  (vi) P.T.B. 10 (early).  (viii) 2 hand weedings.  (ix) 68 em.; 42.4 em.  (x) 20.1, 65 ; 22.12.65.

2. TREATMENTS:
6 sources of 44.8 Kg/ha. of N :  S₀ = Control (No N), S₁ = A/S, S₂ = C/A/N, S₃ = Urea, S₄ = A/S + Calcium equal to the quantity in C/A/N in S₁ and S₅ = Urea + Calcium equal in the quantity in C/A/N in S₃.  N broadcast in two doses. Half dose as basal dressing and half 30 days after planting.

3. DESIGN:
(i) R.B.D.  (ii) 6.  (b) N.A.  (iii) 4.  (iv) (a) 6.4 m. x 4.9 m.  (b) 6.1 m. x 4.6 m.  (v) 15 cm. x 15 cm.  (vi) Yes.

4. GENERAL:
(i) Good.  (ii) Sprayed Endrex.  (iii) Yield of grain.  (iv) (a) 1964—cond.  (b) No.  (c) Nil.  (v) N.A.  (vi) Nil.  (vii) Expt. continued beyond 1965. Hence the results of individual years are presented under 5.

5. RESULTS:

64(25)
(i) 3042 Kg/ha.  (ii) 137.7 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S₀</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
<th>S₅</th>
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<td>2889</td>
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</table>

65(43)
(i) 3662 Kg/ha.  (ii) 231.4 Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S₀</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
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<tbody>
<tr>
<td>Av. yield</td>
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<td>3925</td>
<td>3811</td>
<td>3630</td>
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</table>

C.D. = 136.0 Kg/ha.
Crop :- Paddy (Rabi).

Site :- Rice Res. Stn., Moncompu.

Object :- To test the efficiency of laccadive soil as a Phosphatic fertilizer on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 33.6 Kg/ha. of N as C/A+N+44.8 Kg/ha. of P₂O₅ as Hyper Phos.+33.6 Kg/ha. of K₂O as Mur. of Pot. (ii) Alluvial Clay. (iii) 13.11.64 ; 14.10.65. (iv) (a) Digging and levelling. (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm. x 15 cm. (e) 2. (v) 33.6 Kg/ha. of N as C/A+N+33.6 Kg/ha. of K₂O as Mur. Pot. (vi) P.T.—134 (late). (vii) Irrigated. (viii) 2 hand weedicings. (ix) 68 cm.; 42 cm. (x) 18.3.65 ; 11.2.66.

2. TREATMENTS :
   3 sources of 44.8 Kg/ha. of P₂O₅ : S₀=Control (no P₂O₅), S₁=Super and S₂=Laccadive soil. P₂O₅ ap pled broadcast as basal dressing.

3. DESIGN
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) and (b) 6'1 m. x 6'1 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Stem borer attack. Endrex sprayed as control measure. (iii) Yield of grain (iv) (a) 1964—65. (b) No. (c) N.A. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:
   (i) 3188 Kg/ha. (ii) 417.8 Kg/ha. (based on 2 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th>Treatment</th>
<th>S₀</th>
<th>S₁</th>
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<tr>
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Crop :- Paddy (Kharif).

Site :- Rice Res. Stn., Moncompu.

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

1. BASAL CONDITIONS :
   (i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Clayey loam. (iii) 21.10.60/8.12.60. (iv) (a) 1 ploughing and puddling. (b) Transplanting. (c) 50 Kg/ha. (d) 15 cm. x 15 cm. (e) 2. (v) Nil. (vi) Thirinja siella (medium). (vii) Irrigated. (viii) 1 hand weeding and working of Japanese hoe once. (ix) 40 cm. (x) 15.3.61.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of P₂O₅ as Hyper phos. : P₁=0, P₂=16.8 and P₃=33.6 Kg/ha.
   (2) 3 levels of K₂O as Mur. Pot. : K₀=0, K₁=16.8 and K₂=33.6 Kg/ha.
   (3) 2 levels of N as C/A/N : N₀=33.6 and N₁=67.2 Kg/ha.
   Whole P₂O₅, half dose of N and half dose of K₂O broadcast as basal dressing. Half dose of N and half dose of K₂O broadcast 25 days after planting.

3. DESIGN :
   (i) 3x3x2 confd. (ii) 6 plots/block and 3 blocks/repllication. (b) N.A. (iii) 4. (iv) (a) 5'1 m.x9·5 m. (b) 4·6 m. x 9·1 m. (v) 27 cm. x 30 cm. (vi) Yes.

4. GENERAL:
   (i) Good. Lodged on 1.3.61. (ii) Stem borer was noticed. 0.02% Endrex was sprayed. (iii) Yield of grain. (iv) (a) 1959—60. (b) Yes. (c) N.A. (v) to (vii) N.A.
5. RESULTS:

(i) 320 Kgf/ha.  (ii) 313.7 Kgf/ha. (iii) Only N effect is highly significant. (iv) Av. yield of grain in Kgf/ha.

<table>
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<tr>
<th></th>
<th>K₁</th>
<th>K₂</th>
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C.D. for N marginal means = 147.9 Kgf/ha.

Crop: Paddy (Rahi).

Site: Rice Res. Stn., Monconpu.

Ref: K. 61(35), 62(39).

Type: 'M'.

Object: To study the effect of Nitrophosphate complex fertilizers produced by different methods on Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil.  (b) Paddy. (c) 185 Kg/ha. of C/A+N+124 Kg/ha. of Hyper Phos.+62 Kg/ha. of Mur. Pot. for 61(35); N.A. for other. (ii) Clayey loam. (iii) 18.10.61/20.11.61; 9.11.62/5.12.62. (iv) (a) 1 digging and levelling. (b) Transplanting. (c) 50 Kg/ha. (d) 15 cm. x 15 cm. for 61(35); 23 cm. x 15 cm. for other. (e) 2. (f) N.A. (g) P.T.B.—10 (early). (h) Irrigated. (i) 2 weedings. (ix) 30 cm.; 67 cm.

2. TREATMENTS:

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


(2) 3 levels of fertilizers: L₁ = 13.5 Kg/ha. of N+11.8 Kg/ha. of P₂O₅; L₂ = 26.9 Kg/ha. of N+23.5 Kg/ha. of P₂O₅; L₃ = 53.8 Kg/ha. of N+47.1 Kg/ha. of P₂O₅.

(3) 3 methods of application: M₁ = Broadcast, M₂ = 6.4 cm. below seed and M₃ = Pellet application.

Fertilizers applied as basal dressing N applied as C/A/N with P₁.

3. DESIGN:

(i) 3³ confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 3. (iv) (a) 8.8 m. x 3.7 m. for 61(35); 10.7 m. x 3.0 m. for other. (b) 8.5 m. x 3.2 m. for 61(35); 10.5 m. x 2.7 m. for other. (v) 15 cm. x 23 cm. for 61(35); 8 cm. x 15 cm. for other. (vi) Yes.

4. GENERAL:

(i) Good but crop lodged in 62(39). (ii) Attack of stem borer for both but 0.05%. Endrin sprayed for 61(35) and Endrex sprayed. (iii) Ear bearing tillers and yield of grain. (iv) (a) 1961-62. (b) No. (c) Results of combined analysis given under 5. Results. (v) Pattambi, Mannuthy, Kayankulam and Kottarakara. (vi) Nil. (vii) Error variances are homogeneous and Treatment x Years interaction is absent.

RESULTS:

(i) 2104 Kgf/ha. (ii) 344.7 Kgf/ha. (based on 62 d.f. made up of pooled error and interactions of various components of Treatments x Years). (iii) Main effect of 'L' alone is significant. (iv) Av. yield of grain in Kgf/ha.
Crop :- Paddy (Rabi).

Site :- Rice Res. Stn., Moncompa.

Object :- To study the residual effect of Nitrophosphate complex fertilizer produced by different methods on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Clayey loam. (iii) 6.10.62/8.11.62. (iv) (a) Digging with spade and levelling. (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm. x 15 cm. (e) 2. (v) Nil. (vi) P.T.B.—10 (early). (vii) Irrigated. (viii) 2 weedings. (ix) 67 cm. (x) 23.1.63.

2. TREATMENTS
   All combinations of (1), (2) and (3)
   (1) 3 types of fertilizers : \( P_1 = \text{Single Super} \), \( P_3 = \text{Nitrophosphate produced by O.D.D.A} \) and \( P_3 = \text{Nitrophosphate produced by P.E.C} \).
   (2) 3 levels of fertilizers : \( L_1 = 13.5 \text{ Kg/ha. of } N+11.8 \text{ Kg/ha. of } P_2 0 \text{, } L_2 = 26.9 \text{ Kg/ha. of } N+23.5 \text{ Kg/ha. of } P_1 0 \), and \( L_3 = 53.8 \text{ Kg/ha. of } N+47.1 \text{ Kg/ha. of } P_1 0 \).
   (3) 3 methods of placement : \( M_1 = \text{Broadcast, } M_6 = \text{Pellet application.} \)

Fertilizer applied as basal dressing N as C/A/N with \( P_1 \).

Treatments were applied to the preceding crop.

3. DESIGN:
   (i) 3² confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 8'8 m. x 3'7 m. (b) 8'7 m. x 3'4 m. (v) 1 row around. (vi) Yes.

4. GENERAL:
   (i) Normal, crop lodged. (ii) Slight attack of stem borer was noticed. Controlled by spraying Endrex. (iii) Yield of grain. (iv) (a) 1961—62 (Residual effect in 1962 only). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 2096 Kg/ha. (ii) 533.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

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<th>( P_2 )</th>
<th>( P_3 )</th>
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<td>2066</td>
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C.D. for 'l' marginal means=229.1 Kg/ha.
Crop :- Paddy (Rabi).
Site :- Rice Res. Sta., Moncompu.
Object :- To study the effect of lime and different sources of P on Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy. (b) Paddy. (c) 112 Kg/ha. of C/A+N+26 Kg/ha. of Hyper Phos. (ii) Claying loam. (iii) 30.11.60/30.12.60. (iv) (a) 1 digging and levelling. (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm. x 15 cm. (e) 2. (v) 2 Kg/ha. of A/S+22.4 Kg/ha of K2O as Mur. Pot. (vi) P.T.B.—10 (early) (vii) Irrigated. (viii) 2 weedings. (ix) 40 cm. (x) N.A.

2. TREATMENTS:
Main-plot treatments :
2 levels of lime : L0=0 and L1=112 Kg/ha of slaked lime.
Sub-plot treatments : 
4 sources of P2O5 at 44.8 Kg/ha. : S1=Super. Phos., S2=Hyper Phos., S3=B.M.and S4=Rock Phosphate. P2O5 and lime broadcasted independently as basal dressing before planting.

3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication ; 4 sub-plots/main-plot. (b) 24.4 m. x 6.1 m. (iii) 6. (iv) (a) 6.1m. x 3.1 m. (b) 5.9 m. x 2.9 m. (v) 8 cm. x 8 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (i) Spraying with 0.03% Endrex to control stem borers. (iii) Yield of grain. (iv) (a) 1960—63 (treatments modified in 1961). (b) and (c) N. A. (v) to (vii) N. A.

5. RESULTS :
(i) 2429 Kg/ha. (ii) 198.9 Kg/ha. (b) 235.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

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</table>
Crop: Paddy (Punja).

Site: Rice Res. Stn., Moncompu.

Objekt: To study the effect of lime and different sources of P on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) 185 Kg/ha. of C/A/N+124 Kg/ha. of Hyper Phos.+62 Kg/ha. of Mur. Pot. for 61(36): N. A. for others. (ii) Clayey loam. (iii) 27.10.1961/22.11.1961 ; 14.10.62/9.11.62; 16.11.63/11.2.64. (iv) (a) 1 digging and levelling. (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm x 14 cm (e) 2. (v) Nil for 61(36): 112 Kg/ha. of A/S+22.4 Kg/ha. of K$_2$O as Mur. Pot. for 62(37), 63(107). (vi) P.T.B.—10 (early). (vii) Irrigated. (viii) 2 hand weedings and interculture with Japanese weeder; 2 weedings for 63(107); 1 hand weeding for 61(36). (ix) N. A.; 67 cm: 28 cm. (x) 20.2.1962; 22.1.1963; 11.2.1964.

2. TREATMENTS:
   Main-plot treatments:
   - 2 levels of lime: L0 = 0 and L1 = 112 Kg/ha. of slaked lime.
   Sub-plot treatments:
   - 5 sources of P$_2$O$_5$ at 44.8 Kg/ha.:
     - S0 = Control (no P$_2$O$_5$), S1 = Super Phos., S2 = Hyper Phos., S3 = Rock Phos. and S4 = B.M.
   P$_2$O$_5$ and lime applied as basal dressing before planting.

3. DESIGN:
   (i) Split-plot. (ii) 2 (a) main plots/replication ; 5 sub-plots/main plots. (b) N. A. (iii) 6. (iv) (a) 4.9 m. x 3.7 m. (b) 4.6 m. x 3.2 m. for 61(36); 4.7 m. x 3.4 m for 62(37), 63(107). (v) 15 cm. x 23 cm. for 61(36); 8 cm. x 12 cm. for others. (vi) Yes.

4. GENERAL:
   (i) Normal but crop lodged in 61(36), 62 (37); satisfactory in 63(107). (ii) Slight attack of stem borer but Endrin sprayed for 61(36), 62(107) and Endrex for 62(37). (iii) Yield of grain. (iv) (a) 1960–63 (treatments modified in 61). (b) N. A. (c) Nil. (v) (a) Pattambi. (b) Nil. (vi) Nil. (vii) Sub-plot error variances are heterogeneous, therefore results of individual years are presented below.

5. RESULTS:
   61(36):
   - (i) 1805 Kg/ha. (ii) (a) 382.2 Kg/ha. (b) 365.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

   | $S_0$ | $S_1$ | $S_2$ | $S_3$ | $S_4$ | Mean
   |-----|-----|-----|-----|-----|-----
   | L0  | 1695| 1779| 1817| 1843| 1460| 1719
   | L1  | 1746| 1970| 2080| 1894| 1763| 1891
   | Mean| 1721| 1874| 1949| 1819| 1612| 1805

   62 (37)
   - (i) 1867 Kg/ha. (ii) (a) 490.9 Kg/ha. (b) 234.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

   | $S_0$ | $S_1$ | $S_2$ | $S_3$ | $S_4$ | Mean
   |-----|-----|-----|-----|-----|-----
   | L0  | 1855| 2271| 2202| 2330| 2022| 2136
   | L1  | 1819| 2284| 1814| 2008| 2063| 1998
   | Mean| 1837| 2278| 2008| 1819| 2043| 2067

   C. D. for S marginal means=193.2 Kg/ha.
Crop : Paddy (Rabi).

Site : Rice Res. Stn., Moncompu.

Object : To study the effect of different levels of N, P and lime alone and in combination on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 33.6 Kg/ha. of N as C/A+N+44.8 Kg/ha. of P_O as Super+33.6 Kg/ha. of K_2O as Mur. Pot. (iii) Alluvial clay. (ii) 1.10.64/12.11.64. (iv) (a) Digging and levelling. (b) Transplanting. (c) 50 Kg/ha. (d) 23 cm x 15 cm. (e) 2. (v) 33.6 Kg/ha. of K_2O as Mur. Pot. (vi) P.T.O.—4 (late) (vii) Irrigated. (viii) 2 weedings. (ix) 68 cm. (x) 17.3.65.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 2 levels of N as A/S : N_1 = 33.6 and N_2 = 50.4 Kg/ha.
   (2) 2 levels of P_O as Super : P_1 = 44.8 Kg/ha. , P_2 = 67.2 Kg/ha.
   (3) 3 levels of lime : L_0 = 0, L_1 = 33.6, L_2 = 67.2 Kg/ha.
   Lime broadcasted as basal dressing a week before planting. Full doses of P_O and half of N broadcasted as basal dressing before planting. Half dose of N applied 35 day after planting.

3. DESIGN:
   (i) Fact. in R. B. D. (ii) (a) 12. (b) N. A. (iii) 4. (iv) (a) and (b) 6.1 m x 6.1 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Slight attack of stem borer controlled by spraying Endrex. (iii) Yield of grain. (iv) (a) 1964 only. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS:
   (i) 2892 Kg/ha. (ii) 302.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<th>L_2</th>
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C. D. for S marginal means=289.2 Kg/ha.
Object: To study the effect of different sources and levels of P on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 33.6 Kg/ha. of N as C/A(N+44.8 Kg/ha. of P₂O₅ as Hyper Phosphate+33.6 Kg/ha. of K₂O as Mur. Pot. (ii) Alluvial clay. (iii) N.A./10.11.64. (iv) (a) Digging and levelling. (b) Transplanting. (c) 50 Kg/ha. (d) 25 cm. x 15 cm. (e) 2. (v) 38 Kg/ha. of N as C/A(N+33.6 Kg/ha. of K₂O as Mur. Pot. (vi) P.T.B—4 (late). (vii) Irrigated. (viii) 2 weedings. (ix) 68 cm. (x) 5.3.65.

2. TREATMENTS:
   All combinations of (1) and (2)+control (5 plots).
   (1) 2 levels of P₂O₅: P₁ = 33.6 and P₂ = 67.2 Kg/ha.
   (2) 8 sources of P₂O₅: S₁ = Single Super Phosphate, S₂ = Rock Phosphate, S₃ = Fused Magnesium Phosphate, S₄ = Defluorinated Phosphate, S₅ = Multi Phosphate, S₆ = Hyper Phosphate, S₇ = Nitro Phosphate and S₈ = Basic Slag.
   P₂O₅ broadcasted as basal dressing.

3. DESIGN:
   (i) R. B. D. (ii) (a) 21. (b) N.A. (iii) 5. (iv) (a) 7.6 m. x 7.3 m. (b) 7.2 m. x 7.0 m. (v) 20 cm. x 15 cm. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Slight attack of stem borer. Endrex was sprayed twice. (iii) Grain yield. (iv) (a) 1964—only. (b) and (c) N.A. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 3399 Kg/ha. (ii) 4162 Kg/ha. (iii) Main effect of P and 'control vs others' are highly significant. Main effect of S and interaction P x S are significant. (iv) Av. yield of grain in Kg/ha.

   Control=3081 Kg/ha.

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<th>S₃</th>
<th>S₄</th>
<th>S₅</th>
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C. D. for P marginal means =131.6 Kg/ha.
C. D. for S marginal means =203.2 Kg/ha.
C. D. for the body of P x S table =372.1 Kg/ha.
C. D. for control vs others =166.4 Kg/ha.
2. TREATMENT:

All combinations of (1) and (2)

(1) 6 times of application of 44.8 Kg/ha of N:
   - T₁ = Before planting; T₂ = 2 weeks after planting.
   - T₃ = 4 weeks after planting; T₄ = Half dose as basal dressing + half two weeks after planting.
   - T₅ = Half dose as basal dressing + half four weeks after planting and T₆ = Half dose two weeks after planting + half dose four weeks after planting.

(2) 2 sources of N: S₁ = C/N and S₂ = A/S

3. DESIGN:

(i) Fact in R.B.D. (ii) 12. (b) N.A. (iii) 4. (iv) (a) and (b) 4.6 m X 4.3 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1958-1960. (b) Yes. (c) Nil. (v) to. (vii) N.A.

5. RESULTS:

(i) 2955 Kg/ha. (ii) 150.4 Kg/ha. (iii) Main effect of T alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
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<th>T₂</th>
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C.D. for T marginal means = 153.1 Kg/ha

---

Crop: Paddy (Rabi).
Object: To study the effect of different sources and times of application of N on Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy-Paddy. (b) Paddy. (c) As per treatments. (ii) Shallow lateritic. (iii) 1.10.19/0.7.11.1952
(iv) (a) 6 puddlings and 4 levellings. (b) Transplanting. (c) N.A. (d) 25 m X 25 cm. (e) N.A. (v) 560 Kg/ha of G. L + 22.4 Kg/ha of P₂O₅ as Super + 22.4 Kg/ha of K₂O as Pot. Sul. (vi) PTB-20 (medium) (vii) Unirrigated. (viii) V.A. (ix) 133 cms. (x) 14.2.1961.

2. TREATMENTS: Same as in expt. No 60(20) on page 60.

5. RESULTS:

(i) 1816 Kg/ha. (ii) 165.8 Kg/ha, (iii) Main effect of S is highly significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for S marginal means = 97.4 Kg/ha.
Crop: Paddy (Kharif).
Site: Central Rice Res. Stn., Pattamb.
Object: To find out the comparative efficacy of A/S and Acid Urea at different doses for Paddy.

1. BASAL CONDITIONS:
   (iv) (a) 6 ploughings and levelling. (b) Transplanting. (c) N.A. (d) 25 cm × 15 cm. (e) 2. (v) 4483 Kg/ha of G.L as basal dressing. (vi) PTB—2 (medium). (vii) Unirrigated. (viii) N.A. (ix) 133 em.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of N as Urea: $U_1 = 33.6$, $U_2 = 67.3$ and $U_3 = 100.9$ Kg/ha.
   (2) 4 levels of N as A/S: $S_0 = 0$, $S_1 = 33.6$, $S_2 = 67.3$ and $S_3 = 100.9$ Kg/ha.
   All manures applied in two equal doses as basal at planting and top dressing one month after planting.

3. DESIGN:
   (i) Pact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) and (b) 6 ft. x 3 ft. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Endrin sprayed against stem borers. (iii) Yield of grain. (iv) (a) 1957–60. (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 3472 Kg/ha. (ii) 361.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

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Crop: Paddy (Rabi).
Site: Central Rice Res. Stn., Pattamb.
Object: To find out the comparative efficacy of A/S and Urea at different doses for Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Shallow lateritic. (iii) 7.5.1960/17.6.1960.
   (iv) (a) 6 ploughings and levelling. (b) Transplanting. (c) N.A. (d) 25 cm × 15 cm. (e) 2. (v) 5604 Kg/ha of G.L as basal dressing. (vi) PTB—2 (medium). (vii) Unirrigated. (viii) N.A. (ix) 217 em. (x) 12.10.1960.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of N as Urea: $U_1 = 33.6$, $U_2 = 67.3$ and $U_3 = 100.9$ Kg/ha.
   (2) 4 levels of N as A/S: $S_0 = 0$, $S_1 = 33.6$, $S_2 = 67.3$ and $S_3 = 100.9$ Kg/ha.
   All manures applied in two equal doses as basal at planting and top dressing one month after planting.

3. DESIGN:
   (i) Pact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) and (b) 6 ft. x 3 ft. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Endrin sprayed against stem borers. (iii) Yield of grain. (iv) (a) 1957–60. (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 3066 Kg/ha. (ii) 283.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.
Crop :- Paddy (Kharif).
Site :- Central Rice Res. Stn., Pattambi.
Object :-To assess the advantages of G.M. and G.L. manuring over the local method of manuring to Paddy crop.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) 4483 Kg/ha. of G.L. + 112 Kg/ha. of A.S.
   (ii) Shallow lateritic. (iii) 19.4.1969.
   (iv) (a) 6 puddlings and 4 levellings. (b) Broadcast. (c) to (e) N.A.
   (v) 1121 Kg/ha. of wood ash as basal dressing. (vi) PTB-25 (medium).

2. TREATMENTS:
   4 manurial treatments: M₁ =Control (local method), M₂ =Dhaincha broadcast with Paddy and trampling in dhaincha, M₃ =Applying Glyricidia leaves brought from outside equal to dhaincha in M₂ at the time of paddy broadcast and M₄ =2802 Kg/ha. of Glyricidia leaves applied before paddy broadcast.

3. DESIGN :
   (i) R.B.D. (ii) 4. (b) N.A. (iii) 6. (iv) (a) and (b) 7 6 m. x 4 6 m. (v) Nil. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1958—1960. (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS :
   (i) 949 Kg/ha. (ii) 82.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
   Treatment | M₁ | M₂ | M₃ | M₄
   Av. yield  | 968 | 916 | 982 | 928

Crop :- Paddy (Kharif).
Site :- Central Rice Res. Stn., Pattambi. Type :- 'M'.
Object :-To find out the best combination of different levels of N, P and K for Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Shallow laterite. (iii) 30.4.1961/8.6.1961; 8.5.1962/7.6.1962; 13.5.1963/22.6.1963 and 16.5.1964/14.6.1964. (iv) (a) 2—10 ploughings, levelling, 2 dippings and puddling with spades. (b) Transplanting (d) 25 cm. x 25 cm. (c) 2. (v) 4483 Kg/ha. of G.L. for 61(60); 62(79) and 62(79) N.A. ; Nil for 64(34). (vi) PTB-2 (medium). (vii) Unirrigated. (viii) 1—2 weedicings and gap filling. (ix) 384 cm. for 61(60); 229 cm. N.A. 210 cm. (x) 29.9.1961; 1.10.1962; 4.10.63; 7.10.1964.
2. TREATMENTS:
All combination of (1), (2) and (3)
(1) 3 levels of N as A/S: N$_1$ = 16.8, N$_2$ = 33.6 cm., N$_3$ = 50.4 Kg/ha.
(2) 3 levels of P$_{2O_5}$ as Super: P$_1$ = 16.8, P$_2$ = 33.6 and P$_3$ = 50.4 Kg/ha.
(3) 3 levels of K$_{2O}$ as Mur. Pot.: K$_1$ = 16.8, K$_2$ = 33.6 and K$_3$ = 50.4 Kg/ha.
Half of N, full dose of P$_{2O_5}$ and K$_{2O}$ as basal dressing. Half dose of N one month before flowering. Treatments applied to previous paddy crop for 64(34).

3. DESIGN:
(i) 3ª confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 4. (iv) (a) and (b) 7.6 m. x 4.6 m. (v) Nil.

4. GENERAL:
(i) Normal. (ii) N.A. for 61(60); silver shoot attack, no control measures for 62(79); slight attack of gall fly, no control measures taken for 63(161) and 64(34). (iii) Yield of grain. (iv) (a) 1961—64. (b) Yes. (v) N.A. (vi) Nil. (vii) Combined results of exp. no. 61(60), 62(79) and 63(161) have been given whereas individual results of exp. no. 64(34) is presented below, because residual effect is studied on this exp. Error variances are homogeneous and Treatments x years interaction in absent.

5. RESULTS:
Pooled Results
(i) 2512 Kg/ha. (ii) 160.6 Kg/ha. (based on 260 d.f. made up of interactions of various components of Treatments x years and pooled error). (iii) Main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

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<th>N$_3$</th>
<th>K$_1$</th>
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C.D. for N marginal means = 52.5 Kg/ha.

64(34)
(i) 2833 Kg/ha. (ii) 173.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N marginal means = 28.5 Kg/ha.
Crop: Paddy (Kharif).
Site: Central Rice Res. Sta., Waltambi. Type: 'M'.

Object: To find out the best combination of N, P and K for Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Lateritic loam. (iii) 7.9.61/12.10.61; 5.9.62/8.10.62; 6.9.63/10.10.63. (iv) (a) Digging and levelling. (b) Transplanting. (c) N.A. (d) 25 cm. between lines. (e) 2. (v) 10,000 Kg/ha. of O.L. (vi) PTB—20. (vii) Partly irrigated. (viii) 2 weedings. (ix) N.A. (x) 18.1.62; 15.1.63; 18.1.64.

2. TREATMENTS:
   All combinations of (1), (2) and (3).
   (1) 3 levels of N: N_1 = 16.8, N_2 = 33.6 and N_3 = 50.4 Kg/ha.
   (2) 3 levels of P_2O_5: P_1 = 16.8, P_2 = 33.6 and P_3 = 50.4 Kg/ha.
   (3) 3 levels of K_2O: K_1 = 16.8, K_2 = 33.6 and K_3 = 50.4 Kg/ha.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) and (b) 7.6 m. x 4.6 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Lodged after flowering. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961—1963. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x years interaction is absent. Hence the results are presented for individual years.

5. RESULTS:
   61(135)
   (i) 3215 Kg/ha. (ii) 156.9 Kg/ha. (iii) Main effect of N is highly significant and P x K interaction is significant. (iv) Av. yield of grain in Kg/ha.

   |   | P_1 | P_2 | P_3 | K_1 | K_2 | K_3 | Mean   |
---|-----|-----|-----|-----|-----|-----|-------|
N_1 | 3052 | 3015 | 3083 | 3056 | 3028 | 3066 | 3090   |
N_2 | 3258 | 3282 | 3303 | 3246 | 3245 | 3352 | 3321   |
N_3 | 3224 | 3384 | 3334 | 3310 | 3306 | 3326 | 3314   |
Mean| 3178 | 3227 | 3240 | 3204 | 3193 | 3248 | 3215   |
K_1 | 3232 | 3122 | 3258 |       |      |      |        |
K_2 | 3146 | 3242 | 3191 |       |      |      |        |
K_3 | 3156 | 3317 | 2271 |       |      |      |        |

C.D. for N marginal means: = 74.0 Kg/ha.
C.D. for body of P x K table: = 128.1 Kg/ha.

62(127)
(i) 3575 Kg/ha. (ii) 239.2 Kg/ha. (iii) Main effect of N is highly significant and that of K is significant. (iv) Av. yield of grain in Kg/ha.
### BASAL CONDITIONS:

(i) (a) Paddy—Paddy.  
(b) Paddy.  
(c) 5604 Kg/ha. of G.L.+56 Kg/ha. of A/S for 61(48); As per treatments for 62(106) ; 5604 Kg/ha. of G.L.+112 Kg/ha of A/S for 63(1).  
(ii) Shallow laterite.  
(iii) 6.6,61/U ; 7.61 ; 5.5.62/13.6.62; 4.6.63/11.7.63.  
(iv) (a) 8 ploughings and puddling for 61(48); ploughing with country plough and digging, puddling with spade for 62(106); ploughing with country plough and digging with *mammy* for 63(1).  
(b) Transplanting.  
(c) N.A.  
(d) 25 cm. x25 cm.  
(e) 2.  
(v) 4483 Kg/ha. of G.L.  
(vi) P.T.B.—2 (medium).  
(vii) Unirrigated.  
(viii) 1 hand weeding for 61(48); gap filling and 2 hand weedings for 62(106); N.A. for 63(1).  
(ix) 334 cm.; 229 cm.; 180 cm.  
(x) 17.10.61; 14.10.62; 26.10.63.

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C.D. for $N$ or $K$ marginal means =112·8 Kg/ha.

(i) 3411 Kg/ha.  
(ii) 225·7 Kg/ha.  
(iii) Main effect of $N$ is highly significant.  
(iv) Av. yield of grain in Kg/ha.

### Table

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C.D. for $N$ marginal means =106·4 Kg/ha.

### Crop

Paddy (Kharif).

### Site

Central Rice Res. Stn., Pattambi.

### Type

M'.

### Object

To find out the relative efficacy of applying mixed fertilizers and straight fertilizers separately for Paddy crop.
2. **TREATMENTS:**

3 manurial treatments: \( M_1 = 44.8 \) Kg/ha. of \( N + 22.4 \) Kgf/ha. of \( P_2O_5 + 22.4 \) Kg/ha. of \( K_2O \) as mixed fertilizers, applied in 2 equal doses – one as basal dressing and other one month before flowering. \( M_4 = 22.4 \) Kg/ha. of \( N + 22.4 \) Kgf/ha. of \( P_2O_5 + 22.4 \) Kg/ha. of \( K_2O \) as basal dressing. \( M_0 = 22.4 \) Kg/ha. of \( P_2O_5 + 22.4 \) Kg/ha. of \( K_2O \) as basal dressing. \( M_2 = 22.4 \) Kg/ha. of \( P_2O_5 + 22.4 \) Kg/ha. of \( K_2O \) as basal dressing. \( N \) as top dressing one month before flowering.

In \( M_1 \), the fertilizers were applied as mixed fertilizers and in \( M_4 \) and \( M_2 \) as straight fertilizers. \( N \) as A/S, \( P_2O_5 \) as Super and \( K_2O \) as Mur. Pot.

3. **DESIGN:**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) and (b) 6.1 m x 3.1 m. (v) Nil. (vi) Yes.

4. **GENERAL:**

(i) Satisfactory. (ii) Nil. (iii) Yield of grain for 61(49) and 63(1) and yield of grain, height of plants and tiller counts for 62(106) (iv) (a) 1941-63. (b) Yes. (c) Results of combined analysis given under 5 Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.

5. **RESULTS:**

(i) 2691 Kg/ha. (ii) 1531 Kg/ha. (based on 46 d.f. made up of pooled error and Treatments x years interaction) (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>( M_1 )</td>
<td>2712</td>
</tr>
<tr>
<td>( M_4 )</td>
<td>2674</td>
</tr>
<tr>
<td>( M_2 )</td>
<td>2686</td>
</tr>
</tbody>
</table>

**Crop:** Paddy (Rabi).  
**Site:** Central Rice Res. Sta., Pattambi.  
**Type:** ‘M’.

Object: To find out the relative efficacy of applying mixed fertilizers and straight fertilizers separately for Paddy crop.

1. **BASAL CONDITIONS:**

(i) (a) Paddy – Paddy. (b) Paddy. (c) As per treatments for 61(49) and 62(115); 5004 Kg/ha. of G.L. + 112 Kg/ha. of Super + 44.8 Kg/ha. of Mur. Pot. + 112 Kg/ha. of A/S, for 63(2). (ii) Shallow laterite. (iii) 7.9 to 9.61 m.  
(iii) 61; 1.10.62/9.11.62; 23.9.63/7.11.63.  
(iv) (a) 4 ploughings, 4 puddlings and 2 diggings for 61(49); 6 ploughings and levelling for 61(115): ploughing with country plough and digging with mammukutty for 63(2), (b) Transplanting. (c) N.A. (d) 25 cm x 25 cm. (e) 2. (v) Nil for 61(49) and 62(115); 4483 Kg/ha. of G.L. for 63(2) (vi) P.T.B. — 20 (medium). (vii) Unirrigated (viii) 1 hand weeding for 61(49); weeding for 62(115) and N.A. for 63(2). (ix) 74 cm / 122 cm / 31 cm. (x) 20.1.62 / 7.2.63 / 3.2.64.

2. **TREATMENTS:**

3 manurial treatments: \( M_1 = 44.8 \) Kg/ha. of \( N + 22.4 \) Kg/ha. of \( P_2O_5 + 22.4 \) Kg/ha. of \( K_2O \) applied in 2 equal doses – one as basal dressing and other one month before flowering. \( M_4 = 22.4 \) Kg/ha. of \( N + 22.4 \) Kg/ha. of \( P_2O_5 + 22.4 \) Kg/ha. of \( K_2O \) as basal dressing. \( M_0 = 22.4 \) Kg/ha. of \( N + 22.4 \) Kg/ha. of \( P_2O_5 + 22.4 \) Kg/ha. of \( K_2O \) as basal dressing. \( N \) as top dressing one month before flowering.

In \( M_1 \), the fertilizers were applied as mixed fertilizers and in \( M_4 \) and \( M_2 \) as straight fertilizers. \( N \) applied as A/S, \( P_2O_5 \) as Super and \( K_2O \) as Mur. Pot.

3. **DESIGN:**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) and (b) 6.1 m x 3.1 m. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) N.A. for 61(49) and 62(115); A mild attack of stem borer was noticed which was controlled by spraying Endrin, twice at weekly interval for 63(2). (iv) (a) Yield of grain. (b) 1961-63. (c) Results of combined analysis given under Results. (v) to (vii) N.A. (vii) Error variances are homogeneous and Treatment x years interaction is present.

5. RESULTS:
(i) 2396 Kg/ha. (ii) 2998 Kg/ha. (based on 4 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (v) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2391</td>
<td>2426</td>
<td>2371</td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharij).
Site :- Central Rice Res. Sta., Pattambi.
Type :- 'M'.

Object :- To find out the advantages of applying phosphatic fertilizers, lime and ash alone and in combination for Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy for 61(51); Nil for others. (b) Paddy. (c) 5604 Kg/ha. of G.L.+112 Kg/ha. of B.M.+56 Kg/ha. of Mur. Pot.+56 Kg/ha. of C/A/N for 61(51); As per treatments+6277 Kg/ha. of C.M.+168 Kg/ha. of A/S for 62(98); As per treatments for 63(134). (ii) Shallow laterite. (iii) 21.6.62; 28.5.63/1.7.63. (iv) (a) 8 ploughings, puddlings and levelling by planking for 61(51); 6 to 8 ploughings and 1 levelling for 62(98) and 63(134). (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) 4483 Kg/ha. of G.L. as basal dressing+168 Kg/ha. of A/S as top dressing for 61(51); 4483 Kg/ha. of G.L.+56 Kg/ha. of Mur. Pot. for 62(98); Nil for 63(134). (vi) P.T.B.—26 (medium). (vii) Unirrigated. (viii) Weeding. (ix) 369 cm.; 229 cm.; 127 cm. (x) 23.10.61; 1.10.62; 19.10.63.

2. TREATMENTS:
7 manurial treatments: M0 =Control, M1 =44.8 Kg/ha. of P2O5 as Super, M2 =280 Kg/ha. of lime, M3 =44.8 Kg/ha. of P2O5 as Hyper. Phos., M4 =M1+M2, M5 =44.8 Kg/ha. of P2O5 as Super+Hyper. Phos. in 1:1 ratio and M6 =44.8 Kg/ha. of P2O5 as Super+Ash in 1:1 ratio.

Fertilizers applied as basal dressing.

3. DESIGN:
(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) and (b) 9’1 m. x 4.3 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—63. (b) Yes. (c) Results of combined analysis given under Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatment x years interaction is absent.

5. RESULTS:
(i) 2148 Kg/ha. (ii) 2009 Kg/ha. (based on 66 d.f. made up of pooled error and Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M0</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2083</td>
<td>2184</td>
<td>2085</td>
<td>2194</td>
<td>2174</td>
<td>2071</td>
<td>2245</td>
</tr>
</tbody>
</table>
Crop :- Paddy (Rabi).
Ref :- K. 61(52), 62(116), 63(135).
Site :- Central Rice Res. Sta., Pattambi.  Type :- 'M'.
Object :-To find out the advantages of applying phosphatic fertilizers, lime and ash alone and in combination for Paddy.

1. BASAL CONDITIONS
(i) (a) Paddy—Paddy for 61(52); Nil for others. (b) Paddy. (c) As per treatments 4483 Kg/ha. of G.L.+168 Kg/ha. of A/S for 61(52); As per treatments for others. (ii) Shallow laterite. (iii) 15.9.61/10.11.61; 1.9.62/31.10.62; 9.9.63/11.11.63. (iv) (a) 4 ploughings, 2 diggings and levelling for 61(52); 6 ploughings and levellings for others. (b) Transplanting. (c) N.A. (d) 25cm×25 cm. (e) 2. (v) 6277 Kg/ha. of C.M. as basal dressing+168 Kg/ha. of A/S as top dressing for 61(52); Nil for others. (vi) P.T.B.—15 (late). (vii) Unirrigated. (viii) Weedings. (ix) 64 em.; 122 em.; 108 em. (x) 19.2.62; 15.2.63; 27.4.64.

2. TREATMENTS:
7 manurial treatments: M0 = Control, M1 = 448 Kg/ha. of P2O5 as Super, M2 = 280 Kg/ha. of lime, M3 = 448 Kg/ha. of P101 as Hyper. Phos., M4 = M1 + M2, M5 = 448 Kg/ha. of P2O6 as Super+Hyper Phos. in 1:1 ratio and M6 = 448 Kg/ha. of P2O6 as Super+Ash in 1:1 ratio. Fertilizers applied as basal dressing.

3. DESIGN:
(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) and (b) 9’1 m.×4’3 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961–63. (b) Yes. (c) Results of combined analysis given under 5—Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is present.

5. RESULTS:
(i) 3609 Kg/ha. (ii) 622.3 Kg/ha. (based on 12 d.f. made up of Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M0</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3350</td>
<td>3492</td>
<td>3721</td>
<td>3765</td>
<td>3541</td>
<td>3679</td>
<td>3741</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).
Ref :- K. 61(41), 62(100), 63(133).
Site :- Central Rice Res. Sta., Pattambi. Type :- 'M'.
Object :-To study the effect of different times of application of A/S on Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy for 61(41) & 62(100); Nil for 63(133). (b) Paddy. (c) 504 Kg/ha. of G.L.+112 Kg/ha. of B M.+56 Kg/ha. of Mur. Pot.+56 Kg/ha. of C/A/N for 61(41); 504 Kg/ha. of each of G.L. and C.M. +56 Kg/ha. of each of A/S and Mur. Pot.+112 Kg/ha. of Super for 62(100) ; N.A. for 63(133). (ii) Shallow laterite. (iii) 29.4.61; 16.4.62; 16.4.63. (iv) (a) 30 ploughings for 61(41); 6 to 8 ploughings for 62(100); 6 ploughings and levelling for 63(133). (b) Broadcast. (c) 90 Kg/ha. (d) and (e) 560 Kg/ha. of C.M. (vi) P.T.B.—22 (medium). (vii) Unirrigated. (viii) 2 hand weedings. (ix) 356 cm.; 229 cm.; 144 cm. (x) 23.8.61, 12.8.62; 23.8.63.

2. TREATMENTS:
5 split applications of 448 Kg/ha. of N as A/S : T0 = Control (No N), T1 = As basal dressing, T2 = As top dressing, T3 = Half as basal and half as top dressing, T4 = Half as basal and half as top dressing as T3 but at full rate of A/S at top dressing. Top dressing done one month before flowering.
3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 6·1 m. x 4·6 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—63. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the error variances are heterogeneous and Treatments x years interaction is absent, results of individual years are presented below.

5. RESULTS:

61(41)
(i) 1516 Kg/ha. (ii) 248·1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1465</td>
<td>1336</td>
<td>1541</td>
<td>1599</td>
<td>1477</td>
</tr>
</tbody>
</table>

62(100)
(i) 2029 Kg/ha. (ii) 262·1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1739</td>
<td>1922</td>
<td>2205</td>
<td>2179</td>
<td>2192</td>
</tr>
</tbody>
</table>

63(133)
(i) 2300 Kg/ha. (ii) 470·6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1977</td>
<td>2222</td>
<td>2247</td>
<td>2515</td>
<td>2575</td>
</tr>
</tbody>
</table>

_Crop_ :- Paddy (Kharif).

Site :- Central Rice Res. Stn., Pattambi.

Ref :- K. 61(56), 62(80).

Type :- 'M'.

Object :- To find out the efficacy of Eupatorium as a manure for Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil for 61(56); Paddy—Paddy for 62(80). (b) Paddy. (c) 5604 Kg/ha. of G.L. + 112 Kg/ha. of B.M. + 56 Kg/ha. of C/A/N for 61(56) ; As per treatments for 62(80). (ii) Shallow latereite. (iii) 6.6.6/10.7.61 ; 5.5.62/13.6.62. (iv) (a) 8 ploughings, puddlings and planking for 61(56); ploughing with country plough, digging and puddling with spade for 62(80). (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) Nil. (vi) P.T.B.—2 (medium). (vii) Unirrigated. (viii) 1 hand weeding for 61(56); weeding and gap-filling for 62(80). (ix) 334 cm.; 229 cm. (x) 17.10.61 ; 10.10.62.

2. TREATMENTS:
3 manurai treatments : Mₐ=Control (No manure), M₏=22·4 Kg/ha. of N as C/A/N+22·4 Kg/ha. of P₂O₅ as Super+22·4 Kg/ha. of K₂O as Mur. Pot. and Mₖ=5604 Kg/ha. of Eupatorium. C/A/N applied as top dressing one month before flowering. Super, Mur. Pot. and Eupatorium as basal dressing.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) and (b) 6·1 m. x 4·6 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—63 (Exp. failed in 63). (b) Yes. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.
5. RESULTS:

(i) 2164 Kg/ha. (ii) 135.5 Kg/ha. (based on 30 d.f., made up of pooled error and Treatments x years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M_0</th>
<th>M_1</th>
<th>M_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1992</td>
<td>2367</td>
<td>2133</td>
</tr>
</tbody>
</table>

C.D. = 97.9 Kg/ha.

Crop :- Paddy (Kharij).

Site :- Central Rice Res. Sta., Pattambi.

Type :- 'M'.

Object :- To study the effect of different sources of N on Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy — Paddy for 62(107); Nil for others. (b) Paddy. (c) As per treatments for 62(107), and 64(40); N.A. for 63(136). (ii) Shallow laterite. (iii) 23.5.1962/4.7.1962; 13.5.63/25.6.63; 16.5.64/29.6.64. (iv) (a) Ploughing with country plough, digging and puddling with spades and levelling for 62(107); 6 ploughings and levelling for 63(136); 1 ploughing and 2 diggings for 64(40). (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) 4483 Kg/ha. of G.L. before planting + 22.4 Kg/ha. of P_2O_5 as Super + 22.4 Kg/ha. of K_2O as Pot. Sul. at planting for 62(107) and 64(40); Nil for 63(136). (vi) PTB—2 (medium). (vii) Unirrigated. (viii) Gap filling and weeding for 62(107); N.A. for 63(136); One weeding for 64(40). (ix) 229 cm.; 127 cm.; 224 cm. (x) 23.10.1952; 20.10.1963; 29.10.1964.

2. TREATMENTS:

7 sources of N at 44.8 Kg/ha. : S_1 = A/S/N, S_2 = A/S, S_3 = Urea, S_4 = Calcium Nitrate, S_5 = C/A/N, S_6 = C/N and S_7 = A/C.

N applied in 2 equal doses, 45 and 30 days before flowering.

3. DESIGN:

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) and (b) 9'1 m. x 3'1 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. Lodging occurred from 29/30.9.64 in 64(40). (ii) Nil for 62(107) and 63(136); Slight attack by gall fly was noticed in 64(40). (iii) Yield of grain, height of plants and tiller counts. (iv) (a) 1962—64. (b) Yes. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:

(i) 2219 Kg/ha. (ii) 260.1 Kg/ha (based on 12 d.f., made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
<th>S_5</th>
<th>S_6</th>
<th>S_7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2285</td>
<td>2225</td>
<td>2362</td>
<td>2070</td>
<td>2258</td>
<td>2177</td>
<td>2155</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kabi).

Site :- Central Rice Res. Sta., Pattambi.

Type :- 'M'.

Object :- To study the effect of different sources of N on Paddy.
1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) 44·8 Kg/ha. of \( N+33·6 \) Kg/ha. of \( P_{2}O_{5}+33·6 \) Kg/ha. of \( K_{2}O. \)
   (ii) Shallow laterite. (iii) 22.9.61/8.11.1961. (iv) (a) 6 ploughings and levelling. (b) Transplanting. (c) N.A.
   (d) 25 cm. x 25 cm. (e) 2. (v) Nil. (vi) PTEB—20. (vii) Unirrigated. (viii) Weeding. (ix) 143 cm. (x) 9.2.62.

2. TREATMENTS:
   6 sources of N at 44·8 Kg/ha.: \( S_{1}=A/S/N, S_{2}=A/S, S_{3}=\) Urea, \( S_{4}=\) Calcium Nitrate \( S_{5}=C/A/N \) and \( S_{6}=C/N. \)
   N applied in two equal doses, 45 days and 30 days before flowering.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 9·1 m. x 3·1 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961—only. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 1258 Kg/ha. (ii) 224·9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

\[
\begin{array}{cccccc}
\text{Treatment} & S_{1} & S_{2} & S_{3} & S_{4} & S_{5} \\
\text{Av. yield} & 1203 & 1283 & 1442 & 1368 & 1078 & 1071 \\
\end{array}
\]

Crop :- Paddy (Kharif).
Ref :- K. 60(12).
Site :- Central Rice Res. Stn., Pattambi.
Type :- 'M'.

Object :- To assess the efficiency of B.M. as a manure to Paddy.
Crop: Paddy (Rabi).  
Site: Central Rice Res. Stn., Pattambi.  
Ref: K. 60(13).  
Type: 'M'.

Object: To assess the efficiency of B.M. as a manure to Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy—Paddy.  (b) Paddy.  (c) As per treatments.  (ii) Shallow laterite.  (iii) 1.10.1960/8.11.1960.  
(iv) (a) 6 ploughings and levellings.  (b) Transplanting.  (c) N.A.  (d) 25 cm. x 25 cm.  (v) 5504 Kg/ha. of G.L. as basal dressing.  
(x) 17.2.1961.

2. TREATMENTS to 4. GENERAL:

Same as in exp. No. 60(12) on page 72.

3. RESULTS:

(i) 1598 Kg/ha.  (ii) 1514 Kg/ha.  (iii) Treatment differences are not significant.  
(iv) Av. yield of grain in Kg/ha.  

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1620</td>
<td>1650</td>
<td>1572</td>
<td>1567</td>
<td>1582</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).  
Site: Central Rice Res. Stn., Pattambi.  
Ref: K. 62(109), 64 (87).  
Type: 'M'.

Object: To study the effect of Nitrophosphate complex fertilizers produced by different processes and applied to previous paddy crop on the succeeding Paddy crop.

1. BASAL CONDITIONS:

(i) (a) Paddy—Paddy for 62(109) : N.A. for 64(87).  (b) Paddy.  (c) N.A.  
(ii) Shallow laterite.  
(iv) (a) Ploughing, digging and puddling with spades.  (b) Transplanting.  (c) N. A.  (d) 25 cm. x 25 cm.  (e) 2.  
(f) Nil.  (vi) P.T.B.—2 (medium).  (vii) Unirrigated  
(viii) Weeding and gap filling.  (ix) 229 cm.; 240 cm.  
(x) 30.10.1962; 7.11.1964.

2. TREATMENTS:

All combination of (1), (2) and (3)  
(1) 3 types of fertilizer : P₁=Single Super, P₂=Nitro Phos. produced by O.D.D.A. (20—20—0) and P₃=Nitro Phos. produced by P.E.C. (16—14—0),  
(2) 3 levels of fertilizer : L₁=13·5 Kg/ha. of N+11·8 Kg/ha. of P₀5, L₂=26·9 Kg/ha. of N+23·5 Kg/ha. of P₀5, and L₃=53·8 Kg/ha. of N+47·1 Kg/ha. of P₀5,  
(3) 3 methods of application : M₁=Broadcast, M₄=6 cm. below seed at planting and M₅=Peter application 10 days after planting.  

The source of N is A/S when applied with P₂. Treatments applied to previous paddy crop.

3. DESIGN:

(i) 3' confd.  
(ii) (a) 9 plots/block and 3 blocks/replication.  
(b) N.A.  
(iii) 2.  
(iv) (a) and (b) 4·6 m. x 4·6 m.  
(v) Nil.  
(vi) Yes.

4. GENERAL:

(i) Satisfactory.  
(ii) N.A.  
(iii) Yield of grain.  
(iv) (a) 1961—1964 (expt. for 1961) and 1963—N.A.)  
(b) No.  
(c) Results of combined analysis are presented under 5. Results.  
(v) and (vi) Nil.  
(vii) Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:

(i) 1963 Kg/ha.  
(ii) 326.5 Kg/ha. (based on 70 d. f, made up of Treatments x years interaction and pooled error).  
(iii) Main effect of P is highly significant and that of L is significant.  
(iv) Av. yield of grain in Kg/ha.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) N.A. (ii) Shallow laterite. (iii) 22.9.61 ; 1.10.62 ; 23.9.63. (iv) (a) 8 ploughings. (b) Transplanting. (c) N.A. (d) N.A. for 61 ; 25 cm. between lines for others. (e) 2. (v) G. L. at 5600 Kg/ha. (vi) P.T.B.—20 (medium). (vii) Unirrigated. (viii) N.A. (ix) 52 cm. for 61(63) ; N. A. for others. (x) 7.2.62; 5.2.63; 31.1.64.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 types of fertilizer : P₁=Single Super, P₂=Nitrophosphate produced by ODDA (20-20-0) and P₃=Nitrophosphate produced by PEC (16-14-0).
   (2) 3 levels of fertilizer : L₁=13:5 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+47:2 Kg/ha. of P₂O₅.
   (3) 3 methods of application : M₁=Broadcast, M₂=6 cm. below seed at planting and M₃=Pellet application 10 days after planting.

   Source of N is A/S when applied with P₁.

3. DESIGN:
   (i) 3³ Confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 4·6 m. x 4·6 m. for 61 ; 50·6 sq. m. for 62 and 63. (b) 4·6 m. x 4·6 m. for 61 ; 49·3 sq. m. for 62 and 63. (v) Nil for 61 ; N.A. for others. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961—1963. (b) N.A. (c) —. (v) N.A. (vi) No. (vii) Error variances are heterogeneous and Treatments x years interaction is absent. Therefore, results of individual years are presented.

5. RESULTS:
   61(63)
   (i) 1475 Kg/ha. (ii) 245·0 Kg/ha. (iii) Main effect of L alone is significant. (iv) Av. yield of grain in Kg/ha.  

<table>
<thead>
<tr>
<th></th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>M₁</th>
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<td>L₃</td>
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<td>1934</td>
<td>2022</td>
<td>1980</td>
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<td>1916</td>
<td>1910</td>
<td>1915</td>
<td>1950</td>
<td>2034</td>
<td>1963</td>
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C. D. for P or L marginal means=105·6 Kg/ha.

Ref: K. 61(63), 62(120), 63(163).

Type: ‘M’.
### Table 1

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</table>

C.D. for L marginal means = 169.2 Kg/ha.

### Table 2

(i) 962.6 Kg/ha. (ii) 85.6 Kg/ha. (iii) Main effects of P and L and interaction P×M are significant. (iv) Av. yield of grain in Kg/ha.

### Table 3

<table>
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<th>P3</th>
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C.D. for P or L marginal means = 59.21 Kg/ha.
C.D. for the body of P×M table = 102.5 Kg/ha.

### Table 4

(i) 750 Kg/ha. (ii) 112.8 Kg/ha. (iii) Main effect of L alone is significant. (iv) Av. yield of grain in Kg/ha.

### Table 5

<table>
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<th>P3</th>
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<th>M2</th>
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<td>648</td>
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C.D. for L marginal means = 78.0 Kg/ha.
Crop :- Paddy (Kharif).
Site :- Central Rice Res. Stn., Pattambi.

Object :- To study the residual effect of Nitrophosphate complex fertilizers produced by different processes and applied to previous paddy crop on the succeeding Paddy crop.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy for 62(10); N.A. for 64(89). (b) Paddy. (c) As per treatments. (ii) Shallow laterite. (iii) 5.5.62/8.6.62; 16.5.64/28.6.64. (iv) (a) 1 ploughing with country plough, 2 diggings and puddling with spades. (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) Nil. (vi) P.T.B.—2 (medium) (vii) Unirrigated. (viii) Gap filling and weeding. (ix) 229 cm. : 224 cm. (x) 7.10.62; 28.10.64.

2. TREATMENTS and 3. DESIGN:
Same as in exp. No. 62(109) and 64(87) on page 73.

4. GENERAL:
(i) Satisfactory. (ii) Preventive control measures adopted for 62(10); N.A. for 64(89). (iii) Yield of grain.
(iv) (a) 1962—1964. (b) Yes. (c) Results of combined analysis are presented under 5 Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments X Years interaction is absent. Combined results of 62 and 64 are given. Expt. for 1963 N.A.

5. RESULTS:
(i) 1948 Kg/ha. (ii) 195·5 Kg/ha. (based on 7() d.f. made up of Treatments X years interaction and pooled error). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
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<th>M2</th>
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<td>1947</td>
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<td>1983</td>
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Crop :- Paddy (Kharif).
Site :- Central Rice Res. Stn., Pattambi.

Object :- To find out the effect of continuous application of green leaves and A/S alone and in combination on Paddy.

1. BASAL CONDITIONS:
(i) (a) N. A. (b) Paddy. (c) N.A. (ii) Clay loam. (iii) 5.5.65/22.7.65. (iv) (a) Digging and ploughing. (b) Transplanting. (c) Nil. (d) 20 cm. x 15 cm. (e) 2. (f) Nil. (vi) P.T.B.—2 (late). (vii) Irrigated. (viii) Weeding and gap filling. (ix) 155 cm. (x) 22.10.65.

2. TREATMENTS:
5 manurial treatments; T1 = Green leaf at 5600 Kg/ha. to give 30 Kg/ha. of N, T2 = Green leaf at 11200 Kg/ha. to give 60 Kg/ha. of N, T3 = T1 + 16.6 Kg/ha. of N as A/S, T4 = A/S to supply 36.6 Kg/ha. of N and T5 = A/S to supply 73.2 Kg/ha. of N.

A/S. in all cases to be top dressed one month after planting.
3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) 22.9 m. x 6.1 m. (iii) 5. (iv) (a) N.A. (b) 6.1 m. x 4.6 m. (v) One row around is left out as guard row. (vi) Yes.

4. GENERAL:
(i) to (iii) N.A. (iv) (a) 1963—contd. (b) Yes. (c) Nil. (v) to (v) N.A.

5. RESULTS:
(i) 2010 Kg/ha. (ii) 187.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
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<tr>
<td>Av. yield</td>
<td>1863</td>
<td>2117</td>
<td>1949</td>
<td>2042</td>
<td>2081</td>
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</table>

Site: Central Rice Res. Stn., Pattambi.  Type: ‘M’.

Object:—To assess the relative merits of continuous application of different kinds of G.L. as basal dressing.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy. (b) Paddy. (c) N.A. for 61 and as per treatments for 62. (ii) Laterite loam. (iii) 22.9.61/3.11.61 ; 1.10.62/8.11.62. (iv) (a) Digging and levelling. (b) to (e) N.A. (v) 22 Kg/ha. of P₂O₅ as Super + 22 Kg/ha. of K₂O as M.P. or M.P. of N as A/S. (vi) P.T.B.—20 (medium). (vii) Irrigated. (viii) 2 weedings. (ix) N/A. (x) 30.1.62; 7.2.62.

2. TREATMENTS:
7 kinds of G.L. at 4600 Kg/ha. : G₁=Giricidia, G₂=Indigofera, G₃=Mongo, G₄=Calephasium, G₅=Sesbania, G₆=Dhaincha and G₇=Yengai.

3. DESIGN:
(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) and (b) 9.1 m. x 3.1 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Lodged after flowering. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1961—62. (b) Yes. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:
(i) 2445 Kg/ha. (ii) 102.3 Kg/ha. (based on 6 d.f. made up of Treatments x years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>G₁</th>
<th>G₂</th>
<th>G₃</th>
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<td>2318</td>
<td>2473</td>
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<td>2362</td>
<td>2562</td>
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C.D. = 125.2 Kg/ha.

Crop: Paddy (Kharif).  Ref: K. 60(10), 61(39), 62(77), 64(44).
Site: Central Rice Res. Stn., Pattambi.  Type: ‘M’.

Object:—To find out the effect of continuous application of A/S and G.L. alone and in combinations on Paddy.
1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Shallow laterite. (iii) 7.5/60/17.6/60; 20.5/61/27.6/61; 5.5/62/8.6/62; 16.5/64/28.6/64. (iv) (a) 4 to 8 ploughings, digging, levelling and puddling with spades. (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) Nil. (vi) P.T.B.—2 (medium). (vii) Unirrigated. (viii) Weeding and gap filling. (ix) 309 cm.; 404 cm.; 229 cm. and 237. (x) 11.10.60; 6.10.61; 3.10.62 and 7.10.64.

2. TREATMENTS:
5 manurial treatments: \( M_1 = 5604 \) Kg/ha. of G.L., \( M_2 = 11208 \) Kg/ha. of G.L., \( M_3 = M_1 + 168 \) Kg/ha. of N as A/S, \( M_4 = 336 \) Kg/ha. of N as A/S and \( M_5 = 672 \) Kg/ha. of N as A/S. A/S applied as top dressing one month before flowering and G.L. as basal dressing.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 6.1 m. x 4.6 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Endrin sprayed against stem borer in 60(10) and 64(44). Silver shoots attack observed and control measures adopted in 62(77). (iii) Yield of grain. (iv) (a) 1957—contd. (Expt. failed in 63). (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Expt. is continued and 1965 extpt. is N.A.

5. RESULTS:
60(10)
(i) 2333 Kg/ha. (ii) 1747 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

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<td>2214</td>
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61(39)
(i) 1947 Kg/ha. (ii) 2219 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

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<td>1936</td>
<td>1885</td>
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62(77)
(i) 2384 Kg/ha. (ii) 1525 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( M_1 )</th>
<th>( M_2 )</th>
<th>( M_3 )</th>
<th>( M_4 )</th>
<th>( M_5 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2424</td>
<td>2592</td>
<td>2412</td>
<td>2180</td>
<td>2312</td>
</tr>
</tbody>
</table>

C.D. = 183.6 Kg/ha.

64(44)
(i) 2341 Kg/ha. (ii) 1269 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( M_1 )</th>
<th>( M_2 )</th>
<th>( M_3 )</th>
<th>( M_4 )</th>
<th>( M_5 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2356</td>
<td>2505</td>
<td>2422</td>
<td>2177</td>
<td>2242</td>
</tr>
</tbody>
</table>

C.D. = 152.7 Kg/ha.

Crop: Paddy (Rabi).
Site: Central Rice Res. Stn., Pattambi.
Object: To study the effect of different levels of A/S and G.L. on Paddy.

Ref.: K. 60(18).
Type: ‘M’.
1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) As per treatments. (ii) Shallow laterite. (iii) 1:10.60/7.11.60. (iv) (a) N.A. (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) N.A. (vi) P.T.B.—20 (medium). (vii) Unirrigated. (viii) N.A. (ix) 309 cm. (x) 14.2.61.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of G.L. : G₁ = 2242, G₂ = 5604 and G₃ = 8967 Kg/ha.
   (2) 3 levels of N as A/S : S₁ = 67·2, S₂ = 134·5 and S₃ = 201·8 Kg/ha.
   Green leaf is applied as basal dose and A/S as top dressing one month before flowering.

3. DESIGN:
   (i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) and (b) 7·6 m. x 4·6 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1957-60. (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 2391 Kg/ha. (ii) 215·7 Kg/ha. (iii) Only the effect of S is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>S₁</th>
<th>G₁</th>
<th>G₂</th>
<th>G₃</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>2334</td>
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<td>2464</td>
<td>2498</td>
<td>2615</td>
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<td>2526</td>
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<td>2277</td>
<td>2766</td>
<td>2436</td>
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</tr>
<tr>
<td>Mean</td>
<td>2358</td>
<td>2378</td>
<td>2436</td>
<td>2391</td>
</tr>
</tbody>
</table>

C.D. for S marginal means = 181·7 Kg/ha.

Crop :- Paddy (Kharif).
Site :- Central Rice Res. Stn., Pattambi.
Object :- To find out the effect of N, P and lime on Paddy crop.

Ref :- K. 64(48).
Type :- 'M'.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5604 Kg/ha. of G.L. + 44·8 Kg/ha. of N as A/S + 33·6 Kg/ha. of P₂O₅ as Super + 30·6 Kg/ha. of K₂O as Mur. Pot. (ii) Lateritic. (iii) 5·6.4/18.6.64. (iv) (a) 1 ploughing, digging and levelling. (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) 3363 Kg/ha. of G.L. + 33·3 Kg/ha. of K₂O as Mur. Pot. (vi) P.T.B. = 9 (medium). (vii) Unirrigated. (viii) 1 weeding. (ix) 237 cm. (x) 3.10.64.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 2 levels of N as A/S : N₁ = 44·8 Kg/ha. and N₂ = 67·3 Kg/ha.
   (2) 2 levels of P₂O₅ as Super : P₁ = 22·4 Kg/ha. and P₂ = 44·8 Kg/ha.
   (3) 2 levels of lime : L₂ = 0 and L₃ = 336 Kg/ha.
   A/S applied half as basal and half as top dressing, and full P₂O₅ and lime at basal.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 8. (b) 36·2 m. x 9 m. (iii) 4. (iv) (a) and (b) 9 m. x 4 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Incidence of gall fly noted. Endrin sprayed once. (iii) Tiller counts, plants height and yield of grain. (iv) (a) 1964—66. (b) Yes. (c) Nil. (v) to (vii) N.A.
5. RESULTS:
(i) 3708 Kg/ha.  (ii) 191 4 Kg/ha.  (iii) Main effects of L and P are significant. (iv) Av. yield of grain in Kg/ha.

\[
\begin{array}{|c|c|c|c|c|}
\hline
\text{L} & \text{L} & \text{P} & \text{P} & \text{Mean} \\
\hline
\text{N}_1 & 3583 & 3799 & 3584 & 3798 & 3691 \\
\text{N}_2 & 3655 & 3795 & 3686 & 3764 & 3725 \\
\hline
\text{Mean} & 3619 & 3797 & 3635 & 3781 & 3708 \\
\text{P}_1 & 3523 & 3747 & 3635 & 3781 & 3708 \\
\text{P}_2 & 3715 & 3847 & 3715 & 3847 & 3708 \\
\hline
\end{array}
\]

C.D. for L or P marginal means = 140 7 Kg/ha.

---

_Crop_ - Paddy (Kharif).

_Site_ - Central Rice Res. Stn., Pattambi.

_Ref_ - K. 64(50).

_Type_ - 'M'.

Object - To compare the effect of powdered leaf and dried leaf on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5604 Kg/ha. of G.L.+44 8 Kg/ha. of N as A/S+33 6 Kg/ha. of P_2O_5 as Super +33 6 Kg/ha. of K_2O as Mur. Pot. (ii) Lateritic soil. (iii) 16.5.64/7.7.64. (iv) (a) 7 ploughings, digging and levelling. (b) Transplanting. (c) N.A. (d) 25 cm x 15 cm. (e) 2. (v) 3 1/6 Kg/ha. of N as A/S+33 6 Kg/ha. of P_2O_5 as Super+33 6 Kg/ha. of K_2O (as P and K applied as basal ; N applied in two doses—½ as basal and ½ after planting). (vi) PTB-2 (medium). (vii) Unirrigated. (viii) 2 weedings. (ix) 237 cm. (x) 7.11.1964.

2. TREATMENTS:
4 methods of application of 5604 Kg/ha. of G.L.: \( \text{M}_4 = \) Control (no application), \( \text{M}_1 = \text{G.L.}, \text{M}_2 = \text{G.L. dried before application} \), and \( \text{M}_3 = \text{G.L. dried and powdered before application} \).

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) 10 8 m. x 8 0 m. (iii) 6. (iv) (a) and (b) 8 m x 3 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. Lodged on 30.9.1964. (ii) Incidence of gall fly was noticed. Endrin sprayed once. (iii) Tiller counts, yield of grain and plant height. (iv) (a) 1964—56. (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 2646 Kg/ha.  (ii) 303 3 Kg/ha.  (iii) Treatment differences are n.s significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( \text{M}_3 )</th>
<th>( \text{M}_4 )</th>
<th>( \text{M}_5 )</th>
<th>( \text{M}_6 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2562</td>
<td>2861</td>
<td>2674</td>
<td>2486</td>
</tr>
</tbody>
</table>
Crop : Paddy (Kharij).

Site : Central Rice Res. Stn., Pattambi.

Ref : K. 64(52).

Type : M'.

Object : To find out the effect of micronutrients on the yield of Paddy.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) 44.8 Kg/ha. of N + 33.6 Kg/ha. of P_2O_5 + 33.6 Kg/ha. of K_2O. (ii) Lateritic soil. (iii) 16.5.1964/9.7.1964. (iv) (a) 7 ploughings and digging. (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) 33.6 Kg/ha. of N as A/S + 33.6 Kg/ha. of P_2O_5 as Super + 33.6 Kg/ha. of K_2O as Mur. Pot. (vi) PTB 2 (medium). (vii) Unirrigated. (viii) 2 weedicings. (ix) 22.7 em. (x) 7.11.1964.

2. TREATMENTS :
   8 micronutrient treatments: M_0 = Control, M_1 = 11.2 Kg/ha. of Manganese as Mn. Sul., M_2 = 5.6 Kg/ha. of Iron as Fe. Sul., M_3 = 2.2 Kg/ha. of Molybdemum as Molybdic acid, M_4 = 56 Kg/ha. of Silicon as Sod. Silicate, M_5 = 112 Kg/ha. of Magnesium carbonate, M_6 = 11.2 Kg/ha. of Borax and M_7 = 28 Kg/ha. of Copper as Cu.Sul.

The chemicals are dissolved in water and solution sprayed in soil 5 days before planting.

3. DESIGN :
   (i) R.B.D. (ii) (a) 8. (b) 16.8 m. x 9.6 m. (iii) 4. (iv) (a) and (b) 4.5 m. x 3.8 m. (v) Nil. (vi) es.

4. GENERAL :
   (i) Normal, Lodged on 26.9.1964. (ii) Incidence of gall fly was noticed. Eusdrin was sprayed twice. (iii) Tiller counts, plant height and yield of grain. (iv) (a) 1964-66. (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS :
   (i) 2367 Kg/ha. (ii) 185.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M_0</th>
<th>M_1</th>
<th>M_2</th>
<th>M_3</th>
<th>M_4</th>
<th>M_5</th>
<th>M_6</th>
<th>M_7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
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<td>2341</td>
<td>2281</td>
<td>2474</td>
<td>2474</td>
<td>2415</td>
<td>2370</td>
<td>2370</td>
</tr>
</tbody>
</table>

Crop : Paddy (Kharij).

Site : Central Rice Res. Stn., Pattambi.

Ref : K. 64(32).

Type : M'.

Object : To study the comparative merits of compost prepared by different methods and of C.M. stored by different methods on Paddy.

1. BASAL CONDITIONS :
   (i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Shallow laterite. (iii) 8.5.1964/28.6.1964. (iv) (a) 1 ploughing, 1 digging. (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) 20 Kg/ha. of P_2O_5 + 20 Kg/ha. of K_2O as Mur. Pot. + 20 Kg/ha. of N as A/S. (vi) PTB 26 (medium). (vii) Unirrigated. (viii) 1 weeding. (ix) 209 em. (x) 28.9.1964.

TREATMENTS :
   Main plot treatments :
   2 levels of fertilizers : M_0 = 0 and M_1 = 20 Kg/ha. of N as A/S + 20 Kg/ha. of P_2O_5 as Super + 20 Kg/ha. of K_2O as Mur. Pot.

   Sub-plot treatments :
   All combinations of (1) and (2)
   (1) 4 forms of compost of F.Y.M. : F_1 = F.Y.M. stored in pit system, F_2 = F.Y.M. stored at loose hor system, F_3 = Compost prepared by Bangalore method and F_4 = Compost prepared by Indore method.

   (2) 2 levels of compost and F.Y.M. : L_1 = 125 and L_2 = 250 Q/ha.

Compost and F.Y.M. are applied at time digging : N, P_2O_5, K_2O are applied at final puddling.
3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication and 8 sub-plots/main-plot. (b) 28.2 m. x 14.6 m. (iii) 4. (iv) (a) and (b) 7 m. x 3 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Tiller counts and yield of grain. (iv) (a) 1963-65 (Expt. for 1963 failed). (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 244.1 Kg/ha. (ii) (a) 223.8 Kg/ha. (b) 293.5 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F4</th>
<th>F3</th>
<th>F2</th>
<th>L4</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>M0</td>
<td>2517</td>
<td>2517</td>
<td>2037</td>
<td>2351</td>
<td>2302</td>
<td>2356</td>
</tr>
<tr>
<td>M1</td>
<td>2685</td>
<td>2764</td>
<td>2257</td>
<td>2414</td>
<td>2305</td>
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<tr>
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<td>2601</td>
<td>2641</td>
<td>2147</td>
<td>2333</td>
<td>2404</td>
<td>2482</td>
</tr>
<tr>
<td>L1</td>
<td>2549</td>
<td>2606</td>
<td>2238</td>
<td>2222</td>
<td>2404</td>
<td>2482</td>
</tr>
<tr>
<td>L2</td>
<td>2654</td>
<td>2675</td>
<td>2056</td>
<td>2543</td>
<td>2404</td>
<td>2482</td>
</tr>
</tbody>
</table>

C.D. for F marginal means=221.1 Kg/ha.

Crop: Paddy (Kharif).
Site: Central Rice Res. Sta., Pattambi.
Type: 'M'.

Object: To compare the relative efficiency of different kinds of phosphatic fertilizers on Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy, (b) Paddy. (c) 5004 Kg/ha. of C.M.+112 Kg/ha. of B.M.+56 Kg/ha. of Mur. Pot. +28 Kg/ha. of urea for 62(110); As per treatments for 63(147) and 64(36). (ii) Shallow laterite. (iii) (a) 23.5.1962/7.7.1962; 4.6.1963/12.7.1963; 16.5.1964/24.6.1964. (iv) (a) Ploughing with country plough, digging and puddling with spades for 62(110); 2 ploughings and 2 diggings for 63(147) and 64(36). (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (f) 4483 Kg/ha. of G.L.+24 Kg/ha. of K2O as Mur. Pot. for 62(110); 4483 Kg/ha. of G.L.+44 Kg/ha. of Mur. Pot.+112 Kg/ha. of A/S as top dressing for others. (v) PTB-2 (medium). (vi) Unirrigated. (vii) Gap filling and weeding for 62(110); Rectification of bunds before top dressing and 2 weedings for others. (viii) For 62(110) 229 em.; 210 em. for 63(147) and N.A. for 64(36). (x) 25.10.1962; 2.11.1962; 6.10.1964.

2. TREATMENTS:
All combinations of (1) and (2)+a control
(1) 3 levels of P2O5: P1=16.8, P2=33.6 and P3=50.4 Kg/ha.
(2) 4 sources of P2O5: S1=Hyper Phos., S2=Super, S3=B.M. and S4=Rock Phos. P2O5 applied as basal dressing.

3. DESIGN:
(i) Fact, in R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) and (b) 7.6 m. x 3.1 m. for 62(110), 63(147) and 61.6 m. x 4.6 m. for others. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-64 (during 1961 the expt. is conducted in second season). (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.
5. RESULTS:

(i) 2790 Kg/ha. (ii) 2106 Kg/ha. (based on 150 d.f. make up of Treatments \times years interaction and pooled error). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control = 2657 Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>2802</td>
<td>2806</td>
<td>2805</td>
<td>2717</td>
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<td>F2</td>
<td>2799</td>
<td>2878</td>
<td>2820</td>
<td>2813</td>
<td>2818</td>
</tr>
<tr>
<td>F3</td>
<td>2863</td>
<td>2853</td>
<td>2774</td>
<td>2819</td>
<td>2832</td>
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<tr>
<td>Mean</td>
<td>2808</td>
<td>2847</td>
<td>2760</td>
<td>2789</td>
<td>2801</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).

Site :- Central Rice Res. Stn., Pattambi.

Ref :- 61(53), 62(78), 64(46).

Type :- 'M'.

Object :- To assess the effect of continuous application of C.M., G.L. and A/S alone and in combination with P and K.

1. BASAL CONDITIONS:

(i) (a) Paddy—Paddy. (b) Paddy. (c) 5004 Kg/ha. of G.L.+112 Kg/ha. of B.M.+56 Kg/ha. of C/A/N for 61(53). As per treatments for 62(78) and 64(46). (ii) Shallow Irrigation. (iii) 30.4.61; 5.5.62; 16.5.64. (iv) (a) 8 ploughings. (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) Nil. (vi) P.T.B.—2 (medium). (vii) Unirrigated. (viii) N.A. (ix) 415 cm.; 229 cm.; 112 cm. (x) 6.10.61; 5.10.62; 7.10.64.

2. TREATMENTS:

8 manurial treatments: M1=C.M. at 8967 Kg/ha. M2=G.L. at 4483 Kg/ha. M3=A/S at 4483 Kg/ha. of N, M4=C.M. at 4483 Kg/ha. +A/S at 224 Kg/ha. of N+224 Kg/ha. of P2O5 as Super+224 Kg/ha. of K2O as Pot. Sul., M5=G.L. at 4483 Kg/ha. +224 Kg/ha. of N as A/S+224 Kg/ha. of P2O5 as Super+224 Kg/ha. of K2O as Pot. Sul., M6=G.L. at 2242 Kg/ha. +C.M. at 2242 Kg/ha. +224 Kg/ha. of N as A/S+224 Kg/ha. of P2O5 as Super+224 Kg/ha. of K2O as Pot. Sul., M7=G.L. at 2242 Kg/ha. +C.M. at 2242 Kg/ha. +224 Kg/ha. of N as A/S+224 Kg/ha. of P2O5 as Super+224 Kg/ha. of K2O as Pot. Sul.

3. DESIGN:

(i) R.B.D. (ii) 8. (b) N.A. (iii) 4. (iv) (a) and (b) 4'9 m. x 4'6 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A., Pre-control measures adopted. Endrin sprayed twice. (iii) Grain yield. (iv) (a) 1961-64. (Expt. for 1963 N.A.) (b) Yes. (c) Results of combined analysis are presented under 5. Results.

(v) N.A. (vi) Nil. (vii) Error variances are homogenous and Treatments \times years interaction is present.

5. RESULTS:

(i) 2787 Kg/ha. (ii) 2901 Kg/ha. (based on 14 d.f. make up of Treatments \times years interaction). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M7</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2549</td>
<td>2689</td>
<td>2755</td>
<td>2624</td>
<td>2916</td>
<td>3008</td>
<td>2910</td>
<td>2689</td>
</tr>
</tbody>
</table>

C.D.=254 Kg/ha.
Crop := Paddy (Kharif).

Site := Central Rice Res. Stn., Pattambi.

Ref := K. 61(54).

Type := 'M'.

Object := To assess the continuous application of C.M., G.L. and A/S alone and in combination with P and K on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy-Paddy. (b) Paddy. (c) As per treatments. (ii) Shallow lateritic. (iii) 17.9.61/24.10.61. (iv) (a) 4 ploughings, 2 diggings and levellings. (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) Nil. (vi) P.T.B.—20 (medium). (vii) Unirrigated. (viii) 1 hand weeding. (ix) 74 cm. (x) 20.1.62.

2. TREATMENTS:
   Same as in Expt. No. 61(53), 62(78), 64(46) on page 83.

5. GENERAL:
   (i) 1957–60. (ii) Yes. (iii) Nil. (iv) to (vii) N.A.

5. RESULTS:
   (i) 2909 Kg/ha. (ii) 308.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$G_1$</th>
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</tbody>
</table>
Crop :- Paddy (Kharif).

Site :- Central Rice Res. Stn., Pattambhi.

Object :- To find out the merit of Sodium chloride as a fertilizer as well as its capacity to suppress weeds in Paddy.

1. BASAL CONDITIONS :
   (i) (a) Paddy - Paddy. (b) Paddy. (c) As per treatments. (ii) Shallow lateritic. (iii) 10.5.60. (iv) (a) 8 ploughings. (b) Broadcast. (c) 85 Kg/ha. (d) and (e) N.A. (v) 4438 Kg/ha. of G.L. + 22.4 Kg/ha. of P₂O₅ as Super + 22.4 Kg/ha. of K₂O as Pot. Sul. (vi) P.T.B.-28 (medium). (vii) Unirrigated. (viii) N.A. (ix) 217 cm. (x) 3.1.8.60.

2. TREATMENTS :
   Main-plot treatments : 3 levels of Sodium Chloride: M₀ = 0, M₁ = 112 and M₂ = 224 Kg/ha.
   Sub-plot treatments : 3 levels of manuring : S₀ = No manure, S₁ = 112 Kg/ha. of Super + 56 Kg/ha. of Pot. Sul. and S₂ = 22.4 Kg/ha. of Super + 112 Kg/ha. of Pot. Sul.
   Sod. Chloride applied 3 weeks before sowing; Super and Pot. Sul. applied at sowing.

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

4. GENERAL :
   (i) Normal. (ii) N.A. (iii) Yield of grain. (iv) 1959-60. (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS :
   (i) 655 Kg/ha. (ii) (a) 159·1 Kg/ha. (b) 104·5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S₀</th>
<th>S₁</th>
<th>S₂</th>
<th>Mean</th>
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<td>720</td>
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<tr>
<td>M₁</td>
<td>611</td>
<td>725</td>
<td>607</td>
<td>648</td>
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<tr>
<td>M₂</td>
<td>580</td>
<td>568</td>
<td>645</td>
<td>598</td>
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<tr>
<td>Mean</td>
<td>654</td>
<td>666</td>
<td>645</td>
<td>655</td>
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Crop :- Paddy (Kharif).

Site :- Central Rice Res. Stn., Pattambhi.

Object :- To assess the relative merits of different kinds of G.L. as basal dressing for Paddy in wet lands.

1. BASAL CONDITIONS :
   (i) (a) Paddy — Paddy. (b) Paddy. (c) 5604 Kg/ha. of G.L. + 112 Kg/ha. of B.M. + 56 Kg/ha. of C/A/N. (ii) Shallow laterite. (iii) 30.4.61/9.61 ; 15.6.62/23.7.62. (iv) (a) Ploughings, puddings, planking and levelling. (b) Transplanting. (c) N.A. (d) (a) 25 cm. × 25 cm. (e) 2. (v) 22.4 Kg/ha. of P₂O₅ as Super + 22.4 Kg/ha. of K₂O as Mur. Pot. (vi) P.T.B.—2. (vii) Unirrigated. (viii) 1 to 2 weedings. (ix) 415 cm. and 229 cm. respectively. (x) 4.10.61 and 6.10.62 respectively.

2. TREATMENTS :
   7 sources of 4438 Kg/ha. of G.L. : S₀=Glyricidia, S₁=Indigofera, S₂=Mango, S₃=Calapagorum, S₄=Sesbania, S₅=Dhaincha and S₆=Vangai.

G.L. applied as basal dressing.
3. DESIGN:
(i) R. B. D.  (ii) (a) 7. (b) N. A.  (iii) 4.  (iv) (a) and (b) 9'1 m. x 3'1 m.  (v) Nil.  (vi) Yes.

4. GENERAL:
(b) Yes. (c) Nil. (v) (vi) Nil.  (vii) Error variances are heterogeneous and Treatments x Years interaction is absent. Hence individual results are presented under 5. Results.

5. RESULTS:

61(58)

(i) 2718 Kg/ha. (ii) 129'0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment  
<p>| | | | | | | | |</p>
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<td>S₁</td>
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<td>S₃</td>
<td>S₄</td>
<td>S₅</td>
<td>S₆</td>
<td>S₇</td>
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</tbody>
</table>
Av. yield  
2662 2739 2746 2706 2787 2596 2787

62(108)

(i) 1892 Kg/ha. (ii) 275'5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment  
<p>| | | | | | | |</p>
<table>
<thead>
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<td>S₂</td>
<td>S₃</td>
<td>S₄</td>
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</table>
Av. yield  
1694 1816 1780 1882 1991 2052 2027

Crop : Paddy (Rabi).

Site > Central Rice Res. Stn., Pattambi.

Ref > K. 60(11); 61(40).

Type : 'M'.

Object :— To find out the effect of continuous application of A/S and G.L. alone and in combination on Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Shallow laterite. (ii) 13.9.60/25.10.60; 7.9.61/ 
24.10.61.  (iv) (a) 4 ploughings, digging and levelling. (b) Transplanting. (c) N. A. (d) 25 cm. x 25 cm. 
(e) 2.  (v) N. A. (vi) P.T.B.—20 (medium). (vii) Unirrigated. (viii) N. A. for 60(11); 1 hand weeding for 
61(40).  (ix) N. A. for 60(11); 74 cm. for 61(40). 28.1.61; 23.1.62.

2. TREATMENTS:

5 manurial treatments : M₁ = 5604 Kg/ha. of G.L., M₂ = 11208 Kg/ha. of G.L., M₃ = M₁ + 16'8 Kg/ha. of N as 
A/S; M₄ = 23'6 Kg/ha. of N as A/S and M₅ = 67'2 Kg/ha. of N as A/S. 
A/S applied as top dressing one month before flowering and G.L. as basal dressing.

3 DESIGN:

(i) R.B.D.  (ii) (a) 5. (b) N.A.  (iii) 6.  (iv) (a) and (b) 6'1 m. x 4'6 m. (v) Nil.  (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Endrin sprayed against stemborer in 60(11).  (iii) Yield of grain.  (iv) (a) 1957—61.  
(b) Yes. (c) Nil.  (v) Nil. (vi) Nil.  (vii) Expt. for 57 to 59 have been taken for pooling. Error variances 
are heterogeneous and Treatments x years interaction is absent. Hence individual results are Presented below.

5. RESULTS:

60(11)

(i) 1912 Kg/ha. (ii) 194'2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield grain in 
Kg/ha.

Treatment  
| M₁ | M₂ | M₃ | M₄ | M₅ |
Av. yield  
1771 1921 1933 1917 2016
(i) 1595 Kg/ha. (ii) 260.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
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<td>1546</td>
<td>1719</td>
<td>1682</td>
<td>1456</td>
<td>1572</td>
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</table>

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

**Site:** Agri. Res. Stn., Thaliparamba.

Object:—To study the effect of different levels of K on Paddy.

1. **BASAL CONDITIONS:**
   (i) (a) Paddy—Paddy. (b) Paddy. (c) 5604 Kg/ha. of G.L.+168 Kg/ha. of Super. (d) 168 Kg/ha. of A/S.
   (ii) Clay loam.
   (iii) 31.5.60./31.5.60.
   (iv) (a) N.A. (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 2.

2. **TREATMENTS:**
   6 levels of K₂O: K₀=0, K₁=16.8, K₂=28.0, K₃=39.2, K₄=50.4 and K₅=61.6 Kg/ha.

3. **DESIGN:**
   (i) R.B.D. (ii) 6. (iii) 6. (iv) (a) 7'9 m. x 3'1 m. (b) 7'6 m. x 2'7 m. (v) 15 cm. x 15 cm.
   (vi) Yes.

4. **GENERAL:**
   (i) Satisfactory. (ii) Attack of jassid, rice bugs and cater pillars were noticed. Dusting with B.H.C. (iii) Tiller count and yield of grain. (iv) (a) 1960 only. (b) No. (c) N.A. (v) Nil. (vi) A continuous heavy down pour of rain was unexpectedly recurring during the harvesting time and it hampered the progress of harvesting and thrashing and drying of paddy. (vii) Nil.

5. **RESULTS:**
   (i) 2620 Kg/ha. (ii) 390.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>K₃</th>
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<td>Av. yield</td>
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<td>2731</td>
<td>2734</td>
<td>2550</td>
<td>2622</td>
<td>2405</td>
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</table>

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**Crop:** Paddy *(Rabi)*

**Site:** Agri. College & Res. Instt., Vellayani.

Object:—To study the effect of different types of G.L. on Paddy.

1. **BASAL CONDITIONS:**
   (i) (a) Nil. (b) Paddy for 61(66); Fallow for others. (c) Nil. (ii) (a) Sandy loam. (iii) N.A./12.10.61 ; N.A./N.A. (iv) (a) 6 ploughings, 2 diggings with mammthy for 61(66); 4 ploughings. levelling and 2 diggings for 62(41). (b) Transplanting for 61(66); Broadcast for other. (c) N.A. for 61(66); 90 Kg/ha. for 62(41). (d) 23 cm. x 15 cm. ; N.A. (e) 2 ; N.A. (f) 246 Kg/ha. of Super+79 Kg/ha. of Mur. Pot. (g) 224 Kg/ha. of Super broadcast for other. (h) Kalavali for 61(66); Kochuvithu (early) for other. (i) Irrigated. (ii) 1 weeding and 1 hoeing for 61(66); 1 weeding for other. (ix) 34'3 cm. ; 49 cm. (x) N.A. ; 8.2.63.
2. TREATMENTS:
All combinations of (1) and (2)+a control
(1) 2 types of leaves : L<sub>1</sub>=Green leaves at 9844 Kg/ha. and L<sub>2</sub>=Dry leaves at 2461 Kg/ha.
(2) 3 sources of leaves : S<sub>1</sub>=Glyricidia, S<sub>2</sub>=Indigofora-tejsmania and S<sub>3</sub>=Eupatorium-odoratum.
The percentage of moisture in green leaves was 75% and hence 2461 Kg/ha. of dry leaves are equivalent to
9844 Kg/ha. of green leaves.
Treatments applied as basal dressing just before the last digging.

3. DESIGN:
(i) Fact in R.B.D. (ii) (a) 7. (b) N.A. for 61(66) ; 32·9 m × 10'1 m. for 62(41). (iii) 4. (iv) 4·9 m × 9'5 m.
for 61(66) ; 5'2 m × 9'8 m. for 62(41). (b) 4·6 m × 9'1 m. (v) 30 cm. × 30 cm. for 61(66) ; 30 cm. × 30 cm.
for 62(41). (vi) Yes.

4. GENERAL:
(i) Healthy but crop lodged in 2nd week of January for 61(66); Poor for other. (ii) Crop affected by leaf roller and case worm in 61(66), DDT sprayed ; Stemborer attack in other, controlled by spraying Endrin.
(iii) Yield of grain. (iv) (a) 1959–62 (levels of leaves changed in 1961). (b) No. (c) Results of combined
analysis given under 5. Results (v) (a) and (b) N.A. (vi) and (vii) Error variances are heterogeneous and
Treatments×Years interaction is present.

5. RESULTS:
(i) 1906 Kg/ha. (ii) 420'3 Kg/ha. (based on 28'6 d.f. made up of Treatments×years interaction). (iii) None
of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S&lt;sub&gt;2&lt;/sub&gt;</th>
<th>Mean</th>
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<td>1962</td>
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<td>1760</td>
<td>1812</td>
</tr>
<tr>
<td>Mean</td>
<td>2081</td>
<td>1835</td>
<td>1887</td>
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</table>

Ref :- K. 61(68).
Type :- 'M'.

Object :- To test the effect of fortified compost as against compost with P<sub>2</sub>O<sub>5</sub> added separately on Paddy yield.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 16.10.1961. (iv) (a) 6 ploughings, digging and levelling. (b) Transplanting. (c) 34 Kg/ha. (d) 23 cm × 23 cm. (e) 2. (v) Nil. (vi) Kulavali. (vii) Unirrigated. (viii) and (ix) N.A. (x) 8.2.1962.

2. TREATMENTS:
T<sub>1</sub>=Ordinary compost, T<sub>2</sub>=Compost fortified with Super at 5 '7 Kg/pit, T<sub>3</sub>=Compost fortified with Super at 11'3 Kg/pit, T<sub>4</sub>=Compost fortified with B.M. at 4·5 Kg/pit, T<sub>5</sub>=Compost fortified with B.M. at 9'1 Kg/pit,
T<sub>6</sub>=Compost+Super at 5'7 Kg/pit, T<sub>7</sub>=Compost+Super at 11'3 Kg/pit, T<sub>8</sub>=Compost+B.M. at 4·5 Kg/pit
and T<sub>9</sub>=Compost+B.M. at 9'1 Kg/pit.

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 8'2 m. × 6'4 m. (b) 7·3 m. × 5'5 m. (v) 46 cm. × 46 cm. (iv) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961—only. (b) and (c) Nil. (v) to (vii) Nil.
5. RESULTS:
(i) 1287 Kg/ha. (ii) 300.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
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<td>1028</td>
<td>1483</td>
<td>1296</td>
<td>1512</td>
<td>1254</td>
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<tr>
<td></td>
<td>999</td>
<td>1350</td>
<td></td>
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</table>

Crop: Paddy (Rabi).  
Ref: K. 62(28).  
Type: 'M'.

Object: To study the effect of different phosphatic fertilizers on Paddy in Thottapahy area.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 112 Kg/ha. of Hyper Phos.+84 Kg/ha. of C/A/N as top dressing. (ii) Clayey soil. (iii) 1.12.1962. (iv) (a) 2 ploughings. (b) Transplanting. (c) N.A. (d) 23 cm. x 15 cm. (e) 2. (v) 22.4 Kg/ha. of N as Urea as top dressing. (vi) T—9. Improved (short duration). (vii) Irrigated. (viii) Weeding and thinning. (ix) 15 cm. (x) 22.2.1963.

2. TREATMENTS:
5 manurial treatments: 
M₀=Control, M₁=218 Kg/ha. of Lime as CaO, M₂=218 Kg/ha. of Super, M₃=437 Kg/ha. of Super Lime Mixture in 1 : 1 ratio and M₄=M₁+M₂.

Manures broadcast one day before sowing. 44.8 Kg/ha. of P₂O₅ is supplied by the phosphatic fertilizers.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 10.1 m. x 6.4 m. (b) 9.1 m. x 5.5 m. (v) 0.5 m. x 0.5 m. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Folidol and Copper fungicides were sprayed. (iii) Yield of grain. (iv) (a) 1962—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 2184 Kg/ha. (ii) 265.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
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<td>2242</td>
<td>2083</td>
<td>2223</td>
<td>2148</td>
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Crop: Paddy (Rabi).  
Ref: K. 60(81), 61(75), 62(30).  
Type: 'M'.

Object: To select the best form of lime and its economic dose for Paddy.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Paddy. (c) 22.4 Kg/ha. of N as A/S+44.8 Kg/ha. of P₂O₅ as Super+22.4 Kg/ha. of K₂O as Mur. Pot. (ii) Sandy clay—very dark. (iii) 29.11.1960; 12.10.61; 5.12.62. (iv) (a) 3 ploughings. (b) Transplanting. (c) N.A. (d) 23 cm. x 15 cm. (e) 2. (v) 280 Kg/ha. of Super+89.7 Kg/ha. of Mur. Pot. broadcast as basal dressing and 134 Kg/ha. of A/S as top dressing one week after planting. (vi) PTB—10 (Kenjathikkham) early. (vii) Irrigated. (viii) 3 weeding. (ix) N.A. (x) 15.2.1961; 4.1.62; 11.2.63.
2. TREATMENTS:

7 manurial treatments: 
- M₀ = Control, M₁ = 1121 Kg/ha. of fully burnt Lime (CaO),
- M₂ = 1681 Kg/ha. of half burnt Lime (CaO+CaCO₃),
- M₃ = 2242 Kg/ha. of unburnt Lime (CaCO₃),
- M₄ = 2242 Kg/ha. of fully burnt Lime (CaO),
- M₅ = 2242 Kg/ha. of half burnt Lime (CaO+CaCO₃) and
- M₆ = 4483 Kg/ha. of unburnt Lime (CaCO₃).

Lime in powdered form was applied to the soil as basal dressing.

3. DESIGN:

(i) R.B.D. (ii) 7, (iii) 64.0 m. x 9.1 m. (iv) 9.1 m. x 9.1 m. (b) 9.0 m. x 9.0 m. (v) 6 cm. x 6 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) BHC 1% sprayed at 16.8 Kg/ha. as preventive measure against blast. (iii) Yield of grain (iv) (a) 1961–62 (residual effects studied in 1961–62). (b) Yes. (c) Results of combined analysis are presented under 5. Results. (v) Karapudom and Parakand. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x years interaction is present.

5. RESULTS:

(i) 2676 Kg/ha. (ii) 267.9 Kg/ha. (based on 12 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
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<td>1941</td>
<td>1958</td>
<td>1958</td>
<td>2042</td>
<td>2021</td>
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**Crop:** Paddy (Rabi).  
**Site:** Agri. College and Res. Inst., Vellayani.  
**Ref:** K. 62(32).  
**Type:** ‘M’.

Object: To find out whether Magnesium Salt Manure in combination with Super Phosphate can increase the yield of Paddy in Vellayani Kayalava.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) Nil. (ii) Clavey soil. (iii) 9.3.1962/N.A. (iv) (a) 2 diggings and levellings. (b) Transplanting. (c) N.A. (d) 23 cm. x 15 cm. (e) 28 Kg/ha. of K₂O as Mur. Pot. broadcasted one day before planting. (f) Kochuithu (early). (g) Irrigated. (h) 1 hoeing with Japanese hoe and 1 weeding. (i) 56 cm. (j) 8.5.1962.

2. TREATMENTS:

4 manurial treatments:
- M₀ = Control, M₁ = 22.4 Kg/ha. of N as Urea+22.4 Kg/ha. of P₂O₅ as Super+44.8 Kg/ha. of K₂O as Mur. Pot., M₃ = M₁+106 Kg/ha. of Magnesium Salt and M₅ = M₁+106 Kg/ha. of Dolomite.

Urea applied as top dressing 18 days after transplanting and other manures applied as basal dressing before transplanting.

3. DESIGN:

(i) R.B.D. (ii) 4. (b) 20.4 m. x 4.0 m. (iii) 4. (iv) (a) 5.1 m. x 5.2 m. (b) 4.6 m. x 4.6 m. (v) 30 cm. x 30 cm. (vi) Yes.

4. GENERAL:

(i) Poor. (ii) Slight attack of stem borer. Endrin was sprayed. (iii) Yield of grain and straw. (iv) (a) 1961–63. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:

(i) 834 Kg/ha. (ii) 173.5 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.
Crop :- Paddy (Punja).


Object :- To study the effect of different phosphatic fertilizers on Paddy in upper Vellayani Kayal area.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) Nil. (ii) Clay soil. (iii) 15.3.1961. (iv) (a) Diggings with mammathy. (b) Transplanting. (c) N.A. (d) 23 cm. x 15 cm. (e) 2. (v) Nil. (vi) Cochuvithu (short duration). (vii) Unirrigated. (viii) 2 weedings. (ix) 25 cm. (x) 20.5.1961.

2. TREATMENTS:

7 manural treatments: M₁ = 46 Kg/ha. of Mur. Pot., M₂ = M₁ + 231 Kg/ha. of Super, M₃ = M₁ + 231 Kg/ha. of Lime as CaO, M₄ = 35 Kg/ha. of Mur. Pot. + 461 Kg/ha. of Super Ash Mixture in 1:1 ratio, M₅ = M₁ + 461 Kg/ha. of Super Lime Mixture in 1 ratio, M₆ = M₁ + 161 Kg/ha. of Super Rock Mixture in 1:1 ratio and M₇ = M₁ + 123 Kg/ha. Hyper Phosphate.

Manures broadcast as basal dressing one day before transplanting.

3. DESIGN:

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 6. (iv) (a) 7-0 m. x 7-0 m. (b) 6-4 m. x 6-4 m. (v) 30 cm. x 30 cm. (vi) Yes.

4. GENERAL:

(i) Healthy. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961–62. (b) and (c) N.A. (v) Lower Vellayani Kayal area. (vi) and (vii) Nil.

5. RESULTS:

(i) 1295 Kg/ha. (ii) 227·3 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
<th>M₇</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>879</td>
<td>1502</td>
<td>915</td>
<td>1415</td>
<td>1683</td>
<td>1393</td>
<td>1276</td>
</tr>
</tbody>
</table>

C.D. = 267·9 Kg/ha.
2. TREATMENTS:

8 manurial treatments: $M_0=$ Control, $M_1=231$ Kg/ha. of Super, $M_2=231$ Kg/ha. of Lime as CaO, $M_3=461$ Kg/ha. of Super Lime Mixture in 1 : 1 ratio, $M_4=461$ Kg/ha. of Super Ash Mixture in 1 : 1 ratio, $M_5=123$ Kg/ha. of Rock Phos., $M_6=185$ Kg/ha. of B.M., and $M_7=162$ Kg/ha. of Super Rock Mixture in 1 : 1 ratio.

Manures broadcast one day before sowing. 44.8 Kg/ha. of $P_2O_5$ is supplied by phosphatic fertilizers.

3. DESIGN:

(i) R.B.D. (ii) 8. (b) 28.0 m.×15.2 m. (iii) 6. (iv) (a) 7.0 m.×7.0 m. (b) 6.4 m.×6.4 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL:

(i) Poor and crop lodged in few plots in 1st week of December in 61(73); Good but crop lodged in mid. December for 62(29). (ii) A prophylactic spraying of copper fungicide was given along with Endrin 15 days after sowing for 61(73); Stem borer attack observed in 62(29), copper fungicide was sprayed. (iii) Yield of grain. (iv) (a) 1961—62. (b) Yes. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and interaction is present.

5. RESULTS:

(i) 1293 Kg/ha. (ii) 625 Kg/ha. (based on 7 d.f. made up of treatments×years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$M_0$</th>
<th>$M_1$</th>
<th>$M_2$</th>
<th>$M_3$</th>
<th>$M_4$</th>
<th>$M_5$</th>
<th>$M_6$</th>
<th>$M_7$</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1107</td>
<td>1356</td>
<td>1117</td>
<td>1453</td>
<td>1456</td>
<td>1319</td>
<td>1353</td>
<td>1185</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Rahi).

Ref :- K. 61(72), 62(42).

Site :- Agri. College and Res. Instt., Vellayani.

Type :- 'M'.

Object :-To study the effect of different phosphatic fertilizers on Paddy in Vadayar—Vaikom area.

1. BASAL CONDITIONS:

(i) (a) Paddy—Paddy. (b) Paddy. (c) 224 Kg/ha. of Paddy Mixture for 61(72); As per treatments+22.4 Kg/ha. of each of K,O and N as Mur. Pot. and A/S respectively. (ii) Clayey soil. (iii) 2.10.1961/N.A.; 1.10.1962/N.A. (iv) (a) 2 ploughings. (b) Transplanting. (c) N.A. (d) 23 cm.×15 cm. (e) 2. (v) 22.4 Kg/ha. of K,O as Mur. Pot. broadcasted before sowing+22.4 Kg/ha. of N as A/S as top dressing. (vi) Kochathikkira (short duration). (vii) Irrigated. (viii) 1 weeding for 61(72); weeding, thinning and filling up of gaps for others. (ix) 40 cm.; 20 cm. (x) 6.1.1962; 6.1.1963.

2. TREATMENTS:

8 manurial treatments: $M_0=$ Control, $M_1=231$ Kg/ha. of Super, $M_2=231$ Kg/ha. of Lime as CaO, $M_3=461$ Kg/ha. of Super Lime Mixture in 1 : 1 ratio, $M_4=461$ Kg/ha. of Super Ash Mixture in 1 : 1 ratio, $M_5=123$ Kg/ha. of Rock Phos., $M_6=185$ Kg/ha. of B.M., and $M_7=162$ Kg/ha. of Super Rock Mixture in 1 : 1 ratio.

Manures broadcast one day before sowing. 44.8 Kg/ha. of $P_2O_5$ is supplied by the phosphatic fertilizers.

3. DESIGN:

(i) R.B.D. (ii) 8. (b) 28.0 m.×15.2 m. (iii) 6. (iv) (a) 7.0 m.×6.4 m. (b) 6.4 m.×6.4 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL:

(i) Good but crop lodged in mid. of December for 61(72); Not satisfactory for others. (ii) Blast attack observed for 61(72) but Endrin and copper fungicide were given to both as a preventive measure. (iii) Yield of grain. (iv) (a) 1961—62. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) Since the error variances are heterogeneous and Treatments×years interaction is absent, results of individual years are presented under 5. Results.
5. **RESULTS**:

61(72)

(i) 2682 Kg/ha. (ii) 2512 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
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<tr>
<td>Av. yield</td>
<td>2354</td>
<td>2683</td>
<td>2737</td>
<td>2788</td>
<td>2802</td>
<td>2690</td>
<td>2760</td>
<td>2639</td>
</tr>
</tbody>
</table>

62(42)

(i) 2212 Kg/ha. (ii) 464.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
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<tr>
<td>Av. yield</td>
<td>2198</td>
<td>2345</td>
<td>1740</td>
<td>2313</td>
<td>2157</td>
<td>2478</td>
<td>2298</td>
<td>2167</td>
</tr>
</tbody>
</table>

**Crop**: Paddy (Rabi)

**Ref**: K. 61(65).

**Site**: Agri. College and Res. Instt., Vellayani.

**Type**: ‘M’.

Object:—To study the effect of different phosphatic fertilizers on Paddy in lower Vellayani Kayal area.

1. **BASAL CONDITIONS**:


2. **TREATMENTS**:

   7 manurial treatments: M₁ = 46 Kg/ha. of Mur. Pot., M₄ = M₁ + 231 Kg/ha. of Super, M₃ = M₁ + 231 Kg/ha. of Lime as CaO, M₄ = M₃ + 461 Kg/ha. of Super Ash Mixture in 1:1 ratio, M₅ = M₄ + 461 Kg/ha. of Super Lime Mixture in 1:1 ratio, M₆ = M₅ + 161 Kg/ha. of Super Rock Mixture in 1:1 ratio and M₇ = M₆ + 123 Kg/ha. of Hyper Phosphate.

Manures broadcast as basal dressing one day before transplanting.

3. **DESIGN**:

   (i) R.B.D. (ii) 7. (iii) 6. (iv) 7-0 m. x 7-0 m. (v) 6-4 m. x 6-4 m. (vi) 30 cm. x 30 cm. (vii) Yes.

4. **GENERAL**:

   (i) Healthy. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1959 to 62. (b) Yes. (c) Nil. (v) Upper Vellayani Kayal area. (vi) and (vii) N.A.

5. **RESULTS**:

   (i) 2369 Kg/ha. (ii) 2232 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
<th>M₇</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1865</td>
<td>2527</td>
<td>1771</td>
<td>3160</td>
<td>2389</td>
<td>2697</td>
<td>2177</td>
</tr>
</tbody>
</table>

C.D. = 263.1 Kg/ha.
Crop: Paddy (Rahi).
Ref.: K. 60(82), 61(74), 62(31).
Object: —To select the best form of lime and its economic dose for Paddy.

1. BASAL CONDITIONS:
   (i) (a) N.A. for 60(82); Paddy—Paddy for others. (b) Paddy. (c) 22·4 Kg/ha. of N as A/S + 44·8 Kg/ha. of P₂O₅ as Super + 22·4 Kg/ha. of K₂O as Mur. Pot. for 60(82); As per treatments + 280 Kg/ha. of Super + 89·7 Kg/ha. of Mur. Pot. + 134 Kg/ha. of A/S for others. (ii) Clayey dark grey. (iii) 1.12.60 ; 16.11.1961 ; Nov. 62. (iv) (a) 3 ploughings and levellings. (b) Transplanting. (c) N.A. (d) 23 cm. x 15 cm. (e) 2. (v) 280 Kg/ha. of Super + 89·7 Kg/ha. of Mur. Pot. broadcast + 134 Kg/ha. of A/S as top dressing after a week of planting for 60(82) and 62(31); 280 Kg/ha. of Super + 44·8 Kg/ha. of Mur. Pot. broadcast as basal dressing + 134 Kg/ha. of A/S as top dressing 10 days after planting for 61(74). (vi) PTB—10 (early). (vii) Irrigated. (viii) 3 to 4 weedings. (ix) N.A. (x) 12.2.1961 ; 6.2.1962 ; Feb. 1963.

2. TREATMENTS:
   7 manurial treatments: M₀=Control, M₁=1121 Kg/ha. of fully burnt Lime (CaO), M₂=1681 Kg/ha. of half burnt Lime (CaO+CaCO₃); M₃=2242 Kg/ha. of unburnt Lime (CaCO₃); M₄=2242 Kg/ha. of fully burnt Lime (CaO); M₅=3363 Kg/ha. of burnt Lime (CaO+CaCO₃) and M₆=448·3 Kg/ha. of unburnt Lime (CaCO₃). Lime in powdered form was applied to the soil as basal dressing for 60(82). Lime applied to the previous crop for 61(74). Lime applied to previous crop during 1960 and second residual effect is studied on present Paddy crop for 62(31).

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) 64·0 m. x 9·1 m. (iii) 4. (iv) (a) 9·1 m. x 9·1 m. (b) 9·0 m. x 9·0 m. (v) Nil. (vi) —.

4. GENERAL:
   (i) Good. (ii) Endrex sprayed as a preventive measure against swarming caterpillar attack. (iii) Yield of grain. (iv) (a) 1960 only (Residual effects studied in 1961 and 1962). (b) Yes. (v) Karapadom and Purkad. (vi) Nil. (vii) Kasapodon.

5. RESULTS:
   60(82)
   (i) 3415 Kg/ha. (ii) 148·3 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.
   Treatment  M₀  M₁  M₂  M₃  M₄  M₅  M₆  Av. yield 2802 4098 3447 2935 4094 3615 2914 C.D.=220·3 Kg/ha.
   61(74)
   (i) 3104 Kg/ha. (ii) 65·6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.
   Treatment  M₀  M₁  M₂  M₃  M₄  M₅  M₆  Av. yield 3054 3180 3068 3026 3166 3124 3110 C.D.=82·6 Kg/ha.
   62(31)
   (i) 3006 Kg/ha. (ii) 64·3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
   Treatment  M₀  M₁  M₂  M₃  M₄  M₅  M₆  Av. yield 2648 2956 2879 2963 3236 3110 3250.
Crop :- Paddy (Rabi).
Site :- Agri. College and Res. Instt., Vellayani.
Object :- To study the effect of different types of green leaves and dry leaves on Paddy.

1. BASAL CONDITIONS:
   (i) Nil.  (b) Paddy.  (c) N.A.  (ii) Sandy loam.  (iii) 22.10.60.  (iv) (a) 6 ploughings with Cooper plough and 2 diggings with mammathy.  (b) Transplanting.  (c) N.A.  (d) 23 cm. x 15 cm.  (e) 2.  (v) 492 Kg/ha. of Super Lime Mixture + 79 Kg/ha. of Mur. Pot. broadcast one day before planting.  (vi) Cochin—1 (Late).  (vii) Unirrigated.  (viii) 1 weeding.  (ix) 87 cm.  (x) 28.1.61.

2. TREATMENTS:
   All combinations of (1) and (3) + a control
   (1) 2 types of leaves: L1 = Green leaves at 4920 Kg/ha. and L2 = Dry leaves at 1230 Kg/ha.
   (2) 3 sources of leaves: S1 = Glyricidia, S2 = Indigofera Tyssemia and S3 = Eupatorium Odoratum.
   The percentage of moisture in green leaves was 75% and hence 1230 Kg/ha. of dry leaves are equivalent to 4920 Kg/ha. of green leaves. Treatments applied as basal dressing just before the last digging.

3. DESIGN:
   (i) R.B.D.  (ii) 7.  (b) 40·2 m. x 35·1 m.  (iii) 4.  (iv) (a) 4·9 m. x 9·5 m.  (b) 4·6 m. x 9·4 m.  (v) 30 cm. x 30 cm.  (vi) Yes.

4. GENERAL:
   (i) Poor.  (ii) Severe affect by Spodoptera.  (iii) Yield of grain.  (iv) (a) 1959-62.  (b) N.A.  (v) to (vii) N.A.

5. RESULTS:
   (i) 524 Kg/ha.  (ii) 155'1 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>526</td>
<td>651</td>
<td>550</td>
<td>576</td>
</tr>
<tr>
<td>L2</td>
<td>414</td>
<td>607</td>
<td>475</td>
<td>499</td>
</tr>
<tr>
<td>Mean</td>
<td>470</td>
<td>629</td>
<td>513</td>
<td>537</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).
Object :- To study the effect of different fertilizers on Paddy in lower Vellayani Kayal area.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy.  (b) Paddy.  (c) As per treatments.  (ii) Clayey soil.  (iii) 6.3.62/N.A.  (iv) (a) 2 diggings and levellings.  (b) Transplanting.  (c) N.A.  (d) 23 cm. x 15 cm.  (e) 2.  (v) 22'4 Kg/ha. of N as Urea + 22'4 Kg/ha. of K2O as Mur. Pot.  (vi) Kochuvithu (early).  (vii) Irrigated.  (viii) Hoeing by Japanese hoe and 1 weeding.  (ix) 56 cm.  (x) 7.5.62.

2. TREATMENTS:
   7 manurial treatments: M0 = Control, M1 = 231 Kg/ha. of Super, M2 = 231 K2O/ha. of Lime as Cao, M3 = 461 Kg/ha. of Super Ash Mixture in 1 : 1 ratio, M4 = 461 Kg/ha. of Super Lime Mixture in 1 : 1 ratio, M5 = 461 Kg/ha. of Super Dolomite Mixture in 1 : 1 ratio, and M6 = 231 K2O/ha. of Dolomite.
   Manures broadcast as basal dressing before transplanting.
3. DESIGN:
(i) R.B.D. (ii) 7. (b) N.A. (iii) 6. (iv) (a) 7.0 m. x 7.0 m. (b) 6.4 m. x 6.4 m (v) 30 cm. x 30 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. Crop lodged on 27.4.62. (ii) Slight attack of stem borer was noticed but controlled by spraying Endrin. (iii) Yield of grain. (iv) (a) 1959—1962. (Expt. failed in 1959). (b) Yes. (c) Nil. (v) Upper Vellayani Kayal area (vi) and (vii) Nil.

5. RESULTS:
(i) 1584 Kg/ha. (ii) 229·1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. Yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. Yield</td>
<td>1046</td>
<td>1905</td>
<td>934</td>
<td>2111</td>
<td>1915</td>
<td>1905</td>
<td>1270</td>
</tr>
</tbody>
</table>

CD = 270·1 Kg/ha.

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Crop: Paddy (Kharij).
Object: To study the effect of different phosphatic fertilizers on Paddy in upper Vellayani Kayal area.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Paddy. (c) Nil. (ii) Clayey soil. (iii) 1.3.62. (iv) (a) 2 diggings and levellings. (b) Transplanting. (c) N.A. (d) 23 cm. x 15 cm. (e) 2. (v) 22·4 Kg/ha. of K₂O as Mur. Pot. + 22·4 Kg/ha. of N as Urea. (vi) Kochuvithu (early). (vii) Irrigated. (viii) Hoing by Japanese hoe and 1 weeding. (ix) 56 cm. (x) 8.5.62.

2. TREATMENTS:
7 manurial treatments: M₀ = Control. M₁ = 211 Kg/ha. of Super. M₂ = 188 Kg/ha. of Super+B.M. Mixture in 1:1 ratio, M₃ = 422 Kg/ha. of Super Lime Mixture in 1:1 ratio, M₄ = 422 Kg/ha. of Super Ash Mixture in 1:1 ratio, M₅ = 211 Kg/ha. of Ash and M₆ = 211 Kg/ha. of Lime.
Treatments applied as basal dressing one day before transplanting.

3. DESIGN:
(i) R.B.D. (ii) 7. (b) N.A. (iii) 4. (iv) (a) 5·2 m. x 5·2 m. (b) 4·6 m. x 4·6. (v) 30 cm. x 30 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) There was a slight attack of stem borer and Endrin was sprayed. (iii) Yield of grain. (iv) (a) 1961—1962. (b) No. (c) Nil. (v) Lower Kayal area of Vellayani. (vi) and (vii) Nil.

5. RESULTS:
(i) 925 Kg/ha. (ii) 283·8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>673</td>
<td>1009</td>
<td>1009</td>
<td>1149</td>
<td>1289</td>
<td>532</td>
<td>813</td>
</tr>
</tbody>
</table>

C.D. = 421·6 Kg/ha.
Crop: Paddy (Kharif)
Site: Agri. College and Res. Instt., Vellayani
Object: To study the effect of different phosphatic fertilizers on Paddy in Thottapatty area.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) Clayey soil. (iii) 11.2.62/N.A. (iv) (a) 2 ploughings. (b) Transplanting. (c) N.A. (d) 23 cm. x 15 cm. (e) 2. (v) 22.4 Kg/ha. of K2O as Mur. Pot. broadcast one day before sowing + 22.4 Kg/ha. of N as Urea top dressing. (vi) T. = 9, improved (short duration). (vii) Irrigated. (viii) Weeding and thinning. (ix) 15 cm. (x) 22.2.63.

2. TREATMENTS:
   8 manurial treatments: M0 = Control, M1 = 218 Kg/ha. of Super, M2 = 218 Kg/ha. of Lime as CaO, M3 = 437 Kg/ha. of Super Lime Mixture in 1:1 ratio, M4 = 116 Kg/ha. of Rock Phos., M5 = 141 Kg/ha. of B.M. and M6 = 152 Kg/ha. of Super Rock Mixture in 1:1 ratio.
   Manures broadcast one day before sowing. 44.8 Kg/ha. of P2O5 is supplied by the phosphatic fertilizers.

3. DESIGN:
   (a) R.B.D. (b) 8. (c) N.A. (d) 4. (e) (a) 10'1 m × 6'4 m. (b) 9'1 m × 5'5 m. (f) 46 cm. × 46 cm. (g) Yes.

4. GENERAL:
   (i) Good. (ii) Two sprayings of folidol were given against stemborer attack. Copper fungicide was sprayed at the earhead stage to prevent the attack of blast. (iii) Yield of grain. (iv) (a) 1962 only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 2349 Kg/ha. (ii) 226.3 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.
   Treatment
   M0 M1 M2 M3 M4 M5 M6
   Av. yield 2298 2298 2314 2354 2634 2578 2458
   C.D. = 332.8 Kg/ha.

Crop: Paddy (Rabi).
Site: Agri. College and Res. Instt., Vellayani
Object: To compare the performance of Eupatorium manure with N, P and K fertilizers for Paddy in Vellayani Kayal area.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) Clayey soil. (iii) 28.2.62. (iv) (a) Digging and levelling. (b) Transplanting. (c) N.A. (d) 23 cm. × 15 cm. (e) 2. (v) Nil. (vi) Kochuvithu (early). (vii) Irrigated. (viii) Hoeing with Japanese hoe and 1 weeding. (ix) 56 cm. (x) 7.5. 62.

2. TREATMENTS:
   3 manurial treatments: M0 = Control, M1 = 22.4 Kg/ha. of N as Urea + 22.4 Kg/ha. of P2O5 as Super + 44.8 Kg/ha. of K2O as Mur. Pot. and M3 = Eupatorium manure processed in the laboratory giving quantities of N, P and K as in M1.
   Manures applied as broadcast one day before transplanting.

3. DESIGN:
   (i) R.B.D. (ii) 3. (b) 17.7 m. × 5.5 m. (iii) 4. (iv) (a) 5'2 m. × 5'2 m. (b) 4'6 m. × 4'6 m. (v) 30 cm. × 30 cm. (vi) Yes.
4. GENERAL:
(i) Poor. (ii) Slight attack of stem borer which was controlled by spraying Endrin. (iii) Yield of grain. (iv) (a) 1962 only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 1117 Kg/ha. (ii) 201.3 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

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Crop :- Paddy (Kharif).
Site :- M.A.E. Centre, Karamanai.
Ref :- K. 60 to 63 (M.A.E.).
Type :- 'M'.

Object :- Type II : To find out the direct, residual and cumulative effect of manures on Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Laterite. (iii) 2.6.60/3.7.60; 29.5.61/27.6.61; 6.5.62/5.6.62; 52.4.63/23.5.63. (iv) (a) 2 to 5 ploughings, 2 diggings and levellings. (b) Transplanting. (c) 36 Kg/ha. (d) 23 cm. x 23 cm. (e) N.A. (v) 56.0 Kg/ha. of F.Y.M. for 60 (M.A.E.) Nil for other years. (vi) P.T.B.-26 for 60. P.T.B.—9 for other years. (vii) Irrigated for 60 to 62. Unirrigated for 63. (viii) 1 to 2 weedings. (ix) 163 cm.; 196 cm.; 118 cm. N.A. (x) 4.9.60 to 4.10.60; 11.10.61; 18.9.62; 4.9.63

2. TREATMENTS:
All combinations of (1), (2), (3), and (4)
(1) 3 levels of N as A/S : N₀ = 0, N₁ = 33.6 and N₂ = 67.3 Kg/ha.
(2) 3 levels of P₂O₅ as Super : P₀ = 0, P₁ = 33.6 and P₂ = 67.3 Kg/ha.
(3) 3 levels of K₂O as Mur. Pot. : K₀ = 0, K₁ = 33.6 and K₂ = 67.3 Kg/ha.
(4) 3 levels of F.Y.M : M₀ = 0, M₁ = 5600 and M₂ = 11200 Kg/ha.
P₂O₅, K₂O and F.Y.M. broadcast before planting. N top dressed by broadcast.

3. DESIGN:
(i) 3⁴ confd. (ii) 9 plots/block ; 9 blocks/repllication. (b) N.A. (iii) 1. (iv) (a) 9'1 m. x 4'5 m. (b) 9'0 m. x 4'5 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—contd. (b) Yes. (c) Nil. (v) and (vi) N.A. (vii) Expt. for 1964 and onwards are N.A.

5. RESULTS:
1960

Cumulative Phase
(i) 2229 Kg/ha. (ii) 469.0 Kg/ha. (iii) Main effects of N, P and M are highly significant. Interaction M x N is significant. (iv) Av. yield of grain in Kg/ha.
### 1960

**Residual Phase**

- (i) 1674 Kg/ha.
- (ii) 486.8 Kg/ha.
- (iii) Main effect of N is highly significant. Main effect of P is significant.
- (iv) Av. yield of grain in Kg/ha.

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C.D. for N or P marginal means = 281.0 Kg/ha.

### 1960

**Direct Phase**

- (i) 2117 Kg/ha.
- (ii) 461.0 Kg/ha.
- (iii) Main effects of N and M and interaction M x K are highly significant. Main effect of P and interaction M x N are significant.
- (iv) Av. yield of grain in Kg/ha.

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C.D. for N or P marginal means = 270.8 Kg/ha.

C.D. for the body of M x N table = 469.0 Kg/ha.
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C.D. for N, P or M marginal means = 266.0 Kg/ha.

C.D. for the body of M × K or M × N tables = 461.0 Kg/ha.

1961

Direct Phase

(i) 1902 Kg/ha. (ii) 218.8 Kg/ha. (iii) Main effects of N, P and interaction N × P are highly significant. Main effect of M and interaction P × K are significant. (iv) Av. yield of grain in Kg/ha.

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<th>N₂</th>
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C.D. for N, P or M marginal means = 126.3 Kg/ha.

C.D. for the body of N × P or P × K tables = 218.8 Kg/ha.

1961

Residual Phase

(i) 1424 Kg/ha. (ii) 311.1 Kg/ha. (iii) Main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.
C.D. for N marginal means = 179.6 Kg/ha.

Cumulative Phase

(i) 1925 Kg/ha. (ii) 189.5 Kg/ha. (iii) Main effects of N, P and interaction N x P are highly significant. Main effect of M is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N, P or M marginal means = 109.4 Kg/ha.

C.D. for the body of N x P table = 189.5 Kg/ha.

Cumulative Phase

(i) 2006 Kg/ha. (ii) 306.4 Kg/ha. (iii) Main effects of N and P alone are highly significant. (iv) Av. yield of grain in Kg/ha.
### 1962

**Residual Phase**

(i) 1616 Kg/ha. (ii) 438.2 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N marginal means = 253.0 Kg/ha.

### 1962

**Direct Phase**

(i) 2009 Kg/ha. (ii) 370.5 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N marginal means = 176.9 Kg/ha.

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C.D. for N or P marginal means = 176.9 Kg/ha.

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### Additional Text

- Residual Phase
  - (i) 1616 Kg/ha, (ii) 438.2 Kg/ha, (iii) Main effect of N alone is highly significant, (iv) Avg. yield of grain in Kg/ha.
  - C.D. for N marginal means = 253.0 Kg/ha.

- Direct Phase
  - (i) 2009 Kg/ha, (ii) 370.5 Kg/ha, (iii) Main effects of N and P are highly significant, (iv) Avg. yield of grain in Kg/ha.
  - C.D. for N marginal means = 176.9 Kg/ha.
### Cumulative Phase

(i) 1784 Kg/ha.  
(ii) 496.3 Kg/ha.  
(iii) Main effect of N is highly significant and main effect of M is significant.  
(iv) Av. yield of grain in Kg/ha.

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C.D. for N or P marginal means = 213.9 Kg/ha.

### Residual Phase

(i) 1383 Kg/ha.  
(ii) 441.7 Kg/ha.  
(iii) None of the effects is significant.  
(iv) Av. yield of grain in Kg/ha.

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C.D. for N or M marginal means = 386.5 Kg/ha.
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**1963**

**Direct Phase**

(i) 1752 Kg/ha. (ii) 392.4 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N or P marginal means = 226.5 Kg/ha.
**Crop:** Paddy (*Rabi*).  
**Site:** M.A.E. Centre, Karamanai.  
**Ref:** K. 60 to 63 (M.A.E.).  
**Tyre:** ‘M’.

Object:—Type II: To find out the direct, residual and cumulative effect of manures on Paddy.

### 1. BASAL CONDITIONS:

- **(i)** (a) Paddy—Paddy.  
  (b) Paddy.  
  (c) As per treatments.  
- **(ii)** Laterite.  
- **(iv)** (a) 4 ploughings and 2 diggings.  
  (b) Transplanting.  
- **(v)** (c) 36 Kg/ha.  
  (d) 23 cm. x 23 cm.  
- **(e)** N.A.  
  (f) 56 Q/ha. of F.Y. M. for 60; Nil for other years.  
  (g) PTB-12 for 60; PTB-4 for other years.  
  (h) Irrigated.  
  (i) 2 weedings.  
  (j) N.A.; 40 em.; 107 em.; 38 em.  
- **(x)** 4.1.1961; 8.2.62; 6.2.63; 19.2.64.

### 2. TREATMENTS and 3. DESIGN:

Same as in expt. No 60 (M.A.E.) on page 98.

### 4. GENERAL:

- **(i)** Satisfactory.  
- **(ii)** Nil.  
- **(iii)** Yield of grain.  
- **(iv)** (a) 1958—contd.  
  (b) Yes.  
  (c) N.A.  
- **(v)** (a) N.A.  
  (b) Nil.  
- **(vi)** Dry weather affected the crop in 1961.  
- **(vii)** Nil.

### 5. RESULTS:

#### 1960

**Cumulative Phase**

- **(i)** 2220 Kg/ha.  
- **(ii)** 302.8 Kg/ha.  
- **(iii)** Main effects of N, P, K, and interaction N x P are highly significant.  
- **(iv)** Main effect of M is significant.

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C.D. for N, P, K or M marginal means = 174.8 Kg/ha.

C.D. for the body of N x P table = 302.8 Kg/ha.

### 1960

**Residual Phase**

- **(i)** 1978 Kg/ha.  
- **(ii)** 228.8 Kg/ha.  
- **(iii)** Main effects of N, P, K and M and interactions N x P and N x K are highly significant.  
- **(iv)** Av. yield of grain in Kg/ha.
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C.D. for N, P, K or M marginal means = 130.9 Kg/ha.

C.D. for the body of N x P or N x K table = 226.8 Kg/ha.

1960

Direct Phase
(i) 2206 Kg/ha.  (ii) 300.0 Kg/ha.  (iii) Main effects of N, P, K and interaction N x P are highly significant. Main effect of M is significant.  (iv) Av. yield of grain in Kg/ha.

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C.D. for N, P, K or M marginal means = 173.2 Kg/ha.

C.D. for the body of N x P table = 300.0 Kg/ha.

1961

Cumulative Phase
(i) 2016 Kg/ha.  (ii) 388.5 Kg/ha.  (iii) Main effect of N is highly significant. Main effect of P is significant.  (iv) Av. yield of grain in Kg/ha.
107

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K_o | 1162| 2057| 2887| 1983| 2038| 2094| 1972| 1946| 2178| 2125 |
K_1 | 1365| 1908| 2823| 1725| 2195| 2120| 1171| 1808| 2823| 1872 |
K_2 | 1244| 2027| 2769| 1244| 2027| 2769| 1244| 2027| 2769| 1244 |

P_o | 1171| 1762| 2647| 1174| 1909| 2761| 1909| 2011| 2729| 2761 |
P_1 | 1245| 2093| 2841| 1171| 1808| 2823| 1171| 1808| 2823| 1244 |
P_2 | 1355| 2037| 2900| 1245| 2027| 2769| 1245| 2027| 2769| 1245 |

C.D. for N or P marginal means = 224.3 Kg/ha.

1961

Direct Phase

(i) 1948 Kg/ha. (ii) 249.9 Kg/ha. (iii) Main effect of N is highly significant. Main effect of P and interaction N x P are significant. (iv) Av. yield of grain in Kg/ha.

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K_1 | 1171| 1891| 2674| 1743| 1945| 2048| 2204| 1974| 2269| 2149 |
K_2 | 1106| 1825| 2880| 1779| 2085| 1947| 1872| 1946| 2178| 2125 |

C.D. for N or P marginal means = 144.3 Kg/ha.
C.D. for the body of N x P table = 249.9 Kg/ha.

1961

Residual Phase

(i) 1341 Kg/ha. (ii) 349.5 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.
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C.D. for N marginal means = 201.9 Kg/ha.

1962

Cumulative Phase

(i) 1936 Kg/ha.  (ii) 206.9 Kg/ha.  (iii) Main effects of N, P and interaction M × K are highly significant. Main effect of M is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N, P or M marginal means = 119.4 Kg/ha.

C.D. for the body of M × K table = 206.9 Kg/ha.

1962

Direct Phase

(i) 1515 Kg/ha.  (ii) 254.8 Kg/ha. (iii) Main effect of N is highly significant. Interaction N × K is significant. (iv) Av. yield of grain in Kg/ha.
109

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C.D. for N marginal means = 147·1 Kg/ha.
C.D. for the body of N x K table = 254·8 Kg/ha.

1962.

Residual Phase

(i) 1910 Kg/ha. (ii) 207·4 Kg/ha. (iii) Main effects of N, P and K are highly significant. Interaction M x K is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N, P or K marginal means = 119·7 Kg/ha.
C.D. for the body of M x K table = 207·4 Kg/ha.

1963

Cumulative Phase

(i) 1325 Kg/ha. (ii) 278·6 Kg/ha. (iii) Main effects of M, N and P are highly significant. Interactions M x K and P x K are significant. (iv) Av. yield of grain in Kg/ha.
### 1963

#### Direct Phase

(i) 1255 Kgf/ha.  
(ii) 161'4 Kgf/ha.  
(iii) Main effects of N and P and interactions M×K and P×K are highly significant. Main effect of M is significant.  
(iv) Av. yield of grain in Kgf/ha.

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C.D. for N, P or M marginal means = 160'8 Kg/ha.  
C.D. for the body of M×K or P×K table = 278'6 Kg/ha.

#### Residual Phase

(i) 1083 Kgf/ha.  
(ii) 408'8 Kgf/ha.  
(iii) None of the effects is significant.  
(iv) Av. yield of grain in Kg/ha.
Crop: Paddy (Rabi).  
Site: M.A.E. Centre, Karamanai.  
Ref: K. 62, 63(M.A.E.).  
Type: 'M'.

Object: To study the effect of methods of application of N on Paddy.

1. BASAL CONDITIONS:
   (iv) 3 ploughings and 2 diggings. (v) PTB-4. (vi) Irrigated. 
   (vii) 2 weedings. 

2. TREATMENTS:
   All combinations of (1) and (2)+a control 
   (1) 3 levels of N: N1 = 33.6, N2 = 50.4 and N3 = 67.2 Kg/ha.
   (2) 4 methods of application: M1 = Broadcast just before last puddling and imparted in the soil (sub-surface application), M2 = Broadcast at planting, M3 = Broadcast at planting + about a month after planting and M4 = Application in the form of pellets about three weeks after planting.

3. DESIGN:
   (i) R.B.D. (ii) 13. (iii) 4. (iv) 9 x 4/6 m.; 9 x 4/6 m. 
   (v) 23 cm. x 23 cm.; 46 cm. x 46 cm. 

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Grain yield. 
   (iv) (a) 1962—63. (b) No. 
   (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments x years interaction is absent. Hence the results of individual years are presented.

1962

(i) 1766 Kg/ha. (ii) 1855 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

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1963

(i) 2187 Kg/ha. (ii) 245 Kg/ha. (iii) Interaction N × M alone is significant. (iv) Av. yield of grain in Kg/ha.

Control = 2117 Kg/ha.

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C.D. for the body of N × M table = 352.4 Kg/ha.

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Crop : Paddy (Kharif).

Site : M.A.E. Centre, Karamanai.

Ref. : K. 63(MAE).

Type : 'M'.

Object : To study the effect of methods of application of N on Paddy.

1. BASAL CONDITIONS :
   (i) (a) N.A. (b) Paddy. (c) Nil. (ii) Laterite. (iii) 8.5.63/13.6.63. (iv) (a) 3 ploughings and 2 diggings,
   (b) Transplanting. (c) 36 Kg/ha. (d) 23 cm × 23 cm. (e) N.A. (v) 33.6 Kg/ha. of P₁₀₅ as Super. (vi)

2. TREATMENTS:
   Same as in expt. No. 62(MAE) type V (a) (Rabi) on page 111.

3. DESIGN :
   (i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) 9'1 m × 4'6 m. (b) 8'2 m × 3'7 m. (v) N.A.
   (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1963 only. (b) No. (c) N.A. (v) to (vii) Nil.

5. RESULTS:
   (i) 3287 Kg/ha. (ii) 565.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control = 2906 Kg/ha.

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Crop :- Paddy (*Kharif*).

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

Ref :- K. 60 (MAE).

Type :- 'M'.

Object :- Type V : To study the effect of different times of application of N on the yield of Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) Nil. (ii) Laterite. (iii) 20.6.60/17.7.60. (iv) (a) 4 wet ploughings and one digging. (b) Transplanting. (c) N.A. (d) 23 cm. x 23 cm. (e) 2 to 3. (v) 5604 Kg/ha. of F.Y.M. and 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super broadcast before planting. (vi) P.T.B.-16 medium (125 days duration). (vii) Irrigated. (viii) 2 weedings and one digging. (ix) 122·5 cm. (x) 25.10.60.

2. TREATMENTS :

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

(1) 2 sources of 44·8 Kg/ha. of N : S<sub>1</sub>=A/S and S<sub>2</sub>=Urea.

(2) 7 times of application : T<sub>1</sub>= Full dose before planting, T<sub>2</sub>= Full dose at planting, T<sub>3</sub>= Full dose at tillering, T<sub>4</sub>= <sup>1</sup>/4 dose before planting + <sup>1</sup>/4 at tillering, T<sub>5</sub>= <sup>1</sup>/4 at planting + <sup>1</sup>/4 at tillering + <sup>1</sup>/4 at flowering and T<sub>6</sub>= <sup>1</sup>/4 at planting + <sup>1</sup>/4 at tillering + <sup>1</sup>/4 at flowering.

3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 3. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1956-60. (b) Yes. (c) Nil. (v) (a) At many others M.A.F. Centres. (b) Nil. (vi) Nil. (vii) Harvest delayed due to heavy rains at harvest time.

5. RESULTS:

(i) 2880 Kg/ha. (ii) 416·9 Kg/ha. (iii) 'Control vs. others' alone is highly significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for control vs. others = 510·2 Kg/ha.

Crop :- Paddy (*Rabi*).

Ref :- K. 60 (M.A.E.).

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

Type :- 'M'.

Object :- Type VI : To find out the best method of application of phosphates for Paddy crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) Nil. (ii) Laterite. (iii) 25.9.60/20.10.60. (iv) (a) 4 wet ploughings and 1 digging. (b) Transplanting. (c) N.A. (d) 23 cm. x 23 cm. (e) 2 to 3. (v) 5504 Kg/ha. of F.Y.M. broadcast before planting. (vi) P.T.B.-12 (medium); 120 days duration. (vii) Irrigated. (viii) 2 weedings. (ix) 80·7 cm. (x) 20.1.61.
2. TREATMENTS:

All combinations of (1), (2) and (3) + a control

(1) 2 sources of P<sub>2</sub>O<sub>5</sub>: S<sub>1</sub>=Super and S<sub>2</sub>=Ammo. Phos.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub>: P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

(3) 3 methods of application: M<sub>1</sub>=Broadcasting at puddling time, M<sub>2</sub>=Dipping the seedling in mud

3. DESIGN:

(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) and (v) N.A. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv)(a) 1959 -1960. (b) and (c) No. (v) (a) N.A. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 2586 Kg/ha. (ii) 51.9 Kg/ha. (iii) Main effects of M, P, 'Control vs. others' and interaction P x M are highly significant. (iv) Av. yield of grain in Kg/ha.

Control=1979 Kg/ha.

<table>
<thead>
<tr>
<th>M&lt;sub&gt;1&lt;/sub&gt;</th>
<th>M&lt;sub&gt;2&lt;/sub&gt;</th>
<th>M&lt;sub&gt;3&lt;/sub&gt;</th>
<th>S&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S&lt;sub&gt;2&lt;/sub&gt;</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>2273</td>
<td>2249</td>
<td>2796</td>
<td>2244</td>
<td>2439</td>
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<tr>
<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>2535</td>
<td>2744</td>
<td>3227</td>
<td>2838</td>
<td>2835</td>
</tr>
<tr>
<td>Mean</td>
<td>2404</td>
<td>2496</td>
<td>3012</td>
<td>2631</td>
<td>2637</td>
</tr>
</tbody>
</table>

C.D. for P marginal means =35.6 Kg/ha.
C.D. for M marginal means =43.8 Kg/ha.
C.D. for body of P x M table=61.9 Kg/ha.
C.D. for control vs. others =64.4 Kg/ha.

---

Crop :- Paddy (Kharif).
Site :- M.A.E. Centre, Karamanai.
Object :- Type X :- To study the effect of N, P and G.M. on Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy=G.M.—Paddy. (b) G.M. (c) Nil. (ii) Laterite. (iii) 8.5.63/10.6.63. (iv) (a) 2 diggings and 2 tramplings. (b) Transplanting. (c) 36 Kg/ha. (d) 23 cm. x 23 cm. (e) N.A. (v) Nil. (vi) P.T.B.—9 (135 days). (vii) Unirrigated. (viii) 2 hand weedings. (ix) N.A. (x) 22.9.63.

2. TREATMENTS:

All combinations of (1), (2) and (3)+one extra treatment

(1) 3 levels of G.M. : G<sub>0</sub>=No G.M., G<sub>1</sub>=G.M. raised and ploughed in situ and G<sub>2</sub>=G.M. raised with application of 35 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and ploughed in situ.

(2) 3 levels of N as A/S: N<sub>0</sub>=0, N<sub>1</sub>=17.5 and N<sub>2</sub>=35 Kg/ha.

(3) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=35 and P<sub>2</sub>=70 Kg/ha.

Extra treatment : T=NPK through artificial fertilizers equivalent to those obtained from G.M. P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O applied on 10.6.63 and N on 9.7.61.
3. DESIGN:

(i) 10 confd. (ii) 10 plots/block and 3 blocks/repetition. (b) N.A. (iii) 2. (iv) 12:2 m x 6:9 m. (b) 11:2 m x 5:9 m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) to (c) No. (v) to (vii) Nil.

5. RESULTS:

(i) 2747 Kg/ha. (ii) 142.0 Kg/ha. (iii) Main effects of G and N and interactions G x N, G x P, N x P, G x N x P and 'T vs. others' are highly significant. Main effect of P is significant. (iv) Av. yield of grain in Kg/ha.

\[
T = 2225 \text{ Kg/ha.}
\]

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<thead>
<tr>
<th></th>
<th>(G_1)</th>
<th>(G_2)</th>
<th>(G_3)</th>
<th>(N_1)</th>
<th>(N_2)</th>
<th>(N_3)</th>
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<tr>
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<td>2586</td>
<td>2672</td>
<td>2934</td>
<td>2337</td>
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<td>(P_2)</td>
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<td>2784</td>
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<td>Mean</td>
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<td>2892</td>
<td>2863</td>
<td>2461</td>
<td>3033</td>
<td>3095</td>
<td>2863</td>
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</table>

C.D. for G, P or N marginal means = 97.2 Kg/ha.
C.D. for body of any table = 168.2 Kg/ha.
C.D. for 'T vs. others' = 125.4 Kg/ha.

Crop :- Paddy (Kharif).

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

Ref :- K. 63(M A E).

Type :- 'M'.

Object :- Type XI :- To study the effect of method of application of micro-nutrients on Paddy.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) Paddy. (c) Nil. (ii) Laterite. (iii) 8.5.63/7.6.63. (iv) (a) 2 diggings and 2 tramplings. (b) Transplanting. (c) 36 Kg/ha. (d) 23 cm x 23 cm. (e) N.A. (v) N.A. (v) P.T.B. — 9 (135 days). (vii) Unirrigated. (viii) 2 hand weedings. (ix) N.A. (x) 20.9.63.

2. TREATMENTS :

All combinations of (1) and (2) + 3 extra treatments

(1) 6 sources of micronutrients : \(S_1\) = Mn. Sul., \(S_2\) = Zn. Sul., \(S_3\) = Cu. Sul., \(S_4\) = Borax, \(S_5\) = Sodium Molybdate and \(S_6\) = \(S_3\) + \(S_4\) + \(S_5\) + \(S_6\).

(2) 2 methods of application : \(M_1\) = Soil application and \(M_2\) = Foliar application.

Extra treatments : \(T_1\) = Control, \(T_2\) = 35 Kg/ha, each of \(N\), \(P_2O_5\) and \(K_2O\) and \(T_3\) = Sparrin at 395 Kg/ha.

\(T_1\) is also applied to 12 plots receiving micronutrients and to \(T_2\) plot. Optimum dose of each micronutrient for the two methods has been tried. \(T_1\) and \(T_2\) applied to soil.

Micronutrients applied on 20.7.63, sparrin on 7.6.63 and NPK on 8.7.63.
3. DESIGN:
(i) R.B.D. (ii) 15. (b) N.A. (iii) 4. (iv) (a) 9'1 m. x 4'6 m. (b) 8'2 m. x 3'7 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good. (ii) N.A. (iii) N.A. (iv) (a) 9'1 m. x 4'6 m. (b) 8'2 m. x 3'7 m. (v) N.A. (vi) Yes.

5. RESULTS:
(i) 3701 Kg/ha. (ii) 322'7 Kg/ha. (iii) Interaction S x M and 'T1 vs. T2' are highly significant. Main effect of S is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>Mean</th>
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<td>M1</td>
<td>3156</td>
<td>3446</td>
<td>3371</td>
<td>4318</td>
<td>4152</td>
<td>3862</td>
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<tr>
<td>M2</td>
<td>4194</td>
<td>3322</td>
<td>3280</td>
<td>3488</td>
<td>3405</td>
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<td>3675</td>
<td>3384</td>
<td>3426</td>
<td>3903</td>
<td>3779</td>
<td>3661</td>
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</tbody>
</table>

C.D. for S marginal means = 325.8 Kg/ha.
C.D. for body of S x M table = 460.8 Kg/ha.
C.D. for T1 vs. T2 = 460.8 Kg/ha.

Crop: Paddy (Rabi).
Site: M.A.E. Centre, Karamanai.
Ref: K. 63(M.A.E).
Type: 'M'.
Object: Type XI: To study the effect of method of application of micro-nutrients on Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Black paddy. (c) Nil. (ii) Laterite. (iii) 29.9, 63/20.10.63. (iv) (a) 3 ploughings, 2 diggings and 2 tramplings. (b) Transplanting. (c) 36 Kg/ha. (d) 23 cm. x 23 cm. (e) N.A. (f) Nil. (vi) P.T.B.—4 (140 days). (vii) Irrigated. (vii) 2 hand weeding. (ix) 38 cm. (x) 14.2.64.

2. TREATMENTS:
Same as in expt. no. 63(M.A.E) type XI (Kharif) on page 115. Spartin applied on 20.10.63, NPK on 18.11.63 and micronutrients on 3, 18, 12, 63.

3. RESULTS:
(i) 2068 Kg/ha. (ii) 252'2 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1 = 1993, T1 = 2159, T2 = 2159 Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>2367 2034 2034 2076 2076 1827</td>
</tr>
<tr>
<td>M2</td>
<td>2450 1827 2117 1910 1868 2117</td>
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<tr>
<td>Mean</td>
<td>2408 1931 2076 1993 1972 1972</td>
</tr>
</tbody>
</table>

C.D. for S marginal means = 254.6 Kg/ha.
Crop : Paddy (Mundakar)

Site : (District) : Cannanore, Kottayam, Quilon, Trichur, Thrissur, Alleppy, Kozhikode, Palghat and Ernakulam.

Object :— Type A4 : To study the response curve of important cereals, oilseeds and cash crops to Nitrogen applied singly and in combination with other nutrients.

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

2. TREATMENTS :
   8 manurial treatments :
   - N0 = Control (no manure)
   - N1 = 35 Kg/ha. of N
   - N2 = 70 Kg/ha. of N
   - P1 = 35 Kg/ha. of P04
   - N1P1 = 35 Kg/ha. of N+35 Kg/ha. of P04
   - N2P1 = 70 Kg/ha. of N+35 Kg/ha. of P04
   - N2P2 = 70 Kg/ha. of N+70 Kg/ha. of P04
   - N1P2K1 = 70 Kg/ha. of N+70 Kg/ha. of P04+35 Kg/ha of K2O
   N applied as A/S, P04 as Super and K2O as Mur. Pot.

3. DESIGN :
   A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A1, 11 of type A2 and 3 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 oilseed. All the three type C experiments are conducted on legume crop. For the purpose of conducting the A1, A2 and A3 experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A1, A2 and A3 are laid out. For conducting the three type C trials three villages are randomly selected in each block.

4. GENERAL :
   (i) to (iii) N.A. (iv) (a) 1962 to 1964 for Kozhikode and Palghat, 1964 to 1966 for the rest. (b) and (c) Nil.

5. RESULTS :

Kozhikode
62(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha</td>
<td>167</td>
<td>258</td>
<td>145</td>
<td>436</td>
<td>583</td>
<td>719</td>
<td>1056</td>
<td>52'0</td>
</tr>
</tbody>
</table>

Control yield=1735 Kg/ha. ; No. of trials=12.

63(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha</td>
<td>345</td>
<td>552</td>
<td>373</td>
<td>715</td>
<td>920</td>
<td>1063</td>
<td>1328</td>
<td>94'7</td>
</tr>
</tbody>
</table>

Control yield=2016 Kg/ha. ; No. of trials=18.

64(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
<th>N1P2</th>
<th>N2P2K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha</td>
<td>179</td>
<td>597</td>
<td>327</td>
<td>897</td>
<td>937</td>
<td>1185</td>
<td>1472</td>
<td>62'5</td>
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</tbody>
</table>

Control yield=1995 Kg/ha. ; No. of trials=12.
<table>
<thead>
<tr>
<th>Location</th>
<th>Year</th>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
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<tbody>
<tr>
<td>Palghat</td>
<td>63(S.F.T.)</td>
<td>Treatment</td>
<td>213</td>
<td>310</td>
<td>400</td>
<td>409</td>
<td>246</td>
<td>524</td>
<td>480</td>
<td>122</td>
<td>6</td>
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<tr>
<td></td>
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<td>Av. response of grain in kg/ha.</td>
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<td></td>
<td></td>
<td>Control yield=2166 kg/ha. ; No. of trials=5.</td>
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<tr>
<td>Palghat</td>
<td>63(S.F.T.)</td>
<td>Treatment</td>
<td>421</td>
<td>709</td>
<td>528</td>
<td>919</td>
<td>1208</td>
<td>1286</td>
<td>1684</td>
<td>100</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Av. response of grain in kg/ha.</td>
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<td>Control yield=2401 kg/ha. ; No. of trials=8.</td>
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<tr>
<td>Kottayam</td>
<td>64(S.F.T.)</td>
<td>Treatment</td>
<td>377</td>
<td>485</td>
<td>313</td>
<td>635</td>
<td>759</td>
<td>980</td>
<td>1154</td>
<td>96</td>
<td>8</td>
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<tr>
<td></td>
<td></td>
<td>Av. response of grain in kg/ha.</td>
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<td></td>
<td></td>
<td>Control yield=3284 kg/ha. ; No. of trials=5.</td>
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<tr>
<td>Trichur</td>
<td>64(S.F.T.)</td>
<td>Treatment</td>
<td>305</td>
<td>325</td>
<td>314</td>
<td>385</td>
<td>477</td>
<td>521</td>
<td>780</td>
<td>34</td>
<td>8</td>
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<td>Av. response of grain in kg/ha.</td>
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<tr>
<td>Trichur</td>
<td>64(S.F.T.)</td>
<td>Treatment</td>
<td>429</td>
<td>561</td>
<td>500</td>
<td>869</td>
<td>1015</td>
<td>1267</td>
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<tr>
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<td>Av. response of grain in kg/ha.</td>
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<td>Control yield=1693 kg/ha. ; No. of trials=16.</td>
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<td>N_2</td>
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<td>N_1P_1</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_1P_2</td>
<td>N_2P_2K_1</td>
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<td><em>Trivandrum</em></td>
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<tr>
<td>64(S.F.T.)</td>
<td>Treatment</td>
<td>N_1</td>
<td>N_2</td>
<td>P_1</td>
<td>N_1P_1</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_2P_2K_1</td>
<td>S.E.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Av. response</td>
<td>235</td>
<td>403</td>
<td>256</td>
<td>508</td>
<td>613</td>
<td>900</td>
<td>1109</td>
<td>71-9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control yield=</td>
<td>2382 Kg/ha. ;</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>No. of trials=</td>
<td>19.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ernakulam</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>64(S.F.T.)</td>
<td>Treatment</td>
<td>N_1</td>
<td>N_2</td>
<td>P_1</td>
<td>N_1P_1</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_2P_2K_1</td>
<td>S.E.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Av. response</td>
<td>342</td>
<td>474</td>
<td>346</td>
<td>811</td>
<td>927</td>
<td>1174</td>
<td>1416</td>
<td>100-4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control yield=</td>
<td>1610 Kg/ha. ;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of trials=</td>
<td>15.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cannanore</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64(S.F.T.)</td>
<td>Treatment</td>
<td>N_1</td>
<td>N_2</td>
<td>P_1</td>
<td>N_1P_1</td>
<td>N_2P_1</td>
<td>N_2P_2</td>
<td>N_2P_2K_1</td>
<td>S.E.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Av. response</td>
<td>216</td>
<td>389</td>
<td>210</td>
<td>533</td>
<td>691</td>
<td>939</td>
<td>1195</td>
<td>42-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>grain in Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control yield=</td>
<td>2171 Kg/ha. ;</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of trials=</td>
<td>20.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$NaP_1$</th>
<th>$N_2P_2K_1$</th>
<th>S.E.</th>
<th>Av. response of grain in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>127</td>
<td>248</td>
<td>169</td>
<td>392</td>
<td>551</td>
<td>818</td>
<td>1064</td>
<td>59.7</td>
<td></td>
</tr>
</tbody>
</table>

Control yield—2060 Kg/ha.; No. of trials—17.

Crop: Paddy ($Viceruja$).

Ref: K. 63, 64 (S.F.T.) for Kozhikode; 63, 64, 65 (S.F.T.) for Palghat; 65 (S.F.T.) for Cannanore & Alleppy 64, 65 (S.F.T.) for other centres.

Site: (District): Kozhikode, Palghat, Cannanore, Alleppy, Kottayam, Quilon, Trivandrum and Ernakulam.

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) 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 $P_2O_5$
- $N_2P_2K_1 = 70$ 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 Murr. Pot.

3. DESIGN:

Same as in Type $A_1$ (Mundakar) on page 117.

4. GENERAL:

(i) to (iii) N.A. (iv) 1963 to 1964 for Kozhikode, 1963 to 66 for Palghat, 1965 to 66 for Cannanore and Alleppy, 1964 to 66 for others. (v) to (vii) N.A.

5. RESULTS:

Kozhikode

65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$NaP_1$</th>
<th>$N_2P_2K_1$</th>
<th>S.E.</th>
<th>Av. response of grain in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>240</td>
<td>1034</td>
<td>853</td>
<td>1021</td>
<td>1472</td>
<td>2057</td>
<td>2583</td>
<td>347 1</td>
<td></td>
</tr>
</tbody>
</table>

Control yield—2273 Kg/ha.; No. of trials—6.

64 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$P_1$</th>
<th>$N_1P_1$</th>
<th>$N_2P_1$</th>
<th>$NaP_1$</th>
<th>$N_2P_2K_1$</th>
<th>S.E.</th>
<th>Av. response of grain in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>236</td>
<td>443</td>
<td>383</td>
<td>620</td>
<td>700</td>
<td>1001</td>
<td>1277</td>
<td>75 3</td>
<td></td>
</tr>
</tbody>
</table>

Control yield—2068 Kg/ha.; No. of trials—20.
<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S.E.</th>
<th>Av. yield of grain in Kg/ha.</th>
<th>Control yield</th>
<th>No. of trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paigbat 63(S.F.T.)</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td>268 526 220 704 949 1070 1468</td>
<td>1627 Kg/ha.</td>
<td>9</td>
</tr>
<tr>
<td>64(S.F.T.)</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td>344 456 366 480 828 903 1308</td>
<td>2148 Kg/ha.</td>
<td>16</td>
</tr>
<tr>
<td>65 (S.F.T.)</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td>676 696 588 1200 1424 1796 2060</td>
<td>3284 Kg/ha.</td>
<td>5</td>
</tr>
<tr>
<td>Kottayam 64(S.F.T.)</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td>360 401 503 713 1016 1182 1568</td>
<td>1695 Kg/ha.</td>
<td>10</td>
</tr>
<tr>
<td>65(S.F.T.)</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td>242 267 253 525 831 934 1304</td>
<td>1953 Kg/ha.</td>
<td>6</td>
</tr>
<tr>
<td>Quilon 64(S.F.T.)</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td>226 311 257 363 438 524 685</td>
<td>1760 Kg/ha.</td>
<td>12</td>
</tr>
<tr>
<td>65(S.F.T.)</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td>257 326 293 397 444 512 738</td>
<td>1871 Kg/ha.</td>
<td>9</td>
</tr>
<tr>
<td>Trivandrum 64(S.F.T.)</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
<td>346 446 340 543 634 806 1016</td>
<td>2084 Kg/ha.</td>
<td>13</td>
</tr>
</tbody>
</table>
Crop :- Paddy (Munelakam).

Ref :- K. 64, 65 (S.F.T.) for Trivandrum, Alleppy, Ernakulam, Cannanore, Kottayam, Trichur and Quilon; 62, 63, 64 (S.F.T.) for Kozhikode and Palghat.

Site :- (District) : Trivandrum, Alleppy Type :- 'M'.
     Ernakulam, Cannanore, Kottayam, Trichur, Quilon, Kozhikode and Palghat.

Object :- Type A 2 : To study the response curves of important cereals, cash and oilseed crops to Phosphorus applied singly and in combination with other nutrients.

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

- 8 manural treatments:
  
  - O = Control (no manure)
  
  - \( N_1 = 35 \, \text{Kg/ha. of } N \)
  
  - \( P_1 = 35 \, \text{Kg/ha. of } P_2O_5 \)
  
  - \( P_2 = 70 \, \text{Kg/ha. of } P_2O_5 \)
  
  - \( N_1 P_2 = 35 \, \text{Kg/ha. of } N + 35 \, \text{Kg/ha. of } P_2O_5 \)
  
  - \( N_2 P_2 = 35 \, \text{Kg/ha. of } N + 70 \, \text{Kg/ha. of } P_2O_5 \)
  
  - \( N_1 P_1 = 70 \, \text{Kg/ha. of } N + 35 \, \text{Kg/ha. of } P_2O_5 \)
  
  - \( N_1 P_1 K_1 = 70 \, \text{Kg/ha. of } N + 70 \, \text{Kg/ha. of } P_2O_5 + 70 \, \text{Kg/ha. of } K_2O \)
  
  N applied as A/S, \( P_2O_5 \) as Super and \( K_2O \) as Mar. Pot.

3. DESIGN:

- Same as the experiment Type A1 (Mundakar) on page 117.

4. GENERAL:

- (i) to (iii) N.A. (iv) (a) 1964 to 66 for Trivandrum, Alleppy, Ernakulam, Cannanore, Kottayam, Trichur and Quilon; 1962 to 1964 for Kozhikode and 1962 to 1966 for Palghat (65 N.A.) (c) Nil. (v) to (vii) N.A.

5. RESULTS:

Trivandrum

\( 64(S.F.T.) \)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P1K2</th>
<th>S.E.</th>
<th>Av. response of grain in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>359</td>
<td>417</td>
<td>625</td>
<td>675</td>
<td>845</td>
<td>1153</td>
<td>1481</td>
<td>78</td>
<td>60</td>
</tr>
<tr>
<td>Control yield</td>
<td>2405Kg/ha.; No. of trials=22.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( 65(S.F.T.) \)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P1K2</th>
<th>S.E.</th>
<th>Av. response of grain in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>384</td>
<td>429</td>
<td>682</td>
<td>775</td>
<td>1037</td>
<td>1439</td>
<td>1689</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>Control yield</td>
<td>2784Kg/ha.; No. of trials=20.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Alleppy

\( 64(S.F.T.) \)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P1K2</th>
<th>S.E.</th>
<th>Av. response of grain in Kg/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>256</td>
<td>342</td>
<td>620</td>
<td>772</td>
<td>922</td>
<td>1155</td>
<td>1419</td>
<td>66</td>
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<td>Control yield</td>
<td>1726Kg/ha.; No. of trials=19.</td>
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\( 65(S.F.T.) \)

<table>
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<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P1K2</th>
<th>S.E.</th>
<th>Av. response of grain in Kg/ha.</th>
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<tr>
<td></td>
<td>270</td>
<td>336</td>
<td>551</td>
<td>739</td>
<td>950</td>
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<td>1515</td>
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<td>Control yield</td>
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Ernakulam

\( 64(S.F.T.) \)

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<th>Treatment</th>
<th>N1</th>
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<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N2P2</th>
<th>N1P1K2</th>
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<th>Av. response of grain in Kg/ha.</th>
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<tr>
<td></td>
<td>231</td>
<td>224</td>
<td>404</td>
<td>558</td>
<td>755</td>
<td>953</td>
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<td>Location</td>
<td>Date</td>
<td>Treatment</td>
<td>N1</td>
<td>P1</td>
<td>P2</td>
<td>N1P1</td>
<td>N1P2</td>
<td>N1P3</td>
<td>N1P4</td>
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<td>Kottayam</td>
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<td>Trichur</td>
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<td>268</td>
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<td>Control</td>
<td>1776</td>
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</table>
### 65(S.F.T.)

**Treatment**  
$N_1 P_1 P_2 N_1 P_1 N_1 P_2 N_1 P_2 N_1 P_3 K_1$  
**Av. response of grain in Kg/ha.**  
298 292 384 387 547 503 842 37.8

Control yield=2050 Kg/ha.; No. of trials=15.

### Kozhikode 62(S.F.T.)

**Treatment**  
$N_1 P_1 P_2 N_1 P_1 N_1 P_2 N_1 P_3 N_1 P_3 K_1$  
**Av. response of grain in Kg/ha.**  
163 318 460 559 719 808 1198 42.7

Control yield=1777 Kg/ha.; No. of trials=12.

### 63(S.F.T.)

**Treatment**  
$N_1 P_1 P_2 N_1 P_1 N_1 P_2 N_1 P_2 N_1 P_3 K_1$  
**Av. response of grain in Kg/ha.**  
272 371 541 616 650 1037 1337 157.5

Control yield=2121 Kg/ha.; No. of trials=17.

### 64(S.F.T.)

**Treatment**  
$N_1 P_1 P_2 N_1 P_1 N_1 P_1 N_1 P_2 P_3 K_2$  
**Av. response of grain in Kg/ha.**  
98 223 539 526 764 1130 1679 51.0

Control yield=2148 Kg/ha.; No. of trials=24.

### Palghat

### 62(S.F.T.)

**Treatment**  
$N_1 P_1 P_2 N_1 P_1 N_1 P_1 N_1 P_2 K_1$  
**Av. response of grain in Kg/ha.**  
242 102 -39 218 253 295 301 99.0

Control yield=2947 Kg/ha.; No. of trials=6.

### 63(S.F.T.)

**Treatment**  
$N_1 P_1 P_2 N_1 P_1 N_1 P_1 N_1 P_2 K_1$  
**Av. response of grain in Kg/ha.**  
539 594 815 913 1198 1516 1986 124.4

Control yield=2009 Kg/ha.; No. of trials=9.

### 64(S.F.T.)

**Treatment**  
$N_1 P_1 P_2 N_1 P_1 N_1 P_1 N_1 P_2 K_1$  
**Av. response of grain in Kg/ha.**  
289 321 444 511 746 811 1159 80.7

Control yield=2608 Kg/ha.; No. of trials=27.
Crop: Paddy (*Viruppu*).

Ref: K. 63, 64, (S.F.T.) for Kozhikode; 63, 64, 65 (S.F.T.) for Palghat; 65 for Cannanore and Alleppy and 64, 65 (S.F.T.) for others.

Site: (District) - Kozhikode, Type - 'M'.
Palghat, Cannanore, Alleppy, Kottayam, Trivandrum, Ernakulam and Quilon

Object: Type A4: To study the response curves of important cereals, oilseeds and cash crops to Phosphorus applied singly and in combination with other nutrients.

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

2. TREATMENTS:
   8 manurial treatments:
   - N<sub>0</sub> = Control (no manure).
   - N<sub>1</sub> = 35 Kgf/ha. of N.
   - P<sub>1</sub> = 70 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.
   - N<sub>1</sub>P<sub>1</sub> = 35 Kg/ha. of N + 70 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.
   - N<sub>1</sub>P<sub>2</sub> = 35 Kg/ha. of N + 70 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 70 Kg/ha. of K<sub>2</sub>O.
   - N<sub>2</sub>P<sub>2</sub> = 70 Kg/ha. of N + 70 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 70 Kg/ha. of K<sub>2</sub>O.
   - N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

3. DESIGN:
   Same as the expt. type A1 on Paddy (*Mundakar*) on page 117.

4. GENERAL:
   (i) to (ii) N.A. (iv) (a) 1963 to 64 for Kozhikode; 1963 to 65 for Palghat; 1965 for Cannanore and Alleppy; 1964 and 65 for others. (v) to (vii) N.A.

5. RESULTS:

### Kozhikode

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<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>665</td>
<td>317</td>
<td>945</td>
<td>817</td>
<td>1319</td>
<td>1095</td>
<td>2365</td>
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<td>Control yield = 2227 Kg/ha.; No. of trials = 6.</td>
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### Palghat

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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>162</td>
<td>140</td>
<td>294</td>
<td>470</td>
<td>449</td>
<td>523</td>
<td>962</td>
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<td>Control yield = 2826 Kg/ha.; No. of trials = 8.</td>
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### Cannanore and Alleppy

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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>419</td>
<td>314</td>
<td>582</td>
<td>860</td>
<td>1033</td>
<td>1314</td>
<td>1685</td>
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<td>Control yield = 1779 Kg/ha.; No. of trials = 9.</td>
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<td>Location</td>
<td>Year</td>
<td>Treatment</td>
<td>N, P, N, P, N, P, N, P, K, S.E.</td>
<td>Av. response of grain in Kg/ha</td>
<td>Control yield</td>
<td>No. of trials</td>
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<td>Alleppy</td>
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<td>N, P, N, P, N, P, N, P, N, P, K, S.E.</td>
<td>236 324 464 661 908 1204 1518 1909 123 0</td>
<td>2036 Kg/ha.</td>
<td>1413 Kg/ha.</td>
<td>6</td>
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<tr>
<td>Kottayam</td>
<td>64</td>
<td>N, P, N, P, N, P, N, P, N, P, K, S.E.</td>
<td>431 408 621 781 975 1247 1704 87 9</td>
<td>1669 Kg/ha.</td>
<td>1669 Kg/ha.</td>
<td>12</td>
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<td>Trivandrum</td>
<td>64</td>
<td>N, P, N, P, N, P, N, P, N, P, K, S.E.</td>
<td>274 227 365 478 557 835 1287 96 5</td>
<td>2175 Kg/ha.</td>
<td>2175 Kg/ha.</td>
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Ernakulam

64 (S.F.T.)

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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>144</td>
<td>90</td>
<td>248</td>
<td>342</td>
<td>471</td>
<td>694</td>
<td>869</td>
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</table>

Control yield = 2264 Kg/ha; No. of trials = 6.

65 (S.F.T.)

<table>
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<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>200</td>
<td>257</td>
<td>430</td>
<td>497</td>
<td>710</td>
<td>862</td>
<td>1100</td>
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Control yield = 2045 Kg/ha; No. of trials = 12.

Quilon

64 (S.F.T.)

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<th>Treatment</th>
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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>221</td>
<td>227</td>
<td>262</td>
<td>345</td>
<td>453</td>
<td>562</td>
<td>763</td>
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</table>

Control yield = 1776 Kg/ha; No. of trials = 12.

65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>204</td>
<td>287</td>
<td>379</td>
<td>373</td>
<td>435</td>
<td>488</td>
<td>846</td>
</tr>
</tbody>
</table>

Control yield = 1865 Kg/ha; No. of trials = 9.

Crop: Paddy.  
Ref: K 62, 63, 64 (S.F.T.) for Palghat and Kozhikode; 64, 65 (S.F.T.) for others.

Site: (District) Ernakulam, Trichur, Trivandrum, Alleppy, Cannanore, Kottayam, Quilon, Kozhikode and Palghat.

Type: 'M'.

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

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

2. TREATMENTS:

8 manurai treatments:
- O = Control (no manure).
- N<sub>1</sub> = 35 Kg/ha. of N
- K<sub>1</sub> = 35 Kg/ha. of K<sub>2</sub>O
- N<sub>1</sub>K<sub>1</sub> = 35 Kg/ha. of N + 35 Kg/ha. of K<sub>2</sub>O
- N<sub>1</sub>K<sub>2</sub> = 35 Kg/ha. of N + 70 Kg/ha. of K<sub>2</sub>O
- N<sub>1</sub>P<sub>1</sub>K<sub>1</sub> = 35 Kg/ha. of N + 35 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 35 Kg/ha. of K<sub>2</sub>O
- N applied as A/S; P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.
3. **DESIGN:**
   Same as in experiment Type A on *Mendukar* on page 117.

4. **GENERAL:**
   (i) to (iii) N.A.  (iv) (a) 1962 to 1964 Palghat and Kozhikode; 1964 to 1965 for the rest.  (b) N.A.  (c) Nil.
   (v) to (vii) N.A.

5. **RESULTS:**

**Ernakulam**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N2K1</th>
<th>N3K1</th>
<th>N4P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>222</td>
<td>348</td>
<td>503</td>
<td>572</td>
<td>712</td>
<td>955</td>
<td>1041</td>
</tr>
</tbody>
</table>

Control yield = 1990 Kg/ha.; No. of trials = 20.

**Trichur**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N2K1</th>
<th>N3K1</th>
<th>N4P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>424</td>
<td>390</td>
<td>606</td>
<td>838</td>
<td>1015</td>
<td>1175</td>
<td>1390</td>
</tr>
</tbody>
</table>

Control yield = 1542 Kg/ha.; No. of trials = 15.

**Trivandrum**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N2K1</th>
<th>N3K1</th>
<th>N4P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>866</td>
<td>700</td>
<td>866</td>
<td>1266</td>
<td>1333</td>
<td>1633</td>
<td>1666</td>
</tr>
</tbody>
</table>

Control yield = 2466 Kg/ha.; No. of trials = 3.

**Alleppy**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>K1</th>
<th>K2</th>
<th>N1K1</th>
<th>N2K1</th>
<th>N3K1</th>
<th>N4P1K1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>282</td>
<td>305</td>
<td>458</td>
<td>752</td>
<td>1001</td>
<td>1046</td>
<td>1200</td>
</tr>
</tbody>
</table>

Control yield = 1688 Kg/ha.; No. of trials = 18.
### Cannanore

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_2$</th>
<th>$N_1K_1$</th>
<th>$N_1K_2$</th>
<th>$N_2K_2$</th>
<th>$N_1P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>172</td>
<td>287</td>
<td>314</td>
<td>435</td>
<td>611</td>
<td>1000</td>
<td>1160</td>
<td>129.5</td>
</tr>
</tbody>
</table>

Control yield = 1763 Kg/ha; No. of trials = 15.

### Kottayam

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_2$</th>
<th>$N_1K_1$</th>
<th>$N_1K_2$</th>
<th>$N_2K_2$</th>
<th>$N_1P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>383</td>
<td>469</td>
<td>632</td>
<td>877</td>
<td>1132</td>
<td>1558</td>
<td>1557</td>
<td>63.8</td>
</tr>
</tbody>
</table>

Control yield = 1767 Kg/ha; No. of trials = 20.

### Quilon

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_2$</th>
<th>$N_1K_1$</th>
<th>$N_1K_2$</th>
<th>$N_2K_2$</th>
<th>$N_1P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>235</td>
<td>230</td>
<td>411</td>
<td>430</td>
<td>954</td>
<td>1407</td>
<td>1437</td>
<td>154.2</td>
</tr>
</tbody>
</table>

Control yield = 2073 Kg/ha; No. of trials = 10.

### Kozhikode

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_1$</th>
<th>$K_1$</th>
<th>$K_2$</th>
<th>$N_1K_1$</th>
<th>$N_1K_2$</th>
<th>$N_2K_2$</th>
<th>$N_1P_1K_1$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>187</td>
<td>219</td>
<td>263</td>
<td>400</td>
<td>455</td>
<td>482</td>
<td>673</td>
<td>43.9</td>
</tr>
</tbody>
</table>

Control yield = 1998 Kg/ha; No. of trials = 12.
Crop: Paddy (Vigna).  Ref: K. 64, 65 for all District.

Site: (District): Ernakulam, Kottayam.  Type: 'M'.

Quilon, Trivandrum.

Object: Type A3: To study the response curves of important cereal, oilseed and cash crops to Nitrogen applied singly and in combination with other nutrients.

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

2. TREATMENTS:

   8 manurial treatments:
   N0 = 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+35 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, P as Super Phosphate and K2O as Mur. Pot.
3. DESIGN:
   Same as in Type A₁ (Mundakar) on page 117.

4. GENERAL:
   (i) to (iii) N.A. (iv) (a) 1964 to 65 for all Districts. (b) and (c) Nul. (v) to (vii) N.A.

5. RESULTS:

Ernakulam

64(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁ P₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₁K₃</th>
<th>N₁P₁K₃</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>131</td>
<td>273</td>
<td>398</td>
<td>448</td>
<td>618</td>
<td>769</td>
<td>829</td>
<td>41.6</td>
</tr>
</tbody>
</table>

Control yield = 2084 Kg/ha.; No. of trials = 12.

65(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁ P₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₁K₃</th>
<th>N₁P₁K₃</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>157</td>
<td>254</td>
<td>393</td>
<td>434</td>
<td>595</td>
<td>767</td>
<td>875</td>
<td>41.6</td>
</tr>
</tbody>
</table>

Control yield = 2052 Kg/ha.; No. of trials = 11.

Kottayam

64(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁ P₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₁K₃</th>
<th>N₁P₁K₃</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>279</td>
<td>368</td>
<td>465</td>
<td>770</td>
<td>862</td>
<td>1119</td>
<td>1329</td>
<td>55.2</td>
</tr>
</tbody>
</table>

Control yield = 1751 Kg/ha.; No. of trials = 12.

65(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁ P₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₁K₃</th>
<th>N₁P₁K₃</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>191</td>
<td>139</td>
<td>242</td>
<td>450</td>
<td>539</td>
<td>620</td>
<td>786</td>
<td>78.2</td>
</tr>
</tbody>
</table>

Control yield = 1980 Kg/ha.; No. of trials = 6.

Quilon

64(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁ P₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₁K₃</th>
<th>N₁P₁K₃</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>226</td>
<td>201</td>
<td>290</td>
<td>332</td>
<td>353</td>
<td>461</td>
<td>608</td>
<td>26.2</td>
</tr>
</tbody>
</table>

Control yield = 1729 Kg/ha.; No. of trials = 12.

65(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁ P₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₁K₃</th>
<th>N₁P₁K₃</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>272</td>
<td>290</td>
<td>310</td>
<td>370</td>
<td>425</td>
<td>516</td>
<td>745</td>
<td>51.0</td>
</tr>
</tbody>
</table>

Control yield = 1852 Kg/ha.; No. of trials = 10.

Trivandrum

64(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁ P₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₁K₃</th>
<th>N₁P₁K₃</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>392</td>
<td>292</td>
<td>433</td>
<td>580</td>
<td>665</td>
<td>900</td>
<td>947</td>
<td>50.9</td>
</tr>
</tbody>
</table>

Control yield = 2337 Kg/ha.; No. of trials = 12.
A treatment study was conducted in the districts of Quilon and Trivandrum to evaluate the response of Paddy (Kharif) to different levels of nitrogen (N), phosphorus (P), and potassium (K) applied individually and in combinations. The study involved 12 trials, each conducted by a field assistant for one revenue circle or thana within a zone, with the circle/thana rotation every two years. Each field assistant conducted 31 trials annually, with one-third dedicated to kharif cereals, one-third to oilseed crops, and one-third to legumes. Residual effects of phosphate application were studied on type C trials in two out of the four zones in each district every year.

### Basal Conditions

- **Type A**
  - To study the response of Paddy to levels of N, P, and K applied individually and in combinations.
  - **Basal Conditions**
    - (i) (a) to (c) N.A.
    - (ii) Laterite.
    - (iii) to (x) N.A.

### Treatments

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_2</th>
<th>N_2K_1</th>
<th>N_1P_2K_2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>496</td>
<td>473</td>
<td>857</td>
<td>843</td>
<td>1150</td>
<td>1470</td>
<td>1503</td>
</tr>
</tbody>
</table>

Control mean = 2511 Kg/ha.; No. of trials = 12.

### Results

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>Control yield</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S.E.</th>
<th>NP</th>
<th>NK</th>
<th>PK</th>
<th>NPK</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quilon</td>
<td>16</td>
<td>2010</td>
<td>460</td>
<td>370</td>
<td>280</td>
<td>11'0</td>
<td>70</td>
<td>10</td>
<td>40</td>
<td>10</td>
<td>8'0</td>
</tr>
<tr>
<td>Trivandrum</td>
<td>16</td>
<td>18'0</td>
<td>440</td>
<td>310</td>
<td>200</td>
<td>19'0</td>
<td>30</td>
<td>-20</td>
<td>10</td>
<td>60</td>
<td>13'0</td>
</tr>
</tbody>
</table>
Crop : - Paddy (Rabi).
Site : - Quilon and Trivandrum.

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

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

2. TREATMENTS:
   Same as in exppt. No. 60(S.F.T.) Type A on Paddy (Kharif) on page 133.

3. DESIGN:
   Same as in Type A (Kharif) on page 133.

4. GENERAL:
   (i) to (ii) N.A. (iv) (a) 1960. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   Av. yield of grain in Kg/ha. (Kharif)
   
   District  No. of trials  O  N₃  N₄  N₅  N₆  N₇  N₈  G.M.  S.E./Mean
  ,trials
   Quilon 16 2050 2230 2710 2390 2660 2550 2910 2514 12.6
   Trivandrum 12 1840 2250 2570 2380 2760 2290 2670 2794 29.7
   Trivandrum 3 2080 2600 2820 2500 2560 2290 2510 2480 35.1

Crop : - Paddy (Khari). Ref : - K. 60(S.F.T.)
Type : - 'M'.

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

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

2. TREATMENTS:
   8 manurial treatments :
   O = Control (no manure).
   N₃ =44.8 Kg/ha. of N as A/S.
   N₄ =89.6 Kg/ha. of N as A/S.
   N₅ =44.8 Kg/ha. of N as Urea.
   N₆ =89.6 Kg/ha. of N as A/S/N.
   N₇ =89.6 Kg/ha. of N as C/A/N.

   At Trivandrum instead of treatments N₃ and N₄ mentioned above treatments N₅'' =44.8 and N₆'' =89.6 Kg/ha. of N as C/A/N have been tried with number of trials equal to 3 as a separate experiment.

3. DESIGN:
   Same as in Type A (Khari) on page 133.

4. GENERAL:
   (i) to (iii) N.A. (iv) (a) 1960. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   Av. yield of grain in Kg/ha. (Khari)
   
   District  No. of trials  O  N₁  N₂  N₃  N₄  N₅  N₆  N₇  N₈  G.M.  S.E./Mean
   Quilon 16 2050 2230 2710 2390 2660 2550 2910 2514 12.6
   Trivandrum 12 1840 2250 2570 2380 2760 2290 2670 2794 29.7
   Trivandrum 3 2080 2600 2820 2500 2560 2290 2510 2480 35.1
Crop: Paddy (Rabi).

Site: Quilon and Trivandrum.

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

1. BASAL CONDITIONS:
   (i) N.A. (ii) Laterite. (iii) to (v) N.A.

2. TREATMENTS:
   Same as in exp. No. 60(S.F.T.) Kharif on page 134.

5. RESULTS:

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>G.M.</th>
<th>S.E./Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quilon</td>
<td>24</td>
<td>2380</td>
<td>2820</td>
<td>3150</td>
<td>2880</td>
<td>2980</td>
<td>2390</td>
</tr>
<tr>
<td>Trivandrum</td>
<td>24</td>
<td>1980</td>
<td>2390</td>
<td>2780</td>
<td>2470</td>
<td>2510</td>
<td>2850</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).

Site: Rice Res. Sta., Kayamkulam.

Object: To find out the differential response to manuring of the promising strains.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 4942 Kg/ha. of C.M.+124 Kg/ha. of A/S+124 Kg/ha. of S/P and 62 Kg/ha. of Muri. Pot. for 64(93), As per treatments for 65(10). (ii) Sandy loam. (iii) 29.4.64; 29.4.65. (iv) (a) & (b) 1 ploughing with Iron plough. (b) to (c) N.A. (v) P04 and K2O applied as basal dressing. Half of N applied as basal and other half applied as top dressing one month before flowering. (vi) As per treatments. (vii) Unirrigated. (viii) 2 interculturings and 2 weedings. (ix) 120.6 em.; 108.4 em. (x) 29.7.64; 6.8.65.

2. TREATMENTS:
   Main-plot treatments: 3 levels of N as A/S: N1=22.4, N2=44.8 and N3=67.2 Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 7.0 m. x 3.5 m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grains. (iv) (a) 1964-65. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Sub-plot error variances are heterogeneous. Hence the results of individual years are presented under 5. Results.

5. RESULTS:

64(93)
   (i) 2183 Kg/ha. (ii) (a) 480.4 Kg/ha. (b) 361.1 Kg/ha. (iii) Main effect of V alone is significant. (iv) Av. yield of grain in Kg/ha. 1964-65.
Crop :- Paddy (Rabi).

Site :- Rice Res. Sta., Kayamkulam.

Object :- To find out the effective manurial doses and to compare the Paddy varieties obtained from the cross Chempa x Pinkco.

1. BASAL CONDITIONS :
(i) (a) Paddy—Faddy. (b) Paddy. (c) 30 Kg/ha. of N as A/S., 30 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, 30 Kg/ha. K<sub>2</sub>O as Mur. Pot. and 2000 Kg/ha. of C.M. (ii) Sandy loam. (iii) 25.8.65. (iv) (a) 6 ploughings, 2 levellings. (b) to (e) N.A. (v) As in (i) (c). All the manures except ½ the dose of A/S is applied as basal and ½ of A/S as top dressing. (vi) Nil. (vii) Unirrigated. (viii) 2 hand weedings and 1 interculturing. (ix) 95 cm. (x) 12.1.66.

2. TREATMENTS :
Main-plot treatments :
2 levels of manures : M<sub>1</sub>=40 Kg/ha. of N+30 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+30 Kg/ha. of K<sub>2</sub>O, M<sub>2</sub>=80 Kg/ha. of N+40 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+40 Kg/ha. of K<sub>2</sub>O.

Sub-plot treatments :

3. DESIGN :
(i) Split-plot. (ii) (a) 2 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) and (b) 5 m.×2 m. (v) Nil. (vi) Yes.
4. GENERAL:
   (i) Satisfactory. (ii) No serious incidence of pests or disease. Endrin and Bordeaux mixture were sprayed twice. (iii) Yield of grain. (iv) (a) 1965—N.A. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   (i) 2662 Kg/ha. (ii) (a) 310 Kg/ha. (b) 399 Kg/ha. (iii) Main effect of 'V' alone is highly significant. (iv) Av. grain yield in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M₁</td>
<td>2680</td>
<td>3200</td>
<td>2500</td>
<td>2400</td>
<td>2695</td>
</tr>
<tr>
<td>M₂</td>
<td>2220</td>
<td>3420</td>
<td>2620</td>
<td>2260</td>
<td>2630</td>
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<tr>
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<td>2450</td>
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<td>2662</td>
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C.D. for V marginal means = 368·2 Kg/ha.

Crop :- Paddy (Kharif).
Site :- Rice Res. Stn., Kayamkulam.
Ref :- K. 65(48).
Type :- 'MV'.
Object :- To evolve a high yielding short duration strain under two levels of fertility.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Gingelly. (c) N.A. (ii) Sandy loam. (iii) 1.5.65. (iv) (a) to (e) N.A. (v) 13·6 Kg/ha. each of N, P and K were given of which entire P₂O₅ and K₂O were given as basal dressing in the form of Super and Mur. Pot. (vi) As per treatments. (vii) Unirrigated. (viii) 2 interculturings with attukara hoe and 2 hand weedings. (ix) 108 cm. (x) 11.8.65.

2. TREATMENTS:
   Main-plot treatments :
   4 cultures : V₁—Culture No. 1, V₂—No. 113. V₃—No. 184 and V₄=Kochuvicha.

   Sub-plot treatments :
   2 levels of manures : M₁=Normal fertility (40 Kg/ha. of N+30 Kg/ha. of P₂O₅+30 Kg/ha. of K₂O) and M₂=High fertility (80 Kg/ha. of N+40 Kg/ha. of P₂O₅+40 Kg/ha. of K₂O).

3. DESIGN :
   (i) Split-plot. (ii) (a) 4 main-plots/replication and 2 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) and (b) 5 m. x 2 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Blight incidence was noticed. (iii) Vegetative and productive tiller counts and yield of grain and straw. (iv) (a) 1957—N.A. (b) No. (c) Nil. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:
   (i) 1818 Kg/ha. (ii) (a) 309 Kg/ha. (b) 231 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>V₁</th>
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<th>V₃</th>
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Crop :- Paddy (Rabi).
Site :- Reg. Rice Res. Sta., Kayamkulam.
Object :- To study the differential response to manuring of different varieties.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) 30 Kg/ha. of N as A/S, 30 Kg/ha. of P₂O₅ as Super, 30 Kg/ha. of K₂O as Mur. Pot. 2000 Kg/ha. of C.M. (i) Sandy loam. (ii) N.A. (v) and (vi) As per treatments. (vii) Unirrigated. (viii) 2 hand weedings and 1 interculturing with Japanese hoe. (ix) 95 cm. (x) 25.1.66.

2. TREATMENTS:
   Main-plot treatments :
   3 levels of N : N₁=20, N₂=40 and N₃=60 Kg/ha.
   Sub-plot treatments :

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) 7.0 m. x 3.5 m. (iii) 4. (iv) (a) and (b) 7.0 m. x 3.5 m, (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) No serious incidence of pests or disease noticed. Endrin and Bordeaux mixture sprayed twice. (iii) Yield of grain. (iv) (a) 1964—N.A. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   (i) 2135 Kg/ha. (ii) (a) 187.8 Kg/ha. (b) 353.9 Kg/ha. (iii) Main effects of N and V are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>V₁</th>
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<th>V₃</th>
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<td>2003</td>
<td>2354</td>
<td>1932</td>
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</table>

C.D. for N marginal means=162.5 Kg/ha.
C.D. for V marginal means=296.5 Kg/ha.
2. TREATMENTS:

Main-plot treatments:
- 3 levels of N as Urea: \(N_1 = 22.4\), \(N_2 = 44.8\) and \(N_3 = 67.3\) Kg/ha.

Sub-plot treatments:
- 4 varieties: \(V_1 = PTB-4\), \(V_2 = PTB-16\), \(V_3 = PTB-20\) and \(V_4 = UR-19\).

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/replication and 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) 7 m. x 3.5 m. (v) Nil. (vi) Yes.

4. GENERAL:

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

5. RESULTS:

(i) 2535 Kg/ha. (ii) (a) 250.9 Kg/ha. (b) 268.7 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th></th>
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C.D. of V marginal means = 225.1 Kg/ha.

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**Crop:** Paddy (Kharif)

**Site:** Rice Res. Stn., Kottarakara

**Object:** To evolve an improved strain from Kuttalam variety of Paddy.

1. BASAL CONDITIONS:

(i) (a) No. (b) Paddy. (c) 160.6 Kg/ha. of Super and 61 Kg/ha. of Mur. Pot. (ii) Clayey loam. (iii) 16.5.65/23.6.65. (iv) (a) Digging 3 times, levelling 2 times. (b) to (e) N.A. (v) 160.6 Kg/ha. of Mur. Pot. at 61.8 Kg/ha. as top dressing (vi) As per treatments. (vii) Unirrigated. (viii) Weeding and interculturing (a) 99.9 cm. (x) 30.9.65.

2. TREATMENTS:

Main-plot treatments:
- 3 levels of manure: \(M_1 = 44.8\) Kg/ha. of N, \(M_2 = 89.6\) Kg/ha. of N and \(M_3 = 134.4\) Kg/ha. of N.

Sub-plot treatments:
- 9 cultures: \(V_1 = \text{Culture no. 329}\), \(V_2 = \text{Culture no. 264}\), \(V_3 = \text{S.T.D.}\), \(V_4 = \text{PTB-24}\), \(V_5 = \text{Culture no. 152}\), \(V_6 = \text{Culture no. 53}\), \(V_7 = \text{Culture no. 29}\), \(V_8 = \text{Culture no. 208}\) and \(V_9 = \text{Culture no. 193}\).

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/replication; 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.3 m. x 2.6 m. (b) 6.1 m. x 2.4 m. (v) 8 cm. x 8 cm. (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1955—contd. (b) Yes. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 2511 Kg/ha. (ii) (a) 1005.7 Kg/ha. (b) 514.0 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V1</th>
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<th>V3</th>
<th>V4</th>
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C.D. for V marginal means = 359.8 Kg/ha.

**Crop :- Paddy (Rabi).**

**Site :- Rice Res. Stn., Kottarakara.**

**Ref :- K. 65(59).**

**Type :- 'MV'.**

Object:—To evolve an improved strain of Cheradi (Local) variety by pure line selection under different manurai levels.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) Lateritic. (iii) 30.8.65/13’10.65. (iv) and (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) Interculture operations and weeding. (ix) N.A. (x) 25.2.1966.

2. TREATMENTS:
   Main-plot treatments:
   3 levels of N : N1=44.8, N2=89.6 and N3=134.4 Kg/ha.
   Sub-plot treatments:
   9 strains: S1=29, S2=17, S3=269, S4=34, S5=55, S6=370, S7=328, S8=372 and S9=Standard.

3. DESIGN:
   (i) Split-plot. (ii) (b) 3 main-plots/replication; 9 sub-plots/main-plot. (b) N.A. (iv) (a) N.A. (b) 6.1 m. x 2.4 m. (v) N.A. (vii) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Stem borer attack controlled by spraying 0.05% Endrin. (iii) Grain yield. (iv) (a) 1965—contd. (b) Yes. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   (i) 4795 Kg/ha. (ii) (a) 579.2 Kg/ha. (b) 345.6 Kg/ha. (iii) Main effects of N and S are significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<th>S2</th>
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<th>S4</th>
<th>S5</th>
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</table>
Crop :- Paddy (Rabi).  
Site :- Rice Res. Sta., Kottarakara.
Object :- To evolve an improved strain of Athuttirazhi (local) variety by pure line selection under different manurial levels.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) Lateritic. (iii) 30.8.1965/16.10.65. (iv) (a) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) Interculture operations and weeding. (ix) N.A. (x) 11.2.1966.

2. TREATMENTS:
   Main-plot treatments:
   3 levels of N: N1=44·8, N2=89·6 and N3=134·4 Kg/ha.
   Sub-plot treatments:
   7 varieties: V1=No. 93, V2=No. 185, V3=No. 264, V4=No. 34, V5=No. 60, V6=Athikirazhi standard and V7=PTB-27.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots replication and 7 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 23·2 m. x 6·1 m. (b) 6·1 m. x 3·1 m. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Unlodged. (ii) Case worm attack controlled by dusting B.H.C. and stem borer attack controlled by 0·05% Endrin. (iii) Grain yield. (iv) (a) 1965-only. (b) Nil. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   (i) 3195 Kg/ha. (ii) (a) 653·6 Kg/ha. (b) 461·7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Paddy in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
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Crop :- Paddy (Kharif).  
Site :- Rice Res. Sta., Kottarakara.
Object :- To evolve an important strain from local Karuthachuttiyan variety under different levels of manuring.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) G.L. at 3000 Kg/ha. +40 Kg/ha. of N (P.O.) +30 Kg/ha. of K₂O. (ii) Lateritic. (iii) 20.6.64/23.7.64. (iv) (a) 6 ploughings. (b) Transplanting. (c) 25 Kg/ha. (d) 15 cm. x 25 cm. (e) 2. (f) G.L. at 3000 Kg/ha. + P.O. at 30 Kg/ha. + K₂O at 30 Kg/ha. (v) Irrigated. (vi) As per treatments. (vii) Working intercultivator twice and hand weeding once. (ix) 195 cm. (x) 30.10.64.

2. TREATMENTS:
Main-plot treatments:
3 levels of N: N₁=20, N₂=40, N₃=60 Kg/ha.

Crop: Paddy (Kharij).
Site: Rice Res. Stn., Mannuthy.
Object: To find out the effect of heavy dose of N on the important local strains.

Ref: K. 64(3)
Type: 'MV'.

C.D. for M marginal means=257.2 Kg/ha.
C.D. for C marginal means=358 0 Kg/ha.
Sub-plot treatments:
6 varieties: \( V_1 = \text{P.T.B.-8}, V_2 = \text{P.T.B.-9}, V_3 = \text{P.T.B.-22}, V_4 = \text{P.T.B.-23}, V_5 = \text{P.T.B.-32}, \) and \( V_6 = \text{P.T.B.-34}. \)

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main plots/replication and 6 sub-plots/main plot. (b) 30.5 x 10.5 m. (iii) 4. (iv) (a) 6 m. x 3 m. (b) 5.8 m x 2.9 m. (v) 12 cm. x 8 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Gall fly, case worm, stemborer, stemborer and Helminisporium: Endrin and Cupravit sprayed. (iii) Tiller counts and grain yield. (iv) (a) 1964 only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 2720 Kg/ha. (ii) (a) 362.5 Kg/ha. (b) 396.8 Kg/ha. (iii) Main effect of V is highly significant and main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>( V_1 )</th>
<th>( V_2 )</th>
<th>( V_3 )</th>
<th>( V_4 )</th>
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C.D. for N marginal means=256.0 Kg/ha.
C.D. for V marginal means=326.5 Kg/ha.

Crop: Paddy (Rabi).
Site: Rice Res. Stn., Mannuthy.
Ref: K. 65(34).
Object: To find out the effect of different doses of N on the important varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 Kg/ha. of G.L. and N.P.K. as per schedule. (ii) Lateritic. (iii) 24.8.65/5.10.65. (iv) (a) 6 ploughing, 1 hand weeding and working Rotary Weeder once. (b) to (e) N.A. (v) 5000 Kg/ha. of G.L. and N as per treatments. and 30 Kg/ha. each of \( P_2O_5 \) and \( K_2O \). (vi) As per treatments. (vii) Irrigated. (viii) Hand weeding once with Rotary Weeder. (ix) 39 cm. (x) N.A.

2. TREATMENTS:
Main-plot treatments:
3 levels of N: \( N_1 = 20, N_2 = 40, \) and \( N_3 = 60 \) Kg/ha.
Sub-plot treatments:
5 varieties: \( V_1 = \text{P.T.B.-12}, V_2 = \text{P.T.B.-20}, V_3 = \text{P.T.B.-27}, V_4 = \text{P.T.B.-33}, \) and \( V_5 = \text{Cochin}-1. \)

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main plots/replication and 5 sub-plots/main-plot. (b) 10.5 m x 32.0 m. (iii) 4. (iv) (a) 3.0 m. x 6.0 m. (b) 2.9 m. x 5.8 m. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Gall fly, leaf roller, stemborer and case worm attack, controlled by Enathin 0.1% and Biton sprayings. (iii) Grain and straw yield. (iv) (a) 1964—66 (varieties modified every year). (b) Yes. (c) Nil. (v) Kayamkulam. (vi) and (vii) N.A.
5. RESULTS:

(i) 2816 Kg/ha.  (ii) (a) 3014 Kg/ha.  (b) 299.6 Kg/ha.  (iii) Main effect of V alone is significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
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<td>2677</td>
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Mean 2865 2629 2853 2708 3023

C.D. for V marginal means=248.3 Kg/ha.

Crop :- Paddy (Rabi).
Site :- Rice Res. Sta., Mannuthy.
Ref :- K. 65(35), Type :- 'MV'.

Object :- To compare two Taiwanese varieties with local varieties under two levels of Nitrogen.

1. BASAL CONDITIONS :
   (i) (a) Nil.  (b) Paddy.  (c) 5000 Kg/ha. of G.L. 40 Kg/ha. of N, 120 Kg/ha. of P₂O₅ and 30 Kg/ha of K₂O.
   (ii) Lateritic.  (iii) 28.8.65/27.9.65.  (iv) (a) 6 ploughings.  (b) to (e) N.A.  (vi) 5000 Kg/ha. of G.M., 80 Kg/ha. of N and 30 Kg/ha. of each of P₂O₅ and K₂O at 30 Kg/ha. applied with the last ploughing.  (vi) As per treatments.  (vii) Irrigated.  (viii) Hand weeding once, interculverting once.  (ix) 35 cm.  (x) N.A.

2. TREATMENTS:

   Main-plot treatments :
   2 levels of N : N₁=40 and N₂=120 Kg/ha.

   Sub plot treatments :
   4 varieties : V₁=Taiwan-3, V₂=Taichung N-1, V₃=Cochin-1 and V₄=P.T.B.-12.

3. DESIGN :

   (i) Split-plot.  (a) 2 main-plots/replication and 4 sub-plots/main-plots.  (b) 6 m. x 24 m.  (iii) 4.  (iv) (a) 1.5 m. x 6 m.  (b) 1.3 m. x 5.9 m.  (v) One row.  (vi) Yes.

4. GENERAL :

   (i) Satisfactory.  (ii) Leaf roller and stemborer attack sprayed by Endrin 0.1%.  Blight was noticed and controlled by spraying Cupravit.  (iii) Grain and straw yield.  (iv) (a) 1965-67.  (b) Yes.  (c) N.A.  (v) to (vii) N.A.

5. RESULTS:

(i) 3115 Kg/ha.  (ii) (a) 549.7 Kg/ha.  (b) 399.3 Kg/ha.  (iii) Main effect of V alone is highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
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Mean 2905 2445 4331 2778 3115

C.D. for V marginal means=419.5 Kg/ha.
Crop : Paddy (Kharif).
Site : Rice Res. Stn., Mannuthy.
Ref : K. 65(36).
Type : 'MV'.

Object :—To compare two Taiwanese varieties with local varieties under two levels of Nitrogen.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 Kg/ha. of G.M., N at 40 and 120 Kg/ha. and P,O, and K,O each at 30 Kg/ha.
(ii) Lateritic. (iii) N.A. (iv) (a) 6 ploughings. (b) to (e) N.A. (v) G.M. at 5000 Kg., N at 20 and 60 Kg/ha.
+P,O, and K,O each at 30 Kg/ha. applied with the last ploughing. (vi) As per treatments. (vii) Irrigated,
(viii) Hand weeding once and working interculturator once. (ix) 145 cm. (x) N.A.

2. TREATMENTS:
Main-plot treatments :
2 levels of N: N1=40 and N4=120 Kg/ha.
Sub-plot treatments :
5 varieties V1=Tainan, V2=Taichung N-1, V3=PTB-31, V4=PTB-32 and V5=PTB-32.

3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/repl;ication ; 5 sub-plots/main-plot. (b) 7.5 m.x 28 m. (iii) 4.
(iv) (a) 1.5 m. x 6.0 m. (b) 1.3 m. x 5.9 m. (v) 12 cm. x 12 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Leaf roller and stem borer attack controlled by spraying Endrin 0.1%. Blight was
noticed which was controlled by spraying Cupravit. (iii) Grain and straw yield. (iv) (a) 1965-67. (b) Yes.
(c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 1115 Kg/ha. (ii) (a) 88.9 Kg/ha. (b) 184.6 Kg/ha. (iii) Main effect of N and V are highly significant.
(iv) Av. grain yield is Kg/ha.

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C.D. for N marginal means=89.4 Kg/ha.
C.D. for V marginal means=190.5 Kg/ha.

Crop : Paddy (Kharif).
Site : Rice Res. Stn., Mannuthy.
Ref : K. 65(37).
Type : 'MV'.

Object :—To test the yielding ability of H.R.—98 and to find an optimum manurial dose.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 Kg/ha. of C.M., N at 30, 60 and 90 Kg/ha.+P,O, and K,O at each 30Kg/ha.
(ii) Lateritic. (iii) 14.5.65/29.6.65. (iv) (a) 6 ploughings. (b) to (e) N.A. (v) 5000 Kg/ha. of C.M.+P,O,
and K,O each at 30 Kg/ha. applied with the last ploughings. (vi) As per treatments. (vii) Irrigated.
(viii) Hand weeding once and working interculturator once. (ix) 145 cm. (x) N.A.
2. TREATMENTS:

Main-plot treatments:
3 levels of N: N₁=30, N₂=60 and N₃=90 Kg/ha.

Sub-plot treatments:
3 varieties: V₁=HR-98, V₂=PTB-22 and V₃=PTB-32.

3. DESIGN
(i) Split-plot. (ii) 3 main-plots/replication; 3 sub-plots/main-plot. (b) 9 m x 54 m. (iii) 5.
(iv) (a) 1.0 m x 6.0 m. (b) 0.8 m x 5.9 m. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Gall fly and case worm attack controlled by spraying Endrin. Blight was noticed and controlled by spraying Blitox. (iii) Grain and straw yield (iv) (a) 1964–65. (b) Yes. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 1557 Kg/ha. (ii) (a) 341.9 Kg/ha. (b) 423.9 Kg/ha. (iii) Main effects of N and V are significant. (iv) Av. grain yield in Kg/ha.

<table>
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C.D. for N marginal means=287.6 Kg/ha.
C.D. for V marginal means=319.4 Kg/ha.

Crop :- Paddy (Kharif).
Site :- Rice Res. Stn., Mannuthy.

Object :- To find out an optimum dose of N for the local strains.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 Kg/ha. of G.L. and N, P and K as per treatments. (ii) Lateritic. (iii) 20.5.1965. (iv) (a) 6 ploughings. (b) to (e) N.A. (v) 5000 Kg/ha. of G.L. and N as per treatments and 30 Kg/ha. each of P₂O₅ and K₂O. (vi) As per treatments. (vii) Irrigated. (viii) Hand weeding once working Rotary Weeder. (ix) 145 cm. (x) Harvested on different dates.

2. TREATMENTS:

Main-plot treatments:
3 levels of N: N₁=20, N₂=40 and N₃=60 Kg/ha.

Sub-plot treatments:

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication and 6 sub-plots/main-plot. (b) 10.5 m x 38.5 m. (iii) 4.
(iv) (a) 5.0 m x 6.0 m. (b) 2.9 m x 5.8 m. (v) One row around. (vi) Yes.

Ref :- K. 65(38).
Type :- 'MV'.

---
4. GENERAL:
(i) Satisfactory. (ii) Gall fly, leaf roller stem borer and case worm attack controlled by spreading Endrin 0.1%. Helmithosporium and stick born were noticed and controlled by spraying Bitox. (iii) Grain and straw yield. (iv) (a) 1964-66. (b) Yes. (c) Nil. (v) Kayamkulam. (vi) and (vii) N.A.

5. RESULTS:
(i) 2195 Kg/ha. (ii) (a) 236.8 Kg/ha. (b) 267.3 Kg/ha. (iii) Main effects of N and V are highly significant. (iv) Av. yield of grain in Kg/ha.

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</table>

C.D. for N marginal means=167.2 Kg/ha.
C.D. for V marginal means=219.9 Kg/ha.

---

Crop :- Paddy (Rabi).


Object :- To evolve a high yielding strain from the popular local variety.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) N.A. (ii) Alluvial clay. (iii) N.A./30.10.65. (iv) (a) Ploughing, and levelling. (b) Transplanting. (c) to (e) N.A. (v) Ultra Phosphate and Mur. Pot. as basal dressing. (vi) As per treatments. (vii) Irrigated. (viii) Weeding. (ix) 43 cm. (x) 8.2.66.

2. TREATMENTS:
Main-plot treatments : M_1=Normal manuring and M_2=Heavy manuring.

Sub-plot treatments :
5 varieties : V_1=Athikkira (standard), V_2=Athikkira—2, V_3=Athikkira, V_4=Athikkira—10 and V_5=P.T.B.—20.

3. DESIGN :
(i) Split-plot. (ii) (a) 2 main-plots/replcations and 5 sub-plots/main-plot. (b) 6.1 m. x 30.5 m. (iii) 6. (iv) (a) 6.1 m. x 3.9 m. (b) 5.9 m. x 2.9 m. (v) One row amlround. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Endrin 0.04% sprayed against the attack of stem borer. (iii) Yield of grain. (iv) (a) 1964—N.A. (b) Yes. (c) N.A. (v) Moncompu and Thakazhi (c.f.). (vi) and (vii) Nil.

5. RESULTS:
(i) 3633 Kg/ha. (ii) (a) 64.9 Kg/ha. (b) 226.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.
Crop :- Paddy (Rabi).
Site :- Rice Res. Stn., Moncompu.

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

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) 33.6 Kg/ha. of N as C/A/N+44.8 Kg/ha. of P₂O₅ as Hyper. Phos.+33.6 Kg/ha. of K₂O as Mur. Pot. (ii) Alluvial clay. (iii) 11.9.64/12.10.64. (iv) (a) 4 ploughings and levelling. (b) Transplanting. (c) 45 Kg/ha. in nursery. (d) 15 cm. x 15 cm. (e) 2. (v) Lime was applied at 224 Kg/ha. and washing has been done before the operations to reduce the acidity of the soil. (vi) As per treatments. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 20.1.65.

2. TREATMENTS:

   Main-plot treatments:
   2 manurial treatments: M₁ = 33.6 Kg/ha. of N+44.8 Kg/ha. of P₂O₅+22.4 Kg/ha. of K₂O and M₂ = 67.2 Kg/ha. of N+89.7 Kg/ha. of P₂O₅+44.8 Kg/ha. of K.

   Sub-plot treatments:
   5 cultures: V₁ = Culture No. 2, V₂ = Culture No. 37, V₃ = Culture No. 40, V₄ = P.T.B.-20 and V₅ = Local Athikkina.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/replication; 5 sub-plots/main-plot. (b) 13'1 m. x 10'1 m. (iii) 6. (iv) (a) and (b) 6'1 m. x 1'5 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Rain caused damage to the crop in initial stages. (ii) Slight attack of stem-borer; Endrin sprayed once. (iii) Tiller counts and height of plants at the productive phase and yield of grain. (iv) (a) 1964—N.A. (b) Yes. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   (i) 3110 Kg/ha. (ii) (a) 873.2 Kg/ha. (b) 640.0 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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C.D. for V marginal means = 527.9 Kg/ha.
Crop: Paddy (Rabi).

Site: Rice Res. Sta., Moncompu.

Object: To study the effect of manures on different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) Alluvial clay. (iii) 19.10.64/20.11.64; 28.9.65/30.10.65. (iv) (a) 6 ploughings and levellings. (b) Transplanting. (c) 49 Kg/ha. of nursery. (d) 15 cm. x 15 cm. (e) 2. (v) N.A. (vi) Athikkira (medium). (vii) Nil. (viii) 1 hand weeding. (ix) 43 em.; N.A. (x) 20.2.65; 5.2.66.

2. TREATMENTS:
   Main-plot treatments:
   2 levels of manures: M1 = 33.6 Kg/ha. of N + 44.8 Kg/ha. of P2O5 + 22.4 Kg/ha. of K2O and M2 = 2M1.

   Sub-plot treatments:
   Full dose of P2O5 and K2O and 1/4 dose of N applied as basal dressing other 1/4 of N applied 30 days after transplanting manures applied by broadcasting.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/replication; 5 sub-plots/main-plot. (b) 13 m. x 10 m. (iii) 6. (iv) (a) and (b) 6 m. x 1.5 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Slight attack of stem borer and Endrin sprayed. (iii) Yield of grain. (iv) (a) 1964–65. (b) and (c) N.A. (v) Kumarakom. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present in main-plot and absent in sub-plot.

5. RESULTS:
   (i) 4648 Kg/ha. (ii) (a) 2190.3 Kg/ha. (based on 1 d.f. made up of main-plot Treatments x years interaction). (b) 417.4 Kg/ha. (based on 88 d.f. made up of Treatments x years interaction and pooled error). (iii) Main effect of V is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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C.D. for V marginal means = 219.8 Kg/ha.

Crop: Paddy (Rabi).

Site: Rice Res. Sta., Moncompu.

Object: To evolve a high yielding strain for the popular local variety of Athikkira.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 33.6 Kg/ha. of N as C/A+N+44.8 Kg/ha. of P2O5 as Hyper. Phos. + 33.6 Kg/ha. of K2O as Mur. Pot. (ii) Alluvial clay. (iii) 11.0.64; 18.10.65. (iv) (a) 4 ploughings and levellings. (b) Transplanting. (c) 45 Kg/ha. in nursery. (d) 15 cm. x 15 cm. (e) 2. (v) N.A. (vi) Athikkira. (vii) Irrigated. (viii) Weeding. (ix) 68–4 cm.; 42–7 cm. (x) N.A.; 29.1.66.
2. TREATMENTS:

Main-plot treatments:

2 doses of fertilizers: $M_1 = 33.6$ Kg/ha. of N$+44.8$ Kg/ha. of P$\text{O}_4 + 22.4$ Kg/ha. of K$\text{O}$ and $M_2 =$ Twice $M_1$.

Sub-plot treatments:

5 varieties: $V_1 =$ Athikkira standard, $V_2 =$ Athikkira No. 2, $V_3 =$ Athikkira No. 37, $V_4 =$ Athikkira No. 40 and $V_5 =$ P.T.B. – 20.

$N$ as C/A/N, P$\text{O}_4$ as Ultra Phos. and K$\text{O}$ as Mur. Pot.

3. DESIGN:

(i) Split-plot. (ii) (a) 2 main-plots/replication; 5 sub-plots/main-plot. (b) 61 m. x 30.5 m. (iii) 6. (iv) (a) 61 m. x 31 m. (b) 59 m. x 29 m. (v) 8 cm. x 8 cm. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Endrin was sprayed. (iii) Yield of grain. (iv) (a) 1964 – 65. (b) and (c) N.A. (v) Nil. (vi) N.A. (vii) Sub-plot error variances are heterogeneous. Hence the results of individual years are presented under 5. Results.

5. RESULTS:

64(21)

(i) 6051 Kg/ha. (ii) (a) 715.9 Kg/ha. (b) 534.8 Kg/ha. (iii) Main effect of $V$ alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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C.D. for V marginal means = 441.2 Kg/ha.

66(15)

(i) 4674.9 Kg/ha. (ii) (a) 399.2 Kg/ha. (b) 303.1 Kg/ha. (iii) Main effect of $V$ alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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C.D. for V marginal means = 250.0 Kg/ha.

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**Crop:** Paddy (Kharif).  
**Site:** Agri. Res. Stn., Pattambi.  
**Ref:** K. 61(62), 62(76), 63(160).  
**Type:** ‘MV’.

Object: To study the response to manuring of different varieties of Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil for 61(62); Paddy—Paddy for 62(76) and 63(160). (b) Paddy. (c) G.L. at 4483Kg/ha. as basal dressing and C/A/N at 56 Kg/ha. as top dressing for 61(62); As per treatments for 62(76); N.A. for 63(160). (ii) Shallow laterite. (iii) 2.6.61/3.7.61; 23.5.62/3.7.62, 26.6.63/27.7.63. (iv) (a) 6 to 8 ploughings and puddlings. (b) to (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) 1 to 2 weedings. (ix) 347 cm. for 61(62); 229 cm. for 62(76), N.A., for 63(160). (x) 30.9.61, 12.10.61; 5.10.62; 2.11.63.
2. TREATMENTS:

Main-plot treatments:

3 levels of manures: M₀ = No manure, M₁ = 4483 Kg/ha of O.L. + 22.4 Kg/ha of N as A/S + 22.4 Kg/ha of P₂O₅ as Super and M₂ = 2 M₁.

Sub-plot treatments:


3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/replication and 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 7.3 m. x 2.4 m. for 61(62); 7.6 m. x 2.4 m. for others. (v) No. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-63. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) Combined results are given below for 1961 and 1962 and individual results for 1963, as the error variances for 63 is different from those of 61 and 62. Both the error variances (for 61 and 62) are homogeneous and Treatments x years interactions are present for main and sub-plots.

5. RESULTS:

(i) 2048 Kg/ha. (ii) (a) 1192.4 Kg/ha. (based on 2 d.f. made up of interaction of treatments with years). (b) 945.0 Kg/ha. (based on 6 d.f. made up of interactions of various components of Treatments x years). (iii) Main effect of V is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
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<th>M₀</th>
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<th>M₂</th>
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C.D. for V marginal means = 667.6 Kg/ha.

63(160)

(i) 1064 Kg/ha. (ii) (a) 419.0 Kg/ha. (b) 215.3 Kg/ha. (iii) Main effect of M is significant while that of V is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
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C.D. for M marginal means = 418.5 Kg/ha.

C.D. for V marginal means = 184.6 Kg/ha.
Crop: Paddy (Kharij);
Ref: 61(37), 62(102), 63(158);
Type: 'MV'.

Obj.: To study the effect of manures on different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy. (b) Paddy. (c) G.L. at 5604 Kg/ha.+B.M. at 112 Kg/ha.+56 Kg/ha. of Mur. Pot. applied as basal dressing for 61(37); As per treatments for 62(102); N.A. for 63(158)
(ii) Shallow laterite.
(iii) 2.6.69/14.7.61; 23.5.1962/25.6.62 ; N.A.
(iv) (a) 8 ploughings, puddlings, plankings and levellings.
(b) Transplanting for 61(37); N.A. for others. (c) to (e) N.A.
(v) Nil.
(vi) As per treatments. (vii) Unirrigated.
(viii) Weeding and gap filling. (ix) 361'0 cm ; 228'6 cm. ; N.A.
(x) 11.10.61 and 26.10.61 ; 17, 18.10.62 ; N.A.

2. TREATMENTS:
Main-plot treatments:
3 levels of manure: M_0 = Control (no manure), M_1 = 4488 Kg/ha. of G.L. + 22 Kg/ha. each of N, P_2O_5, and K_2O as AS, Super and Pot. Sul. respectively and M_2 = 2M_1.
Sub-plot treatments:
9 varieties: V_1 = PTB-1, V_2 = PTB-2, V_3 = PTB-5, V_4 = PTB-9, V_5 = PTB-22, V_6 = PTB-24, V_7 = PTB-26, V_8 = PTB-31 and V_9 = PTB-34.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication and 9 sub-plots/main-plot. (b) N.A. (iii) (a) 6·1 m. x 3·1m. (iv) N.A. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-63. (b) Yes. (c) —. (v) N.A. (vi) Nil. (vii) Sub-plot error variances are heterogeneous. Therefore individual results are given in 5. Results.

5. RESULTS:
61(37)
(i) 1772 Kg/ha. (a) 319·8 Kg/ha. (b) 253·6 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V_1</th>
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<th>V_3</th>
<th>V_4</th>
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C.D. for V marginal means—206·6 Kg/ha.

62(102)
(i) 2289 Kg/ha. (ii) (a) 630·2 Kg/ha. (b) 354·8 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
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<th>V_4</th>
<th>V_5</th>
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C.D. for V marginal means—289·0 Kg/ha.
Crop :- Paddy ('Kharij').  
Site :- Central Rice Res. Sta., Pattambi.  
Object :- To assess the response of different strains to different levels of manuring in double crop Paddy.

1. BASAL CONDITIONS:
   (i) (a) Faddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Laterite loam. (iii) 23.5.62/25.6.62. (iv) (a) Digging and levelling. (b) Nursery sown and seedling planted. (c) —. (d) 25 cm. between lines. (e) 2. (v) and (vi) As per treatments. (vii) Irrigated. (viii) Gap filling and weeding. (ix) N.A. (x) 17.10.62.

2. TREATMENTS:
   Main-plot treatments :
   3 manuring levels : $M_0$=No manure, $M_1$=4480 Kg/ha. of G.L. + 22'4 Kg/ha. each of N, P and K and $M_2$=8960 Kg/ha. of G.L. +44'8 Kg/ha. each of N,P, and K.

Sub-plot treatments :
9 strains of PTB $V_1=1$, $V_2=2$, $V_3=5$, $V_4=9$, $V_5=22$, $V_6=24$, $V_7=26$, $V_8=31$ and $V_9=34$.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication and 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6'1 m. x 3'1 m. (v) One row on each side. (vi) Yes.

4. GENERAL:
   (i) Lodged after flowering. (ii) Nil. (iii) Grain yield. (iv) (a) 1962—64 (b) No. (c) —. (v) to (vii) Nil.

5. RESULTS:
   (i) 2289 Kg/ha. (ii) (a) 631'0 Kg/ha. (b) 355'2 Kg/ha. (iii) Main effect of $V$ alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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C.D. for $V$ marginal means—289'5 Kg/ha.
Crop :- Paddy (Raoi).

Site :- Central Rice Res. Stn., Pattambi.

Object :- To study the effect of manures on different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Laterite loam. (iii) 25.0.61/11.11.61 ; 1.10.62/9.11.62 ; 10.10.62/12.11.62. (iv) (a) 4 ploughings and two diggings. (b) Transplanting. (c) N.A. (d) 25 cm. between lines. (e) 2. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) Weeding twice. (ix) 52.4 cm. for 61 ; N.A. for 62 and 63. (x) 2, 2.6.12 ; 16.2.63 ; 26.2.64 to 7.3.64.

2. TREATMENTS:
   Main-plot treatments:
   3 levels of manures: M₀ = Control, M₁ = 4483 Kg/ha. of G.L. + 22 Kg/ha. of P₂O₅ and 22 Kg/ha. of K₂O as A/S, Super and Pot. Sui. respectively, M₂ = Twice M₁.
   Sub-plot treatments:

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication ; 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 6.1 m. x 3.1 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Negligible. (iii) Yield of grain. (iv) (a) 1961 - 63. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments X years interaction is absent. Results of individual years are presented. Data for 1963 expt. was not available.

5. RESULTS:
   61(38)
   (i) 1883 Kg/ha. (ii) (a) 268.6 Kg/ha. (b) 304.7 Kg/ha. (iii) Main effects of V and interaction M x V are highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<th>V₃</th>
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C.D. for V marginal means = 248.8 Kg/ha.
C.D. for M means at the same level of V = 430.9 Kg/ha.
C.D. for V means at the same level of M = 430.6 Kg/ha.

62(125)
(i) 2681 Kg/ha. (ii) (a) 420.5 Kg/ha. (b) 391.5 Kg/ha. (iii) Main effects of M and V are highly significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for M marginal means = 257.2 Kg/ha.
C.D. for V marginal means = 319.7 Kg/ha.
Crop: Paddy (Kharif).

Object: To assess the response of different strains of Paddy to different levels of manuring.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy, (b) Paddy, (c) As per treatments. (ii) Shallow laterite. (iii) 1.6.60/1.7.60.
   (iv) (a) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) N.A. (ix) 308 cm.
   (x) 3.10.60.

2. TREATMENTS:
   Main-plot treatments:
   3 levels of manures: M1=6725 Kg/ha. of G.L.+4708 Kg/ha. of C.M.+224 Kg/ha. of A/S, M2=5604 Kg/ha. of G.L.+2354 Kg/ha. of C.M.+112 Kg/ha. of A/S and M3=1121 Kg/ha. of G.L.+785 Kg/ha. of C.M.+56 Kg/ha. of A/S.

   Sub-plot treatments:
   G.L. and C.M. applied as basal dressing and A/S as top dressing one month after planting.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication and 11 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.6 m. x 2.4 m. (v) An inter space of 60 cm. is left between plots. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Grain yield. (iv) (a) 1957—60. (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 2672 Kg/ha. (ii) (a) 368.5 Kg/ha. (b) 296.5 Kg/ha. (iii) Main effects of V and M are significant.
   (iv) Av. yield of grain in Kg/ha.

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C.D. for M marginal means=192.2 Kg/ha.
C.D. for V marginal means=240.9 Kg/ha.

Crop: Paddy (Rabi).

Object: To assess the response of the strains of Paddy to different levels of manuring.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy, (b) Paddy, (c) As per treatments. (ii) Shallow laterite. (iii) 26.9.60/3.11.60.
   (iv) and (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) N.A. (ix) 308.7 cm. (x) On different dates according to maturity.
2. TREATMENTS:

Main-plot treatments:
3 levels of manure: $M_1=6725$ Kg/ha. of G.L. + $4708$ Kg/ha. of C.M. + $224$ Kg/ha. of A/S, $M_2=5604$ Kg/ha. of G.L. + $2354$ Kg/ha. of C.M. + $112$ Kg/ha. of A/S, $M_3=5604$ Kg/ha. of G.L. + $2354$ Kg/ha. of C.M. + $112$ Kg/ha. of A/S.

Sub-plot treatments:
8 varieties: $V_1=PTB-4$, $V_2=PTB-12$, $V_3=PTB-15$, $V_4=PTB-18$, $V_5=PTB-20$, $V_6=PTB-21$, $V_7=PTB-27$ and $V_8=PTB-33$.

G.L. and C.M. applied as basal dressing and A/S as top dressing one month after planting.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication and 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 7.6 m. x 2.4 m. (v) An inter space of 60 cm. is left between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Grain yield. (iv) (a) 1957-60. (b) Yes. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 2444 Kg/ha. (ii) (a) 576.4 Kg/ha. (b) 478.4 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V</th>
<th>V</th>
<th>V</th>
<th>V</th>
<th>V</th>
<th>V</th>
<th>V</th>
<th>V</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M_1</td>
<td>2591</td>
<td>2422</td>
<td>3235</td>
<td>2166</td>
<td>2835</td>
<td>2453</td>
<td>2769</td>
<td>2568</td>
</tr>
<tr>
<td>M_2</td>
<td>5895</td>
<td>1915</td>
<td>3566</td>
<td>2335</td>
<td>2171</td>
<td>2248</td>
<td>2274</td>
<td>2300</td>
</tr>
<tr>
<td>M_3</td>
<td>2575</td>
<td>1797</td>
<td>3346</td>
<td>2098</td>
<td>1979</td>
<td>1915</td>
<td>2347</td>
<td>2300</td>
</tr>
<tr>
<td>Mean</td>
<td>2687</td>
<td>2045</td>
<td>3389</td>
<td>2166</td>
<td>2328</td>
<td>2205</td>
<td>2463</td>
<td>2265</td>
</tr>
</tbody>
</table>

C.D. for V marginal means = 390.6 Kg/ha.

Crop : - Paddy. Ref : K. 64(61), 65(9);
Site : - Reg. Rice Res. Stn., Kayamkulam. Type : - 'C'.

Object : - To find out the optimum time and frequency of interculturing the transplanted Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 33.6 Kg/ha. of each of N as A/S, P, O, as Super and K, O as Mur. Pot. (ii) Sandy loam. (iii) 4.9.64 ; 30.8.65. (iv) (a) 5 ploughings. (b) to (e) N.A. (v) 5000 Kg/ha. of C.M. + 125 Kg/ha. of Super + 60 Kg/ha. of Mur Pot. + 50 Kg/ha. of Urea. Half of Urea as basal dressing and half as top dressing. (vi) UR-19. (vii) Unirrigated. (viii) As per treatments. (ix) 98.0 cm. ; 95.5 cm. (x) 5.1.65 ; 12.1.66.

2. TREATMENTS:
8 times of interculturing : $T_0$ = No interculturing, $T_1$ = 15 days, $T_2$ = 30 days, $T_3$ = 45 days after transplanting $T_4$ = 15 and 30 days, $T_5$ = 15 and 45 days, $T_6$ = 30 and 45 days and $T_7$ = 15, 30 and 45 days after transplanting.

3. DESIGN:
(i) R.B.D. (ii) (a) 8. (b) 36.6 m. x 6.1 m. for 64(61); 32 m. x 8 m. for 65(9). (iii) 4. (iv) (a) and (b) 6.1 m. x 4.6 m. for 64; 4 m. x 8 m. for 65. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Bitox and Endrin sprayed. (iii) Grain yield. (iv) (a) 1964 - cond. (b) N.A. (c) Nil. (v) to (vii) N.A.
5. RESULTS:

64(61)

(i) 2975 Kg/ha. (ii) 216·0 Kg/ha. (iii) Treatment differences are highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2655</td>
<td>3615</td>
<td>3068</td>
<td>3023</td>
<td>2933</td>
<td>2879</td>
<td>2870</td>
</tr>
</tbody>
</table>

C.D. = 317·7 Kg/ha.

65(9)

(i) 2318 Kg/ha. (ii) 240·5 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2070</td>
<td>2305</td>
<td>2277</td>
<td>2469</td>
<td>2328</td>
<td>2344</td>
<td>2727</td>
</tr>
</tbody>
</table>

C.D. = 353·7 Kg/ha.

Crop: - Paddy (Kharif).

Site: - Rice Res. Stn., Kayamkulam.

Ref: - K. 61(17), 62(44), 63(71).

Type: - 'C'.

Object: - To find out the best method of sowing and covering seeds.

1. BASAL CONDITIONS:

   (i) (a) Nil. (b) Paddy. (c) 4683 Kg/ha. of C.M.+112 Kg/ha. of Super as basal dressing and 112 Kg/ha. of A/S+56 Kg/ha. of Mur. Pot. as top dressing for 62(44); N.A. for others. (ii) Sandy loam. (iii) 7.4.61; 17.4.62; 8.4.63. (iv) (a) As per treatments for 62(44); 1 ploughing with iron plough followed by 2 ploughings with local plough for others. (b) As per treatments. (c) N.A. for 62(44); 40 Kg/ha. for others. (d) and (e) N.A. (v) Super at 112 Kg/ha. as basal dressing and 1681 Kg/ha. of C.M.+ 56 Kg/ha. of A/S+56 Kg/ha. of Mur. Pot. as top dressing for 62(44); 120 Kg/ha. of Super broadcast before the final ploughing for others. (vi) P.T.B. - 31; P.T.B. - 23. (vii) Unirrigated (viii) 2 intercultivations and weedings for 62(44); N.A. for others. (ix) N.A. (x) 31.7.61; 2.8.62; 5.8.63.

2. TREATMENTS:

4 methods of sowing: M_1 = Broadcast sowing and covering by 2 ploughings, M_2 = Broadcast sowing and covering by one ploughing and planking, M_3 = Dibbling behind the country plough and planking and M_4 = Sowing with Chinese seed drill and planking.

Note: - For 61(17) M_1 was not applied.

3. DESIGN:

R.B.D. (ii) (a) 4. (b) N.A. (iii) 8 for 61(17), 6 for others.  (iv) (a) and (b) 6·1 m. x 3·1 m. for 62(44) and 63(71); (a) 11·9 m. x 6·7 m. (b) 6·7 m. x 3·7 m. for 61(17). (v) N.A. (vi) Yes.

4. GENERAL:

(i) Immediately after flowering treatments M_1, M_2 lodged in all the replications in 62(44); Normal for others. (ii) Nil for 62(44); Helminthosporium attack in other experiments which was controlled by spraying Fytolan. (iii) Yield of grain. (iv) (a) 1961-63 (treatments modified in 62). (b) No. (c) Results of combined analysis for 62 and 63 and individual year results for 61 are given under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:

(i) 993 Kg/ha. (ii) 512·2 Kg/ha. (based on 3 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M_1</th>
<th>M_2</th>
<th>M_3</th>
<th>M_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av yield</td>
<td>798</td>
<td>971</td>
<td>1320</td>
<td>882</td>
</tr>
</tbody>
</table>
(i) 1173 Kg/ha.  (ii) 282.7 Kg/ha.  (iii) Treatment differences are highly significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>993</td>
<td>1000</td>
<td>1526</td>
</tr>
</tbody>
</table>

C.D. = 294.0 Kg/ha.

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

**Site :-** Rice Res. Stn., Kayamkulam.

**Object :-** To find out the optimum time and number of intercultures for Paddy crop.

1. **BASAL CONDITIONS**:
   (i) (a) N.A.  (b) Paddy.  (c) 4042 Kg/ha. of C.M. + 124 Kg/ha. of Super + 62 Kg/ha. of Mur. Pot. + 62 Kg/ha. of A/S.
   (ii) Sandy loam.  (iii) 25.4.64.
   (iv) (a) One ploughing with iron plough, 3 ploughings with country plough, levelling, breaking of clods.  (b) Dibbling seeds behind the plough in furrows.  (c) to (e) N.A.
   (v) 25 Kg/ha. of A/S, 25 Kg/ha. of Mur. Pot. and 50 Kg/ha. of Super applied as basal dressing 25 Kg/ha. of A/S top dressed one month after sowing.  (vi) PTB - 23.  (vii) Unirrigated.  (viii) N.A.  (ix) 120′6 m.  (x) 4.8.64.

2. **TREATMENTS**:
   8 times of interculture:  
   - T0 = No interculture, T1 = 15 days, T2 = 25 days, T3 = 35 days, T4 = 15 and 25 days, T5 = 15 and 35 days, T6 = 25 and 35 days and T7 = 15, 25 and 35 days after sowing.

3. **DESIGN**:
   (i) R.B.D.  (ii) (a) 8.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 8 m. × 4 m.  (v) N.A.  (vi) Yes.

4. **GENERAL**:
   (i) Satisfactory.  (ii) Nil but spraying Endrex mixed with Fytolan (twice) was applied as a prophylactic measure.  (iii) Grain yield.  (iv) (a) 1964 only.  (b) and (c) N.A.  (v) to (vii) Nil.

5. **RESULTS**:
   (i) 1938 Kg/ha.  (ii) 280.8 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1719</td>
<td>1836</td>
<td>1938</td>
<td>2055</td>
<td>2234</td>
<td>1977</td>
<td>1797</td>
<td>1943</td>
</tr>
</tbody>
</table>

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**Crop :-** Paddy (Reh).

**Site :-** Rice Res. Stn., Kayamkulam.

**Object :-** To find out the optimum time and frequency of working rotary cultivator to increase the yield of Paddy.

1. **BASAL CONDITIONS**:
   (i) (a) N.A.  (b) and (c) Nil.  (ii) Sandy loam.  (iii) N.A./16.8.63.  (iv) (a) 2 ploughings with tractor and 2 with country plough and puddling.  (b) Transplanting.  (c) to (e) N.A.  (v) C.M. 6000 Kg/ha. Super at 125 Kg/ha., Mur. Pot. at 60 Kg/ha. as basal application and A/S at 100 Kg/ha. as top dressing.  (vi) UR - 19/165 days.  (vii) Unirrigated.  (viii) N.A.  (ix) 99 cm.  (x) 2.1.64.
2. TREATMENTS:

6 times of interculture: $T_1 = 15$th day, $T_2 = 30$th day, $T_3 = 45$th day, $T_4 = 30$th and 30th day, $T_5 = 45$th day and 45th day after planting.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 6 x 6 m. (b) 5 x 5 m. (v) 13 cm. x 8 cm. (vi) Yes.

4. GENERAL:

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

5. RESULTS:

(i) 2370 Kg/ha. (ii) 140·3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$T_1$</th>
<th>$T_2$</th>
<th>$T_3$</th>
<th>$T_4$</th>
<th>$T_5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2376</td>
<td>2436</td>
<td>2282</td>
<td>2332</td>
<td>2398</td>
</tr>
</tbody>
</table>

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**Crop**: Paddy (Kharif).

**Site**: Rice Res. Stn., Kayamkulam.

**Object**: To find out the efficiency of growing different Catch crops during the third crop season and to study their effect on the succeeding Paddy crop.

1. BASAL CONDITIONS:

(i) (a) As per treatments. (b) Catch crops as per treatments. (c) N.A. (iii) Sandy loam. (iii) 29.4.65. (iv) (a) Ploughing and furrow making. (b) Dibbling. (c) N.A. (v) 136 Kg/ha. each of N, P, K as A/S, Super and Mur. Pot. respectively. (vi) PTB-23. (vii) Unirrigated. (viii) Two intercultures and 2 hand weedicings. (ix) 168 cm. (x) 6.8.65.

2. TREATMENTS:

$T_0$=Fallow, $T_1$=Sesamum followed by paddy, $T_2$=Corn-pea followed by paddy, $T_3$=Horse gram followed by paddy, $T_4$=Black gram followed by paddy, $T_5$=Groundnut followed by paddy.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 7 m. x 5 m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Grain yield. (iv) (a) 1965—contd. (b) Yes. (c) N.A. (v) to (vii) Nil.

5. RESULTS:

(i) 1774 Kg/ha. (ii) 196·7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$T_0$</th>
<th>$T_1$</th>
<th>$T_2$</th>
<th>$T_3$</th>
<th>$T_4$</th>
<th>$T_5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1929</td>
<td>1636</td>
<td>1707</td>
<td>1700</td>
<td>1843</td>
<td>1829</td>
</tr>
</tbody>
</table>

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**Crop**: Paddy (Rabi).

**Site**: Reg. Rice Res. Stn., Kayamkulam.

**Object**: To find out the efficiency of growing different Catch crops and study their effect on the yield of succeeding crop of Paddy.
1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) 6 ploughings, 2 levellings, and inter-culturing with Japanese hoe. (b) to (e) N.A. (v) N.A. (vi) U.R.—19 (late) (vii) Unirrigated. (viii) 2 hand weedings and 1 interculturing. (ix) 95 cm. (x) N.A.

2. TREATMENTS:
   5 types of Catch crop: $T_0$=Fallow, $T_1$=Sesamum, $T_2$=Corn pea, $T_3$=Horse gram, $T_4$=Black gram and $T_5$=Groundnut.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) 30 m. x 7 m. (iii) 4. (iv) (a) and (b) 7 m. x 5 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) N.A. (iii) Yield of grain. (iv) (a) 1965—contd. (b) Yes. (c) Nil. (v) to (viii) N.A.

5. RESULTS:
   (i) 1760 Kg/ha. (ii) 199·6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$T_0$</th>
<th>$T_1$</th>
<th>$T_2$</th>
<th>$T_3$</th>
<th>$T_4$</th>
<th>$T_5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1829</td>
<td>1664</td>
<td>1900</td>
<td>1714</td>
<td>1700</td>
<td>1750</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharij).
Site :- Rice Res. Stn., Kayamkulam.
Object :- To ascertain the efficiency of sowing with Chinese seed drill in comparison with local method.

Ref :- K. 61(5).
Type :- 'C'.

C.D. = 161·0 Kg/ha.
Crop: Paddy (Kharif).  
Site: Rice Res. Stn., Kottarakara.  
Object: To find out the optimum time and number of inter-cultivations for transplanted Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Fallow—Paddy.  
   (b) Paddy.  
   (c) N.A.  
   (ii) Lateritic and porous.  
   (iii) 9.6.63/10.7.63.  
   (iv) (a) Ploughings by wooden plough and levelling.  
   (b) Transplanting.  
   (c) 34 Kgha.  
   (d) 15 cm. x 25 cm.  
   (e) 2 (v) C.M. at 4942 Kgha. + Super at 161 Kgha. + Mur. of Pot. at 62 Kgha. as basal dressing and A/S at 111 Kgha. as top dressing one month before flowering.  
   (vi) P.T.B.—24 (125 days).  
   (vii) Unirrigated.  
   (viii) As per treatments.  
   (ix) N.A.  
   (x) 3.10.63.

2. TREATMENTS:
   6 times of working Japanese weeder: 
   \( T_1 = 15 \) days, \( T_2 = 30 \) days, \( T_3 = 45 \) days, \( T_4 = 15 \) days and 30 days, \( T_5 = 15 \) days and 45 days, \( T_6 = 30 \) days and 45 days after planting.

3. DESIGN:
   (i) R.B.D.  
   (ii) 6.  
   (iii) 4.  
   (iv) (a) and (b) 1/250 ha.  
   (v) Nil.  
   (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  
   (ii) Minor attack of Rice hispa; dusting with B.H.C. 10% at 25 Kgha.  
   (iii) Yield of grain.  
   (iv) (a) 1963—only.  
   (b) and (c) Nil.  
   (v) to (vii) N.A.

5. RESULTS:
   (i) 1697 Kgha.  
   (ii) 652 Kgha.  
   (iii) Treatment differences are not significant.  
   (iv) Av. yield of grain in Kgha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
<th>( T_5 )</th>
<th>( T_6 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2067</td>
<td>2026</td>
<td>1596</td>
<td>1670</td>
<td>1165</td>
<td>1655</td>
</tr>
</tbody>
</table>

Crop: Paddy (Rabi).  
Site: Rice Res. Stn., Kottarakara.  
Object: To find out the optimum time and number of intercultures for Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Fallow—Paddy.  
   (b) Paddy.  
   (c) 4942 Kgha. of C.M. for 63(106) ; N.A. for others.  
   (ii) Lateritic.  
   (iii) 18.9.63; 11.9.64 and 28.8.65.  
   (iv) (a) 5 ploughings, 2 levellings and 1 digging.  
   (b) Transplanting.  
   (c) 34 Kgha.  
   (d) 15 cm. x 25 cm.  
   (e) 2 (v) C.M. at 4942 Kgha. of C.M. + 161 Kgha. of Super + 62 Kgha. of Mur. Pot.  
   (vi) P.T.B.—20.  
   (vii) Unirrigated.  
   (viii) As per treatments.  
   (ix) N.A.  
   (x) 22.1.64.  
   (x) 25.1.66.

2. TREATMENTS:
   7 times of working Japanese weeder: 
   \( T_1 = 15 \) days, \( T_2 = 30 \) days, \( T_3 = 45 \) days, \( T_4 = 15 \) days and 30 days, \( T_5 = 15 \) days and 45 days, \( T_6 = 30 \) days and 45 days and \( T_7 = 15 \) days and 30 days and 45 days after transplanting.

3. DESIGN:
   (i) R.B.D.  
   (ii) 7.  
   (b) 20'1 m x 24'1 m. for 63(106); 23'0 m. x 9'3 m. for 64(78), 65(14).  
   (iii) 4.  
   (iv) (a) and (b) 7'6 m. x 4'3 m. for 63(106).  
   (v) Nil.  
   (vi) Yes.

4. GENERAL:
   (i) Slightly lodged.  
   (ii) N.A. (iii) Grain yield.  
   (iv) (a) 1963—contd.  
   (b) N.A.  
   (c) Nil.  
   (v) and (vi) N.A.  
   Hence the results of individual years are presented.
5. RESULTS:

63(106)

(i) 2003 Kg/ha. (ii) 328·3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2115</td>
<td>1964</td>
<td>2268</td>
<td>2051</td>
<td>1817</td>
<td>2086</td>
<td>1724</td>
</tr>
</tbody>
</table>

64(78)

(i) 3311 Kg/ha. (ii) 334·2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3543</td>
<td>3188</td>
<td>3104</td>
<td>3029</td>
<td>3469</td>
<td>3235</td>
<td>3610</td>
</tr>
</tbody>
</table>

65(14)

(i) 4074 Kg/ha. (ii) 414·2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3875</td>
<td>4054</td>
<td>4261</td>
<td>4413</td>
<td>4009</td>
<td>4207</td>
<td>3696</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).

Site: Rice Res. Stn., Mannuthy.

Ref: K. 61(28), 62(89), 63(124).

Type: C?.

Crop: Paddy (Kharif).

Site: Rice Res. Stn., Mannuthy.

Ref: K. 61(28), 62(89), 63(124).

Type: C?.

Object: To find out the efficacy of different methods of covering broadcast Paddy.

1. BASAL CONDITIONS:

(i) (a) Paddy—Paddy for 61(28); N.A. for 62(89); Nil for 63(124). (b) Paddy. (c) 504 Kg/ha of C.M. + Super at 112 Kg/ha, + Mur. Pot. at 56 Kg/ha, + A/S at 112 Kg/ha, for 61(28); C.M. at 2242 Kg/ha + Super at 112 Kg/ha + Mur. Pot. at 56 Kg/ha, for 62(89); 5604 Kg/ha of C.M. + 24 Kg/ha of P.O as Super + 34 Kg/ha of K.O as Mur. Pot. for 63(124); (ii) Laterite. (iii) 28 4·61; 3.5 62; 12 5·63 (iv) (a) 6 ploughings. (b) Broadcast for 61(28), 63(124); As per treatments. (c) 112 Kg/ha; 34 to 45 Kg/ha; 90 Kg/ha, for 62(89). (d) N.A.; 15 cm x 25 cm; N.A. (e) N.A. for 61(28) and 63(124); 3 for 62(89). (v) For 61(28) and 62(89) same as in (i) (c) above; 2242 Kg/ha of powdered C.M.+112 Kg/ha of A/S+168 Kg/ha of Super+67 Kg/ha of Mur. Pot. for 63(124). (vi) PTB—32. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A.; 237 cm; 252 cm. (x) 5·9 61; 10, 19·9 62; 17·9 63.

2. TREATMENTS:

3 methods of covering seeds: M_1 = Ploughing twice, M_2 = Ploughing and planking and M_3 = Dibbling of seeds in plough furrows and planking.

3. DESIGN:

(i) R.B.D. (ii) (a) 3. (b) 9 1 m x 14·9 m for 61(28), 62(89); 14·9 m x 15·8 m for 63(124). (iii) 8. (iv) a x 84 6 m x 91 m for 61(28), 62(89); 4·6 m x 7·6 m for 63(124). (v) 7 cm x 7 cm for 61(28), 62(89); Nil for 63(124). (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Case worm and gall fly attack for 61(28) and Endrin sprayed; Rice bug attack in 62(89) controlled by dusting B.H.C 10%; Case worm and gall fly controlled by spraying Endrin in 63(89). (iii) No. of productive tillers and grain yield. (iv) (a) 1961—63. (b) Yes. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:

(i) 2129 Kg/ha. (ii) 245·2 Kg/ha. (based on 4 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M_1</th>
<th>M_2</th>
<th>M_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2199</td>
<td>2211</td>
<td>1977</td>
</tr>
</tbody>
</table>
Crop :- Paddy (Kharij).

Site :- Rice Res. Sta., Mannuthy.

Ref :- K. 63(114), 64(11), 65(25).

Type :- 'C'.

Object :- To find out the optimum number and time of working intercultivator for Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) 5604 Kg/ha. of C.M.+A/S at 112 Kg/ha. + Super at 179 Kg/ha. + Mur. Pot. at 67 Kg/ha. for 63(114); 3000 Kg/ha. of G.L.+30 Kg/ha. of each of N, P₂O₅ and K₂O for 64(11); 5000 Kg/ha. of G.M.+40 Kg/ha. of N+30 Kg/ha. of each of P₂O₅ and K₂O for 65(25). (ii) Laterite. (iii) 10.6:6.3:11.7; 22.5:6.4:7.6; N.A. (iv) (a) 6 ploughings and puddlings for 63(114); 6 ploughings puddling and levelling for 64(11); 6 ploughings for 65(25). (v) Transplanting. (c) 25 Kg/ha. for 63(114), 64(11); N.A. for 65(25). (d) 15 cm. x 25 cm. 63(114), 64(11); N.A. for 65(25). (e) 2 63(114), 64(11); N.A. for 65(25). (vi) 5604 Kg/ha. of C.M.+168 Kg/ha. of Super in 2 doses and 67 Kg/ha. of Mur. Pot. for 63(114); 3000 Kg/ha. of G.L.+30 Kg/ha. of each of N, P₂O₅, K₂O for 64(11); 5000 Kg/ha. of G.L.+20 Kg/ha. of N +30 Kg/ha. of each of P₂O₅ and K₂O applied at last ploughing for 65(25). (vii) PTB-32 (medium). (viii) Irrigated. (ix) Interculturing as per treatments.

2. TREATMENTS:

7 times of working intercultivator: 7 times of working intercultivator: T₁=15 days, T₂=30 days, T₃=45 days, T₄=15 and 30 days, T₅=15 and 45 days, T₆=30 and 45 days and T₇=15, 30 and 45 days after planting.

3. DESIGN:

(i) R.B.D. (ii) (a) 7. (b) 5:7 m. x 18.9 m. for 63(114); 9:8 m. x 17:6 m. for 64(11); N.A. for 65(25). (iii) 4. (iv) (a) 2:5 m. x 9:1 m. for 63(114); 2.5 m. x 9:1 m. for 64(11); 2:5 m. x 9:1 m. for 65(25). 2:4 m. x 9:1 m. for 65(25). (b) 2:9 m. x 9:0 m. for 63(114); 2:2 m. x 9:2 m. for 64(11); (v) 16 cm. x 6 cm. for 63(114); 15 cm. x 26 cm. for 64(11); 8 cm. x 3 cm. for 65(25). (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Case worm, gall fly, stem borers attack controlled by spraying Endrin 63(114); Stem borer and stalk borer attack for 64(11) and Cupravit, Endrin sprayed Leaf roller, rice bug and bight attack in 65(25) controlled by Cupravit and Endrin 0.1%. (iii) Grain and straw yield. (iv) (a) 1963—65. (b) Yes. (c) Nil. (d) (v)—(vii) Since the error variances are heterogeneous and Treatments x years interaction is absent. Therefore the results of individual years are presented under 5. Results.

5. RESULTS:

63(114)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>2433</td>
<td>1982</td>
<td>2031</td>
<td>2274</td>
<td>2055</td>
<td>2153</td>
<td>2274</td>
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64(11)

<table>
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<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1949</td>
<td>1909</td>
<td>1823</td>
<td>1946</td>
<td>1909</td>
<td>1909</td>
<td>1921</td>
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</table>

65(25)

<table>
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<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3474</td>
<td>3474</td>
<td>3445</td>
<td>3428</td>
<td>3323</td>
<td>3468</td>
<td>3439</td>
</tr>
</tbody>
</table>
Crop: Paddy (Rabi)
Ref: K. 63(115), 64(12), 65(26).
Site: Rice Res. Stn., Mannuthy.
Type: ‘C’.

Object: To find out optimum number and time of working intercultivator for Paddy crop.

1. BASAL CONDITIONS:

(i) (a) Nil.
(b) Paddy.
(e) 5604 Kg/ha. of C.M. +112 Kg/ha. of A/S +179 Kg/ha. of Super +67 Kg/ha. of Mur. Pot. for 63(115); 3000 Kg/ha. of G.L. +30 Kg/ha. of each of N, P, O, and K, O for 64(12); 5000 Kg/ha. of G.L. +40 Kg/ha. of N +30 Kg/ha. of P, O, and K, O for 65(26).
(ii) Laterite.
(iii) 11.10.63; 4.9.64/8.10.64; 19.8.65/2.10.65.
(iv) (a) 6 ploughings and puddlings for 63(115); 6 ploughings, puddling and levelling for 64(12); 9 ploughings for 65(26). (b) Transplanting. (c) 25 Kg/ha. for 63(115) and 64(12); N.A. for 65(26). (d) 15 cm. x 25 cm. for 63(115), 64(12); N.A. for 65(26). (e) 2 for 63(115), 64(12); N.A. for 65(26).
(v) 5604 Kg/ha. of C.M. +168 Kg/ha. of A/S in 2 equal doses. 168 Kg/ha. of Super +67 Kg/ha. of Mur. Pot. for 63(115); 3000 Kg/ha. of G.L. +30 Kg/ha. of each of N, P, O, and K, O for 64(12); 5000 Kg/ha. of G.M. +30 Kg/ha. of each of P, O, and K, O for 65(26). (vi) PTB-12 (medium). (vii) Irrigated. (viii) Intercultivations as per treatments. (ix) 252 cm.; 300 cm.; 35 cm. (x) 8.1.64; 25.1.65; 23.1.66.

2. TREATMENTS:

7 times of working intercultivator: T1 = 15 days, T2 = 30 days, T3 = 45 days, T4 = 15 and 30 days, T5 = 15 and 45 days, T6 = 30 and 45 days, and T7 = 15, 30, and 45 days after planting.

3. DESIGN:

(i) R.B.D.
(ii) (a) 7. (b) 5·7 m. x 18·9 m. for 63(115); 9·8 m. x 17·6 m. for 64(12); N.A. for 65(9).
(iii) (iv) (a) 2·5 m. x 9·1 m. for 63(115); 2·5 m. x 9·8 m. for 64(12); 2·5 m. x 9·1 m. for 65(9). (b) 2·9 m. x 9·0 m. for 63(115); 2·2 m. x 9·2 m. for 64(12); 2·4 m. x 9·1 m. for 65(9). (v) 16 cm. x 6 cm. for 63(115); 15 cm. x 26 cm. for 64(12); 8 cm. x 3 cm. for 65(26). (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Case worm, gall fly, stem borer controlled by spraying Endrin for 63(115). (iii) Tiller counts, height and yield of grain. (iv) (a) 1963-65. (b) Yen. (c) Nil. (v) (a) Kayamkulam. (b) Nil. (vi) Nil. (vii) Since the error variances are heterogeneous and Treatment x years interaction is absent. Therefore results of individual years are presented under 5. Results.

5. RESULTS:

63(115)

(i) 2172 Kg/ha. (ii) 175·5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment | T1 | T2 | T3 | T4 | T5 | T6 | T7
---|---|---|---|---|---|---|---
Av. yield | 2250 | 2116 | 2226 | 2031 | 2274 | 2226 | 2080

64(12)

(i) 3147 Kg/ha. (ii) 139·1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment | T1 | T2 | T3 | T4 | T5 | T6 | T7
---|---|---|---|---|---|---|---
Av. yield | 3206 | 3194 | 3181 | 3108 | 3212 | 3004 | 3126

65(26)

(i) 2784 Kg/ha. (ii) 377·2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment | T1 | T2 | T3 | T4 | T5 | T6 | T7
---|---|---|---|---|---|---|---
Av. yield | 2613 | 2787 | 3026 | 2706 | 2863 | 2712 | 2782
Crop :- Paddy (Kharif).

Site :- Rice Res. Stn., Mannuthy.

Ref :- 62(91), 63(116).

Type :- 'C'.

Object :- To test the efficacy of Japanese weeder produced by the various firms.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) 2242 Kg/ha. of C.M. for 62(91); 5604 Kg/ha. of C.M. + 112 Kg/ha. of A/S + 168 Kg/ha. of Super + 67 Kg/ha. of Mur. Pot. for 63(116). (ii) Laterite. (iii) 24.5.62/10.7.62; 10.6.63/10.7.63 respectively. (iv) (a) 6 ploughings and puddlings. (b) Transplanting. (c) 34 to 45 Kg/ha. for 62(91); 25 Kg/ha. for 63(116). (d) 25 cm. x 15 cm. (e) 2. (v) G L. at 4483 Kg/ha. for 62(91); 5604 Kg/ha. of C.M. and 34 Kg/ha. each of N, P2O5 and K2O as A/S, Super and Mur. Pot. respectively. (vi) PTB-32 (medium). (vii) Irrigated. (viii) Working with Japanese hoe once; hand weeding once for 63(116). (ix) 237 em. and 252 em. respectively. (x) 4.10.62 and 5.10.63 respectively.

2. TREATMENTS:

   All are Japanese type weeders. Weeding done 20 and 40 days after planting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 8. (b) 12.0 m. x 18.9 m. for 62(91) and 23.5 m. x 18.9 m. for 63(116). (iii) 4. (iv) (a) 2.5 m. x 9.1 m. (b) 2.3 m. x 9.0 m. (v) 12 cm. x 8 cm. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Gall fly, case worm, stem borer etc., controlled by spraying endrin. (iii) No. of productive tillers/hill and grain yield. (iv) (a) 1962-63. (b) N.A. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments x years interaction is absent. Hence the results of individual years are presented under 5. Results.

5. RESULTS:

62(91)
(i) 2070 Kg/ha. (ii) 169.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2080</td>
<td>1989</td>
<td>2165</td>
<td>2043</td>
<td>2122</td>
<td>2062</td>
<td>2128</td>
<td>1970</td>
</tr>
</tbody>
</table>

63(116)
(i) 1972 Kg/ha. (ii) 383.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1934</td>
<td>2055</td>
<td>1837</td>
<td>1849</td>
<td>2068</td>
<td>1861</td>
<td>1910</td>
<td>2262</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Rabi).

Site :- Rice Res. Stn., Mannuthy.

Ref :- K. 62(92), 63(117).

Type :- 'C'.

Object :- To test the efficacy of Japanese weeder produced by various firms.
1. BASAL CONDITIONS:
(i) (a) NA. (b) Paddy. (c) C.M. at 2242 Kg/ha. for 62(92); 5604 Kg/ha. of C.M.+112 Kg/ha. of A/S+168 Kg/ha. of Super+67 Kg/ha. of Mur. Pot. (ii) Laterite. (iii) 5.9.62/N.A.; 5.9.63/10.10.63. (iv) (a) 6 ploughings and puddlings. (b) Transplanting. (c) 34 to 45 Kg/ha. for 62(92), 25 Kg/ha. for 63(117) (d) 15 cm. x 25 cm. (e) 2. (v) G.L. at 4483 Kg/ha. for 62(92), 5604 Kg/ha. of C.M.+34 Kg/ha. each of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O as A/S, Super and Mur. Pot. respectively. (vi) P.T.B.—12 (medium). (vii) Irrigated. (viii) Working Japanese hoe once and hand weeding once. (ix) 63 cm.; 252 cm. (x) 8.1.63 ; 5.1.64.

2. TREATMENTS:
8 weeding treatments: W<sub>0</sub>=No weeding (control); W<sub>1</sub>=Working Kumbakonam weeder, W<sub>2</sub>=Working Swasthik weeder, W<sub>a</sub>=Working American spring weeder, W<sub>s</sub>=Working Curlholmer weeder, W<sub>t</sub>=Working D.H. weeder and W<sub>r</sub>=Hand weeding. All are Japanese type weeders. Weeding done 20 and 40 days after planting.

3. DESIGN:
(i) R.B.D. (ii) (a) 8. (b) 12.0 m. x 18.9 m. for 62(92); 23.5 m. x 18.9 m. for 63(117). (iii) 4. (iv) (a) 2.5 m x 9.1 m. (b) 2.3 m. x 8.9 m. (v) 12 cm. x 8 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) and (iii) N.A. (iv) (a) 1962—only. (b) and (c) Nil. (v) Yes.

5. RESULTS:
(i) 2472 Kg/ha. (ii) 230.0 Kg/ha. (based on 49 d.f. made up of Treatments X years interaction and pooled error). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W&lt;sub&gt;a&lt;/sub&gt;</th>
<th>W&lt;sub&gt;1&lt;/sub&gt;</th>
<th>W&lt;sub&gt;2&lt;/sub&gt;</th>
<th>W&lt;sub&gt;s&lt;/sub&gt;</th>
<th>W&lt;sub&gt;t&lt;/sub&gt;</th>
<th>W&lt;sub&gt;r&lt;/sub&gt;</th>
<th>W&lt;sub&gt;t&lt;/sub&gt;</th>
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<tbody>
<tr>
<td>Av. yield</td>
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<td>2548</td>
<td>2384</td>
<td>2305</td>
<td>2518</td>
<td>2560</td>
<td>2548</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Rabi).  
Type :- 'C'.  
Object :- To find out the optimum number and time of working the intercultivation for Paddy crop.
5. RESULTS:

(i) 1875 Kg/ha.  (ii) 965 Kg/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1828</td>
<td>1913</td>
<td>1883</td>
<td>1880</td>
<td>1871</td>
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</tr>
</tbody>
</table>

Crop: Paddy (Rabi).

Site: Agri. Res. Sta., Pattambi.  Type: 'C'.

Object: To compare the efficacy and economy of different methods of planting...

1. BASAL CONDITIONS:

(i) (a) Nil.  (b) Paddy.  (c) 5604 Kg/ha. of G.L. + 112 Kg/ha. of A/S for 60(24); 5004 Kg/ha. of G.L. + 112 Kg/ha. of B.M. + 68 Kg/ha. of Mur. Pot. + 68 Kg/ha. of C/N for 60(42); N.A. for others.  (ii) Shallow laterite;

(b) 64 cm.  19.5.59/2.11.59;

(c) P.T.B.-26 (medium).

2. TREATMENTS:

3 methods of planting:  M₁ = Bulk planting, M₂ = Planting in lines at 25 cm. spacing, and M₃ = Planting in double rows at 15 cm. x 15 cm. spacing.

3. DESIGN:

(i) R.B.D.  (ii) (a) 3.  (b) N.A.  (iii) 8.  (iv) (a) and (b) 6 1 m. x 1.5 m.  (v) Nₒ.  (vi) Yeş.

4. GENERAL:

(i) Satisfactory.  (ii) N.A.  (iii) Grain yield.  (iv) (a) 1958–1963.  (b) Nₒ.  (c) Results of combined analysis are given under 5. Results.  (v) and (vi) Nil.  (vii) Exp. No. 58(174) is also included while giving the combined results.  Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:

(i) 3574 Kg/ha.  (ii) 211.5 Kg/ha. (based on 94 d. f. made up of pooled error and Treatments x years interaction).  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3648</td>
<td>3415</td>
<td>3668</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).

Site: Agri. Res. Sta., Pattambi.  Type: 'C'.

Object: To compare the efficacy and economy of different methods of planting.

1. BASAL CONDITIONS:

(i) (a) Nil.  (b) Paddy.  (c) 5604 Kg/ha. of G.L. + 112 Kg/ha. of A/S for 60(23); 12 C.L. Kg/ha. of C.M. for 60(75); N.A. for others.  (ii) Shallow laterite;

(b) 229 cm.  18.5.59/30.6.59; 23.5.60/22.6.60; 8.5.62/21.6.62; 28.5.63/27.2.64.

(c) P.T.B.-26 (medium).  (v) P.T.B.-26 (medium).  (vii) Unirrigated.  (viii) 1 to 2 weedings.  (ix) N.A. ; 309 cm. ; 229 cm. ; N.A.  

(a) 3.9.59; 9.10.62; 28.9.62; 7.10.63.
2. TREATMENTS:
3 methods of planting: M₁ = Bulk planting, M₂ = planting in lines at 25 cm. spacing and M₃ = Planting in double rows at 15 cm. x 15 cm. spacing.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) and (b) 6'1 m² x 1'5 m. (v) No. (vi) Yes.

4. GENERAL:
(i) Satisfactory, (ii) N.A. (iii) Grain yield. (iv) (a) 1958—1963 (Expt. for 1961—N.A.) (b) No. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nil. (vii) Expt. No. 58(173) is also included while giving the combined results. Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:
(i) 2912 Kg/ha. (ii) 165.7 Kg/ha. (based on 78 d.f. made up of pooled error and Treatments x years interaction). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2937</td>
<td>2830</td>
<td>2970</td>
</tr>
<tr>
<td>C.D. = 82.8 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif.)


Ref :- K. 61(43), 62(99), 63(155).

Type :- 'C'.

Object :- To find out the effect of planking in uplands after broadcast of Paddy.

1. BASAL CONDITIONS:
(i) (a) No. (b) Paddy, (c) 126 Q/ha. F.Y.M. as basal dressing for 61(43); N.A. for others. (ii) Laterite loam. (iii) 19.5.61 ; 3.5.62 ; 25.5.63. (iv) (a) 6 to 10 ploughings. (b) As per treatments. (c) to (e) N.A. (v) 126 Q/ha. of F.Y.M for 61 (43); 360 Kg/ha. of A/S for 62(99); N.A. for 63. (vi) F.T.B.—28 (medium) (vii) Unirrigated. (viii) 2 weedings. (ix) 359 cm.; 229 cm.; N.A. (x) 6.9.61 ; 3.9.62 ; 20.9.63.

2. TREATMENTS:
3 methods of planting: M₁ = Covering seeds by country plough twice, M₂ = Covering seeds by country plough twice and planking once and M₃ = Dibbling and planking once.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) and (b) 3'1 m. x 3'7 m. (v) An outerspace of 61 cm. left in between plots. (vi) Yes.

4. GENERAL:
(i) Normal in 61(43) and unsatisfactory in 62(99) and 63(155) (ii) Preventive sprayings with insecticides in 62(99); Nil in others. (iii) Tiller counts and grain yield. (iv) (a) 1961—1963. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x years interaction is absent. Results of individual years are presented under 5. Results.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>570</td>
<td>551</td>
<td>532</td>
</tr>
</tbody>
</table>

61(43)

(i) 551 Kg/ha. (ii) 127.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
(i) 206 Kg/ha. (ii) 37.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M&lt;sub&gt;1&lt;/sub&gt;</th>
<th>M&lt;sub&gt;2&lt;/sub&gt;</th>
<th>M&lt;sub&gt;3&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>197</td>
<td>219</td>
<td>203</td>
</tr>
</tbody>
</table>

(63/155)

(i) 251 Kg/ha. (ii) 106.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M&lt;sub&gt;1&lt;/sub&gt;</th>
<th>M&lt;sub&gt;2&lt;/sub&gt;</th>
<th>M&lt;sub&gt;3&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>257</td>
<td>286</td>
<td>209</td>
</tr>
</tbody>
</table>

**Crop :- Paddy (Rabi).**

**Site :- Central Rice Res. Stn., Pattambi.**

Ref :- K. 62(123), 63(157).

**Type :- 'C'.**

Object :- To find out the optimum number and time of working intercultivators for Paddy.

1. **BASAL CONDITIONS :**

(i) (a) Paddy — Paddy. (b) Paddy (c) N.A. for 62 and as per treatments for 63. (ii) Laterite loam. (iii) 1.10.62/1.11.62; 23.9.63/26.10.63. (iv) (a) Digging and levelling. (b) Transplanting. (c) N.A. (d) 25 cm, between lines. (e) 2. (v) 5600 Kg/ha of G.L. (vi) P.T.B.—20 (medium). (vii) Irrigated. (viii) Gap filling 15 days after planting. (ix) N.A. (x) 2.2.63; 30 1.64.

2. **TREATMENTS :**

5 interculture operations: C<sub>0</sub>=No interculturing, C<sub>1</sub>=Once after 15 days of planting, C<sub>2</sub>=Twice 15 and 30 days after planting, C<sub>3</sub>=Thrice 15, 30 and 45 days after planting and C<sub>4</sub>=Five times, 15, 22, 29, 36 and 43 days after planting.

3. **DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 7m. x 3 m. (b) 6'5 m. x 2'5 m. (v) 25 cm. on all sides. (vi) Yes.

4. **GENERAL :**

(i) Lodged after flowering. (ii) N.A. (iii) Yield of grain. (iv) 1962—63. (b) Yes. (c) Results of combined analysis given under 5. Results. (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments x years interaction is absent.

5. **RESULTS :**

(i) 2741 Kg/ha. (ii) 351.1 Kg/ha. (based on 28 d.f. made up of pooled error and Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C&lt;sub&gt;0&lt;/sub&gt;</th>
<th>C&lt;sub&gt;1&lt;/sub&gt;</th>
<th>C&lt;sub&gt;2&lt;/sub&gt;</th>
<th>C&lt;sub&gt;3&lt;/sub&gt;</th>
<th>C&lt;sub&gt;4&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2741</td>
<td>2912</td>
<td>2790</td>
<td>2569</td>
<td>2711</td>
</tr>
</tbody>
</table>

**Crop :- Paddy (Kharif).**

**Site :- Central Rice Res. Stn., Pattambi.**

Ref :- K. 62(104), 63(151).

**Type :- 'C'.**

Object :- To find out the efficacy of different intercultivators.

1. **BASAL CONDITIONS :**

(i) (a) N.A. (b) Paddy. (c) N.A. (c) Shallow laterite. (iii) 23.5.62/23.6.62; 4.6.63/4.7.63. (iv) (a) Ploughing with country plough and levelling. (b) Transplanting. (c) N.A. (d) 25 cm between lines. (e) 2. (v) 12'4 C.L./ha of C.M. (vi) P.T.B.—2 (medium). (vii) Unirrigated. (viii) Weeding twice. (ix) 229 cm. (x) 18.10.62; 17.10.63.
2. TREATMENTS:
6 types of intercultivators for interculturing:
- \( C_0 \) = Control (no interculturing),
- \( C_1 \) = Akshot cultivator,
- \( C_2 \) = Carlohomes and Co. cultivators,
- \( C_3 \) = Rotary cultivator,
- \( C_4 \) = Touret Gune cultivators, and
- \( C_5 \) = Swasthic cultivator.

3. DESIGN:
(i) R.B.D. (ii) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 6'1 m. x 3'0 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Yield of grain, height measurements and tiller counts. (iv) (a) 1962-63. (b) Yes. (c) Results of combined analysis are given under 5. Results. (v) N.A. (v) Nil. (vi) Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:
(i) 3056 Kg/ha. (ii) 193'1 Kg/ha. (based on 31 d.f. made up of pooled error and Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( C_0 )</th>
<th>( C_1 )</th>
<th>( C_2 )</th>
<th>( C_3 )</th>
<th>( C_4 )</th>
<th>( C_5 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3133</td>
<td>3133</td>
<td>3133</td>
<td>2969</td>
<td>2915</td>
<td>3074</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Rabi).
Site :- Central Rice Res. Stn., Pattambi.

Object := To find out the efficiency of different intercultivators.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) Laterite loam. (iii) 23.9.63/29.10.63 (iv) (a) Digging and levelling. (b) Nursery raised and seedling planted. (c) N.A. (d) 25 cm. (e) 12'4 C.L./ha. of C.M. (vi) M.B.—20 (medium). (vii) Irrigated. (viii) Gap filling 15 days after planting. (ix) N.A. (x) 30.1.64.

2. TREATMENTS:
6 types of intercultivators:
- \( C_0 \) = Control (no interculturing),
- \( C_1 \) = Akshot cultivator,
- \( C_2 \) = Carlohomes and Co. cultivators,
- \( C_3 \) = Rotary cultivator,
- \( C_4 \) = Touret Gune cultivator and
- \( C_5 \) = Swasthic cultivator.

3. DESIGN:
(i) R.B.D. (ii) 6. (b) Nil. (iii) 4. (iv) (a) and (b) 6 m. x 3 m. (v) one row on each side. (vi) Yes.

4. GENERAL:
(i) Lodged after flowering. (ii) Negligible. (iii) Grain yield. (iv) (a) 1963 only. (b) and (e) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 2324 Kg/ha. (ii) 96'4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( C_0 )</th>
<th>( C_1 )</th>
<th>( C_2 )</th>
<th>( C_3 )</th>
<th>( C_4 )</th>
<th>( C_5 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2247</td>
<td>2324</td>
<td>2340</td>
<td>2339</td>
<td>2257</td>
<td>2429</td>
</tr>
</tbody>
</table>
Crop: Paddy (1st crop).  
Ref: K. 62(105), 63(155), 64(38).

Type: 'C'.

Object: To find out the optimum number and time of working of intercultivator for Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil; Paddy – Paddy for 63(156). (b) Paddy. (c) 12.4 C.L./ha. of C.M.
   (ii) Shallow laterite.
   (iii) 23.5/23.6; 4.6/4.7; 6.5/6.64.
   (iv) (a) 8 ploughings and levelings. (b) As per treatments. (c) to (e) N.A.
   (v) C.M. at 12.4 C.L./ha. as basal dressing and 112 Kg/ha. as top dressing.
   (vi) P.T.B.-2.
   (vii) Unirrigated.
   (viii) Gap-filling, and interculturing as per treatments.
   (ix) 102 em.; 220 cm.

2. TREATMENTS:
   5 times of interculturing: T₀=Control (no interculturing), T₁=15 days, T₂=30 days, T₃=45 days and T₄=60 days after planting.

3. DESIGN:
   (i) R.B.D. (ii) 5. (b) N.A. (iii) 4. (iv) (a) and (b) 7.6 m×3.0 m. (v) No. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Slight attack of gall-fly noticed in 64(38) and no control measures taken. Nil for others. (iii) Gram yield. (iv) (a) 1961-1964. (b) Yes. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:
   (i) 2477 Kg/ha. (ii) 156.4 Kg/ha. (based on 44 d.f. made up of Treatments x years interaction and pooled error). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2562</td>
<td>2517</td>
<td>2428</td>
<td>2455</td>
<td>2421</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).

Site: Rice Res. Stn., Vythila.

Ref: K. 62(36).

Type: 'C'.

Object: To find out the efficiency of local practice of Pokkali cultivation.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) Nil. (ii) Clay loam. (iii) 2.7/2.8, 6.2/6.4.
   (iv) (a) to (c) N.A. (v) Nil. (vi) Cheruviripu (medium). (vii) Unirrigated. (viii) 1 weeding (xx) 102 cm. (x) 29.11.62.

2. TREATMENTS:
   T₀=Dismentling the mounds, washing the soil and planting the seedlings, T₁=Pulling out the seedlings from mounds, washing them and planting, T₂=Seedlings from nurseries, raised outside the field and planting and T₃=Local method of cutting and dismounting the seedlings.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) 37.5 m.×47 m. (iii) 6. (iv) 9.4 m.×47 m. (b) 9.1 m.×46 m. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Slight attack of case worm, controlled by spraying Endrin. (iii) No. of production of tillers, height of plants a week before harvest and dry yield of grain and straw. (iv) (a) 1962 only. (b) and (c) Nil. (v) to (vi) N.A.
5. RESULTS:
   (i) 0.06 Kg/ha. (ii) 60.8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>638</td>
<td>646</td>
<td>574</td>
<td>546</td>
<td></td>
</tr>
<tr>
<td>C.D. - 74.8 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy (Rabi).

Site: Rice Res. Stn., Kayamkulam.

Type: CV.

Ref: K. 61(9), 62(71), 63(86).

Object: To find out the optimum spacing for different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy-Sesamum. (b) Paddy. (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 1.7.61/19, 20.8.61; 15.7.62/30.8.62; N.A./27.8.63. (iv) (a) 4 ploughings and 2 puddlings for 61(9); 4 ploughings with country plough, 2 with iron plough, puddling and levelling for 62(71); 2 tractor ploughings for 63(86). (b) Transplanting. (c) N.A. (d) As per treatments. (e) N.A. for 61(9) and 63(86); 2 for 62(71). (v) C.M. at 224 Kg/ha. + 112 Kg/ha. of Super as basal dressing + A/S at 56 Kg/ha. + Mur. Pot. at 56 Kg/ha. as top dressing for 61(9); 4000 Kg/ha. of C.M. as basal dressing, 40 Kg/ha. of A/S at 100 Kg/ha. as top dressing for 62(71); C.M. at 5000 Kg/ha. + Super at 125 Kg/ha. + Mur. Pot. at 50 Kg/ha. as basal and A/S at 100 Kg/ha. as top dressing for 63(86). (vi) As per treatments. (vii) U. Irrigated. (viii) 2 weedings for 61(9); 1 interculturing and 2 weedings for 62(71); N.A. for 63(86). (ix) 90 cm.; N.A.; 99 cm. (x) 5. 15.1.62; 21.1.63; 12.1.64.

2. TREATMENTS:
   Main-plot treatments:
   4 late varieties: \( V_1 \) = P.T.B.-4, \( V_2 \) = P.T.B.916, \( V_3 \) = P.T.B.-20 and \( V_4 \) = U.R.-19.

   Sub-plot treatments:
   6 sprayings: \( S_1 \) = 10 cm. \times 15 cm., \( S_2 \) = 15 cm. \times 15 cm., \( S_3 \) = 15 cm. \times 23 cm., \( S_4 \) = 23 cm. \times 23 cm., \( S_5 \) = 23 cm. \times 30 cm. and \( S_6 \) = 30 cm. \times 30 cm.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/replication; 6 sub-plots/main-plot. (b) 24.2 m. \times 15.00 m. for 61(9); N.A. for others. (iii) 4. (iv) (a) and (b) 3.7 m. \times 3.7 m. for 61(9); 5.5 m. \times 2.7 m. for 62(71) and 63(86). (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil for 61(9) and 63(86); Helminthosporium attack noticed in 62(71), Cupravit sprayed. (iii) Height, tiller counts and yield of grain. (iv) (a) 1961-63. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

5. RESULTS:
   61(9)
   (i) 2636 Kg/ha. (ii) 689.2 Kg/ha. (b) 588.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>V₁</td>
<td>2409</td>
<td>2870</td>
<td>2751</td>
<td>2510</td>
<td>2642</td>
</tr>
<tr>
<td>V₂</td>
<td>2685</td>
<td>2327</td>
<td>2923</td>
<td>2900</td>
<td>2076</td>
</tr>
<tr>
<td>V₃</td>
<td>2229</td>
<td>2519</td>
<td>3111</td>
<td>2388</td>
<td>2872</td>
</tr>
<tr>
<td>V₄</td>
<td>2474</td>
<td>2607</td>
<td>2676</td>
<td>2977</td>
<td>2893</td>
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<tr>
<td>Mean</td>
<td>2449</td>
<td>2581</td>
<td>2865</td>
<td>2694</td>
<td>2621</td>
</tr>
</tbody>
</table>

Mean 2636
Crop: Paddy (Kharij).
Site: Rice Res. Stn., Kayamkulam.
Ref.: K. 61(18).
Type 'CV'.

Object: To find out the optimum number of seedlings per hole for Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy—Sesamum. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) 1.7.61/17, 18.8.61 (iv) (a)
   4 ploughings and 2 puddlings (b) to (d) N.A. (c) As per treatments. (v) C.M. at 2242 Kg/ha. + Super at
   112 Kg/ha. as basal dressing. A/S at 56 Kg/ha. + Mur. Pot. at 56 Kg/ha. as top dressing. (vi) As per
   treatments. (vii) Unirrigated. (viii) 2 weedings. (ix) 90 em. (x) 15.1.62.
   Main-plot treatments:
   Sub-plot treatments:
   3 Number of seedlings/hole: S, = 2; S, = 4 and S, = 6.

2. DESIGN:
   Split-plot. (ii) (a) 4 main plots/block and 3 sub-plots/main-plot. (b) 19'2 m. x 13.6 m. (iii) 5. (iv) (a)
   and (b) 6'1 m. x 3'5 m. (v) Nil.

3. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Tiller counts taken two months after planting, yield of grain. (iv) to (vii)
   N.A.
5. RESULTS:

(i) 2967 Kg/ha. (ii) (a) 282.4 Kg/ha. (b) 272.7 Kg/ha. (iii) Main effect of V alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>3303</td>
<td>3032</td>
<td>2828</td>
<td>2656</td>
</tr>
<tr>
<td>S2</td>
<td>3080</td>
<td>3092</td>
<td>3100</td>
<td>2714</td>
</tr>
<tr>
<td>S3</td>
<td>3136</td>
<td>2951</td>
<td>2800</td>
<td>2818</td>
</tr>
<tr>
<td>Mean</td>
<td>3173</td>
<td>3025</td>
<td>2939</td>
<td>2729</td>
</tr>
</tbody>
</table>

C.D. for V marginal means=224.7 Kg/ha.

---

Crop :- Paddy (Rabi).

Site :- Rice Regs. Stn., Mannuthy.

Object :- To find out the best combination of spacing with levels of N.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Paddy. (c) 5000 Kg/ha. of G.L. and N, P, K as per treatments. (ii) Lateritic. 2.9.65/21.10.65. (iii) 6 ploughings. (b) to (e) N.A. (c) 5000 Kg/ha. of G.L. and N, P and K as per treatments. (vi) PTR=12 (medium). (vii) Irrigated. (viii) 1 hand weeding. (ix) 38 cm. (x) 26.1.66.

2. TREATMENTS:

Main-plot treatments :

N1=20, N2=40 and N3=60 Kg/ha.

Sub-plot treatments :

6 spacings : S1=15 cm. x 10 cm., S2=15 cm. x 15 cm., S3=20 cm. x 10 cm., S4=20 cm. x 15 cm., S5=25 cm. x 10 cm. and S6=25 cm. x 15 cm.

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) 19.5 m. x 38.5 m. (iii) 4. (iv) (a) 6 m. x 6 m. (b) Varies according to spacings. (v) One row around. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Case worm, gall fly and stem borer attack—spraying. Endrin, Helminthosporium was noticed and controlled by spraying Blitox. (iii) Grain yield. (iv) (a) 1965—67. (b) Yes. (c) N.A. (v) Kayamkulam. (vi) and (vii) N.A..

5. RESULTS:

(i) 2126 Kg/ha. (ii) (a) 432.8 Kg/ha. (b) 277.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
<th>N1</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
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<td>Mean</td>
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<td>2162</td>
<td>2244</td>
<td>2037</td>
<td>2161</td>
<td>2126</td>
</tr>
</tbody>
</table>
Crop: Paddy (Kharif).
Site: Rice Res. Stn., Mannuthy.

Object: To find out the best age of seedlings at planting and the effect of heavy manuring in the nursery on yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) 126 Q/ha. of C.M.+112 Kg/ha. of A/S for 60(5); 56 Kg/ha. of C.M. for 61(31). (ii) Laterite. (iii) 3, 7 and 11.6.60/2.7.60 for 60(5); N.A. for 61(31). (iv) (a) 6 ploughings and levellings. (b) Transplanting. (c) N.A. (d) 15 cm. x 25 cm. (e) N.A. (v) 126 Q/ha. of C.M.+56 Kg/ha. of A/S as basal dressing, 56 Kg/ha. of A/S as top dressing after planting for 60(5); 5604 Kg/ha. of C.M.+112 Kg/ha. of Super+56 Kg/ha. of Pot. Ash. (vi) PTB=32 (medium). (vii) Unirrigated. (viii) 2 tractor cultivations and 2 weedings. (ix) N.A. (x) 28.10.60; N.A.

2. TREATMENTS:
   Main-plot treatments:
   2 levels of manures: M₀=No manure and M₁=Heavy manuring of nursery with 10 C.L. of F.Y.M+45 Kg/ha. of A/S.
   Sub-plot treatments:
   3 ages of seedlings: S₁=20, S₂=25 and S₃=30 days.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6,1 m. x 1.3 m. (b) 5.8 m. x 1.3 m. (v) 13 cm. x 13 cm. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil for 60(5); case worm, gall fly and stem borer were noticed. Endrex sprayed for 61(31). (iii) Grain yield. (iv) (a) 1960–61. (b) No. (c) -. (v) and (vi) Nil. (vii) Main and sub-plot error variances are homogeneous and Treatments x years interaction is absent in both.

5. RESULTS:
   (i) 1732 Kg/ha. (ii) (a) 199·1 Kg/ha. (based on 7 d.f. made up of Treatments x years interaction and pooled error). (b) 290·3 Kg/ha. (based on 28 d.f. made up of various components of Treatments x years interaction and pooled error). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>S₁</th>
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<th>S₃</th>
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<tr>
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Crop: Paddy (Rabi).
Site: Rice Res. Stn., Mannuthy.

Object: To find out the best age of seedlings for transplanting and also to know whether heavy manuring to the nursery would affect the yield.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) 126 Q/ha. of C.M.+112 Kg/ha. of A/S for 60(6); 56 Q/ha. of C.M. for 61(32). (ii) Loamy and gravelly for 60(6) and laterite for 61(32). (iii) N.A. (iv) (a) 6 ploughings. (b) Transplanting. (c) N.A. (d) 15 cm. x 25 cm. (e) N.A. (v) 126 Q/ha. of C.M.+56 Kg/ha. of A/S as basal dressing, 56 Kg/ha. of A/S as top dressing one month after planting for 60(6); 5604 Kg/ha. of C.M.+112 Kg/ha. of A/S+112 Kg/ha. of Super+56 Kg/ha. of Potash for 60(6). (vi) PTB=27 (medium); PTB=10 (Short). (vii) Irrigated. (viii) 2 intercultivations with Japanese cultivator. (ix) and (x) N.A.
2. TREATMENTS:

Main-plot treatments:
2 levels of manures: $M_a=0$ and $M_1=24.7$ C.I. of F.Y.M. or 5604 Kg/ha. of G.L. +112 Kg/ha. of A/S.

Sub-plot treatments:
3 ages of seedlings: $S_1=20$, $S_2=25$ and $S_3=30$ days.

3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6'1 m. x 1'5 m. (b) 5'9 m. x 1'3 m. (v) 13 cm. x 13 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Stem borer and Paddy borer attacks were noticed. (iii) Grain yield. (iv) (a) 1960-61. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Sub-plot variances are heterogeneous. Therefore results of individual years are presented under 5. Results.

5. RESULTS:

(i) 2859 Kg/ha. (ii) (a) 152'1 Kg/ha. (b) 263'9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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61(32)

(i) 1461 Kg/ha. (ii) (a) 218'1 Kg/ha. (b) 122'5 Kg/ha. (iii) Main effect of $S$ is significant. (iv) Av. yield of grain in Kg/ha.

<table>
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<tr>
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<td>1322</td>
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C.D. for $S$ marginal means=133'4 Kg/ha.

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**Crop:** Paddy (*Kharif*).

**Site:** Rice Res. Stn., Mannuthy.

**Ref:** K. 64(1), 65(24).

**Type:** 'CM'.

**Object:** To find out the best combination of spacing with different levels of N for Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) G.L. at 3000 Kg/ha. (ii) Lateritic. (iii) 20.6.64/17.7.64; 9.6.65/13.7.65.
(iv) (a) 6 ploughings. (b) to (c) N.A. (v) 3000 Kg/ha. of G.L. +30 Kg/ha. of $P_2O_5$ +30 Kg/ha. of $K_2O$.
(vi) PTB-32 (medium). (vii) Irrigated. (viii) Hand weeding. (ix) 195 cm.; 145 cm. (x) 30.10.64; 8.10.65
2. TREATMENTS:

Main-plot treatments:
- 3 levels of N: \( N_1 = 20 \), \( N_2 = 40 \) and \( N_3 = 60 \) Kgf/ha.

Sub-plot treatments:
- (1) 3 row to row spacings: \( S_1 = 15 \), \( S_2 = 20 \) and \( S_3 = 25 \) cm.
- (2) 2 plant to plant spacings: \( R_1 = 10 \) and \( R_2 = 15 \) cm.

3. DESIGN:

- (i) Split-plot. (ii) (a) 3 main-plots/replication; 6 sub-plots/main-plot. (b) 38.5 m x 19.5 m. (iii) 4.
- (a) 6 m x 6 m. (b) 5.8 m x 5.9 m. (v) One row around. (vi) Yes.

4. GENERAL:

- (i) Satisfactory. (ii) Case worm, gall fly and stem borer, stick borer and Helminthosporium, Endrin and Cupravit sprayed. (iv) (a) 1964—65. (b) Yes. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent both in the main-plots and sub-plots.

5. RESULTS:

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<th>( S_3 )</th>
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<th>( R_2 )</th>
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<td>2705</td>
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<td>2711</td>
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</tbody>
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C.D. for N marginal means = 146.1 Kgf/ha.

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Crop :- Paddy (Kharif).
Type :- 'CM'.

Object :- To find out the best combinations of spacing with different levels of N for Paddy crop.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) Paddy. (c) 3707 Kgf/ha. of G.L. + 25 C.L./ha. of C.M. + 371 Kgf/ha. of Super + 62 Kgf/ha. of Mur. Pot. (ii) Shallow lateritic consisting of clay and sand with limited quantity of silt. (iii) 2.5.64/16.6.64. (iv) (a) 8 ploughings and levelling. (b) to (e) N.A. (v) G.L. at 4483 Kgf/ha. + Mur. Pot. at 60 Kgf/ha. + Super at 75 Kgf/ha. as basal dressing. (vi) PTB—21 (medium). (vii) Unirrigated. (viii) Rectification of bands once before top dressing the manure and weeding once. (ix) 208 cm. (x) 19.9.64.

2. TREATMENTS:

All combinations of (1), (2) and (3)
- (1) 3 levels of N as A/S: \( N_1 = 20 \), \( N_2 = 40 \) and \( N_3 = 60 \) Kgf/ha.
- (2) 3 row to row spacings: \( S_1 = 15 \), \( S_2 = 20 \) and \( S_3 = 25 \) cm.
- (3) 2 plant to plant spacings: \( R_1 = 10 \) and \( R_2 = 15 \) cm.
3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 18. (b) 31·8 m. x 28·2 m. (iii) 4. (iv) (a) 10·2 m. x 4·2 m. (b) 9 m. x 3 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory, crop lodged on 20.8.64. (ii) Nil. (iii) Grain yield. (iv) (a) 1964—only. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 2198 Kg/ha. (ii) 156·5 Kg/ha. (iii) Main effects of N, S and R are significant. (iv) Mean yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>R₁</th>
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<td>2238</td>
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<td>2313</td>
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</tbody>
</table>

C.D. for N or S marginal means = 91·3 Kg/ha.
C.D. for R marginal means = 74·5 Kg/ha.

Crop :- Paddy (Rabi).
Site :- Agri. College and Res. Instt., Vellayani.
Type :- ‘CM’.
Ref :- K. 60(45).

Object :- To find out a modified and economical Japanese method of Paddy cultivation.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Paddy. (c) Cow dung and G.L. dose N.A. (ii) N.A. (iii) 15.10.60. (iv) (a) 6 ploughings, 2 diggings, levelling and 2 puddlings. (b) Transplanting. (c) 28 Kg/ha. (d) 48 cm. x 25 cm. (e) 3. (v) Compost at 251 Q/ha. (vi) Co—1 (medium). (vii) Irrigated. (viii) 2 weedings. (ix) 52·8 cm. (x) 31.1.61.

2. TREATMENTS:
5 methods of cultivation: M₁=Japanese method (56 Q/ha. of G.L.+125·5 Q/ha. of Compost+225 Kg/ha. of each of A/S and Super), M₂=Local method (125 Q/ha. of Compost and 98·8 Q/ha. of ash), M₃=Modified Japanese method I (22·4 Q/ha. of G.L.+125·5 Q/ha. of Compost, 56·0 Kg/ha. of A/S+50·0 Kg/ha. of Super); M₄=Modified Japanese method II (33·6 Q/ha. of green leaf+125·5 Q’ ha. of Compost+121·2 Kg/ha. of A/S+112·1 Kg/ha. of Super) and M₅=Modified Japanese method III (44·9 Q/ha. of green leaf+125·5 Q/ha. of Compost+168·1 Kg/ha. of A/S+168·1 Kg/ha. of Super). The Compost and green leaf applied before ploughing and the fertilizers were applied in 2 doses, ⅓ at planting and ⅔ one month after planting as top dressing.

3. DESIGN:
(i) R.B.D. (ii) (a) 5 (b) 38·4 m. x 13·7 m. (iii) 6. (iv) (a) 6·1 m. x 13·7 m. (b) 5·6 m. x 13·3 m. (v) 23 cm. x 23 cm. (vi) Yes.
4. GENERAL:
   (i) Satisfactory. (ii) Attack of rice case worm was noticed. (iii) Dusted Gamaxin on 19.11.60. (iv) (a) 1958—60 (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 1252 Kg/ha. (ii) 209.7 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

   Treatment | M₁ | M₂ | M₃ | M₄ | M₅ |
   Av. yield | 1426 | 910 | 1315 | 1375 | 1234 |
   C.D. = 252.6 Kg/ha.

   Crop :- Paddy (Kharif).
   Site :- M.A.E. Centre, Karamanai.
   Ref :- K. 61 to 63 (M.A.E.).
   Type :- 'CM'.

   object :- Type VII : To study the effect of manures and cultural practices on Paddy.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) Nil. (ii) Laterite. (iii) As per treatments. (iv) (a) 4 ploughings, 1 digging and 1 trampling. (b) Transplanting. (c) 35 Kg/ha. (d) and (e) As per treatments. (v) 5504 Kg/ha. of F.Y.M. (vi) PB—9. (vii) Irrigated. (viii) 2 weedings. (ix) 196 cm., 119 cm.; N.A. (x) 29.9.61, 16, 28.10.61 ; 28.8.62, 10, 27.9.62 ; 27.8.63 ; 12.9.63 and 27.10.63.

2. TREATMENTS:
   Main-plot treatments :
   All combinations of (1), (2) and (3)
   (1) 3 dates of planting: D₁ =15 days before normal, D₂ =Normal and D₃ =15 days after normal.
   (2) 3 spacings: S₁ =15 cm. x 15 cm., S₂ =20 cm. x 20 cm. and S₃ =25 cm. x 25 cm.
   (3) 3 rates of planting: R₁ =2, R₂ =4 and R₃ =6 seedlings/ha.

   Sub-plot treatments :
   All combinations of (1) and (2)
   (1) 2 levels of N : N₀ =0 and N₁ =44.8 Kg/ha.
   (2) 2 levels of P₂O₅ : P₀ =0 and P₁ =44.8 Kg/ha.
   Dates for 61 are D₁ =18.5.61/16.6.61 ; D₂ =3.6.61/1.7.61 and D₃ =18.6.61/17.7.61.
   Dates for 62 are D₁ =15.5.62 N.A., D₂ =31.5.62/N.A. ; D₃ =15.6.62/N.A.
   Dates for 63 are D₁ =15.4.63/15.5.63 ; D₂ =30.4.63/30.5.63 and D₃ =15.5.63/15.6.63.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 blocks/replication ; 9 main-plots/block and 4 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 9'1 m. x 4'5 m. for 61 ; 9'1 m. x 4'6 m. for 62 and 63. (b) 9'0 m. x 4'5 m. for 61 ; S₁ =8'8 m. x 4'3 m., S₀ =8'7 m. x 4'2 m. and S₃ =8'6 m. x 4'1 m. for 62 ; S₁ =8'5 m. x 4'0 m., S₀ =8'3 m. x 3'8 m. and S₃ =8'1 m. x 3'6 for 63. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961—63. (b) No. (c) NIL. (v) N.A. (vi) Heavy rainfall in 1961. (vii) Sub-plot error variances are heterogeneous. Hence results of individual years are presented below.

5. RESULTS:
   1961
   (i) 1622 Kg/ha. (ii) 225.4 Kg/ha. (iii) 143.5 Kg/ha. (iii) Main effects of N and P and interaction N x P are highly significant. Main effect of D and interaction D x N are significant. (iv) Av. yield of grain in Kg/ha.
<table>
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<th>N6</th>
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C.D. for D marginal means
C.D. for N or P marginal means
C.D. for N means at the same level of D=100.4 Kg/ha.
C.D. for D means at the same level of N=147.9 Kg/ha.
C.D. for body of N x P table

1962
(i) 2465 Kg/ha. (ii) (a) 513.7 Kg/ha. (b) 273.7 Kg/ha. (iii) Main effects of N, P and interaction N x P are highly significant. Main effects of D, S and interaction S x P are significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for D or S marginal means
C.D. for N or P marginal means
C.D. for P means at the same level of S=191.7 Kg/ha.
C.D. for S means at the same level of P=324.8 Kg/ha.
C.D. for body of N x P table
1983

(i) 2162 Kg/ha. (ii) (a) 864.9 Kg/ha. (b) 607.0 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for N marginal means=245.4 Kg/ha.

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**Crop:** Paddy (Kharif).

**Site:** Agronomic Res. Stn., Chalakudi.

**Type:** 'T'.

**Ref:** 64(29), 65(3).

Object: To find out the optimum water requirement of Paddy crop at different stages of growth.

1. **Basal Conditions:**
   (i) (a) Paddy-Paddy. (b) Pulse crop. (c) Nil. (ii) Sandy loam. (iii) 21.5.64/16.6.64; 15.5.65/17.6.65. (iv) (a) Ploughing. (b) Transplanting. (c) N.A. (d) 20 cm × 20 cm. (e) N.A. (v) G.L. at 25 Q/ha., 60 Kg/ha. of N+30 Kg/ha. of P2O5+30 Kg/ha. of K2O. (vi) PTB—32. (vii) Irrigated. (viii) Weeding and hoeing. (ix) N.A. (x) 1.10.64, 27.9.65.

2. **Treatments:**
   All combinations of (1), (2) and (3)
   (1) 3 levels of irrigation from transplanting to tillering: $A_0=0$, $A_1=2.5$ and $A_2=5.0$ cm. of standing water.
   (2) 3 levels of irrigation from tillering to flowering: $B_0=0$, $B_1=2.5$ and $B_2=5.0$ cm. of standing water.
   (3) 3 levels of irrigation from flowering to maturity: $C_0=0$, $C_1=2.5$ and $C_2=5.0$ cm. of standing water.

3. **Design:**
   (i) 3 confd. (ii) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 75 sq. m. (b) 65 sq. m. (v) N.A. (vi) Yes.

4. **General:**
   (i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964—contd. (b) Yes. (c) Nil. (v) and (vi) N.A. (vii) Expt. continued beyond 65, hence the individual results are given below.
5. RESULTS:

64(29)

(i) 1398 Kg/ha. (ii) 143'4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

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65(3)

(i) 1720 Kg/ha. (ii) 236'0 Kg/ha. (iii) Main effect of B is significant. (iv) Av. yield of grain in Kg/ha.

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<th>A₂</th>
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C.D. for B marginal means=161'8 Kg/ha.

Crop := Paddy (Rabi).

Site := Agronomic Res. Stn., Chalakudi.

Ref := K. 64(30), 65(2).

Type := 'T'.

Object := To find out the optimum water requirement of Paddy crop at different stages of growth.

1. BASAL CONDITIONS:

(i) (a) Paddy-Paddy. (b) Paddy. (c) N.P.K. at 67 2, 33'6, 33'6 Kg/ha. respectively. (ii) Sandy loam. (iii) 13'9'-64/7'10'64; 4'9'-65/13'10'65. (iv) (a) Ploughing. (b) Transplanting. (c) N.A. (d) 20 cm. x 20 cm. (e) N.A. (v) G.L. at 25 Q/ha. and N.P.K. at 60, 30, 30 Kg/ha. respectively. (vi) P.T.B.-4. (vii) Irrigated. (viii) Weeding and hoeing. (ix) N.A. (x) 12.2.65; 4.2.66.

2. TREATMENTS:

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

(1) 3 levels of irrigation from transplanting to tillering : A₀ =0, A₁ =2'5 and A₂ =5'0 cm. of standing water.

(2) 3 levels of irrigation from tillering to flowering : B₀ =0, B₁ =2'5 and B₂ =5'0 cm. of standing water.

(3) 3 levels of irrigation from flowering to maturity : C₀ =0, C₁ =2'5 and C₂ =5'0 cm. of standing water.
3. DESIGN:
(i) 3 Conf. fact. (ii) (a) 9 plots/block; 3 blocks/replication. (b) 5'8 m. x 27 m. (iii) 2. (iv) (a) and (b) 8'9 m. x 8'5 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Endrin sprayed. (iii) Yield of grain. (iv) (a) 1964—contd. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) The expt. is continued beyond 1965, hence the individual results are given below.

5. RESULTS:

### 64(30)
(i) 2925 Kg/ha. (ii) 1920 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

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### 65(2)
(i) 2345 Kg/ha. (ii) 1697 Kg/ha. (iii) Main effect of A is significant. (iv) Av. yield of grain in Kg/ha.

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C.D. for A marginal means=116.30 Kg/ha.

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**Crop**: Paddy (Rabi).  
**Ref**: K. 63(110), 64(80), 65(8).  
**Site**: Agronomic Res. Stn., Coyalmanam. **Type**: -T.

Object:—To find out the optimum quantity of water required for Paddy during different seasons and stages of growth.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) N.A. for 63(110); 6000 Kg/ha. of C.M.+33'6 Kg/ha. of P₀6O₆+33'6 Kg/ha. of K₂O+44'8 Kg/ha. of N for others. (ii) Sandy loam. (iii) N.A./16.10.63; 28.8.64/14.10.64; 21.9.65/21.10.65 (iv) (a) 6 ploughings. (b) Transplanting. (c) N.A. (d) 25'4 cm. x 25'4 cm. (e) 3. (v) 4000 Kg/ha. of C.M., 30 Kg/ha. each of P₀6O₆ and K₂O. (vi) C₀—25 (improved). (vii) Irrigated. (viii) N.A. (ix) 26'6 cm. for 63 (110); N.A. for others. (x) 8.2.64 ; 6.3.65 ; 17.2.66.
2. TREATMENTS:

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

(1) 3 levels of irrigation from planting to tillering: \( A_0 = 0 \), \( A_1 = 2.5 \), \( A_2 = 5.0 \) cm. standing water.

(2) 3 levels of irrigation from tillering to flowering: \( B_0 = 0 \), \( B_1 = 2.5 \), \( B_2 = 5.0 \) cm. standing water.

(3) 3 levels of irrigation from flowering to maturity: \( C_0 = 0 \), \( C_1 = 2.5 \), \( C_2 = 5.0 \) cm. standing water.

3. DESIGNS:

(i) 3^2 Conf. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) 75 sq.m. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Control measures taken. (iii) Grain yield. (iv) (a) 1963—Contd. (b) and (c) N.A. (v) and (vi) N.A. (vii) The experiment is continued beyond 65, hence the individual results are given below.

5. RESULTS:

\[ \text{(i) 3668 Kg/ha. (ii) 305'2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of paddy in Kg/ha.} \]

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<th>( A_2 )</th>
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\[ \text{(i) 4260 Kg/ha. (ii) 751'9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of paddy in Kg/ha.} \]

<table>
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\[ \text{(i) 2551 Kg/ha. (ii) 646'9 Kg/ha. (iii) Main effect of A is significant. (iv) Av. yield of paddy in Kg/ha.} \]

<table>
<thead>
<tr>
<th></th>
<th>( A_0 )</th>
<th>( A_1 )</th>
<th>( A_2 )</th>
<th>( C_0 )</th>
<th>( C_1 )</th>
<th>( C_2 )</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>( C_0 )</td>
<td>4187</td>
<td>4127</td>
<td>4500</td>
<td>4271</td>
<td>4273</td>
<td>4236</td>
<td>4260</td>
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<tr>
<td>( C_1 )</td>
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<td>4544</td>
<td>4216</td>
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<td>4273</td>
<td>4236</td>
<td>4260</td>
</tr>
<tr>
<td>( C_2 )</td>
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<td>4313</td>
<td>4291</td>
<td>4271</td>
<td>4273</td>
<td>4236</td>
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</table>
Crop :- Paddy (Kharif).

Ref :- K. 63(119), 64(79), 65(7).

Site :- Agronomic Res. Stn., Coiyalmannam. Type :- 'P'.

Object :- To find out the optimum quantity of water required for Paddy during different seasons and stages of growth.

1. BASEL CONDITIONS :
   (i) (a) Nil.  (b) Paddy.  (c) N.A.  (ii) Sandy loam. (iii) N.A./12.6.63; 5.5.64/29.6.64; 5.5.64/11.6.65
   (iv) (a) 8 ploughings (b) Transplanting. (c) N.A (d) 25.4 cm.×25.4 cm. (e) 3. (v) 4000 Kg/ha. of C.M.,
   20 Kg/ha. of each of P4O10 and K2O were applied. (vi) P.T.B. –26 (improved).  (vii) Irrigate .  (viii) N.A.
   (ix) 167.8 cm. for 63(10); N.A. for others. (x) 30.9.63; 8.10.64; 30.9.65.

2. TREATMENTS :
   Same as in Expt. No. 63(110), 64(80), 65(24) on page 183.

3. DESIGN :
   (i) 3^2 confd.  (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A.  (iii) 2.  (iv) (a) and (b) 75 sq.m.
   (v) Nil.  (vi) Yes.

4. GENERAL :
   (i) Good. (ii) Control measures taken. (iii) Paddy yield. (iv) to (vi) N.A. (vii) The experiment is
   continued beyond 1965. Hence the individual results are given below.

5. RESULTS

63(109)
   (i) 3172 Kg/ha.  (ii) 350-7 Kg/ha.  (iii) None of the effects is significant. (iv) Av. yield of Paddy in Kg/ha.

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>C1</th>
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<tr>
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<td>Mean</td>
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C.D. for A marginal means=443.3 Kg/ha.
Crop : Paddy (Kharif).

Site : Agronomic Res. Stn., Chalakudi.

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

1. BASAL CONDITIONS :
(i) (a) Paddy—Paddy—Groundnut. (b) Groundnut. (c) Nil. (ii) Sandy loam. (iii) 22.5.64/18.6.64 ; 15.5.65/13.6.65. (iv) (a) Ploughing. (b) Transplanting. (c) N.A. (d) 20 cm.×20 cm. (e) N.A. (v) N.A. (vi) P.T.B.—32. (vii) Irrigated. (viii) Hand weeding, Japanese hoe and interculturing. (ix) N.A. (x) 2.10.64; 25.9.65.

2. TREATMENTS
Main-plot treatments :
4 levels of irrigation : I₁=0, I₂=2, I₃=4 and I₄=6 cm. of standing water.

Sub-plot treatments :
3 level of N : N₁=100, N₂=150 and N₃=200 Kg ha.

(i) 2031 Kg/ha. (ii) 76-2 Kg/ha. (iii) Maineffect of A is significant. (iv) Av. yield of Paddy in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>A₁</th>
<th>A₂</th>
<th>C₁</th>
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<td>2078</td>
<td>2011</td>
<td>2026</td>
<td>2011</td>
<td>2056</td>
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</tbody>
</table>

C.D. for A marginal means = 52.7 Kg/ha.

65(23)
(i) 3434 Kg/ha. (ii) 283.4 Kg/ha. (iii) The main effect of C and interaction A×B are significant. (iv) Av. yield of Paddy in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>A₁</th>
<th>A₂</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
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<td>B₁</td>
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<td>3629</td>
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<td>3399</td>
<td>3323</td>
<td>3569</td>
<td>3410</td>
</tr>
</tbody>
</table>

C.D. for C marginal means = 195.0 Kg/ha.
C.D. for the means in the body of A×B table = 337.7 Kg/ha.

Ref : K. 64(27), 65(4).
Type ‘IM’.
3. DESIGN:
   (i) Split-plot.  (ii) (a) 4 main plots/replication; 3 sub-plots/main plot.  (b) N.A.  (iii) 4.  (iv) (a) and (b) 7·5 m. x 7·5 m.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Good.  (ii) Nil.  (iii) Yield of dry paddy.  (iv) (a) 1964—Contd.  (b) Yes.  (c) Nil.  (v) Coyalmannam.  (vi) and (vii) N.A.

5. RESULTS:

   64(27)
   (i) 1527 Kg/ha.  (ii) (a) 91·7 Kg/ha.  (b) 104·9 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of grain in Kg/ha.

   \[
   \begin{array}{cccc|c}
   & I_0 & I_1 & I_2 & I_3 & \text{Mean} \\
   N_1 & 1489 & 1495 & 1539 & 1520 & 1511 \\
   N_2 & 1590 & 1527 & 1438 & 1501 & 1514 \\
   N_3 & 1533 & 1552 & 1578 & 1559 & 1556 \\
   \text{Mean} & 1537 & 1525 & 1518 & 1527 & 1527 \\
   \end{array}
   \]

   65(34)
   (i) 1963 Kg/ha.  (ii) (a) 257·0 Kg/ha.  (b) 368·8 Kg/ha.  (iii) None of the effects is significant.  (iv) Av. yield of grain in Kg/ha.

   \[
   \begin{array}{cccc|c}
   & I_0 & I_1 & I_2 & I_3 & \text{Mean} \\
   N_1 & 1886 & 1715 & 1831 & 1881 & 1828 \\
   N_2 & 2289 & 1771 & 1841 & 1856 & 1939 \\
   N_3 & 2153 & 1957 & 2113 & 2258 & 2120 \\
   \text{Mean} & 2109 & 1814 & 1928 & 1999 & 1963 \\
   \end{array}
   \]

---

**Crop :-** Paddy (Rabi).

**Site :-** Agronomic Res. Stn., Chalakudi.

**Object :-** To study the effect of irrigation and N on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy—Groundnut.  (b) Groundnut.  (c) Nil.  (d) Sandy loam.  (ii) 14.9.64/10.10.64; 4.9.65/12.10.65.  (iv) (a) Ploughing.  (b) Transplanting.  (c) N. A. (d) 20 cm. x 20 cm.  (e) N.A.  (v) N.A.  (vi) P.T.B.—4 (medium).  (vii) Irrigated.  (viii) Hand weeding.  (iv) N.A.; 51 cm.  (x) 10.2.65; 3.2.66.

2. TREATMENTS and 3. DESIGNS:
   Same as in expt. No. 64(27), 65(4) on page 186.

3. GENERAL:
   (i) Satisfactory.  (ii) Attack of stem borer was controlled by spraying Endrin.  (iii) Grain yield.  (iv) (a) 1964—Contd  (b) Yes.  (c) N.A.  (v) Agronomic Res. Stn., Coyalmannam.  (vi) and (vii) Nil.
5. RESULTS:

6 (28)

(i) 2837 Kg/ha. (ii) (a) 351.7 Kg/ha. (b) 305.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
<th>I_4</th>
<th>Mean</th>
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<td>N_3</td>
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<td>2864</td>
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<tr>
<td>Mean</td>
<td>2667</td>
<td>2943</td>
<td>2816</td>
<td>2920</td>
<td>2837</td>
</tr>
</tbody>
</table>

65(29)

(i) 2317 Kg/ha. (ii) (a) 69.0 Kg/ha. (b) 83.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
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<td>2333</td>
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</tbody>
</table>

--

**Crop:** Paddy (Kharif).

**Site:** Agronomic Res. stn., Coyalmannam.

**Ref:** K. 64(81), 65(5).

**Type:** ['IM'].

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

1. BASAL CONDITIONS:

   (i) (a) Nil. (b) Paddy. (c) 5000 lbs of C.M.; 30 : 30 : 30 : N., P., K. (ii) Sandy loam. (iii) 5.5.64/28.6.64; 27.5.65/24.6.65. (iv) (a) to (e) N.A. (v) 5000 lbs. of C. M., 30 lbs P and 30 lbs K (vi) P.T.B.-26 (medium). (vii) Irrigated. (viii) Weeding and hoeing. (ix) N.A. (x) 1.10.64; 14.10.65.

2. TREATMENTS:

   Same as in expt. No. 63(111), 64(82), 65(6) on page 189.

3. DESIGN:

   (i) Split-plot. (ii) (a) and (b) 4 main plots/replication; 3 sub-plots/main plot. (iii) 4. (iv) (a) and (b) 50 sq. m. (v) 2. (vi) Yes.

4. GENERAL:

   (i) Lodged. (ii) Nil. (iii) Grain yield. (iv) (a) 1964-Contd. (b) Yes. (c) Nil. (v) to (vii) Nil.

5. RESULTS:

64(81)

(i) 2090 Kg/ha. (ii) (a) 164.2 Kg/ha. (b) 227.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain Kg/ha.
189

\[ \begin{array}{c|cccc|c}
   & I_1 & I_2 & I_3 & I_4 & \text{Mean} \\
 N_1 & 2050 & 1940 & 1975 & 1990 & 1989 \\
 N_2 & 2100 & 2080 & 2110 & 2170 & 2115 \\
 N_3 & 2210 & 2250 & 2150 & 2055 & 2166 \\
 \text{Mean} & 2120 & 2090 & 2078 & 2072 & 2090 \\
\end{array} \]

65(5)

(i) 2366 Kg/ha. (ii) (a) 392·1 Kg/ha. (b) 358·4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

\[ \begin{array}{c|c|c|c|c|c}
   & I_1 & I_2 & I_3 & I_4 & \text{Mean} \\
 N_1 & 2505 & 2665 & 2395 & 2535 & 2525 \\
 N_2 & 2480 & 2750 & 2210 & 2665 & 2526 \\
 N_3 & 2765 & 2635 & 2505 & 2685 & 2647 \\
 \text{Mean} & 2583 & 2683 & 2370 & 2628 & 2566 \\
\end{array} \]

Crop: Paddy (Rabi).

Ref: K. 63(111), 64(82), 65(6).

Site: Agronomic Res. Sta., Coyalmannam. Type: 'IM'.

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

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) Sandy loam. (iii) N.A. for 63(111); 28.8.64/21.10.64; 21.9.65/23.10.65.

(iv) (a) N.A. (b) Transplanting. (c) N.A. (d) 25 cm. x 25 cm. (e) 3. (v) 5000 Kg/ha. of G.M. + 30 Kg/ha. each of P_2O_5 and K_2O applied as basal dose. (vi) Co-25 (improved). (vii) Irrigated. (viii) N.A. (ix) 27 cm. for 63(111); N.A. for 64(82); 19 cm. for 65(36). (x) N.A. for 63; 8.2.65; 28.2.66.

2. TREATMENTS:

Main-plot treatments:

4 levels of irrigation: I_1 = 0, I_2 = 2 cm., I_3 = 4 cm, and I_4 = 6 cm. of standing water.

Sub-plot treatments:

3 levels of N: N_1 = 40, N_2 = 60 and N_3 = 80 Kg/ha.

3. DESIGN:

(i) Split-plot. (ii) 4 main plots/replication and 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 50 sq. m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Control measures taken. (iii) Grain yield. (iv) (a) and (b) N.A. (c) Nil. (v) and (vi) Nil. (vii) As the expt. is contd. beyond 1965, the results of individual years are given under 5. Results.

5. RESULTS:

63(111)

(i) 3151 Kg/ha. (ii) (a) 267·3 Kg/ha. (b) 337·1 Kg/ha. (iii) Main effect of N alone is significant.

(iv) yield of grain in Kg/ha.
<table>
<thead>
<tr>
<th></th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
<th>I₄</th>
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<tbody>
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<td>3090</td>
<td>3278</td>
<td>3151</td>
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</table>

C.D. for N marginal means = 246.0 Kg/ha.

64(82)

(i) 3892 Kg/ha. (ii) (a) 458.9 Kg/ha. (b) 264.8 Kg/ha. (iii) Main effect of I alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>I₁</th>
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<th>I₃</th>
<th>I₄</th>
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</table>

C.D. for I marginal means = 423.8 Kg/ha.

65(6)

(i) 2043 Kg/ha. (ii) (a) 332.9 Kg/ha. (b) 318.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
<th>I₄</th>
<th>Mean</th>
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<td>1970</td>
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<td>2138</td>
<td>2148</td>
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</table>

Crop :- Paddy (Kharij).

Site :- Agronomic Res. Stn., Coyalmannam.

Object :- Fixation of yard stick to determine the increase in production of Paddy due to improved agricultural practice.

1. BASAL CONDITIONS:

(i) (a) Paddy—Paddy. (b) Paddy. (c) N, P and K each at 30 Kg/ha as A/S, Super and Mur. Pet. respectively 6000 Kg/ha. of F.Y.M. (ii) Sandy loam mixed with gravel. (iii) 5.5.65/15.6.65. (iv) (a) to (e) N.A. (v) N.A. (vi) P.T.B.—26 (medium). (vii) Irrigated. (viii) N.A. (ix) 85° cm. (x) 11 and 21.10.65.
2. TREATMENTS:

Main-plot treatments:
19 levels of irrigation: $L_0 = 0$ cm. (field capacity) at all the stages of growth, $L_1 = 2.5$ cm. in first stage, $L_2 = 5$ cm. in second stage and zero cm. in third stage of growth of paddy.

Sub-plot treatments:
All combinations of (1), (2) and (3)
(1) 2 levels of fertilizers: $F_1 =$ local practices, $F_2 =$ $F_1 + 34$ Kg/ha. of each of N, P and K.
(2) 2 types of seeds: $S_1 =$ Local seed and $S_2 =$ Improved seed.
(3) 2 types of cultural practices: $C_1 =$ Local practices (Bulk planting and hand weeding), $C_2 =$ Improved cultural practices (seed dressing, line planting, 3 seedlings/hole and chemical means of plant protection).

3. DESIGN:
(i) Split-plot.
(ii) 2 main plots/replication and 8 sub-plots/main plot.
(iii) N.A.
(iv) 1/250th ha.
(v) Nil.
(vi) Yes.

4. GENERAL:
(i) Lodged on 21.10.65.
(ii) Nil.
(iii) Tiller counts, height measurements and yield of grain.
(iv) (a) 1965—Contd.
(b) Yes.
(c) Nil.
(v) Agronomic Res. Stn., Chalakudi, Pariyaram.
(vi) and (vii) N.A.

5. RESULTS:
(i) 2449 Kg/ha.
(ii) (a) 293.6 Kg/ha.
(b) 398.0 Kg/ha.
(iii) None of the effects is significant.
(iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Paddy (Kharif)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site</td>
<td>Rice Res. Stn., Kayamkulam</td>
</tr>
<tr>
<td>Type</td>
<td>'D'</td>
</tr>
</tbody>
</table>

Object: To assess the efficiency of different insecticides in controlling the mole cricket.

1. BASAL CONDITIONS:
(i) (a) Nil.
(b) Sesamum (c) N.A.
(ii) Sandy loam. (iii) 1.5.65.
(iv) (a) to (e) N.A. (v) 13'6 Kg/ha. each of N, P and K. as A/S, Super Phosphate and Muriate of Potash. (vi) P.T.B.—23.
(vii) Unirrigated.
(viii) Two interculturing and two hand weedings. (ix) 108 cm. (x) 8.8.65.

2. TREATMENTS:
4 insecticidal treatments: $T_0 =$ Control, $T_1 =$ Aldrex at 28 Kg/ha., $T_2 =$ BHC at 28 Kg/ha. and $T_3 =$ Heptachlor at 28 Kg/ha.

Chemicals are applied before sowing.

3. DESIGN:
(i) R.B.D.
(ii) (a) 4.
(b) N.A.
(iii) 5.
(iv) (a) and (b) 2 m. x 2 m.
(v) N.A.
(vi) Yes.
4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965—Contd. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 2212.5 Kg/ha. (ii) 471.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$T_n$</th>
<th>$T_1$</th>
<th>$T_2$</th>
<th>$T_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1400</td>
<td>2400</td>
<td>2350</td>
<td>2300</td>
</tr>
</tbody>
</table>

**Crop**: Paddy (Khairif).

**Site**: Rice Res. Stn., Kayamkulam.

**Ref**: K. 65(57).

**Type**: ‘D’.

Object:—To try the foliar application of Urea alone and in combination with Endrin and Bordeaux Mixture.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 20.4 Kg/ha. of N, 136 Kg/ha. each of P$_2$O$_5$ and K$_2$O. (ii) Sandy loam. (iii) 29.4.65.
(ii) to (e) N.A. (v) 25 Kg/ha. of Mur. Pot. and 75 Kg/ha. of Super. (vi) P.T.B.—23. (vii) Unirrigated. (viii) Two interculturings and two hand weedicings. (ix) 188 cm. (x) 11.8.65.

2. TREATMENTS:
13 foliar spray treatments: $T_0$ = Control (no spraying), $T_1$ = 9 Kg/ha. of urea in 40 gallons of water sprayed one month after sowing, $T_2$ = 9Kg/ha. of Urea in 40 gallon of water sprayed two months after sowing, $T_3$ = $T_1$ and $T_2$, $T_4$ = 10 ozs. of Endrin in 40 gallons of water one month after sowing, $T_5$ = 10 ozs. of Endrin in 40 gallons of water two months after sowing, $T_6$ = $T_4$ and $T_5$, $T_7$ = Bordeaux Mixture 1% sprayed one month after sowing, $T_8$ = Bordeaux Mixture 1% sprayed two months after sowing, $T_9$ = $T_6$, $T_10$ = $T_7$ and $T_8$, $T_11$ = Mixture of Urea, Endrin and Bordeaux Mixture sprayed one month after sowing, $T_12$ = Mixture of Urea, Endrin and Bordeaux Mixture sprayed two months after sowing and $T_{13}$ = $T_9$ and $T_{11}$.

3. DESIGN:
(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) and (b) 7.0 m. x 3.5 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) 1965—contd. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 1970/9 Kg/ha. (ii) 296.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$T_0$</th>
<th>$T_1$</th>
<th>$T_2$</th>
<th>$T_3$</th>
<th>$T_4$</th>
<th>$T_5$</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1888</td>
<td>2112</td>
<td>2000</td>
<td>2001</td>
<td>1755</td>
<td>1949</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>$T_6$</th>
<th>$T_7$</th>
<th>$T_8$</th>
<th>$T_9$</th>
<th>$T_{10}$</th>
<th>$T_{11}$</th>
<th>$T_{12}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>1888</td>
<td>2034</td>
<td>2153</td>
<td>1908</td>
<td>1906</td>
<td></td>
</tr>
</tbody>
</table>

**Crop**: Paddy (Rabi).

**Site**: Rice Res. Stn., Kayamkulam.

**Ref**: K. 63(82), 64(62).

**Type**: ‘D’.

Object:—To study the effect of different insecticides to control stem borer pest of Paddy.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) N.A. for 63(82), 34 Kg/ha. each of N, P and K as A/S, Super and Mur. Pot. respectively for 64(62). (ii) Sandy loam. (iii) N.A. 76.86.53; N.A. 76.69.64. (iv) (a) 4 to 6 ploughings and puddlings. (b) Planting 6 weeks old seedlings. (e) and (d) N.A. (e) 2. (v) C.M. at 6000 Kg/ha. + Super at 125 Kg/ha. + Mur Pot. at 60 Kg/ha. as basal dressing and A/S at 100 Kg/ha. as top dressing for 63(82). 5003 Kg/ha. of C.M. +125 Kg/ha. of Super +60 Kg/ha. of Mur. Pot. + 50 Kg/ha. of Urea for 64(62). (vi) U.R.-19. (vii) Unirrigated. (viii) 2 weedings and 2 interculturings. (ix) 99 em., 98 cm. (x) 4.1.64; 14.1.65.

2. TREATMENTS:
5 Insecticides : I₀ = No insecticides (control), I₁ = Telodrine at 1 5 Kg/ha. in 560 litres of water, I₂ = Basudin at 1·1 Kg/ha. in 467 litres of water, I₃ = Folidol at 0·3 Kg/ha. in 467 litres of water, and I₄ = Endrin at 0·6 Kg/ha. in 467 litres of water.

3. DESIGN:
(i) R.B.D. (ii) 5. (b) N.A. (iii) 4. (iv) (a) and (b) 6 1 m × 3 7 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Blitox sprayed uniformly against disease in 64(62). (iii) Yield of grain. (iv) (a) 1962—1964. (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:
(i) 2989 Kg/ha. (ii) 320.1 Kg/ha. (based on 28 d. f. made up of Treatments × years interaction and pooled error). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>I₀</td>
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<td>I₁</td>
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<tr>
<td>I₂</td>
<td>2887</td>
</tr>
<tr>
<td>I₃</td>
<td>2952</td>
</tr>
<tr>
<td>I₄</td>
<td>3148</td>
</tr>
</tbody>
</table>

Crop : Paddy (Kharif).
Site : Rice Res. Stn., Kayamkulam.
Type : 'D'.

Object :—To find out the effect of treating the seeds in Sodium Bicarbonate solution.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 4483 Kg/ha. of C.M. as basal dressing + 56 Kg/ha. of A/S + 56 Kg/ha. of Mur. Pot. as top dressing. (ii) Sandy loam. (iii) 18.4.62. (iv) (a) N.A. (b) Dibbling the seeds in furrows. (c) to (e) N.A. (v) 112 Kg/ha. of Super as basal dressing and 1618 Kg/ha. of C.M. + 56 Kg/ha. of A/S + 56 Kg/ha. of Mur. Pot. as top dressing. (vi) P.T.B.—31 (Early). (vii) Unirrigated. (viii) 2 interculturings and 1 weedings. (ix) N.A. (x) 10.8.62.

2. TREATMENTS:
6 concentrations of solution : S₀ = No soaking, S₁ = Soaking in water, S₂ = 3%, S₃ = 5%, S₄ = 7% and S₅ = 9%.

3. DESIGN:
(i) R.B.D. (ii) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 6·7 m. × 2·4 m. (v) Nil. (vi) Yes.

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

5. RESULTS:
(i) 718 Kg/ha. (ii) 1120 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S₀</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
<th>S₅</th>
<th>S₆</th>
<th>Av. yield</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>715</td>
<td>741</td>
<td>759</td>
<td>707</td>
<td>733</td>
<td>650</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Paddy (Rabi).

Site: Rice Res. Stn., Kayamkulam.

Object: To find out the effect of treating seeds in Sodium Bicarbonate solution on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy—Sesamum. (b) Paddy. (c) Nil. (ii) Sandy loam. (iii) 2.3.61/5.9.61. (iv) (a) 4 ploughings and 2 puddlings. (b) to (e) N.A. (v) 224 Kg/ha. of C.M.+112 Kg/ha. of Super as basal dressing. 56 Kg/ha. of A/S+56 Kg/ha. of Mur. Pot. as top dressing. (vi) U.R.—19 (late). (vii) Unirrigated. (viii) 2 weedings. (ix) 90 cm. (x) 18.1.62.

2. TREATMENTS:
   5 solutions of Sodium Bicarbonate for soaking seeds: $S_0$—Soaking in water, $S_1$=3%, $S_2$=5%, $S_3$=7% and $S_4$=9%.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) 14’8 m. x 3’8 m. (iii) 5. (iv) (a) and (b) 3’8 m. x 2’4 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961—only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   (i) 3156 Kg/ha. (ii) 273'2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$S_0$</th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>$S_3$</th>
<th>$S_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3236</td>
<td>3199</td>
<td>3018</td>
<td>3160</td>
<td>3165</td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).

Site: Rice Res. Stn., Kayamkulam.

Object: To find out the effect of treating seeds in Sodium Bicarbonate solution on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy—Sesamum. (b) Sesamum. (c) Nil. (ii) Sandy loam. (iii) 24.4.61/N.A. (iv) (a) 4 ploughings and 2 puddlings. (b) to (e) N.A. (v) 6277 Kg/ha. of C.M.+112 Kg/ha. of Super as basal dressing and 56 Kg/ha. of A/S+56 Kg/ha. of Mur. Pot. as top dressing. (vi) P.T.B.—10 (early). (vii) Unirrigated. (viii) 2 intercultivations and 2 ploughings. (ix) N.A. (x) 10.8.61.

2. TREATMENTS:
   5 concentrations of Sodium Bicarbonate solution for soaking the seeds: $C_0=0$, $C_1=3\%, C_2=5\%, C_3=7\%$ and $C_4=9\%$.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) 18’6 m. x 3’1 m. (iii) 5. (iv) (a) and (b) 3’4 m. x 3’1 m. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Yield of dry paddy. (iv) to (vii) N.A.

5. RESULTS:
   (i) 1833 Kg/ha. (ii) 120'9 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$C_0$</th>
<th>$C_1$</th>
<th>$C_2$</th>
<th>$C_3$</th>
<th>$C_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1842</td>
<td>1820</td>
<td>1709</td>
<td>1992</td>
<td>1798</td>
</tr>
<tr>
<td>C.D.</td>
<td>162'1 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Paddy (Kharif).

Site: Rice Res. Stn., Kayamkulam.

Type: ‘D’.

Object: To find out the efficiency of different weedicides over the local practice of hand weeding.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. for 63(76) and 65(17); C.M. at 492 Kg/ha. + A/S at 124 Kg/ha. + Super at 124 Kg/ha. + Mur. Pot. at 62 Kg/ha. for 64(97). (ii) Sandy loam. (iii) 8.4-33 N.A., 25.4-64/N.A. and 59.4-65/N.A. (iv) (a) 3 to 4 ploughings, planking, harrowing and breaking of clods. (b) Dry sowing for 63(76); A/S and Super at 124 Kg/ha. + Mur. Pot. at 62 Kg/ha. for 64(97). (c) 3 to 4 ploughings, planking, harrowing and breaking of clods. (d) Dry sowing for 63(76); A/S and Super at 124 Kg/ha. + Mur. Pot. at 62 Kg/ha. for 64(97). (e) Super at 124 Kg/ha. + Mur. Pot. at 62 Kg/ha. for 65(17). (vi) P.T.B. — 23. (vii) Unirrigated. (viii) 1 hoeing in 64(97).

2. TREATMENTS:
   4 weed control treatments: \( W_0 = \) Control (no weeding); \( W_1 = \) M.C.P.A. at 2.82 litres in 1123 litres of water; \( W_2 = \) 2.4 D at 2.25 Kg/ha. in 1123 litres of water; \( W_3 = \) Hand weeding.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) and (b) 61 m. x 3'. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Helminthosporium attacked; Fytolan sprayed in 63(76); Endrin mixed with Fytolan sprayed in 64(97); Nil in 65(17). (iii) Weed counts and yield of grain. (iv) (a) 1962-1965 (1962—N.A.) (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:
   (i) 1900 Kg/ha. (ii) 199.3 Kg/ha. (based on 42 d.f. made up of Treatments x years interaction and pooled error). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

   Treatment
   \[ \begin{array}{l}
   W_0 \\
   W_1 \\
   W_2 \\
   W_3 \\
   \end{array} \]

   Av. yield
   \[ \begin{array}{l}
   1781 \\
   1961 \\
   1870 \\
   1988 \\
   \end{array} \]

   C.D. = 146.9 Kg/ha.

Crop: Paddy (Rabi).

Site: Rice Res. Stn., Kayamkulam.

Type: ‘D’.

Object: To find out the efficacy of different weedicides.

1. BASAL CONDITIONS:
   (i) (a) Paddy-Paddy-Sesamum. (b) Paddy. (c) N.A. for 63(79); 34 Kg/ha. of N as A/S + 34 Kg/ha. of K as Mur. Pot. (ii) Sandy loam. (iii) Nil. (iv) (a) 4 ploughings for 63(79); 6 puddlings and 1 planking for 64(60). (b) Transplanted. (c) 34 Kg/ha. of N as A/S + 34 Kg/ha. of K as Mur. Pot. (iv) (a) and (b) 23 cm. x 15 cm. (v) 5000 Kg/ha. of C.M. + 125 Kg/ha. of Super + 60 Kg/ha. of Urea. (vi) U.R. - 19 (late) (vii) Unirrigated. (viii) N.A. for 63(79); 2 weedicides for 64(60). (ix) 99 cm.; 98 cm. (x) 4.1.64; 15.1.65.

2. TREATMENTS and 3. DESIGN:
   Same as in Expt. No 63(76), 64(97) and 65(17) given as above.

4. GENERAL:
   (i) Satisfactory. (ii) Negligible-prophylatic measures taken for 63(79). Nil for 64(60); (iii) Yield of grain. (iv) (a) 1963-1964. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.
5. RESULTS:
(i) 3043 Kg/ha. (ii) 324·2 Kg/ha. (based on 27 d.f. made up of Treatment x years interaction and pooled error). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W_a</th>
<th>W_1</th>
<th>W_2</th>
<th>W_3</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>2976</td>
<td>3008</td>
<td>3038</td>
<td>3151</td>
</tr>
</tbody>
</table>

Crop : Paddy (Kharif).
Site : Rice Res. Stn., Mannuthy.

Ref : K. 64(6).
Type : 'D'.

Object : To find the effect of combined use of fertilizers, insecticides and fungicides on Paddy crops.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Paddy. (c) 5604 Kg/ha. of C.M.+34 Kg/ha. each of N, P and K. (ii) Laterite. (iii) 22.6.64/6.7.74. (iv) (a) 6 ploughings, puddlings and levellings (b) Transplanting. (c) to (e) N.A. (v) 5604 Kg/ha of C.M.+22 Kg/ha of N+3 Kg/ha. of P_2O_5 +3 Kg/ha. of K_2O. (vi) F.T.B.—32 (medium). (vii) Irrigated. (viii) Weeding. (ix) 300 cm. (x) 7.10.64.

2. TREATMENTS:
All combinations of (1) and (2) with a control:
(1) 4 chemical spravings: C_1 = Urea at 9·0 Kg/ha., C_2 = Endrin at 0·7 Kg/ha., C_3 = Cupravit at 1·12 Kg/ha., C_4 = C_1 + C_2 + C_3 in equal proportion.
(2) 3 times of application: T_1 = One month, T_2 = Two months, T_3 = T_1 + T_2, plus one control: T_0 = No spraying.
The above quantities of chemicals were mixed in 450 litres of water and sprayed.

3. DESIGN:
(i) Fact in R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) and (b) 10 m. x 3 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Stem borer and stack borer. (iii) Yield of grain. (iv) (a) 1964—only. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 2049 Kg/ha. (ii) 286·3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C_1</th>
<th>C_2</th>
<th>C_3</th>
<th>C_4</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>T_2</td>
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<td>1975</td>
<td>1867</td>
<td>2083</td>
<td>1973</td>
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<td>T_3</td>
<td>1958</td>
<td>1933</td>
<td>2275</td>
<td>2058</td>
<td>2056</td>
</tr>
<tr>
<td>T_4</td>
<td>2158</td>
<td>2150</td>
<td>1892</td>
<td>2192</td>
<td>2098</td>
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<tr>
<td>Mean</td>
<td>2028</td>
<td>2019</td>
<td>2011</td>
<td>2111</td>
<td>2042</td>
</tr>
</tbody>
</table>

Crop : Paddy (Rabi).
Site : Rice Res. Stn., Mannuthy.

Ref : K. 64(7).
Type : 'D'.

Object : To find the effect of combined use of fertilizers, insecticides and fungicides on Paddy crop.
1. BASAL CONDITIONS:

(i) (a) N.A. (b) Paddy. (c) C.M. at 5604 Kg/ha, +34 Kg/ha each of N, P and K.

(ii) Laterite.

(iii) 4.9.64/10.64; 22.5.65/6.7.64. (iv) (a) 6 ploughings, puddlings and levelling. (b) Transplanting. (c) N.A. (v) 5604 Kg/ha of C.M. +22 Kg/ha of N +3 Kg/ha of P, 0, and K. (vi) P.T.B. —15 (medium); P.T.B.—32 (medium). (vii) Irrigated. (viii) Weeding. (ix) 300 cm.

2. TREATMENTS to 4. GENERAL:

Same as in expt. No. 64(6) on page 196.

5. RESULTS:

(i) 1331 Kg/ha. (ii) 140.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Control mean = 1283 Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>Mean</th>
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<td>1362</td>
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<td>1229</td>
<td>1225</td>
<td>1346</td>
<td>1258</td>
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<td>1321</td>
<td>1412</td>
<td>1300</td>
<td>1433</td>
<td>1365</td>
</tr>
</tbody>
</table>

Mean | 1268 | 1340 | 1351 | 1380 | 1335 |

Crop :- Paddy (Rabi).

Ref :- K. 62(90), 63(123).

Site :- Rice Res. Stn., Plannuthy.

Type :- 'D'.

Object :- To test the efficacy of Telodrin in controlling stemborer pest of Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) C.M. at 2242 Kg/ha, for 62(90); 5604 Kg/ha. of C.M.+34 Kg/ha. of P, 0, +34 Kg/ha. of K, 0 for 63(123). (ii) Laterite.

(iii) 11.10.62/N.A.; 8.9.63/7.10.63. (iv) (a) 6 ploughings. (b) N.A. (c) 34 to 45 Kg/ha. (d) 15 cm. x 25 cm. (e) 2 to 3. (v) C.M. at 2242 Kg/ha + Super at 112 Kg/ha. + Mur. Pot. at 56 Kg/ha. as basal dressing for 62(90). 5604 Kg/ha. of C.M.+34 Kg/ha. each of P, 0, and K, 0 as basal dressing for 63(123) (vi) P.T.B.—10 (early); (vii) Irrigated. Weeding (ix) 63 cm.; 25 cm.

2. TREATMENTS:

5 Insecticides : I0 = No insecticide (control); I1 = Endrin 0·50%; I2 = Endrin 0·10%; I3 = 1.4 Kg/ha. of Telodrin and I4 = 2·8 Kg/ha. of Telodrin.

Insecticides sprayed one week before transplanting.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) 17.7 m. x 7.6 m. (iii) 4. (iv) (a) 3·1 m. x 7.6 m. (b) 2·8 m. x 7·5 m. (v) 12 cm. x 12 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Attack of case worm and stem borer. Chemicals sprayed as per treatments. (iii) Tiller counts and grain yield. (iv) 1962—1964(N.A.) (b) Yes. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments x years interaction is present.

5. RESULTS:

(i) 1002 Kg/ha. (ii) 108.1 Kg/ha. (based on 4 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.
Crop :- Paddy (Rabi).  
Site :- Rice Res. Stn., Mannuthy.  
Type :- 'D'.

Object :- To find out the efficiency of various insecticides in controlling stemborer pest of Paddy.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Field. (c) 50.0 Kg/ha. of G.L. and N, P and K at 40, 40 and 30 Kg/ha. respectively.
   (ii) Lateritic. (iii) 2.9.65/22.10.65. (iv) (a) Ploughing six times. (b) Transplanting. (c) to (e) N.A.
   (v) 500 Kg/ha. of G.L. and N, P and K at 20, 30 and 30 Kg/ha. respectively. (vi) P.T.B. 12 (medium).
   (vii) Irrigated. (viii) Hand weeding once. (ix) 38 cm. (x) 25.1.66.

2. TREATMENTS:
   5 insectical treatments: T 0 = Control, T 1 = Endrin 0.08%, T 2 = Folidol 0.08%, T 3 = Telodin 0.08%, and T 4 = Ekatox 0.08%.
   Seedlings were dippled at planting time in the insecticides and sprayed once in two months after the planting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) 5.6 m. x 10 f m. (iii) 5. (iv) (a) 2.1 m. x 5.6 m. (b) 2.0 m. x 5.4 m. (v) One row.
   (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Case worm, Gall fly and stemborer were attacked and controlled by spraying Endrin. Helmimorphorium was noticed and Blitox was sprayed. (iii) Grain yield. (iv) (a) 65-contrl. (b) N.A.
   (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 5204 Kg/ha. (ii) 632 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I</th>
<th>I</th>
<th>I</th>
<th>I</th>
<th>I</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>520</td>
<td>487</td>
<td>509</td>
<td>519</td>
<td>477</td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (Rabi).  
Site :- Rice Res. Stn., Mannuthy.  
Type :- 'D'.

Object :- To find out the effect of combined use of fertilizers and compatible insecticides and fungicides.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Field. (c) C.M. 5000 Kg/ha. + 30 Kg/ha. of P 2 O 5 + 30 Kg/ha. of K 2 O broadcasted. (ii) Lateritic. (iii) 19.8.65/30.10.65. (iv) (a) 6 ploughings, puddlings and levellings. (b) Transplanting. (c) to (e) N.A. (v) G.M. 5000 Kg/ha. + 30 Kg/ha. of N + 30 Kg/ha. of K 2 O broadcasted. (vi) Irrigated. (vii) Weeding. (viii) 203 cm. (x) 17.1.66.

2. TREATMENTS:
   13 spraying treatments: T 0 = No spraying, T 1 = Urea at 3.6 Kg. in 40 gallons of water/Hect. Sprayed one month after planting, T 2 = Urea at 3.6 Kg. in 40 gallons of water/Hect. sprayed two months after planting, T 3 = Urea at 3.6 Kg. in 40 gallons of water/Hect. sprayed one and two months after planting, T 4 = Endrin at 28 Kg. in 40 gallons of water/Hect. one month after planting, T 5 = Endrin at 28 Kg. in 40 gallons of water/Hect. two month after planting, T 6 = Endrin at 28 Kg. in 40 gallons of water/Hect. one and two months after planting, T 7 = Cupravit at 45 Kg. in 40 gallons of water/Hect. one month after planting, T 8 = Cupravit at 45 Kg. in 40 gallons of water/Hect. two month after planting.
3. DESIGN:

(i) R.B.D. (ii) (a) 13. (b) 117 m. x 26 m (iii) 4. (iv) 9 m. x 2 m. (b) 8/6 m. x 17 m. (v) Yes. (vi) Yes.

4. GENERAL:

(i) Lodged. (ii) Sprayed Endrin for stem borer, case worm and leaf roller, sprayed Cupravit for blight and fungicides. (iii) Yield of grain. (iv) (a) 1965—cond. (b) Yes. (c) N.A. (v) Central Rice Res. Stn., Pattambi. (vi) and (vii) Nil.

5. RESULTS:

(i) 3112 Kg/ha. (ii) 1444 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of Paddy in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T6</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3155</td>
<td>3240</td>
<td>3078</td>
<td>3198</td>
<td>3112</td>
<td>3266</td>
<td>3198</td>
</tr>
<tr>
<td>C.D.</td>
<td>206.4 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Crop: Paddy (Kharif).

Site: Rice Res. Stn., Mannuthy.

Objec:—To find out the effect of combined use of fertilizers and combatible insecticides and fungicides on the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) 5000 Kg/ha. of C.M. +30 Kg. of N+30 Kg/ha. of P2O5 +30 Kg/ha. of K2O broadcast. (ii) Lateritic. (iii) 13.5.65/22.6.65. (iv) (a) 6 ploughing, puddling and levelling. (b) Transplanting. (c) to (e) N.A. (v) 5000 Kg/ha. of C.M. +30 Kg. of N+30 Kg/ha. of P2O5 +30 Kg/ha. of K2O broadcast. (vi) PTB—(late). (vii) Irrigated. (viii) Weeding. (ix) 203.7 cm. (x) 26.9.65.

2. TREATMENTS and 3. DESIGN:

Same as in exp. No. 65(32) on page 198.

3. RESULTS:

(i) 2979 Kg/ha. (ii) 335 6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Paddy in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T6</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
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<tr>
<td>Av. yield</td>
<td>2719</td>
<td>3069</td>
<td>2668</td>
<td>2924</td>
<td>3143</td>
<td>3035</td>
<td>3292</td>
</tr>
<tr>
<td></td>
<td>2907</td>
<td>2864</td>
<td>2873</td>
<td>3181</td>
<td>2779</td>
<td>3078</td>
<td></td>
</tr>
</tbody>
</table>
Crop :- Paddy (Kharif).

Object :- To find out an effective weedicide for Paddy.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) F.Y.M. at 126 Q/ha. (ii) Lateritic soil. (iii) 17.5.61/N.A. (iv) (a) 10 ploughings. (b) Broadcasting. (c) 72 Kg/ha. (d) 25 cm. x 25 cm. (e) 2. (v) F.Y.M. at 126 Q/ha. (vi) PTB-28 (medium). (vii) Unirrigated. (viii) N.A. (ix) 369 cm. (x) 4.9.61.

2. TREATMENTS :
   5 weedicides:
   \( W_0 \) = Control, \( W_1 \) = M.C.P.A. at 2.8 litres/ha., \( W_2 \) = M.C.P.A. at 5.6 litres/ha., \( W_3 \) = 2-4-D at 1.7 Kg/ha. acid equivalent in 455 litres of water and \( W_4 \) = 2-4-D at 2.2 Kg/ha. acid equivalent in 455 litres of water.

Weedicides applied 45 days after sowing.

3. DESIGN :
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 6.1 m. x 4.6 m. (v) Nil. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) and (iii) N.A. (iv) (a) 1961 only. (b) and (c) Nil. (v) and (vi) N.A. (vii) Nil.

5. RESULTS :
   (i) 672 Kg/ha. (ii) 274.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( W_0 )</th>
<th>( W_1 )</th>
<th>( W_2 )</th>
<th>( W_3 )</th>
<th>( W_4 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>726</td>
<td>483</td>
<td>832</td>
<td>568</td>
<td>749</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).

Object :- To find out the effect of different weedicides on the control of weeds in broadcast Paddy.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) C.M. at 12 C.L./ha. + 56 Kg/ha. of P,O, as Super + 34 Kg/ha. of K,O as Mur. Pot. as basal dressing and 34 Kg/ha. of N as A/S as top dressing. (ii) Lateritic soil. (iii) 16.5.64. (iv) (a) 7 ploughings, digging and levelling. (b) Broadcast. (c) N.A. (d) 25 cm. x 25 cm. (e) 2. (v) C.M. at 12 C.L./ha. + 56 Kg/ha. of P,O, as Super + 34 Kg/ha. of K,O as Mur. Pot. as basal dressing and 34 Kg/ha. of N as A/S as top dressing. (vi) PTB-23 (medium) (vii) Unirrigated. (viii) Nil. (ix) 236 cm. (x) 13.9.64.

2. TREATMENTS :
   Main-plot treatments:
   All combinations of (1) and (2)
   (1) 2 levels of E.P.T.C. : \( E_0 \) = No application and \( E_1 \) = Pre-sowing application with 2-2 Kg/ha. acid equivalent.
   (2) 3 methods of weeding:
   \( M_0 \) = Unweeded, \( M_4 \) = Hand weeded by local method and \( M_1 \) = 3-4 D.P.A. applied at 3-3 Kg/ha. acid equivalent when grass was in 2-4 leaf stage.

   Sub-plot treatments:
   5 levels of weedicides:
   \( W_0 \) = No application, \( W_1 \) = M.C.P.A. at 1.1 Kg/ha., \( W_2 \) = M.C.P.A. at 2.2 Kg/ha., \( W_3 \) = M.C.P.P. at 1.2 Kg/ha. and \( W_4 \) = M.C.P.P. at 2.2 Kg/ha. acid equivalent applied 5 weeks after sowing.

3. DESIGN :
   (i) Spilt-plot. (ii) (a) 6 main-plots/replication, 5 sub-plots/main-plot. (iii) 27.0 m. x 32.4 m. (iv) (a) and (b) 6 m. x 4 m. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) Incidence of gall fly was noticed. (iii) Yield of grain. (iv) (a) 1964 only. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 1116 Kg/ha. (ii) (a) 334.6 Kg/ha. (b) 189.3 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Avg. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>W₀</th>
<th>W₁</th>
<th>W₂</th>
<th>W₃</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>E₀</td>
<td>1205</td>
<td>1108</td>
<td>1074</td>
<td>1128</td>
<td>1191</td>
<td>1042</td>
<td>1054</td>
<td>1328</td>
</tr>
<tr>
<td>E₁</td>
<td>1140</td>
<td>1092</td>
<td>1084</td>
<td>1075</td>
<td>1063</td>
<td>940</td>
<td>1128</td>
<td>1204</td>
</tr>
<tr>
<td>Mean</td>
<td>1173</td>
<td>1100</td>
<td>1079</td>
<td>1102</td>
<td>1127</td>
<td>991</td>
<td>1091</td>
<td>1266</td>
</tr>
</tbody>
</table>

| M₀  | 956  | 1011 | 986  | 1020 | 983  |
| M₁  | 1142 | 1060 | 1060 | 1038 | 1156 |
| M₂  | 1156 | 1229 | 1192 | 1247 | 1241 |
| M₃  | 1173 | 1100 | 1079 | 1102 | 1127 |

C.D. for M marginal means=145.1 Kg/ha.

Crop :- Paddy (Rabi).
Ref :- K. 61(67).
Site :- Agric. College and Instt., Villayani.
Type :- 'D'.

Object :- To study different methods of weed control for Paddy crop.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) Nil. (ii) Loamy. (iii) 30.10.61. (iv) (a) to (b) N.A. (v) F.Y.M. at 5604 Kg/ha. (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) 24.1.62.

2. TREATMENTS:
6 methods of weed control: M₀ = Unweeded (control), M₁ = Local method of weeding, M₂ = Post emergence application of 2-4-D once, M₃ = M₂ twice, M₄ = M₃ + Cultural method of weeding and M₅ = Cultural method of weeding.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 6/9 m. x 4/6 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Stem borer attack : BHC applied at 11 Kg/ha. (iii) Weight of grain, straw and weeds. (iv) (b) 1961 only. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS:
(i) 857 Kg/ha. (ii) 229.0 Kg/ha. (iii) Treatment differences are significant. (iv) Avg. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>699</td>
<td>772</td>
<td>627</td>
<td>970</td>
<td>1073</td>
<td>1000</td>
</tr>
</tbody>
</table>

C.D. = 272.4 Kg/ha.
Crop: Paddy (Rabi).

Ref: K. 64(103).


Type: 'D'.

Object: To find out effective methods of weed control in Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) N.A. (ii) Loamy. (iii) N.A./3.12.64. (iv) (a) Ploughing with country plough and levelling. (b) Transplanting. (c) and (e) N.A. (v) G.M. at 52/8 Kg/ha. as basal dressing. (vi) P.T.B-10 (120 days). (vii) Irrigated. (viii) N.A. (ix) 21 cm. (x) 18.2.62.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1) and (2)
(1) 4 methods of weed controlling: M₁ = Continuous sub-merging till grain filling, M₂ = Light irrigation, M₃ = Irrigation when cracks developed, M₄ = EPTC at 3/4 Kg/ha.
(2) 2 hand weeding treatments: W₀ = No weeding and W₁ = Hand weeding.
Sub-plot treatments:
4 weedicides: T₀ = Control, T₁ = 2-4 D at 2'/2 Kg/ha., T₂ = 3-4 D at 3'4 Kg/ha., T₃ = T₂ + T₄.

3. DESIGN:
(i) Split-plot. (ii) (a) 8 main-plot/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6'1 m. X 5'2 m. (b) 5'5 m. X 4'6 m. (v) 30 cm. X 30 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Stem borer attack. (iii) Yield of grain. (iv) (a) 1964—N.A. (b) N.A. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 1012 Kg/ha. (ii) (a) 236'-5 Kg/ha. (b) 250'2 Kg/ha. (iii) Main effect of M and T are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>W₀</td>
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<td>927</td>
<td>1096</td>
<td>848</td>
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<td>1175</td>
<td>1108</td>
<td>1288</td>
<td>656</td>
<td>1119</td>
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<tr>
<td>T₂</td>
<td>972</td>
<td>791</td>
<td>882</td>
<td>814</td>
<td>1102</td>
</tr>
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<td>T₃</td>
<td>1288</td>
<td>1108</td>
<td>1153</td>
<td>859</td>
<td>1102</td>
</tr>
</tbody>
</table>

C.D. for M marginal means = 123'0 Kg/ha.
C.D. for T marginal means = 124'5 Kg/ha.

Crop: Paddy (Rabi).

Ref: K. 60(31), 60(32), 60(33), 60(34).


Type: 'D'.

Object: To find out the incidence of pests when seedlings are dipped in solutions of insecticides.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) G.L. at 4483 Kg/ha. as basal dressing. A/S at 112 Kg/ha. as top dressing one month after planting. (ii) Shallow laterite. (iii) 29.9.60/11.6.60, 16.9.60/1.11.60, 16.9.60/1.11.60 and 16.9.60/20.10.60 respectively. (iv) (a) 6 puddlings and 4 levellings. (b) Transplanting. (c) N.A. (d) 25 cm. x 15 cm. (e) 2. (v) G.L. at 5604 Kg/ha. as basal dressing + A/S at 112 Kg/ha. one month after planting. (vi) PTB—12, PTB—15, PTB—20 and PTB—21 respectively. (vii) Unirrigated. (viii) N.A. (ix) 309 cm. (x) 8.2.61; 21.1.61; 16.2.61 and 1.2.61 respectively.

2. TREATMENTS:
4 insecticides: I_0 =Control, I_1 =Endrin at 0.028 Kg. in 28.4 litres, I_2 =Folidol at 0.028 Kg. in 56.8 litres and I_3 =D.D.T. 550 at 0.454 Kg. in 113.7 litres.

Insecticides applied two weeks after planting and three weeks after 1st spray.

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 15.2 m. x 1.5 m. (b) 15.2 m. x 0.9 m. (v) 30 cm. on either side.

4. GENERAL:
(i) Normal. (ii) Insecticides sprayed as per schedule. (iii) Pest counts and grain yield. (iv) (a) 1960 only. (b) No (c) Nil. (v) and (vi) Nil. (vii) Expts. conducted on different varieties during 1960. Error variances are heterogeneous and Treatments x varieties interaction is absent. Individual results are given under 5. Results.

5. RESULTS:
(i) 2994 Kg/ha. (ii) 153.5 Kg/ha. (based on 9 d.f. made up of Treatments x varieties interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_0</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2914</td>
<td>3033</td>
<td>3038</td>
<td>2992</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).
Type :- 'D'.

Object :- To compare the efficacy of Basudin 20 E.C. with other insecticides like Folidol and Endrin for Paddy.
5. RESULTS:

60(37)

(i) 2716 Kg/ha. (ii) 168.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_0</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>2684</td>
<td>2732</td>
<td>2860</td>
<td>2588</td>
</tr>
</tbody>
</table>

60(38)

(i) 2260 Kg/ha. (ii) 288.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_0</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2183</td>
<td>2216</td>
<td>2185</td>
<td>2457</td>
</tr>
</tbody>
</table>

60(39)

(i) 2307 Kg/ha. (ii) 121.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_0</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2213</td>
<td>2285</td>
<td>2345</td>
<td>2385</td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).  
Ref :- K. 60(27), 60(28), 60(29), 60(30).  
Type :- 'D'.

Object :- To find out the incidence of pests when seedlings are dipped in solution of insecticides.

1. BASAL CONDITIONS:

(i) (a) Paddy—Paddy. (b) Paddy. (c) G.L. at 4483 Kg/ha. as basal dressing+A/S at 112 Kg/ha. as top dressing one month after planting. (ii) Shallow laterite. (iii) 7.5.60/11.6.60; 11.6.60/7.6.60; 29.4.60/7.6.60 and 23.5.60/23.6.60 respectively. (iv) (a) 6 puddlings and 4 levellings. (b) Transplanting. (c) N.A. (d) 25 cm. x 15 cm. (e) 2. (f) G.L. at 5004 Kg/ha. as basal dressing+A/S at 112 Kg/ha. one month after planting. (vi) PTB—2, PTB—7, PTB—9 and PTB—26 respectively. (vii) Unirrigated. (viii) N.A. (ix) 309 em. (x) 7.10.60; 24.9.60; 28.9.60 and 9.10.60 respectively.

2. TREATMENTS:

4 insecticides: I_0 = Control, I_1 = Endin at 0.028 Kg. in 28.4 litres; I_2 = Folodol at 0.028 Kg. in 56.8 litres and I_3 = D.D.T. 150 at 0.454 Kg. in 113.7 litres.

Seedlings kept dipped in the solution for one hour.

3. DESIGN:

(i) R.B.D. (ii) 4. (b) N.A. (iii) 6. (iv) (a) 15.2 m. x 1.5 m. (b) 15.2 m. x 0.9 m. (v) 30 cm. x 30 cm.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Pest counts and grain yield. (iv) (a) 1959—60. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous. Treatments x varieties interaction is absent. Individual results are given under 5. Results.

5. RESULTS:

60(27)

(i) 3060 Kg/ha. (ii) 234.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_0</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2926</td>
<td>2315</td>
<td>3117</td>
<td>3046</td>
</tr>
</tbody>
</table>
(i) 1871 Kg/ha. (ii) 1460 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I₀</th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1810</td>
<td>1861</td>
<td>1901</td>
<td>1912</td>
</tr>
</tbody>
</table>

(i) 2197 Kg/ha. (ii) 261·1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I₀</th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2297</td>
<td>2256</td>
<td>1963</td>
<td>2271</td>
</tr>
</tbody>
</table>

(i) 2604 Kg/ha. (ii) 142·8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I₀</th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2586</td>
<td>2720</td>
<td>2474</td>
<td>2637</td>
</tr>
</tbody>
</table>


Object := To compare the relative merits of Endrex and Folidol for Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) G.L. at 5604 Kg/ha, as basal dressing and A/S at 112 Kg/ha, as top dressing for 61(47). G.L. at 4942 Kg/ha, of Super at 124 Kg/ha, Mur. Pot. at 62 Kg/ha, of C/A/N at 124 Kg/ha, for 63(128). (ii) Shallow laterite. (iii) 16.9.60/21.10.60 ; 22.9.61/10.11.61 ; 19.11.63/N.A. respectively. (iv) (a) 4 to 8 ploughings, puddings and levelling. (b) Transplanting. (c) and (d) N.A. (e) 2. (f) G.L. at 5604 Kg/ha, for 60(36). C.M. at 126 Q/ha, + B.M. at 110 Kg/ha, + Mur. Pot. at 56 Kg/ha, as basal dressing and urea 56 Kg/ha, as top dressing for 62(47). G.L. at 153 Q/ha, Super at 305 Kg/ha, Mur. Pot. at 153 Kg/ha, and A/S at 305 Kg/ha, for 63(128). (v) PTB - 20 (medium). (vi) Unirrigated. (vii) 1 weeding. (ix) 309 cm.; 52 cm. and 43 cm. respectively. (x) 18.1.61; 9.2.62 and 17.2.64 respectively.

2. TREATMENTS:
   3 insecticides: I₀ = Control, I₁ = Endrex and I₂ = Folidol. Insecticides applied at 0'84 Kg/ha, one week before planting, 1'1 Kg/ha, two weeks after planting and 1'1 Kg/ha, 3 weeks after the second application if necessary.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) 15'2 m. × 1'3 m. (b) 15'2 m. × 0'9 m. (v) 30 cm. on either side.

4. GENERAL:
   (i) Satisfactory. (ii) Insecticides sprayed as per schedule. (iii) Yield of grain and tiller counts. (iv) (a) 1958–63 (62 N.A.). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Expt. No. 58(195) and 59(197) have also been included while giving combined results. Error variances are heterogeneous and Treatments × years interaction is present.

5. RESULTS:
   (i) 1921 Kg/ha (based on 8 d.f. made up of Treatments × years interaction). (ii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1836</td>
<td>1984</td>
<td>1942</td>
</tr>
</tbody>
</table>

C.D. = 111·1 Kg/ha.
Crop: Paddy (Rabi).


Type: ‘D’.

Object: To compare the effect of Aldrex 5% dust and B.H.C. 10% dust on Paddy crop.

1. BASAL CONDITIONS:
   
   (i) Nil. (b) Paddy. (c) N.A. for 60(26). G.L. at 5640 Kg/ha. as basal dressing and A/S at 112 Kg/ha. as top dressing for 61(46). G.L. at 4942 Kg/ha. + Super at 124 Kg/ha. + Mur. Pot. at 62 Kg/ha. as basal dressing and A/S at 62 Kg/ha. as top dressing for 63(130). (ii) Shallow laterite. (iii) 15.10.64/22.10.64 respectively. (iv) (a) 4 to 8 ploughings and 6 to 8 puddlings. (b) Transplanting. (c) N.A. (d) 25 cm. x 15 cm. (e) 2. 3. (f) G.L. at 5604 Kg/ha. for 60(26). C.M. at 126 Qt./ha. + B.M. at 112 Kg/ha. + Mur. Pot. at 56 Kg/ha. as basal dressing and A/S at 62 Kg/ha. as top dressing for 61(46). G.L. at 153 Qt./ha. + Mur. Pot. at 153 Kg/ha. + Super at 305 Kg/ha. as basal dressing and A/S at 305 Kg/ha. as top dressing for 63(130). (v) P.T.B.—20. (vi) Unirrigated. (vii) One weeding. (viii) 309 cm.; 58 cm. and 43 cm. respectively. (x) 17.1.61 ; 10.2.62 and 4.2.64 respectively.

2. TREATMENTS:
   
   3 Insecticidal treatments: I₀ = Control (no insecticide), I₁ = Aldrex 5% dust and I₂ = B.H.C. 10% dust. 16.8 Kg/ha. of insecticides applied one week before planting, 16.8 Kg/ha. 4 weeks after planting if necessary.

3. DESIGN:
   
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) 15'2 m. x 1'5 m. (b) 15'2 m. x 0'9 m. (v) 30 cm. on either side. (v) Yes.

4. GENERAL:
   
   (i) Normal. (ii) Insecticides sprayed as per schedule. (iii) Tiller counts and grain yield. (iv) (a) 1958—63. (b) Nil. (c) Nil (v) and (vi) Nil. (vi) Expt. 58(200) and 59(202) have also been included in the combined analysis.

5. RESULTS:
   
   (i) 1949 Kg/ha. (ii) 350 Kg/ha. (based on 8 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1961</th>
<th>1965</th>
<th>1922</th>
</tr>
</thead>
<tbody>
<tr>
<td>I₀</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I₁</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I₂</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).


Ref: K. 64(31).

Object: To find out an effective insecticide to control the incidence of silver shoot on medium duration Paddy varieties.

1. BASAL CONDITIONS:
   
   (i) (a) Nil. (b) Paddy. (c) 5000 Kg/ha. of G.L. + 33'6 Kg/ha. of N + 33'6 Kg/ha. of P₂O₅ + 33'6 Kg/ha. of K₂O. (ii) Laterite soil. (iii) 15.6.64/18.6.64 (iv) (a) 7 ploughings, digging and levelling. (b) Broadcast. (c) 56 Kg/ha. (d) 25 cm. x 25 cm. (e) 2. (f) 5000 Kg/ha. of G.L. + 33'6 Kg/ha. of N + 33'6 Kg/ha. of P₂O₅ + 33'6 Kg/ha. of K₂O. (v) As per treatments. (vi) Unirrigated. (vii) Nil. (iv) 236 cm. (v) P.T.B.—26 on 19.10.64 and P.T.B.—2 and 9 on 5.11.64.

2. TREATMENTS:
   
   All combinations of (1) and (2)
   
   
   (2) 7 insecticides: I₀ = Control, I₁ = Aldrex 5% dust-dusting, I₁ = Parathion 0’5% spraying, I₁ = Ekatin 0’1% spraying, I₄ = Temodrin 28 am./ha. in 337 litres of water/ha. spraying, I₄ = Endrin 0’05% spraying and I₄ = Dimecron 0’04% spraying.
   
   Insecticides applied 10 days before pulling out in the nursery 15 days after planting.
3. DESIGN:
(i) Fact in R.B.D. (ii) (a) 21. (b) 31 m. x 22 m. (iii) 4. (a) and (b) 7 m. x 4 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Crop lodged. (ii) Attack of gallfly. (iii) Yield of grain. (iv) (a) 1964—only. (b) No. (c) Nil. (v) to (vi) Nil.

5. RESULTS:
(i) 1629 Kg/ha. (ii) 205'2 Kg/ha. (iii) Main effect of V alone is significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>l4</th>
<th>l1</th>
<th>l2</th>
<th>l3</th>
<th>l4</th>
<th>l5</th>
<th>l6</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>2165</td>
<td>2223</td>
<td>2339</td>
<td>2143</td>
<td>2192</td>
<td>2009</td>
<td>2263</td>
</tr>
<tr>
<td>V2</td>
<td>1000</td>
<td>1312</td>
<td>1134</td>
<td>1268</td>
<td>1112</td>
<td>1250</td>
<td>1246</td>
</tr>
<tr>
<td>V3</td>
<td>1625</td>
<td>1357</td>
<td>1518</td>
<td>1352</td>
<td>1336</td>
<td>1625</td>
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<tr>
<td>Mean</td>
<td>1597</td>
<td>1631</td>
<td>1664</td>
<td>1588</td>
<td>1613</td>
<td>1628</td>
<td>1685</td>
</tr>
</tbody>
</table>

C.D. of V marginal means = 109.12 Kg/ha.

**Crop :- Red Gram (Kharif).**
**Site :- Pulses Res. Stn., Sasthamcattah.**

Object :- To find out the best time of sowing of Redgram.

1. BASAL CONDITIONS:
(i) and (ii) N.A. (iii) June, 1965. (iv) (a) Small ridges are made at a distance of 60 cm. (b) Dibbling on the ridges. (c) to (e) N.A. (v) 100 Kg/ha of Super. (vi) Local. (vii) Unirrigated. (viii) Hoeing and weeding twice. (ix) 10.2 cm. (x) January, 66.

2. TREATMENTS:
5 dates of sowing : D1 = 15.6.65, D2 = 25.6.65, D3 = 5.7.65, D4 = 15.7.65 and D5 = 25.7.65.

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

4. GENERAL:
(i) Not satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1965—N.A. (b) and (c) N.A. (v) Nil. (vi) Dry period predominated. (vii) Nil.

5. RESULTS:
(i) 43 Kg/ha. (ii) 23.6 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40</td>
<td>57</td>
<td>65</td>
<td>28</td>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>

C.D. = 28.4 Kg/ha.

**Crop :- Black Gram (Kharif).**
**Site :- Pulse Res. Stn., Sasthamcattah.**

Object :- To find out the optimum spacing to get highest yield.
1. **BASAL CONDITIONS**:  
   (i) (a) Nil. (b) Black Gram. (c) Super at the rate of 100 Kg/ha. (ii) Laterite. (iii) 23.6.65. (iv) (a) 2 diggings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) N.A. (v) Super at the rate of 100 Kg/ha. as basal dressing. (vi) Medium. (vii) Unirrigated. (viii) 1–2 weedings. (ix) N.A. (x) 12.9.65.

2. **TREATMENTS**:  
   Same as in expt. No. 65(15) on page 207.

3. **DESIGN**:  
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 5. (iv) 6 m. x 2 m. (v) Nil. (vi) Yes.

4. **GENERAL**:  
   (i) Satisfactory. (ii) Pod worms were noticed in tender pod and controlled by spraying Endrin. (iii) Yield only. (iv) (a) 1964—contd. (b) No. (c) N.A. (v) to (vii) Nil.

5. **RESULTS**:  
   (i) 73 Kg/ha. (ii) 35.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>86</td>
<td>88</td>
<td>93</td>
<td>54</td>
<td>78</td>
</tr>
</tbody>
</table>

---

**Crop**: Cowpea (Kharif).  
**Ref**: K. 65(15)  
**Site**: Pulses Res. Stn., Sasthamcottah.  
**Type**: 'C'.

Object:—To find out the optimum spacing to get highest yield.

---

1. **BASAL CONDITIONS**:  
   (i) (a) Nil. (b) Cowpea. (c) S/P at the rate of 100 Kg/ha. (ii) Laterite. (iii) 21.6.65. (iv) (a) 2 diggings. (b) Dibbling. (c) N.A. (d) As per treatment. (e) N.A. (v) Super at the rate of 100 Kg/ha. as basal dressing. (vi) Medium. (vii) Unirrigated. (viii) 1–2 weedings. (ix) N.A. (x) 2.9.65.

2. **TREATMENTS**:  
   6 spacings; S1=15x15, S2=15x20, S3=15x25, S4=20x20, S5=20x25 and S6=25x25 cm.

3. **DESIGN**:  
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 5. (iv) 6 m. x 2 m. (v) Nil. (vi) Yes.

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

5. **RESULTS**:  
   (i) 118 Kg/ha. (ii) 34.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>86</td>
<td>118</td>
<td>138</td>
<td>123</td>
<td>113</td>
</tr>
</tbody>
</table>

---

**Crop**: Bhindi.  
**Ref**: K. 60(60), 61(88).  
**Site**: Agri. College and Res. Instt., Vellayani.  
**Type**: 'D'.

Object:—To find out effective pesticide to control pests on Bhindi.
1. BASAL CONDITIONS:
   (i) (a) to (c) Nil. (ii) Red loam. (iii) 13.7.60; 7.8.61. (iv) (a) to (e) N.A. (v) 2-3 Kg/plant of cowdung
   manure. (vi) Local. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 1.9.60 to 2.10.60; N.A.

2. TREATMENTS:
   7 insecticidal treatments: T0=Control (no treatment), T1=Mechanical, T2=D.D.T. 2% spray,
   T3=Lindane 0.05% spray, T4=Heptachlor 0.15% spray, T5=Malathion 0.15% spray and T6=Diazinon 0.05% spray.

3. DESIGN:
   (i) R.B.D. (ii) (a) 7. (b) 16.8 m. x 3.8 m. (iii) 5. (iv) (a) 3.8 m. x 2.3 m. (b) 2.3 m. x 1.5 m. (v) 76 cm.
   x 38 cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Moderate attack of pests for 60(60); Infestation by Jassid and Aphids for 61(88),
   (iii) Yield of bhindi and incidence of pests. (iv) (a) 1959-61 (modified in 60). (b) No. (c) Nil. (v) N.A.,
   (vi) and (vii) Nil.

5. RESULTS:

   Yield of Bhindi.
   60(60)
   (i) 7021 Kg/ha. (ii) 1607-0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of bhindi
   in Kg/ha.

   Treatment | T0 | T1 | T2 | T3 | T4 | T5 | T6
   Av. yield | 7157 | 7250 | 6802 | 7430 | 7735 | 6085 | 6688

   61(88)
   (i) 1795 Kg/ha. (ii) 627-2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of bhindi
   in Kg/ha.

   Treatment | T0 | T1 | T2 | T3 | T4 | T5 | T6
   Av. yield | 1450 | 1511 | 2187 | 1690 | 1584 | 2048 | 2096

   Jassids count per plot
   61(88)
   (i) 360.2. (ii) 135.3. (iii) Treatment differences are not significant. (iv) Av. number of Jassids/plot.

   Treatment | T0 | T1 | T2 | T3 | T4 | T5 | T6
   Av. number | 559.4 | 427.3 | 211.3 | 408.2 | 454.8 | 252.1 | 208.3

   Shoot borer Count per plot
   60(60)
   (i) 1.9. (ii) 2.0. (ii) Treatment differences are not significant. (iv) Av. number of aphids/plot.

   Treatment | T0 | T1 | T2 | T3 | T4 | T5 | T6
   Av. number | 2.8 | 3.2 | 0.8 | 2.6 | 0.8 | 1.8 | 1.0

   Aphids count per plot
   61(88)
   (i) 516.3. (ii) 273.6. (iii) Treatment differences are highly significant. (iv) Av. number of aphids/plot.

   Treatment | T0 | T1 | T2 | T3 | T4 | T5 | T6
   Av. number | 889.6 | 585.4 | 574.6 | 358.0 | 841.4 | 204.2 | 169.6
   C.D.=357.3

   Aphids count per plot
   60(57)
   (i) 176.2 aphids/plot. (ii) 368.0 aphids/plot. (iii) Treatment differences are not significant. (iv) Av.
   number of aphids/plot.

   Treatment | T0 | T1 | T2 | T3 | T4 | T5 | T6
   Av. number | 674.0 | 193.2 | 222.8 | 12.2 | 67.0 | 26.2 | 36.2
Crop: Sweet Potato (Kharif).  
Site: Tuber Res. Stn., Mannuthy.  
Type: 'M'.

Object: To determine the best combination of N, P and K for Sweet Potato.

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) Sweet potato.  (c) As per treatments.  (ii) Lateritic and gravelly soil.  (iii) 22.6.60; 15.7.61; 10.7.62.  (iv) (a) 2 to 3 ploughings.  (b) Ridge planting.  (c) N.A.  (d) 91 cm. x 30 cm.  (e) Single cutting 23 cm. long with 3 nodes.  (v) 12 to 25 C.L./ha. of Cowdung for 60(62), 61(106) and 62(23); 74 to 247 tins/ha. of ash for all.  (vi) Hybrid for 63(45); Local white (late) for others.  (vii) Unirrigated.  (viii) Weeding and earthing up.  (ix) N.A.  (x) 10.12.60; 5.12.61; 13.12.62.

2. TREATMENTS:
   Main-plot treatments:
   All combinations of (1) and (2)
   (1) 3 levels of \( P_0 \): \( P_0 = 0 \), \( P_1 = 56 \) and \( P_2 = 112 \) Kg/ha.
   (2) 3 levels of \( K_0 \) as potash: \( K_0 = 0 \), \( K_1 = 90 \) and \( K_2 = 179 \) Kg/ha.
   Sub-plot treatments:
   2 levels of N: \( N_0 = 0 \) and \( N_1 = 90 \) Kg/ha.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 9 main-plots/replication; 2 sub-plots/main-plot.  (b) N.A.  (iii) 6.  (iv) (a) 5.5 m. x 7.3 m.  (b) 3.7 m. x 6.7 m.  (v) 91 em. x 30 cm.  (vi) Yes.

4. GENERAL:
   (i) Good.  (ii) Nil.  (iii) Yield of tubers.  (iv) (a) 1958-62.  (b) Yes.  (c) Nil.  (v) N.A.  (vi) Nil.  (vii) Sub-plot error variances are heterogeneous. Hence the results of individual years are presented under 5. Results.

5. RESULTS:
60(62)
   (i) 4718 Kg/ha.  (ii) (a) 1748'0 Kg/ha.  (b) 943'7 Kg/ha.  (iii) Main effects of N and P are highly significant and interactions \( P \times K \) and \( N \times P \times K \) are significant.  (iv) Av. yield of tubers in Kg/ha.

\[
\begin{array}{cccc|c|c}
 & P_0 & P_1 & P_2 & K_0 & K_1 & K_2 & \text{Mean} \\
\hline
N_0 & 2836 & 4069 & 4665 & 3329 & 4274 & 3966 & 3856 \\
N_1 & 4459 & 5980 & 6298 & 4993 & 5661 & 6082 & 5579 \\
\hline
\text{Mean} & 3648 & 5024 & 5481 & 4161 & 4968 & 5024 & 4718 \\
\hline
K_0 & 2790 & 5379 & 4315 & 3514 & 5425 & 5964 & 4639 & 4269 & 6165 \\
K_1 & 4639 & 4269 & 6165 & 382'7 Kg/ha. & 366'1 Kg/ha. & 144'7 Kg/ha. \\
\hline
\end{array}
\]

C.D. for P marginal means = 3856
C.D. for N marginal means = 5579
C.D. for the body of \( P \times K \) table = 4718

61(106)
   (i) 3762 Kg/ha.  (ii) (a) 1641 Kg/ha.  (b) 785'7 Kg/ha.  (iii) Main effect of N alone is highly significant.  (iv) Av. yield of tubers in Kg/ha.
<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
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</thead>
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<tr>
<td>N₀</td>
<td>3380</td>
<td>2805</td>
<td>3103</td>
<td>2928</td>
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<td>3370</td>
<td>3096</td>
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<tr>
<td>N₁</td>
<td>4726</td>
<td>3904</td>
<td>4654</td>
<td>4141</td>
<td>4120</td>
<td>5024</td>
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<tr>
<td>Mean</td>
<td>4053</td>
<td>3355</td>
<td>3879</td>
<td>3534</td>
<td>3554</td>
<td>4197</td>
<td>3762</td>
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</tbody>
</table>

C.D. for N marginal means = 304.8 Kg/ha.

(i) 2777 Kg/ha.  (ii) (a) 1183.3 Kg/ha. (b) 633.1 Kg/ha.  (iii) Main effects of N and K and interaction N×K are highly significant.  (iv) Av. yield of tubers in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>N₀</td>
<td>2223</td>
<td>2242</td>
<td>2349</td>
<td>2069</td>
<td>2451</td>
<td>2293</td>
<td>2271</td>
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<tr>
<td>N₁</td>
<td>3123</td>
<td>3258</td>
<td>3467</td>
<td>2876</td>
<td>3276</td>
<td>3696</td>
<td>3283</td>
</tr>
<tr>
<td>Mean</td>
<td>2673</td>
<td>2750</td>
<td>2908</td>
<td>2473</td>
<td>2864</td>
<td>2994</td>
<td>2777</td>
</tr>
</tbody>
</table>

C.D. for K marginal means = 563.7 Kg/ha.
C.D. for N marginal means = 233.7 Kg/ha.
C.D. for K means at the same level of N = 637.5 Kg/ha.
C.D. for N means at the same level of K = 425.2 Kg/ha.

Crop: Sweet Potato.
Site: Palghat.
Ref: K. 63(S.F.T).
Type: M.

Object: Type A: To study the response curve of important cereals, cash and oilseeds crops to Nitrogen applied singly and in combination with other nutrients.

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

2. TREATMENTS:
   8 manurial treatments:
   N₀ = 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
   N₁P₂ = 120 Kg/ha. of N + 35 Kg/ha. of P₂O₅
   N₂P₁ = 120 Kg/ha. of N + 70 Kg/ha. of P₂O₅
   N₂P₂ = 120 Kg/ha. of N + 70 Kg/ha. of P₂O₅ + 60 Kg/ha. of K₂O.
   N applied as AS, P₂O₅ as Super and K₂O as Mur. Pot.
3. DESIGN:
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 oilseed. 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) to (iii) N.A. (iv) (a) 1963 for Palghat. (b) and (c) Nil. (v) to (vii) Nil.

5. RESULTS:

**Palghat**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N2</th>
<th>N4</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P3</th>
<th>N1P3</th>
<th>N1P4</th>
<th>N1P4K4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>784</td>
<td>1034</td>
<td>1205</td>
<td>2075</td>
<td>5877</td>
<td>4388</td>
<td>6431</td>
<td>11434</td>
<td></td>
</tr>
</tbody>
</table>

Control yield=4619 Kg/ha.; No. of trials=3.

Ripe :- Sweet Potato.  
Site :- Palghat.  
Ref :- K. 63(S.F.T).  
Type :- 'M'.

Object :- Type A4 : To study the response curve of important cereals, oil seeds and cash crops to Phosphorus applied singly and in combination with other nutrients.

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

2. TREATMENTS:
8 manural treatments:

- N0 =Control (no manure).
- N1 =60 Kg/ha. of N.
- P1 =35 Kg/ha. of P04.
- P2 =70 Kg/ha. of P04.
- N1P1 =60 Kg/ha. of N+35 Kg/ha. of P04.
- N1P2 =60 Kg/ha. of N+70 Kg/ha. of P04.
- N1P4 =120 Kg/ha. of N+70 Kg/ha. of P04.
- N1P4K4 =120 Kg/ha. of N+70 Kg/ha. of P04+120 Kg/ha. of K04.


3. DESIGN:
Same as in Type A1 on page 211.

4. GENERAL:
(i) to (iii) N.A. (iv) (a) 1963. (b) and (c) Nil. (v) to (vii) N.A.
5. RESULTS:

Palghat

63(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>P_1</th>
<th>P_2</th>
<th>N_1P_1</th>
<th>N_2P_1</th>
<th>N_2P_2</th>
<th>N_1P_2K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tuber in Kg/ha.</td>
<td>672</td>
<td>454</td>
<td>296</td>
<td>2299</td>
<td>2108</td>
<td>5093</td>
<td>4750</td>
<td>809.8</td>
</tr>
</tbody>
</table>

Control yield=5423 Kg/ha.; No. of trials=3.

Crop : Sweet Potato.

Site : Palghat.

Ref : K. 63(S.F.T).

Type : ‘M’.

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

1. BASAL CONDITIONS:

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

2. TREATMENTS:

8 manural treatments:

- N_0 =Control (no manure).
- N_1 =60 Kg/ha. of N.
- K_1 =60 Kg/ha. of K_2O.
- K_2 =120 Kg/ha. of K_2O.
- N_1K_1 =60 Kg/ha. of N+60 Kg/ha. of K_2O.
- N_1K_2 =60 Kg/ha. of N+120 Kg/ha. of K_2O.
- N_2K_2 =120 Kg/ha. of N+120 Kg/ha. of K_2O.
- N_1P_1K_1 =60 Kg/ha. of N+60 Kg/ha. of P_2O_5+60 Kg/ha. of K_2O.

N applied as A/S, P as P_2O_5 and K as K_2O.

3. DESIGN:

Same as in Type A_1 on page 211.

4. GENERAL:

(i) to (iii) N.A. (iv) (a) 1963. (b) and (c) N.I. (v) to (vii) N.A.

5. RESULTS:

Palghat

63(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N_1</th>
<th>K_1</th>
<th>K_2</th>
<th>N_1K_1</th>
<th>N_2K_1</th>
<th>N_2K_2</th>
<th>N_1P_2K_1</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>2121</td>
<td>1917</td>
<td>3301</td>
<td>4223</td>
<td>3927</td>
<td>5065</td>
<td>6721</td>
<td>1214.0</td>
</tr>
</tbody>
</table>

Control yield=10608 Kg/ha.; No. of trials=3.

Crop : Sweet Potato.

Site : Tuber Crop Res. Stn., Mannuthy.

Ref : K. 60(63), 61(105), 62(24), 64(181).

Type : ‘G’.

Object :— To determine the optimum spacing and the best method of cultivation of Sweet Potato.
1. BASAL CONDITIONS:

(i) (a) Nil. (b) Sweet Potato. (c) 5 C.L. of Cowdung+25 tins of ash for 60(63); 25 tins of Compost and 25 tins of Ash for 61(105); 124 C.L./ha. of Cowdung+74 tins of Ash for 62(24); 50 tins of Ash applied before taking ridges for 64(181). (ii) Laterite and gravelly soil. (iii) 27.6.60; 21.7.61; 14.7.62; 20.8.64. (iv) (a) Ploughing and digging. (b) As per treatments. (c) N.A. (d) As per treatments. (e) Single cutting 23 cm. long with 3 nodes. (v) 25 tins of Compost and 25 tins of Ash were mixed and applied before making ridges and flat beds for 60(63): 12 4 C.L./ha. of Cowdung after tilling+74 tins of Ash at planting for 61(105); 24 7 C.L./ha. of Cowdung and 247 tins/ha. of Ash applied before planting for 62(24); 50 tins of Ash applied before taking ridges for 64(181). (vi) Local white (late). (vii) Unirrigated. (viii) Weeding, interculturing and earthing up carried cut even after planting. (ix) N.A. (x) 12.12.60; 8.12.61; 15.12.62; December 64.

2. TREATMENTS:

All combinations of (1) and (2)

(1) 2 methods of planting: M1=On ridges and M2=On flat beds.
(2) 3 spacings: S1=0.61 m. X 0.15 m.; S2=0.61 m. X 0.30 m. and S3=0.61 m. X 0.46 m.

3. DESIGN:

(i) R.B.D. (ii) 6. (b) N.A. (iii) 6. (iv) (a) S1=5.5 m. X 8.5 m.; S2=6.1 m. X 8.5 m.; S3=6.4 m. X 8.5 m. (b) 5.5 m. X 7.3 m. (v) Border rows are discarded.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1959—64. (b) Yes. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) N.A. (vii) Expts. No. 58(10), 58(11) are also taken into consideration while giving the pooled results. Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:

(i) 4331 Kg/ha. (ii) 1973°0 Kg/ha. (based on 25 d.f. made up of Treatments x years interaction). (iii) Main effects of M and S are highly significant. (iv) Av. yield of tubers in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>6418</td>
<td>4699</td>
<td>3721</td>
<td>4946</td>
</tr>
<tr>
<td>M2</td>
<td>4641</td>
<td>3479</td>
<td>3027</td>
<td>3716</td>
</tr>
<tr>
<td>Mean</td>
<td>5330</td>
<td>4089</td>
<td>3374</td>
<td>4331</td>
</tr>
</tbody>
</table>

C.D. for M marginal means—553°1 Kg/ha.
C.D. for S marginal means—677°4 Kg/ha.

Crop :- Tapioca.

Ref :- K. 63, 64(S.F.T.) for Kozhikode, 63, 64, 65 (S.F.T.) for Palghat and 64, 65(S.F.T.) for the rest.

Site :- (District) :- Cannanore, Ernakulam, Alleppy, Kozhikode, Kottayam, Quilon and Palghat.

Type :- ‘M’.

Object :- Type A1.—To study the response curves of important cereals, cash and oilseed crops to N applied singly and in combination with other nutrients.
1. BASAL CONDITIONS:
   (i) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
   8 manurial treatments:
   - N<sub>0</sub> = Control (no manure)
   - N<sub>1</sub> = 60 Kg/ha. of N
   - N<sub>2</sub> = 120 Kg/ha. of N
   - P<sub>1</sub> = 35 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
   - N<sub>1</sub>P<sub>1</sub> = 60 Kg/ha. of N + 35 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
   - N<sub>2</sub>P<sub>1</sub> = 120 Kg/ha. of N + 70 Kg/ha. of P<sub>2</sub>O<sub>5</sub>
   - N<sub>1</sub>P<sub>2</sub> = 120 Kg/ha. of N + 60 Kg/ha of K<sub>2</sub>O
   - N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

3. DESIGN:
   A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A<sub>0</sub>, 11 of type A<sub>1</sub>, 11 of type A<sub>2</sub>, and 3 are of type C. The eleven experiments under type A<sub>0</sub>, A<sub>1</sub>, and A<sub>2</sub> are distributed as 3 on a Kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A<sub>0</sub>, A<sub>1</sub>, and A<sub>2</sub> experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A<sub>0</sub>, A<sub>1</sub>, and A<sub>2</sub> are laid out. For conducting the three type-C trials three villages are randomly selected in each block.

4. GENERAL:
   (i) to (iii) N.A. (iv) (a) 1963 to 64 Kozhikode; 63 to 66 for Palghat; 1964 to 66 for the rest. (b) and (c) N.A. (v) Nil. (vi) and (vii) N.A.

5. RESULTS:
   Cannanore
   64(S.F.T.)
   Treatment:
   - N<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>
   - Av. response of tubers in Kg/ha. 1130 1730 720 1990 1500 2360 2960 3390
   - Control yield=7270 Kg/ha.; No. of trials=12.

   65(S.F.T.)
   Treatment:
   - N<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>
   - Av. response of tubers in Kg/ha. 1620 2210 2390 3880 5550 6780 8770
   - Control yield=22510 Kg/ha.; No. of trials=12.

   Ernakulam
   64(S.F.T.)
   Treatment:
   - N<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>
   - Av. response of tubers in Kg/ha. 1620 2210 2390 3880 5550 6780 8770
   - Control yield=22510 Kg/ha.; No. of trials=12.

   65(S.F.T.)
   Treatment:
   - N<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>
   - Av. response of tubers in Kg/ha. 3128 4666 3151 6099 7474 8958 11903
   - Control yield=22441 Kg/ha.; No. of trials=12.
<table>
<thead>
<tr>
<th>Location</th>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
<th>N1P1</th>
<th>N2P1</th>
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<th>N2P2</th>
<th>N1P4</th>
<th>N2P4</th>
<th>N1P6</th>
<th>N2P6</th>
<th>K1</th>
<th>S.E.</th>
<th>Av. response of tuber in Kg/ha.</th>
<th>Control yield=</th>
<th>No. of trials=</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alleppy</td>
<td>64(S.F.T.)</td>
<td>N1</td>
<td>N2</td>
<td>P1</td>
<td>N1P1</td>
<td>N2P1</td>
<td>N1P2</td>
<td>N2P2</td>
<td>N1P4</td>
<td>N2P4</td>
<td>N1P6</td>
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<td>N2P1</td>
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<td>N1P1</td>
<td>N2P1</td>
<td>N1P2</td>
<td>N2P2</td>
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<td>N1P6</td>
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<td>N2P1</td>
<td>N1P2</td>
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<td>N1P4</td>
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<td>N2P6</td>
<td>K1</td>
<td>S.E.</td>
<td>2923</td>
<td>5510</td>
<td>1290</td>
</tr>
<tr>
<td>Quilon</td>
<td>64(S.F.T.)</td>
<td>N1</td>
<td>N2</td>
<td>P1</td>
<td>N1P1</td>
<td>N2P1</td>
<td>N1P2</td>
<td>N2P2</td>
<td>N1P4</td>
<td>N2P4</td>
<td>N1P6</td>
<td>N2P6</td>
<td>K1</td>
<td>S.E.</td>
<td>1150</td>
<td>2780</td>
<td>1300</td>
</tr>
<tr>
<td></td>
<td>65(S.F.T.)</td>
<td>N1</td>
<td>N2</td>
<td>P1</td>
<td>N1P1</td>
<td>N2P1</td>
<td>N1P2</td>
<td>N2P2</td>
<td>N1P4</td>
<td>N2P4</td>
<td>N1P6</td>
<td>N2P6</td>
<td>K1</td>
<td>S.E.</td>
<td>1391</td>
<td>2160</td>
<td>1215</td>
</tr>
</tbody>
</table>
Palghat

63 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₄</th>
<th>P₁</th>
<th>N₁[P₁]</th>
<th>N₀P₁</th>
<th>N₂P₁</th>
<th>N₄P₂</th>
<th>N₄P₂K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>1803</td>
<td>2684</td>
<td>2793</td>
<td>3402</td>
<td>5242</td>
<td>6907</td>
<td>7461</td>
<td>446/0</td>
<td></td>
</tr>
<tr>
<td>Control yield=7536 Kg/ha.; No. of trials=9.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

64 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₄</th>
<th>P₁</th>
<th>N₁[P₁]</th>
<th>N₀P₁</th>
<th>N₂P₁</th>
<th>N₄P₂</th>
<th>N₄P₂K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>110</td>
<td>560</td>
<td>620</td>
<td>52</td>
<td>1020</td>
<td>1280</td>
<td>1600</td>
<td>138/0</td>
<td></td>
</tr>
<tr>
<td>Control yield=6630 Kg/ha.; No. of trials=8.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>N₄</th>
<th>P₁</th>
<th>N₁[P₁]</th>
<th>N₀P₁</th>
<th>N₂P₁</th>
<th>N₄P₂</th>
<th>N₄P₂K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>4500</td>
<td>7000</td>
<td>6000</td>
<td>10000</td>
<td>14500</td>
<td>20000</td>
<td>24500</td>
<td>2015/5</td>
<td></td>
</tr>
<tr>
<td>Control yield=40000 Kg/ha.; No. of trials=3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Tapioca. Ref: K. 63, 64 (S.F.T.) for Kozhikode; 63, 64, 65 (S.F.T.) for Palghat; 1964 (S.F.T.) for Trichur and 64, 65 (S.F.T.) for others.

Site: (District) : Cannanore, Kotta - Type: ‘M’.

Object: Type A₁: To study the response curve of important cereals, oilseeds and cash crops to Phosphorus applied singly and in combination with other nutrients.

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

2. TREATMENTS:
   8 manural treatments:
   O =Control (no manure)
   N₁ =60 Kg/ha. of N.
   P₁ =35 Kg/ha. of P₂O₅.
   P₂ =70 Kg/ha. of P₂O₅.
   N₁P₁ =60 Kg/ha. of N+35 Kg/ha. of P₂O₅.
   N₂P₁ =60 Kg/ha. of N+70 Kg/ha. of P₂O₅.
   N₂P₁ =120 Kg/ha. of N+70 Kg/ha. of P₂O₅.
   N₂P₁K₁ =120 Kg/ha. of N+70 Kg/ha. of P₂O₅+120 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 page 214.

4. GENERAL:
   (i) to (iii) N.A. (iv) (a) 1963 to 64 for Kozhikode; 1963 to 65 for Palghat; 1964 for Trichur and 1964 to 1965 for other. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:

**Cannanore**

64 (S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁[P₁]</th>
<th>N₀P₁</th>
<th>N₂P₁</th>
<th>N₄P₂</th>
<th>N₄P₂K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>390</td>
<td>1630</td>
<td>1190</td>
<td>1690</td>
<td>1960</td>
<td>4120</td>
<td>5440</td>
<td>893/0</td>
<td></td>
</tr>
<tr>
<td>Control yield=8250 Kg/ha.; No. of trials=12.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Treatment</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>S.E.</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------</td>
<td>---------------</td>
<td>---------------</td>
<td>----------------</td>
<td>------------------</td>
<td>------------------</td>
<td>-----------------</td>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>Kottayam</td>
<td>N&lt;sub&gt;1&lt;/sub&gt; pl</td>
<td>3649</td>
<td>236</td>
<td>3644</td>
<td>10256</td>
<td>13879</td>
<td>23863</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Av. response of tubers in Kg/ha.</td>
<td>4100</td>
<td>3960</td>
<td>5880</td>
<td>8040</td>
<td>9480</td>
<td>11150</td>
<td>14480</td>
<td>515 0</td>
</tr>
<tr>
<td></td>
<td>Control yield=18270 Kg/ha.; No. of trials=12.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palghat</td>
<td>N&lt;sub&gt;1&lt;/sub&gt; P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>1807</td>
<td>2528</td>
<td>3518</td>
<td>4737</td>
<td>6090</td>
<td>6973</td>
<td>8096</td>
<td>281 4</td>
</tr>
<tr>
<td></td>
<td>Av. response of tubers in Kg/ha.</td>
<td>2300</td>
<td>2580</td>
<td>3500</td>
<td>4780</td>
<td>6090</td>
<td>6973</td>
<td>8096</td>
<td>281 4</td>
</tr>
<tr>
<td></td>
<td>Control yield=7281 Kg/ha.; No. of trials=9.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quilon</td>
<td>N&lt;sub&gt;1&lt;/sub&gt; pl</td>
<td>2090</td>
<td>1200</td>
<td>1730</td>
<td>2260</td>
<td>2850</td>
<td>3700</td>
<td>4660</td>
<td>439 0</td>
</tr>
<tr>
<td></td>
<td>Av. response of tubers in Kg/ha.</td>
<td>2000</td>
<td>1200</td>
<td>1730</td>
<td>2260</td>
<td>2850</td>
<td>3700</td>
<td>4660</td>
<td>439 0</td>
</tr>
<tr>
<td></td>
<td>Control yield=11050 Kg/ha.; No. of trials=12.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palghat</td>
<td>N&lt;sub&gt;1&lt;/sub&gt; P&lt;sub&gt;1&lt;/sub&gt;</td>
<td>2850</td>
<td>3200</td>
<td>3800</td>
<td>4737</td>
<td>6090</td>
<td>6973</td>
<td>8096</td>
<td>281 4</td>
</tr>
<tr>
<td></td>
<td>Av. response of tubers in Kg/ha.</td>
<td>1807</td>
<td>2528</td>
<td>3518</td>
<td>4737</td>
<td>6090</td>
<td>6973</td>
<td>8096</td>
<td>281 4</td>
</tr>
<tr>
<td></td>
<td>Control yield=7281 Kg/ha.; No. of trials=9.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Trichur

**64(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_i$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$N_iP_1$</th>
<th>$N_iP_2$</th>
<th>$N_iP_3$</th>
<th>$N_iP_4$</th>
<th>$K_i$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>3600</td>
<td>3230</td>
<td>4720</td>
<td>5880</td>
<td>7150</td>
<td>4080</td>
<td>14220</td>
<td>669'0</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 20430 Kg/ha.; No. of trials = 7.

### Trivandrum

**64(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_i$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$N_iP_1$</th>
<th>$N_iP_2$</th>
<th>$N_iP_3$</th>
<th>$N_iP_4$</th>
<th>$K_i$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>900</td>
<td>750</td>
<td>1090</td>
<td>1620</td>
<td>2140</td>
<td>2910</td>
<td>3550</td>
<td>238'0</td>
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</tr>
</tbody>
</table>

Control yield = 8780 Kg/ha.; No. of trials = 12.

### Alleppy

**64(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_i$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$N_iP_1$</th>
<th>$N_iP_2$</th>
<th>$N_iP_3$</th>
<th>$N_iP_4$</th>
<th>$K_i$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>937</td>
<td>838</td>
<td>1627</td>
<td>2393</td>
<td>3040</td>
<td>3614</td>
<td>4832</td>
<td>243'6</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 9082 Kg/ha.; No. of trials = 11.

### Trivandrum

**65(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_i$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$N_iP_1$</th>
<th>$N_iP_2$</th>
<th>$N_iP_3$</th>
<th>$N_iP_4$</th>
<th>$K_i$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>1486</td>
<td>4066</td>
<td>6266</td>
<td>7353</td>
<td>11200</td>
<td>21593</td>
<td>21860</td>
<td>1486'7</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 18906 Kg/ha.; No. of trials = 12.

### Kozhikode

**65(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_i$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$N_iP_1$</th>
<th>$N_iP_2$</th>
<th>$N_iP_3$</th>
<th>$N_iP_4$</th>
<th>$K_i$</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>1048</td>
<td>993</td>
<td>1690</td>
<td>2584</td>
<td>2041</td>
<td>3319</td>
<td>4477</td>
<td>206'7</td>
<td></td>
</tr>
</tbody>
</table>

Control yield = 6700 Kg/ha.; No. of trials = 10.
Crop :- Tapioca.  Ref :- K. 63, 64 for Kozhikode ; 64 (S.F.T.) for Trichur ; 65 (S.F.T.) for Alleppy and 64, 65 (S.F.T.) for others.

Site :- (District) : Cannanore, Type :- 'M'.  Kottayam, Kozhikode, Palghat, Quillon, Trichur, Trivandrum, Ernakulam and Alleppy.

Object :- Type A3 :- To study the response curves of important cereals, cash and oilseed crops to Potash applied singly and in combination with other nutrients.

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

2. TREATMENTS:

   8 manurai treatments:
   O  =Control (no manure).
   \(N_1\)  =60 Kg/ha. of N.
   \(K_1\)  =60 Kg/ha. of \(K_2O\).
   \(K_2\)  =120 Kg/ha. of \(K_2O\).
   \(N_1K_1\)  =60 Kg/ha. of \(N+60\) Kg/ha. of \(K_2O\).
   \(N_1K_2\)  =60 Kg/ha. of \(N+120\) Kg/ha. of \(K_2O\).
   \(N_2K_2\)  =120 Kg/ha. of \(N+120\) Kg/ha. of \(P_2O_5\).
   \(N_1P_1K_1\)  =60 Kg/ha. of \(N+35\) Kg/ha. of \(P_2O_5\)+60 Kg/ha. of \(K_2O\).

   N applied as A/S, \(P_2O_5\) as Super and \(K_2O\) as Mur. Pot.

3. DESIGN:
   Same as in Type A1 on page 214.

4. GENERAL:
   (i) to (iii) N.A.  (iv) 1963 to 64 for Kozhikode ; 64 for Quillon ; 1965 for Alleppy and 1964 to 65 for others.
   (b) and (c) N.A.  (v) to (vii) N.A.

5. RESULTS:

   Cannanore

   64(S.F.T.)

   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 tubers in Kg/ha.  1350  220  2090  1720  2440  3280  3530  4240
   Control yield=7560 Kg/ha.; No. of trials=12.

   65(S.F.T.)

   Treatment                   \(N_1\)  \(K_1\)  \(K_2\)  \(N_1K_1\)  \(N_1K_2\)  \(N_2K_4\)  \(N_1P_1K_1\)  S.E.
   Av. response of tubers in Kg/ha.  599  1412  1925  2211  2811  3192  3407  3526
   Control yield=9022 Kg/ha.; No. of trials=11.
### Kottayam

**64 (S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1 K_1 )</th>
<th>( N_1 K_2 )</th>
<th>( N_1 P_1 K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>2990</td>
<td>3200</td>
<td>5260</td>
<td>6620</td>
<td>7870</td>
<td>9160</td>
<td>10760</td>
</tr>
</tbody>
</table>

Control yield = 19070 Kg/ha.; No. of trials = 11.

### Kozhikode

**63 (S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1 K_1 )</th>
<th>( N_1 K_2 )</th>
<th>( N_1 P_1 K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>494</td>
<td>912</td>
<td>1290</td>
<td>1961</td>
<td>2446</td>
<td>3092</td>
<td>3307</td>
</tr>
</tbody>
</table>

Control yield = 7860 Kg/ha.; No. of trials = 9.

### Palghat

**64 (S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1 K_1 )</th>
<th>( N_1 K_2 )</th>
<th>( N_1 P_1 K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>1530</td>
<td>1900</td>
<td>2760</td>
<td>3420</td>
<td>4200</td>
<td>5350</td>
<td>5660</td>
</tr>
</tbody>
</table>

Control yield = 8590 Kg/ha.; No. of trials = 10.

### Qui! on

**65 (S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( N_1 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1 K_1 )</th>
<th>( N_1 K_2 )</th>
<th>( N_1 P_1 K_1 )</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>3500</td>
<td>1000</td>
<td>3700</td>
<td>8000</td>
<td>12500</td>
<td>22500</td>
<td>20000</td>
</tr>
</tbody>
</table>

Control yield = 30000 Kg/ha.; No. of trials = 2.
### Trichur
**64(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>1122</td>
<td>1348</td>
<td>1500</td>
<td>2215</td>
<td>2800</td>
<td>3406</td>
<td>3893</td>
</tr>
</tbody>
</table>

Control yield = 7891 Kg/ha.; No. of trials = 9.

### Trivandrum
**64(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>3900</td>
<td>4340</td>
<td>6490</td>
<td>7940</td>
<td>10810</td>
<td>11900</td>
<td>14820</td>
</tr>
</tbody>
</table>

Control yield = 19980 Kg/ha.; No. of trials = 7.

### Ernakulam
**64(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>510</td>
<td>570</td>
<td>880</td>
<td>1300</td>
<td>1530</td>
<td>2010</td>
<td>2390</td>
</tr>
</tbody>
</table>

Control yield = 8860 Kg/ha.; No. of trials = 12.

### Allepy
**65(S.F.T.)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of tubers in Kg/ha.</td>
<td>806</td>
<td>565</td>
<td>1300</td>
<td>1530</td>
<td>1987</td>
<td>2877</td>
<td>3050</td>
</tr>
</tbody>
</table>

Control yield = 9063 Kg/ha.; No. of trials = 12.
Crop : Tapioca.
Site : Quilon and Trivandrum.

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

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

2. TREATMENTS:
8 manural treatments :

1. Control (no manure).
2. 44.8 Kg/ha. of N as A/S.
3. 22.4 Kg/ha. of P as Super.
4. 22.4 Kg/ha. of K as Mur. Pot.
5. 44.8 Kg/ha. of N as A/S + 22.4 Kg/ha. of P as Super.
6. 44.8 Kg/ha. of N as A/S + 22.4 Kg/ha. of K as Mur. Pot.
7. 44.8 Kg/ha. of N as A/S + 22.4 Kg/ha. of K as Mur. Pot + 22.4 Kg/ha. of P as Super.
8. 44.8 Kg/ha. of N as A/S + 22.4 Kg/ha. of K as Mur. Pot + 22.4 Kg/ha. of P as Super + 22.4 Kg/ha. of K as Mur. Pot.

N applied as A/S, P as Super and K as Mur. Pot.

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 Khari/cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3
on a legumenous 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 be 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) to (iii) N.A. (iv) (a) 1960. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS :

<table>
<thead>
<tr>
<th>District</th>
<th>No. of Control yield</th>
<th>n</th>
<th>p</th>
<th>k</th>
<th>S.E.</th>
<th>np</th>
<th>nk</th>
<th>pk</th>
<th>npk</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quilon 16</td>
<td>89.7</td>
<td>10.5</td>
<td>5.6</td>
<td>13.9</td>
<td>0.69</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>Trivendrum 16</td>
<td>84.8</td>
<td>11.1</td>
<td>9.8</td>
<td>14.3</td>
<td>0.68</td>
<td>2.1</td>
<td>1.8</td>
<td>1.5</td>
<td>0.47</td>
<td></td>
</tr>
</tbody>
</table>

Crop : T. pioca.
Site : Quilon and Trivandrum.

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

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

2. TREATMENTS :

0 =Control (no manure)
1 =44.8 Kg/ha. of N as A/S.
2 =89.6 Kg/ha. of N as A/S.
3 =44.8 Kg/ha. of N as Urea.
4 =89.6 Kg/ha. of N as Urea.
5 =44.8 Kg/ha. of N as A/S/N.
6 =89.6 Kg/ha. of N as A/S/N.
224

3. DESIGN:

Same as in Type A on page 223.

4. GENERAL:

(i) to (iii) N.A. (iv) (a) 1960. (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:

Av. yield of tubers in Q/ha.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trials</th>
<th>0</th>
<th>116</th>
<th>108</th>
<th>102</th>
<th>117</th>
<th>108</th>
<th>102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quillen</td>
<td>5</td>
<td>89</td>
<td>106</td>
<td>117</td>
<td>117</td>
<td>108</td>
<td>108</td>
<td>2.22</td>
</tr>
<tr>
<td>Trivandrum</td>
<td>16</td>
<td>81</td>
<td>93</td>
<td>103</td>
<td>97</td>
<td>106</td>
<td>97</td>
<td>0.87</td>
</tr>
</tbody>
</table>

Crop :- Tapioca.

Site :- Tuber Res. Stn., Mannuthy.

Ref :- K. 60(69), 61(69).

Object :- To determine the best doses of N, P and K and the best spacing for Tapioca.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Tapioca. (c) 12 C.L./ha. of Cowdung+124 tins/ha. of ash+as per treatments. (ii) Nil, (iii) 27.4.60; 15.5 61. (iv) (a) Ploughing. (b) Straight planting on mounds. (c) N.A. (d) As per treatments. (e) 22.9 cm. cutting. (v) 50 tins each of garden compost and ash were mixed and broadcasted after ploughing. (vi) H—105 (9 months) for 60(69); Malayan—4 (9 months) for 61(69). (vii) Unirrigated. (viii) 2-3 weedings, interculturing and earthing up. (ix) N.A. (x) 16.3.61; 3.3.62.

2. TREATMENTS:

All combinations of (1), (2), (3) and (4)

(1) 3 levels of N as A/S:

N1 = 56
N2 = 112
N3 = 168 Kg/ha.

(2) 3 levels of P2O5 as Super:
P0 = 0, P1 = 67 and P2 = 134 Kg/ha.

(3) 3 levels of K2O as Mur. Pot.:

K1 = 90, K2 = 134 and K3 = 179 Kg/ha.

(4) 3 spacings:

S1 = 6 rows of 12 plants at 61 cm. spacing.
S2 = 4 rows of 8 plants at 91 cm. spacing.
S3 = 3 rows of 6 plants at 122 cm. spacing.

P2O5 applied 15 days after planting. N 45 days after planting and K2O during the third month of planting.

3. DESIGN:

(i) 3^2 fact. confd. (ii) (a) 9 plots/block ; 9 blocks/replication. (b) 16.5 m. x 27.4 m. (iii) 1. (iv) (a) 5.5 m. x 9.1 m. (b) 3.7 m. x 7.3 m. (v) 0.9 m. x 0.9 m. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1958—61. (b) Yes. (c) Results of combined analysis are presented under 5. Results. (v) Trivandrum, Thiruvilla. (vi) N.A. (vii) Expts. No. 58(44) and 59(45) are also included in combined analysis. Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:

(i) 124+4 Q/ha. (ii) 24-7 Q/ha. (based on 60 d.f. made up of Treatments x years interactions). (iii) Main effects of S and N are highly significant. (iv) Av. yield of Tubers in Q/ha.
Crop: Tapioca.  
Site: Tapioca Res. Stn., Thiruvalla.  
Object: To study the effect of N, P, K and spacing on Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) Cowdung at 3632 Kg/ha, in dried powdered form and as per treatments.  
   (ii) Laterite.  
   (iii) 7.4.60; 4.4.61; 30.3.63.  
   (iv) (a) Digging, making mounds etc. (b) to (e) N.A.  
   (v) 3632 Kg/ha of Cowdung applied in the form of powder in shallow pits and mounds made over them.  
   (vi) T - 37 Nedumangadan (late).  
   (vii) Unirrigated.  
   (viii) 2 interculturings and 2 weedings.  
   (ix) 406 cm. for 60(68); 638 cm. for 61(70); 291 cm. for 63(44).  
   (x) 2.3.61, 2.2.62, 6.2.64.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4)
   (1) 3 levels of N as A/S: N₁ = 56, N₂ = 112 and N₃ = 168 Kg/ha.
   (2) 3 levels of P₂O₅ as Super: P₁ = 0, P₂ = 67 and P₃ = 134 Kg/ha.
   (3) 3 levels of K₂O as Mur. Pot.: K₁ = 90, K₂ = 134 and K₃ = 179 Kg/ha.
   (4) 3 spacings: S₁ = 0.6 m. x 0.6 m., S₂ = 0.9 m. x 0.9 m. and S₃ = 1.2 m. x 1.2 m.

3. DESIGN:
   (i) 3 fact. confd.  
   (ii) (a) 9 plots/block; 9 blocks/repetition.  
   (b) 27.4 m. x 15.5 m.  
   (iii) 1. (iv) (a) 9'1 m. x 5.5 m.  
   (b) 7.3 m. x 3.7 m.  
   (v) 0'9 m. x 0'9 m.

4. GENERAL:
   (i) Lodging in July due to heavy rains.  
   (ii) Nil.  
   (iii) Tubber yield.  
   (iv) (a) 1959-63 (expt. for 62=N.A).  
   (b) Yes.  
   (c) Results of combined analysis are presented under 5 Results.  
   (v) Trivandram.Mannuthy.  
   (vi) N.A.  
   (vii) Expt. for 59(46) is also taken in the pooled analysis. Error variance are homogenous and Treatments x years interaction is present.

5. RESULTS:
   (i) 169'0 Q/ha.  
   (ii) 25'9 Q/ha. (based on 72 d.f. made up of Treatments x years interactions).  
   (iii) Main effect of P is significant. Main effect of S is highly significant. Interaction N x S is highly significant. Interaction N x K is significant.  
   (iv) Av. yield of tuber in Q/ha.
Crop: Tapioca.
Site: Tapioca Res. Stn., Trivandrum.

Object: To study the effect of N, P, K and spacing on Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) Cowdung at 126 Q/ha. applied before first tilling as basal dressing. (ii)
   (a) Laterite. (b) 19.4.60; 30.5.61. (iii) (a) Tilling. (b) and (c) N.A. (iv) (a) Cowdung at 126 Q/ha. applied at the time of tilling. (v) M-4 (late). (vi) Irrigated. (vii) N.A.
   (viii) 171 cm. (ix) 170 cm. (x) Nil.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4)
   (1) 3 levels of N as A/S: N₁=56, N₂=112 and N₃=168 Kg/ha.
   (2) 3 levels of P₂O₅ as Super: P₀=0, P₁=67 and P₂=134 Kg/ha.
   (3) 3 levels of K₂O as Mur. Pot.: K₁=90, K₂=134 and K₃=179 Kg/ha.
   (4) 3 spacings: S₁=0.6 m. x 0.6 m., S₂=0.9 m. x 0.9 m. and S₃=1.2 m. x 1.2 m.

3. DESIGN:
   (i) 3 x fact. confd. (ii) (a) 9 plots/block; 9 blocks/replication. (b) 27.4 m. x 16.5 m. (iii) L. (iv) (a) 9'1 m. x 5.5 m. (b) 7.3 m. x 3.7 m. (v) 0.9 m. x 0.9 m. (vi) Yes.

4. GENERAL:
   (i) Lodging in July due to heavy rains. (ii) Nil. (iii) Tuber yield. (iv) (a) 1959—61. (b) Yes. (c) Results of combined analysis are presented under 5. Results. (v) Mannuthy, Thiruvilla. (vi) N.A. (vii) Exps. of 1958 and 1959 are also taken for pooling the results. Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS:
   (i) 221'3 Q/ha. (ii) 35'7 Q/ha. (based on 96 d.f. made up of various components of Treatments x years). (iii) Main effects of S and N are highly significant. Mean effect K is significant. (iv) Av. yield of tuber in Q/ha.
Crop: Sugarcane (Ratoon) (Rabi).
Site: Sugarcane Res. Farm, Thiruvalla.

Object: To study the best time of application of Potash to Sugarcane.
Ref: K. 60(54).
Type: 'M'.

1. BASAL CONDITIONS:
(i) (a) Plant cane—Ratoon—Paddy, (b) Plant cane. (c) As per treatments. (ii) Loam. (iii) 18.12.59 (Ratoon). (iv) (a) to (e) N.A. (v) Nil. (vi) Co—449 (medium). (vii) Irrigated. (viii) N.A. (ix) 302 cm. (x) N.A.

2. TREATMENTS:
Main-plot treatments:
2 levels of K₂O: K₁ = 112 Kg/ha. and K₂ = 224 Kg/ha.
Sub-plot treatments:
4 methods of application: M₁ = Full dose at planting, M₂ = Half dose at planting and half 4 months after planting, M₃ = 1/3 at planting, 3/8 two months after planting and 3/8 four months after planting and M₄ = 1/3 at planting and 1/3 at the end of May.

3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication and 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 15'5 m. x 13'1 m. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of Sugarcane. (iv) (a) 1959—60. (b) Yes. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 750’8 Q/ha. (ii) (a) 34’3 Q/ha. (b) 55’2 Q/ha. (iii) Main effects of M alone is significant. (iv) Av. yield of sugarcane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₁</th>
<th>N₂</th>
<th>P₁</th>
<th>P₂</th>
<th>K₁</th>
<th>K₂</th>
<th>K₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>225’2</td>
<td>244’0</td>
<td>252’7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S₂</td>
<td>222’6</td>
<td>246’9</td>
<td>246’1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S₃</td>
<td>173’7</td>
<td>188’1</td>
<td>191’9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>207’2</td>
<td>226’3</td>
<td>230’2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K₁</td>
<td>196’6</td>
<td>223’8</td>
<td>219’9</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>K₂</td>
<td>211’2</td>
<td>226’4</td>
<td>231’3</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>K₃</td>
<td>213’7</td>
<td>228’8</td>
<td>239’4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>200’3</td>
<td>226’8</td>
<td>229’0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₁</td>
<td>209’1</td>
<td>223’4</td>
<td>234’4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₂</td>
<td>212’1</td>
<td>228’8</td>
<td>227’3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for S or N or K marginal means = 9’6 Q/ha.

C.D. for M marginal means = 58’0 Q/ha.
Crop :- Sugarcane (Rabi).
Site :- Sugarcane Res. Farm, Thiruvilla.
Object :- To study the effect of N, P, K and lime on growth and quality of Sugarcane.

1. BASAL CONDITIONS:

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of P04, : P0 =0, P1 =56 and P2 =112 Kg/ha.
   (2) 3 levels of K2O : K0 =0, K1 =112 and K2 =224 Kg/ha.
   Note:—112 Kg/ha. of N applied to all the plots.

3. DESIGN:
   (i) Fact in R.B.D. (ii) 9. (b) N.A. (iii) 4. (iv) (a) and (b) 15:5 m. x 13:1 m. (v) Nil. (iv) Yes.

4. GENERAL:
   (i) Not lodged. (ii) N.A. (iii) Yield. (iv) (a) 1960—61. (b) Yes. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:
   (i) 9051·1 Q/ha. (ii) 2136·6 Q/ha. (based on 8 d.f. made up of Treatments x years interaction) (iii) Main effect of K alone is significant. (iv) Av. yield of sugarcane in Q/ha.

<table>
<thead>
<tr>
<th>K0</th>
<th>K1</th>
<th>K2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>7042·5</td>
<td>8661·9</td>
<td>9917·3</td>
</tr>
<tr>
<td>P1</td>
<td>7067·6</td>
<td>9917·3</td>
<td>10808·6</td>
</tr>
<tr>
<td>P2</td>
<td>7469·4</td>
<td>9816·9</td>
<td>10707·9</td>
</tr>
</tbody>
</table>

Mean 7193·2 9465·4 10497·3 9051·1
C.D. for K marginal means—2011·4 Q/ha.

Crop :- Sugarcane.
Site :- Sugarcane Research Farm (The Travancore Sugars & Chemicals)
Tiruvalla.
Object :- To study the effect of P and K on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sugarcane for 59(200) and 60(106) ; Paddy for 61(140). (c) 100 Kg/ha. of C/A/N+i-Sugarcane fertilizer mixture at 400 Kg/ha. (ii) Loam. (iii) 1.12.59; 17.12.60; 20.12.61. (iv) (a) Ploughing and digging. (b) to (e) N.A. (v) 247·1 Kg/ha. of N as A/S. (vi) Co—449 (medium). (vii) Irrigated. (viii) Weeding, digging and earthing up once. (ix) 364·6 cm. ; 389·9 cm. ; 354·6 cm. (x) 1.12.60 ; 17.12.61 ; 20.12.62.
2. TREATMENTS:

All combinations of (1) and (2)

(1) 3 levels of P as Super: P₀ = 0, P₁ = 56, and P₂ = 112 Kg/ha.
(2) 3 levels of K₂O as Potash: K₀ = 0, K₁ = 112, and K₂ = 224 Kg/ha.

2511 Kg/ha. of lime was applied to Rep. I and III.

3. DESIGN:

(i) Split-plot. (ii) (a) 2 main-plots/replication and 9 sub-plots/main-plots. (b) N.A. (iii) 2. (iv) (a) and (b) 15.6 m. x 13.1 m. (v) Nil. (vi) Yes.

4. GENERAL:


5. RESULTS:

(i) 88.8 tonnes/ha. (ii) 14.6 tonnes/ha. (based on 16 d.f. made up of Treatments x years interaction). (iii) No effect is significant. (iv) Av. yield of sugarcane in tonnes/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
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<tbody>
<tr>
<td>K₀</td>
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<td>K₁</td>
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<td>31.7</td>
<td>35.2</td>
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<td>38.7</td>
<td>35.8</td>
<td>33.4</td>
<td>36.0</td>
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</table>

Crop :- Sugarcane. Ref :- K. 60(53).

Site :- Sugarcane Res. Farm, Thiruvalla. Type :- 'M'.

Object :- To study the effect of lime and different levels of P and K on the yield of Sugarcane.

1. BASAL CONDITIONS:

(i) (a) Plantcane—Ratoon—Paddy. (b) Paddy. (c) Paddy mixture at 125 Kg/ha. (ii) Loam.
(iii) 3 to 12.59. (iv) (a) 2 ploughings. (b) In furrows and ridges. (c) to (e) N.A. (v) 112 Kg/ha. of N.

2. TREATMENTS:

Main-plot treatments:

2 levels of lime : L₀ = 0 and L₁ = 25 Q/ha.

Sub-plot treatments:

All combinations of (1) and (2)

(1) 3 levels of P₂O₅ : P₀ = 0, P₁ = 56 and P₂ = 112 Kg/ha.
(2) 3 levels of K₂O : K₀ = 0, K₁ = 112 and K₂ = 224 Kg/ha.

3. DESIGN:

(i) Split-plot. (ii) (a) 2 main-plots/replication and 9 sub-plots/main-plots. (b) N.A. (iii) 2. (iv) (a) and (b) 15.6 m. x 13.1 m. (v) Nil. (vi) Yes.

4. GENERAL:

(ii) Nil. (iii) Yield of Sugarcane. (iv) (a) 1958–1960. (b) Nil. (c) Nil. (v) to (vii). N.A.
5. RESULTS:

(i) 897.5 Q/ha.  (ii) (a) 153.7 Q/ha.  (b) 61.9 Q/ha.  (iii) Main effect of K alone is highly significant.  (iv) Av. yield of sugarcane in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>K_2</th>
<th>K_1</th>
<th>K_0</th>
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<td>793.3</td>
<td>925.2</td>
<td>973.9</td>
<td>895.2</td>
<td>907.6</td>
<td>889.6</td>
<td>897.5</td>
</tr>
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</table>

C.D. for K marginal means = 53.85 Q/ha.

Crop :- Tobacco (Rabi).

Site :- Tobacco Res. Stn., Kanhangad.

Ref :- K. 60(66), 61(89).

Type :- 'M'.

Object :- To study the effect of different levels and times of application of N on the yield and quality of Tobacco.

1. BASAL CONDITIONS:

(i) (a) Tobacco—Paddy.  (b) Paddy.  (c) Nil.  (ii) Sandy soil.  (iii) 15.11.60, 6.12.61.  (iv) (a) Digging, levelling and forming furrows and ridges.  (b) to (e) N.A.  (v) 50 C.L/ha. of loose box C.M.  (vi) Peasain.  (vii) Irrigated.  (viii) Hoeing, weeding, earthing, tapping and desuckering.  (ix) Nil; N.A.  (x) 20.2.61 ; 5.3.62.

2. TREATMENTS:

Main-plot treatments:
3 levels of N as fish manure : N_1 = 202, N_2 = 235 and N_3 = 269 Kg/ha.

Sub-plot treatments:
3 times of application : T_1 = Full does at transplanting, T_2 = Half does at transplanting+½ after 15 days and T_3 = dose after 15 days+½ dose after 30 days+½ dose after 45 days of transplanting.

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main plots/replication ; 3 sub-plots/main plot.  (b) N.A.  (iii) 6.  (iv) (a) 7.0 m. × 5.2 m. for 60(66); 7.9 m. × 5.2 m. for 61(89).  (b) 6.4 m. × 4.6 m.  (v) 30 cm. × 30 cm. for 60(66); 76 cm. × 30 cm. for 61(89).

4. GENERAL:

(i) Normal.  (ii) Attack of grass hopper for 60(66) and foliold was sprayed; Aphid and Mosaic attack for 61(89) for which 0.01% Foliod was sprayed.  (iii) Tobacco yield.  (iv) (a) 1958—1962.  (b) No.  (c) Results of combined analysis are presented under 5.Results.  (v) and (vi) Nil.  (vii) Error variances are homogeneous and Treatments x years interaction is absent.

5. RESULTS:

(i) 1953 Kg/ha.  (ii) (a) 244.5 Kg/ha. (based on 22 d.f. made up of pooled error+Interaction of N x years)  (b) 244.5 Kg/ha. (based on 66 d.f. made up of pooled error+Interactions of T and N x T with years).  (iii) Main effect of T is highly significant.  (iv) Av. yield of cured leaf Kg/ha
Crop : Tobacco (Rabi).

Site : Tobacco Res. Sta., Kanhangad.

Object : To study the effect of organic and inorganic manures on the yield and quality of Tobacco.

1. BASAL CONDITIONS :
(i) (a) Tobacco—Paddy. (b) Paddy. (c) Nil. (ii) Sandy soil. (iii) 20.11.60 ; 13.12.61 ; N.A. (iv) (a) Plooughing, digging and levelling. (b) Planting on ridges. (c) N.A. (d) 150 cm. x 76 cm. for 62(22) ; N.A. for others. (e) N.A. (v) 251 Q/ha. of C.M. for 62(22) ; 50 C.L./ha. of others. (vi) Panan. (vii) Irrigated. (viii) Hoeing, weeding, earthing, topping and desuckering. (ix) Nil ; N.A., Nil. (x) 30.2.61 ; 14.3.62 ; N.A.

2. TREATMENTS :
All combinations of (1) and (2) + a control
(2) 2 levels of P₁₀ as S₈ : P₁₀=0 and P₁₀=55 Kg/ha.

Mixture of N taken in 1 : 1 ratio.

5. RESULTS :
(i) 38.6 Q/ha. (ii) 10.9 Q/ha. (60 d.f. made up of various components of Treatments x years interaction),
(iii) Main effect of P alone is significant. (iv) Av. yield of Tobacco in Q/ha.

Control = 421

<table>
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<tr>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
<th>S₅</th>
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<tr>
<td>Mean</td>
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<td>40.9</td>
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</tbody>
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C.D. for P marginal means = 2.2 Q/ha.
Crop: Tobacco (Rabi).  
Site: Tobacco Res. Stn., Kanhangad.  
Type: 'M'.

Object: To fix up a manurial schedule for Chewing Tobacco.

1. BASAL CONDITIONS:
   (i) (a) Tobacco—Paddy. (b) Paddy. (c) 251 Q/ha. of F.Y.M. for 63(21); N.A. for 64(135); N.A. for 65(100). (ii) Sandy soil. (iii) N.A., 24.11.64; 19.11.65.  
   (iv) (a) 2 ploughings, digging and forming ridges and furrows.  
   (b) to (e) N.A.  
   (v) 250 Q/ha. of lose box C.M. half as basal dressing and half as top dressing for 63(21); 50 C.L./ha. of lose box C.M. as basal dressing for others. (vi) Punnau (local).  
   (vii) Irrigated. (viii) Topping and desuckering for 63(21); N.A. for others.  
   (ix) N.A., 27.2.65; 21.2.66.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N: N 1 =49, N 2 =99 and N 3 =148 Kg/ha.
   (2) 3 levels of P 2 O 5 : P 1 =49, P 2 =99 and P 3 =148 Kg/ha.
   (3) 3 levels of K 2 O: K 1 =49, K 2 =99 and K 3 =148 Kg/ha.

3. DESIGN:
   (i) 3^ confd.  
   (ii) 9 plots/block; 3 blocks/replication.  
   (b) N.A.  
   (iii) 2.  
   (iv) (a) 5·5 m. x 4·9 m. for 63(21); 5·5 m. x 5·5 m. for others.  
   (b) 5·5 m. x 4·9 m. for 63(21); 5·0 m. x 4·4 m. for 64(135); 5·5 m. x 5·5 m. for 65(100).  
   (v) 28 cm. x 55 cm. for 64(135); Nil for others.

4. GENERAL:
   (i) Satisfactory.  
   (ii) Nil.  
   (iii) Yield of green leaf.  
   (iv) (a) 1963-65.  
   (b) No.  
   (c) Results of combined analysis are presented under 5. Results.  
   (v) and (vi) Nil.  
   (vii) Error variances are heterogeneous and all components of Treatments x years interaction excepting P x K x years are present. Hence pooled results for all factors excepting (P x K) are presented and individual results for (P x K) for different years are presented.

5. RESULTS:
   (i) 208·4 Q/ha.  
   (ii) 18·5 Q/ha. (28 d.f. made up of various components of Treatments x years interaction).
   (iii) None of the effects is significant.  
   (iv) Av. yield of tobacco in Q/ha.

<table>
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<tr>
<th></th>
<th>P 1</th>
<th>P 2</th>
<th>P 3</th>
<th>K 1</th>
<th>K 2</th>
<th>K 3</th>
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63(21)  

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<tr>
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<td>190</td>
<td>202</td>
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</tr>
<tr>
<td>P 3</td>
<td>187</td>
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</tr>
<tr>
<td>Mean</td>
<td>193</td>
<td>198</td>
<td>184</td>
<td>192</td>
</tr>
</tbody>
</table>
Crop :- Tobacco. 

Ref :- K. 62\(^{2}\) (S.F.T.) for Palghat & Kozhikode.

Site :- (District) : Palghat & Kozhikode. Type :- 'M'.

Object :- Type A\(_1\) : To study the response curves of important cereals, cash and oilseed crops to Nitrogen applied singly and in combination with other nutrients.

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

2. TREATMENTS:
   8 manurial treatments
   O = Control (no manure)
   N\(_1\) = 15 Kg/ha. of N
   N\(_2\) = 30 Kg/ha. of N
   P\(_1\) = 30 Kg/ha. of P\(_2\)O\(_5\)
   N\(_1\)P\(_1\) = 15 Kg/ha. of N+30 Kg/ha. of P\(_2\)O\(_5\)
   N\(_2\)P\(_1\) = 30 Kg/ha. of N+30 Kg/ha. of P\(_2\)O\(_5\)
   N\(_2\)P\(_2\) = 30 Kg/ha. of N+60 Kg/ha. of P\(_2\)O\(_5\)
   N\(_2\)P\(_2\)K\(_1\) = 30 Kg/ha. of N+60 Kg/ha. of P\(_2\)O\(_5\)+30 Kg/ha of K\(_2\)O


3. DESIGN:
   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 oilseed. All the three type C experiments are conducted on 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.
4. GENERAL:
   (i) to (iii) N.A. (iv) (a) 1962 for Palghat and Kozhikode. (b) and (c) N.A. (vi) Nil. (v) to (vii) N.A.

5. RESULTS:

**Palghat**

<table>
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<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>1507</td>
<td>1828</td>
<td>1394</td>
<td>2372</td>
<td>2748</td>
<td>3020</td>
<td>3588</td>
</tr>
</tbody>
</table>

Control yield = 3934 Kg/ha.; No. of trials = 3.

**Kozhikode**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>143</td>
<td>1250</td>
<td>1371</td>
<td>2100</td>
<td>3183</td>
<td>3584</td>
<td>3842</td>
</tr>
</tbody>
</table>

Control yield = 6237 Kg/ha.; No. of trials = 8.

**Crop:** Tobacco.  
**Ref:** K. 62 (S.F.T.) for Palghat and Kozhikode.  
**Site:** (District): Palghat and Kozhikode.  
**Type:** 'M'.

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

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

2. TREATMENTS:
   8 manurial treatments:
   - N<sub>0</sub> = Control (no manure).
   - N<sub>1</sub> = 25 Kg/ha. of N.
   - P<sub>1</sub> = 25 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.
   - N<sub>2</sub>P<sub>1</sub> = 25 Kg/ha. of N+25 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.
   - N<sub>1</sub>P<sub>2</sub> = 25 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.
   - N<sub>4</sub>P<sub>4</sub>K<sub>4</sub> = 50 Kg/ha. of K<sub>2</sub>O.

N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

3. DESIGN:
   Same as the exp. type A1 on page 233.

4. GENERAL:
   (i) to (iii) N.A. (iv) (a) 1962 for Palghat and Kozhikode. (v) to (vii) N.A.

5. RESULTS:

**Palghat**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;P&lt;sub&gt;4&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>S.E.</th>
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<tbody>
<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>2387</td>
<td>2219</td>
<td>2278</td>
<td>2545</td>
<td>3227</td>
<td>3454</td>
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</table>

Control yield = 4443 Kg/ha.; No. of trials = 3.
Object: -- Type A 2: To study the response curves of important cereals, oilseed and cash crops to Potash applied singly and in combination with other nutrients.

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

2. TREATMENTS:
   8 Manural Treatments:
   \( N_0 \) = Control (no manure).
   \( N_1 = 15 \) Kg/ha. of \( N \).
   \( K_1 = 60 \) Kg/ha. of \( K_2O \).
   \( K_2 = 120 \) Kg/ha. of \( K_2O \).
   \( N_1K_1 = 15 \) Kg/ha. of \( N \) + \( 60 \) Kg/ha. of \( K_2O \).
   \( N_1K_2 = 15 \) Kg/ha. of \( N \) + \( 120 \) Kg/ha. of \( K_2O \).
   \( N_2K_2 = 30 \) Kg/ha. of \( N \) + \( 120 \) Kg/ha. of \( K_2O \).
   \( N_1P_1K_1 = 15 \) Kg/ha. of \( N \) + \( 30 \) Kg/ha. of \( P_2O_5 \) + \( 60 \) Kg/ha. of \( K_2O \).
   N applied as \( AS, P_2O_5 \), as Super and \( K_2O \) Mur. Pot.

3. DESIGN:
   Same as in Type A 1 on page 233.

4. GENERAL:
   (i) to (iii) N.A.  (iv) 1952.  (v) to (vii) N.A.

5. RESULTS:

**Palghat**

62(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1K_1 )</th>
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<th>( N_1P_1K_1 )</th>
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<tr>
<td>Av. response of grain in Kg/ha.</td>
<td>148</td>
<td>-49</td>
<td>178</td>
<td>188</td>
<td>198</td>
<td>316</td>
<td>1433</td>
<td>601.9</td>
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Control yield = 2273 Kg/ha.; No. of trials = 2.

**Kozhikode**

62(S.F.T.)

<table>
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<th>( K_1 )</th>
<th>( K_2 )</th>
<th>( N_1K_1 )</th>
<th>( N_1K_2 )</th>
<th>( N_2K_2 )</th>
<th>( N_1P_1K_1 )</th>
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<tbody>
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<td>Av. response of grain in Kg/ha.</td>
<td>722</td>
<td>1384</td>
<td>2604</td>
<td>2436</td>
<td>3150</td>
<td>4235</td>
<td>4359</td>
<td>335.4</td>
</tr>
</tbody>
</table>

Control yield = 5883 Kg/ha.; No. of trials = 8.
Crop: Tobacco (Kabi).
Site: Tobacco Res. Sta., Kanhangad.

Object: To study the effect of different spacings and topping on the yield and quality of Tobacco.

1. BASEL CONDITIONS:
   (i) (a) Tobacco—Paddy. (b) Paddy. (c) Nil. (ii) Sandy soil. (iii) 18.11.60; 9.12.61. (iv) (a) Digging and levelling. (b) Planting on ridges. (c) and (d) As per treatments. (e) —. (v) 50 C.L./ha. of loose b.x C.M. (vi) Ponnan. (vii) Irrigated. (viii) 3 hoeings, 3 weedicings, 2 earthing and desuckering. (ix) Nil; N.A. (x) 28.2.61; 21.3.62.

2. TREATMENTS:
   Main-plot treatments:
   3 spacings: S₁ = 91 cm. x 76 cm. (48 plants/plot), S₂ = 91 cm. x 61 cm. (60 plants/plot) and S₃ = 91 cm. x 46 cm. (80 plants/plot).
   Sub-plot treatments:
   3 numbers of leaves topped/plant: L₁ = 11, L₂ = 13 and L₃ = 15.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/repetition; 3 sub-plots/main-plot. (b) N.A. (iii) b. (iv) (a) 9.8 m. x 4.3 m. (b) 9.1 m. x 3.6 m. (v) 30 cm. x 30 cm. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Light attack of grass hopper for 60(65) for which Folidol was sprayed at 1 oz. in 20 gallons of water; Attack of aphid and mosaic for 61(91) for which Folidol 0.01% was sprayed. (iii) Tobacco yield. (iv) (a) 1958-63. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Data for 62 and 63—N.A.

5. RESULTS:

**60(65)**

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₁</td>
<td>19.4</td>
<td>18.3</td>
<td>17.2</td>
<td>18.3</td>
</tr>
<tr>
<td>L₂</td>
<td>19.4</td>
<td>17.7</td>
<td>18.4</td>
<td>18.5</td>
</tr>
<tr>
<td>L₃</td>
<td>19.6</td>
<td>18.5</td>
<td>17.5</td>
<td>18.5</td>
</tr>
<tr>
<td>Mean</td>
<td>19.4</td>
<td>18.2</td>
<td>17.7</td>
<td>18.4</td>
</tr>
</tbody>
</table>

**61(91)**

<table>
<thead>
<tr>
<th></th>
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<th>S₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₁</td>
<td>14.4</td>
<td>14.8</td>
<td>13.7</td>
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</tr>
<tr>
<td>L₂</td>
<td>15.9</td>
<td>16.1</td>
<td>14.2</td>
<td>15.4</td>
</tr>
<tr>
<td>L₃</td>
<td>14.6</td>
<td>14.4</td>
<td>14.8</td>
<td>14.6</td>
</tr>
<tr>
<td>Mean</td>
<td>15.0</td>
<td>15.1</td>
<td>14.2</td>
<td>14.8</td>
</tr>
</tbody>
</table>
Crop :- Tobacco (Rabi).
Site :- Tobacco Res. Sta., Kanhangad.

Object :- To find out interaction of spacing and different levels of Nitrogen on the yield and quality of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) Tobacco—paddy. (b) Paddy. (c) N.A. (ii) Sandy. (iii) 22.11.65. (iv) (a) to (e) N.A.
   (v) 20 cart loads of loose box cattle manure per acre prior to transplanting. (vi) Pannan (local variety).
   (vii) Irrigated. (viii) 2 weedings, desuckering and topping. (ix) N.A. (x) 23.2.66.

2. TREATMENTS:
   Main-plot treatments :
   3 spacings : $S_1=120$ cm. $\times 50$ cm., $S_2=120$ cm. $\times 70$ cm. and $S_3=120$ cm. $\times 90$ cm.

   Sub-plot treatments :
   3 levels of N as A/S : $N_1=25$, $N_2=50$ and $N_3=75$ Kg/ha.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) Five. (iv) (a) and
   (b) varies according to the treatments. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Green weight. (iv) to (vii) N.A.

5. RESULTS:
   (i) 54 Kg/ha. (ii) (a) ±2 Kg/plot. (b) 40 Kg/ha. (iii) Main effects of S and N are highly significant.
   (iv) Av. yield of Tobacco in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>$S_3$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$N_1$</td>
<td>49</td>
<td>52</td>
<td>57</td>
<td>53</td>
</tr>
<tr>
<td>$N_2$</td>
<td>50</td>
<td>60</td>
<td>57</td>
<td>56</td>
</tr>
<tr>
<td>$N_3$</td>
<td>51</td>
<td>55</td>
<td>51</td>
<td>52</td>
</tr>
<tr>
<td>Mean</td>
<td>50</td>
<td>55</td>
<td>55</td>
<td>54</td>
</tr>
</tbody>
</table>

   C.D. for S marginal means=2.7 Kg/ha.
   C.D. for N marginal means=3.0 Kg/ha.
2. TREATMENTS:

Main-plot treatments:
3 spacings: \( S_1 = 120 \text{ cm} \times 50 \text{ cm}, S_2 = 120 \text{ cm} \times 70 \text{ cm} \) and \( S_3 = 120 \text{ cm} \times 90 \text{ cm} \).

Sub-plot treatments:
3 levels of \( N \): \( N_1 = 62 \), \( N_2 = 124 \) and \( N_3 = 185 \text{ Kg/ha} \).

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/replication and 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) and (b) 5.5 m \( \times \) 4.9 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Height, total no. of leaves, leaf area and leaf yield. (iv) to (vii) N.A.

5. RESULTS:

(i) 179.7 Q/ha. (ii) (a) 23.7 Q/ha. (b) 21.5 Q/ha. (iii) None of the effects is significant. (iv) Av. yield in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( N_3 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( S_1 )</td>
<td>179.2</td>
<td>170.5</td>
<td>166.1</td>
<td>171.9</td>
</tr>
<tr>
<td>( S_2 )</td>
<td>179.8</td>
<td>179.2</td>
<td>183.6</td>
<td>180.9</td>
</tr>
<tr>
<td>( S_3 )</td>
<td>191.1</td>
<td>181.7</td>
<td>186.1</td>
<td>186.3</td>
</tr>
<tr>
<td>Mean</td>
<td>183.4</td>
<td>177.2</td>
<td>178.6</td>
<td>179.7</td>
</tr>
</tbody>
</table>

Crop: Tobacco (Rabi).

Site: Tobacco Res. Stn., Kanhangad.

Object: To find out the effect of spacing and different levels of Nitrogen on the yield and quality of chewing Tobacco.

1. BASAL CONDITIONS:

(i) (a) Paddy—Tobacco. (b) Paddy. (c) Nil. (ii) Sandy. (iii) 17.11.64. (iv) (a) Digging and levelling. (b) to (e) Nil. (v) 20 C.L. of loose box C.M. as basal dressing. (vi) Pannas (local). (vii) Irrigated. (viii) and (ix) N.A. (x) 6.3.65.

2. TREATMENTS:

Main-plot treatments:
3 spacings: \( S_1 = 120 \text{ cm} \times 50 \text{ cm}, S_2 = 120 \text{ cm} \times 70 \text{ cm} \) and \( S_3 = 120 \text{ cm} \times 90 \text{ cm} \).

Sub-plot treatments:
5 levels of \( N \): \( N_1 = 62 \), \( N_2 = 124 \) and \( N_3 = 185 \text{ Kg/ha} \).

3. DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/replication and 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) and (b) 5.5 m \( \times \) 4.9 m. (v) Nil. (vi) Yes.

4. GENERAL:

(i) N.A. (ii) Nil. (iii) to (vii) N.A.

5. RESULTS:

(i) 177.6 Q/ha. (ii) (a) 17.3 Q/ha. (b) 14.9 Q/ha. (iii) Main effect of \( S \) is highly significant. (iv) Av. yield of grain in Kg/ha.
Crop : Gingelly (Rabi).  
Ref : K. 65(97).
Type : ‘M’.

Site : Oil Seed Res. Sta., Kayamkulam.

Object :—To find out the residual effect of fertilisers applied to second crop Paddy on the succeeding sesamum crop.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy—Sesamum. (b) Paddy. (c) As per the schedule shown under the treatments. 
   (ii) Sandy loam. (iii) 22.1.65. 
   (iv) (a) Ploughing, harrowing, breaking clods, digging with space and removing weeds. (b) to (e) N.A. 
   (v) N, P and K applied as per schedule under treatments. (vi) local. 
   (vii) Unirrigated. (viii) Digging the inter space of sesamum and weeding the crop was carried out twice 
   during the crop period. (ix) Not recorded. (x) 10.4.65.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N: N₀ = 0, N₁ = 33.6 and N₂ = 67.2 Kg/ha. 
   (2) 3 levels of P₂₀: P₀ = 0, P₁ = 16.8 and P₂ = 33.6 Kg/ha. 
   (iii) 3 levels of K₂₀: K₀ = 0, K₁ = 16.8 and K₂ = 33.6 Kg/ha.

3. DESIGN:
   (i) 3 × Partially confd. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 8.5 m × 4.0 m. 
   (b) 8.5 m × 3.2 m. (v) Three rows in each side. (vi) Yes.

4. GENERAL:
   (i) Due to lack of rain the crop did not attain the required height. (ii) Nil. (iii) Date of germination, 
   date of flowering, date of harvesting and yield were recorded. (iv) (a) 1965 only. (b) and (c) Nil. 
   (v) to (vii) N.A.

5. RESULTS:
   (i) 84 Kg/ha. (ii) 38.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Sesamum in 
   Kg/ha.

<table>
<thead>
<tr>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>82</td>
<td>95</td>
<td>74</td>
<td>83</td>
<td>90</td>
<td>77</td>
</tr>
<tr>
<td>N₁</td>
<td>76</td>
<td>98</td>
<td>90</td>
<td>107</td>
<td>69</td>
<td>87</td>
</tr>
<tr>
<td>N₂</td>
<td>79</td>
<td>80</td>
<td>84</td>
<td>78</td>
<td>68</td>
<td>98</td>
</tr>
<tr>
<td>Mean</td>
<td>79</td>
<td>91</td>
<td>82</td>
<td>89</td>
<td>76</td>
<td>87</td>
</tr>
</tbody>
</table>

C.D. for S marginal means=12.9 Q/ha.
Crop: Paddy.  
Site: (District): Palghat and Kozhikode.  
Type: 'M'.

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

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

2. TREATMENTS:
   8 manurial treatments:
   
   \[
   \begin{align*}
   N_0 & = \text{Control (no manure)}.
   
   N_1 & = 25 \text{ Kg/ha. of } N
   
   N_2 & = 50 \text{ Kg/ha. of } N
   
   P_1 & = 25 \text{ Kg/ha. of } P_2O_5
   
   N_1P_1 & = 25 \text{ Kg/ha. of } N + 25 \text{ Kg/ha. of } P_2O_5
   
   N_2P_1 & = 50 \text{ Kg/ha. of } N + 25 \text{ Kg/ha. of } P_2O_5
   
   N_1P_2 & = 25 \text{ Kg/ha. of } N + 50 \text{ Kg/ha. of } P_2O_5
   
   N_1P_2K_1 & = 50 \text{ Kg/ha. of } N + 50 \text{ Kg/ha. of } P_2O_5 + 25 \text{ Kg/ha. of } K_2O
   \end{align*}
   \]

3. DESIGN:
   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 35 experiments are conducted in a year of which 11 are of type A, 11 of type A, 11 of type A, 11 of type A, and 11 of type A, are distributed as 3 on kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A, A, A and A, experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A, A, A, and A are laid out. For conducting the three type-C trials three villages are randomly selected in each block.

4. GENERAL:
   (i) to (iii) N.A. (iv) (a) 1960 (b) and (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   \[
   \begin{align*}
   \text{Palghat} & 62(S.F.T.) \\
   \text{Treatment} & N_1 \ N_2 \ P_1 \ N_1P_1 \ N_2P_1 \ N_1P_2 \ N_1P_2K_1 \ S.E. \\
   \text{Av. response of grain in Kg/ha.} & 73 \ 183 \ 128 \ 168 \ 75 \ 357 \ 268 \ 130.9 \\
   \text{Control yield}=143 \text{ Kg/ha.}; \text{No. of trials}=2.
   \\
   \text{Kozhikode} & 63(S.F.T.) \\
   \text{Treatment} & N_1 \ N_2 \ P_1 \ N_1P_1 \ N_2P_1 \ N_1P_2 \ N_1P_2K_1 \ S.E. \\
   \text{Av. response of grain in Kg/ha.} & 77 \ 123 \ 56 \ 182 \ 275 \ 340 \ 530 \ 24.2 \\
   \text{Control yield}=608 \text{ Kg/ha.}; \text{No. of trials}=4.
   \\
   \text{Kozhikode} & 62(S.F.T.) \\
   \text{Treatment} & N_1 \ N_2 \ P_1 \ N_1P_1 \ N_2P_1 \ N_1P_2 \ N_1P_2K_1 \ S.E. \\
   \text{Av. response of grain in Kg/ha.} & 110 \ 203 \ 192 \ 271 \ 339 \ 447 \ 531 \ 59.8 \\
   \text{Control yield}=485 \text{ Kg/ha.}; \text{No. of trials}=7.
   \end{align*}
   \]
Crop :- Gingelly

Ref :- K. 62, 63 (S.F.T) for Kozhikode and Palghat.

Site :- (District) : Palghat, Kozhikode.

Type :- 'M'.

Object :- Type A3 : To study the response of curves of important, cash crops, cereals and oilseed crop to phosphorous applied singly and combinations.

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

2. TREATMENTS:
   § Manural Treatments :  
   N0 = Control (no Manure)
   N1 = 25 Kg/ha. of N
   P1 = 25 Kg/ha. of P2O5
   P2 = 50 Kg/ha. of P2O5
   N1P1 = 25 Kg/oa. 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
   N1P2K2 = 50 Kg/ha. of N + 50 Kg/ha. of P2O5 + 50 Kg/ha. of K2O
   N applied as A/S, P2O5 as Super and K2O as Mur. Pot.

3. DESIGN:
   Same as in experiment Type A1 on page 240.

4. GENERAL:
   (i) to (iii) N.A.  (iv) (a) 1962 to 1953.  (v) to (vii) N.A.

5. RESULTS:

Kozhikode

62(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P1K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of gingelly in Kg/ha.</td>
<td>102</td>
<td>114</td>
<td>174</td>
<td>253</td>
<td>302</td>
<td>429</td>
<td>578</td>
</tr>
</tbody>
</table>

Control yield = 467 Kg/ha.; No. of trials = 7.

63(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>P1</th>
<th>P2</th>
<th>N1P1</th>
<th>N1P2</th>
<th>N1P1K2</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of gingelly in Kg/ha.</td>
<td>175</td>
<td>206</td>
<td>288</td>
<td>419</td>
<td>485</td>
<td>749</td>
<td>1010</td>
</tr>
</tbody>
</table>

Control yield = 850 Kg/ha.; No. of trials = 8.
Palghat

62(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₂P₂</th>
<th>N₂P₂K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of gingelly in Kg/ha.</td>
<td>109</td>
<td>110</td>
<td>100</td>
<td>8</td>
<td>73</td>
<td>272</td>
<td>277</td>
<td>61'4</td>
</tr>
</tbody>
</table>

Control yield=462 Kg/ha.; No. of trials=2.

63(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>P₁</th>
<th>P₂</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₂P₂</th>
<th>N₂P₂K₂</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of gingelly in Kg/ha.</td>
<td>73</td>
<td>96</td>
<td>194</td>
<td>170</td>
<td>269</td>
<td>308</td>
<td>395</td>
<td>31'6</td>
</tr>
</tbody>
</table>

Control yield=635 Kg/ha.; No. of trials=4.

---

**Crop:** Gingelly.  
**Ref:** K. 62(S.F.T.) 63 for Palghat Kozhikode.

**Site:** (District) Palghat, Kozhikode.  
**Type:** - 'M'.

Objects: —Type A₃: To study the response curves of important cereal, cash and oilseeds crops to Potash applied singly, in combination with other nutrients.

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

2. **TREATMENTS:**

   8 Manurial Treatments
   
   N₀  = Control (No Mannure)
   N₁  = 25 Kg/ha. of N
   K₁  = 25 Kg/ha. of K₂O
   K₂  = 51 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
   N₁P₁K₁ = 25 Kg/ha. of N+25 Kg/ha. of P₂O₅+25 Kg/ha. of K₂O
   N applied as A/S, P₂O₅ as Super, K₂O as Mur. Pot.

3. **DESIGN:**

   Same as in Type A₂ on page 240.

4. **GENERAL:**

   (i) to (iii) N.A. (iv) 1962 only. and Kozhikode. (v) to (vii) N.A.

5. **RESULTS:**

   Palghat

62(S.F.T.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₁</th>
<th>K₁</th>
<th>K₂</th>
<th>N₁K₁</th>
<th>N₁K₂</th>
<th>N₂K₂</th>
<th>N₁P₁K₁</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. response of gingelly in Kg/ha.</td>
<td>71</td>
<td>114</td>
<td>130</td>
<td>177</td>
<td>207</td>
<td>383</td>
<td>452</td>
<td>48'1</td>
</tr>
</tbody>
</table>

Control yield=321 Kg/ha.; No. of trials=2.
Crop :- Gingelly.  
Site :- Oilseeds Res. Stn., Eruthempathy.  

Object :- To find out the optimum time of sowing for sesamum in uplands.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) and (c) N.A. (ii) Lateritic. (iii) As per treatments. (iv) (a) 6 ploughings. (b) Dibbling. (c) 3 to 6 Kg/ha. (d) 15 cm. between rows. (e) 1. (v) N.A. (vi) Pattambi (late). (vii) Unirrigated. (viii) Thinning the seedlings, weedings and intercultering once. (ix) N.A. (x) 9 to 24.12.64.

2. TREATMENTS :
   3 dates of sowing: D1=17.8.64, D2=24.8.64 and D3=31.8.64.

3. DESIGN :
   (i) R.B.D. (ii) (a) 3. (b) 9·9 m. x 27·2 m. (iii) 8. (iv) (a) 9·6 m. x 8·4 m. (b) 9·0 m. x 7·5 m. (v) 0·3 m. x 0·5 m. (vi) Yes.

4. GENERAL :
   (i) Good. (ii) Nil. (iii) Yield of sesamum. (iv) (a) 1964 only. (b) Nil. (c) N.A. (v) to (vii) N.A.

5. RESULTS :
   (i) 87 Kg/ha. (ii) 33·9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Object :- To find out the optimum seed rate for Sesamum.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) and (c) N.A. (ii) Lateritic. (iii) 18.8.64. (iv) (a) 6 ploughings. (b) Dibbling. (c) As per treatments. (d) 15 cm. x 15 cm. (e) 1. (v) N.A. (vi) Pattambi (late). (vii) Unirrigated. (viii) 1 weeding and 1 interculturing. (ix) N.A. (x) 10.2.64.

2. TREATMENTS :
   4 seed rates: R1=3, R2=4, R3=5 and R4=6 Kg/ha.

3. DESIGN :
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) and (b) 4·5 m. x 6·0 m. (v) Nil. (vi) Yes.

4. GENERAL :
   (i) and (ii) Nil. (iii) Yield of sesamum. (iv) (a) 1964 only. (b) and (c) Nil. (v) to (vii) N.A.
5 RESULTS:
(i) 136 Kg/ha. (ii) 28'7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of sesame in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( R_1 )</th>
<th>( R_2 )</th>
<th>( R_3 )</th>
<th>( R_4 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>132</td>
<td>134</td>
<td>137</td>
<td>121</td>
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</table>

Crop -> Gingelly.  
Site -> Oilseeds Res. Stn., Kayamkulam.  
Ref -> K. 65(98).  
Type -> 'C'.

Object: To find out the optimum spacing for the best performance of Sesamum crop.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy—Sesamum. (b) Paddy. (c) 123.6 Kg/ha. of A/S, 123.6 Kg/ha. of Super phosphate, 61.8 Kg/ha. of Mur. of Pot, was applied to the Paddy crop. (ii) Sandy loam. (iii) 6.2.66. (iv) (a) Ploughing, harrowing, interculturing, thinning and weeding. (b) to (c) N.A. (v) 74.1 Kg/ha. of A/S, 37.1 Kg/ha. of Super Phosphate. 74.1 Kg/ha. of Mur. of Pot. was applied as basal dose. (vi) Early (70 to 75 days) (vii) Unirrigated. (viii) Thinning, weeding and intercultural operations were done twice during the crop period. (ix) 95.7 m.m. (x) 18.4.66.

2. TREATMENTS:
6 spacings: \( S_1 = 15.2 \text{ cm.} \times 15.2 \text{ cm.} \), \( S_2 = 15.2 \text{ cm.} \times 22.9 \text{ cm.} \), \( S_3 = 22.3 \text{ cm.} \times 22.9 \text{ cm.} \), \( S_4 = 22.9 \text{ cm.} \times 30.5 \text{ cm.} \), \( S_5 = 15.2 \text{ cm.} \times 30.5 \text{ cm.} \) and \( S_6 = 30.5 \text{ cm.} \times 30.5 \text{ cm.} \).

3. DESIGN:
(i) R.B.D. (ii) (a) N.A. (b) Nil. (iii) 5. (iv) (a) 548.6 cm. x 274.3 cm. (b) Vary according treatments, (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Slight attack of shoot and pod caterpillar was effectively controlled by dusting with 10% B.H.C. (iii) Yield of grain. (iv) (a) 1965—only. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
(i) 1162.8 Kg/ha. (ii) 190.4 Kg/ha. (iii) The treatment effects are not significant. (iv) Av. yield of sesame in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( S_1 )</th>
<th>( S_2 )</th>
<th>( S_3 )</th>
<th>( S_4 )</th>
<th>( S_5 )</th>
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<tr>
<td>Av. yield</td>
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<td>1202.5</td>
<td>1131.2</td>
<td>1190.7</td>
<td>1145.1</td>
<td>1028.1</td>
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</table>

Crop -> Groundnut (Kharif).  
Site -> Integrated Seed Development Farm, Eruthempathy.  
Ref -> K. 65(68).  
Type -> 'M'.

Object: To formulate manurial schedule for Red Pollachi Groundnut.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Groundnut. (c) 10 Kg/ha. of N + 15 Kg/ha. of P and 30 Kg/ha. of K. (ii) Balcareous. (iii) 6 and 7.5.65. (iv) (a) Ploughed and pulverised the soil to a depth of 10 cm. (b) Dibbling. (c) to (e) N.A. (v) Fertilisers applied as per treatments. (vi) Red Pollachi (early). (vii) Unirrigated. (viii) 2 Intercultures 20 and 40 days after sowing. (ix) N.A. (x) 13.9.65.
2. TREATMENTS:

Main-plot treatments:
3 methods of application of lime:
L₀ = No lime, L₁ = Lime at 200 Kg/ha. as basal dressing and L₂ = Lime at 200 Kg/ha. as top dressing.

Sub-plot treatments:
5 manurial treatments:
M₀ = No manure, M₁ = 10 Kg/ha. of N + 15 Kg/ha. of P₀ + 30 Kg/ha. of K₀, M₂ = 10 Kg/ha. of N₀ + 30 Kg/ha. of P₀ + 45 Kg/ha. of K₀, M₃ = 10 Kg/ha. of N₀ + 15 Kg/ha. of P₀ + 45 Kg/ha. of K₀, M₄ = 10 Kg/ha. of N₀ + 30 Kg/ha. of P₀ + 45 Kg/ha. of K₀.

3. DESIGN:
(i) Split plot. (ii) (a) 3 main-plots/replication, 5 sub-plots/main-plot. (b) 39.0 m. x 9.6 m. (iii) 4. (iv) (a) 7.8 m. x 9.6 m. (b) 6.0 m. x 9.0 m. (v) and (vi) Yes.

4. GENERAL:
(i) No lodging. (ii) Nil. (iii) Periodical observations on general growth, flowering were taken. Dry pod yield was also noted. (iv) 1965 - N.A. (b) Yes. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 661 Kg/ha. (ii) (a) 173.5 Kg/ha. (b) 228.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of dry pods in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
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<td>L₀</td>
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<td>662</td>
<td>620</td>
<td>801</td>
<td>606</td>
<td>678</td>
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<tr>
<td>L₁</td>
<td>620</td>
<td>597</td>
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<td>704</td>
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<td>658</td>
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<tr>
<td>L₂</td>
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<td>750</td>
<td>583</td>
<td>565</td>
<td>745</td>
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<td>670</td>
<td>648</td>
<td>690</td>
<td>660</td>
<td>661</td>
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</tbody>
</table>

Crop: Groundnut (Kharif).
Site: Oilseed Res. Stn., Eruvampathy.
Object: To formulate a manurial schedule for Red Po/Lachi Groundnut.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Laterite soil with fair admixture of sand. (iii) 1.6.64. (iv) (a) 6 ploughings. (b) Dibbling. (c) to (e) N.A. (v) 10 Kg/ha. of N₀ + 30 Kg/ha. of P₀ and K₀ as basal dressing. (vi) Red pōllachi (medium). (vii) Unirrigated. (viii) 2 weedings and hoeing at monthly intervals. (ix) N.A. (x) 27.9.64.

2. TREATMENTS:
Main-plot treatments:
3 methods of application of 200 Kg/ha. of lime: L₀ = No lime, L₁ = Basal dressing and L₂ = Top dressing.

Sub-plot treatments:
5 levels of manures:
M₀ = No manure, M₁ = 10 Kg/ha. of N₀ + 30 Kg/ha. of P₀ + 30 Kg/ha. of K₀, M₂ = 10 Kg/ha. of N₀ + 15 Kg/ha. of P₀ + 30 Kg/ha. of K₀, M₃ = 10 Kg/ha. of N₀ + 30 Kg/ha. of P₀ + 45 Kg/ha. of K₀, M₄ = 10 Kg/ha. of N₀ + 15 Kg/ha. of P₀ + 45 Kg/ha. of K₀.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main plots/replications and 5 sub-plots/main-plot. (b) 43.0 m. x 30.8 m. (iii) 4. (iv) (a) 9.6 m. x 7.8 m. (b) 9.0 m. x 6.0 m. (v) 0.3 m. x 0.9 m. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of dry pods. (iv) (a) 1964—N.A. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 663 Kg/ha. (ii) (a) 143.6 Kg/ha. (b) 77.7 Kg/ha. (iii) Main effect of M is highly significant. (iv) Av.
yield of dry pods in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>M_0</th>
<th>M_1</th>
<th>M_2</th>
<th>M_3</th>
<th>M_4</th>
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<td>685</td>
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<td>647</td>
</tr>
<tr>
<td>L_1</td>
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<td>736</td>
<td>662</td>
<td>667</td>
<td>745</td>
<td>673</td>
</tr>
<tr>
<td>L_2</td>
<td>579</td>
<td>694</td>
<td>713</td>
<td>694</td>
<td>662</td>
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<td>570</td>
<td>699</td>
<td>670</td>
<td>682</td>
<td>694</td>
<td>663</td>
</tr>
</tbody>
</table>

C.D. for M marginal means=64.2 Kg/ha.

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**Crop:** Groundnut (*Kharif*).
**Ref:** K. 65(69).
**Site:** Integrated Seed Development Farm, Eruthempathy. **Type:** 'C'.

Object:—To find out suitable time of sowing of Groundnut in Kerala.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Groundnut. (c) 10 Kg/ha. of N+15 Kg/ha. of P+30 Kg/ha. of K. (ii) Balcareous, (iii) Sown
15 and 30.4.65[15.5.65]. (iv) (a) Ploughed the soil and pulverised to a depth of 10 cm. (b) Dibbling. (c)
N.A. (d) 30 cm. x 10 cm. (e) Nil. (v) Nil. (vi) Red pollachi (early). (vii) Unirrigated. (viii) 2 weedings.
(ix) N.A. (x) 27.8.65 and 3.9.65.

2. TREATMENTS:
3 dates of sowing: T_1=15.4.1965, T_2=30.4.1965 and T_3=15.5.1965.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) 7.6 m. x 21.8 m. (iii) 8. (iv) (a) 7.6 m. x 6.6 m. (b) 6.0 m. x 6.0 m. (v) and
(vi). Yes.

4. GENERAL:
(i) No lodging. (ii) Nil. (iii) Periodical observations were conducted on flowering peg formation and
general growth. (iv) (a) 1965—contd. (b) No. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
(i) 4968 Kg/ha. (ii) 8927 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain
in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_3</th>
<th>T_2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>6306</td>
<td>6372</td>
<td>2226</td>
</tr>
</tbody>
</table>

C.D.=9574 Kg/ha.
Crop :- Groundnut (Kharif).

Ref :- K. 65(70);

Site :- Integrated Seed Development Farm, Eruthempathy. Type :- 'C'.

Object :- To find out suitable time of sowing of Groundnut in Kerala.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Groundnut. (c) N.P.K.—10 : 15 : 30 Kg/ha. (ii) Balcareous. (iii) As per treatments.
   (iv) (a) Ploughed the soil and pulverised to a depth of 10 cm. (b) to (e) N.A. (v) Nil. (vi) Red polachi (early).
   (vii) Unirrigated. (viii) 2 intercultures. (ix) N.A. (x) 27.8.65 and 3.9.65.

2. TREATMENTS:
   3 levels of sowing : T₁=15.4.1965, T₂=30.4.1965. and T₃=15.5.1965.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) 7.6 m. x 21.8 m. (iii) 8. (iv) (a) 7.6 m. x 6.6 m. (b) 6.0 m. x 6.0 m. (v) and (vi) Yes.

4. GENERAL:
   (i) No lodging. (ii) Nil. (iii) Periodical observations were conducted on flowering, peg formation and general growth. Dry pod yield was also noted. (iv) (a) 1965 contd. (b) No. (c) N.A. (v) and (vi) N.A. (vii) Nil.

5. RESULTS:
   (i) 675 Kg/ha. (ii) 150 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of dry pods in Kg/ha.

Crop :- Groundnut (Kharif).

Ref :- K. 65(67).

Site :- Integrated Seed Development Farm, Eruthempathy. Type :- 'C'.

Object :- To find out proper spacing of Groundnut in Kerala.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Groundnut. (c) As in 65 (68). (ii) Balcareous. (iii) 29.4.65. (iv) (a) Ploughed the soil to a depth of 10 cm. (b) Dibbling. (c) N.A. (d) 10 cm. x 30 cm. (e) 1. (v) N.P.K.—10 : 15 : 30Kg/ha. (vi) Red polachi (early). (vii) Unirrigated. (viii) 2 intercultures. (ix) N.A. (x) 30.8.65.

2. TREATMENTS:
   5 spacing : S₁ = 30 cm. x 10 cm, S₂ = 30 cm. x 15 cm, S₃ = 30 cm. x 20 cm, S₄ = 30 cm. x 25 cm. and S₅ = 30 cm. x 30 cm.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) 39.0 m. x 9.6 m. (iii) 6. (iv) (a) 9.6 m. x 7.8 m. (b) 9.0 m. x 6.0 m. (v) and (vi) Yes.

4. GENERAL:
   (i) Not lodged. (ii) Nil. (iii) Periodical observations on growth flowering and pegging were conducted. Dry pod yield was noted. (iv) (a) 1965—contd. (b) No. (c) N.A. (v) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 756 Kg/ha. (ii) 95.7 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of dry pods in Kg/ha.
Crop: Pepper.

Site: Pepper Res. Stn., Thodupuzha.

Ref: K. 63(11), 64(106).

Type: 'M'.

Object: To determine the optimum manurial requirements of Pepper for high yield.

1. BASAL CONDITIONS:
   (i) Forest land cleared in 1957. During 60, 61 and 62 manures at the rate of 1-4 kg/ha. of A/S+ 85 gm. of Super+57 gm. of Mur. Pot. applied to each Vine. In 61 fertilisers as per treatments are applied. (ii) Laterite soil. (iii) Rooted Vines. (iv) Vailsukonnykadan. (v) Planting of rooted Vines in June, 1959 with 3 m x 3 m spacing. (vi) 3 months old. (vii) N.A. for 63(11), Compost at 3-6 Kg/Vine+t-lime at 340 gm/Vine for 64(106). (viii) Weeding and mulching. (ix) Nil. (x) Irrigated. (xi) 353 cm. and 397 cm. respectively, (xii) January and February 1964; and January, 65.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N as A/S: N0 = 0, N1 = 44.8 and N2 = 89.7 Kg/ha.
   (2) 3 levels of P2O5 as Super: P0 = 0, P1 = 44.8 and P2 = 89.7 Kg/ha.
   (3) 3 levels of K2O as Mur. Pot.: K0 = 0, K1 = 22.4 and K2 = 44.8 Kg/ha.

   N applied in two equal doses at an interval of 5 days. P and K applied 15 days after the application of 1st. dose of N. Fertilisers applied around the vines 23 to 30 cm. away and slightly worked into the soil. All manures applied in August.

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

4. GENERAL:
   (i) Satisfactory. (ii) Nil in 1963 (11). Incidence of wilt observed in 64(106) controlled by applying Aretan. (iii) Yield of pepper. (iv) (a) 1963—64. (b) Nil. (v) and (vi) N.A. (vii) and (viii) Nil.

5. RESULTS:
   63(11)
   (i) 118 gm./plot. (ii) 143 gm./plot. (iii) None of the effects is significant. (iv) Av. yield of pepper in gm./plot.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>K0</th>
<th>K1</th>
<th>K2</th>
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<td>127</td>
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</tbody>
</table>
Crop :- Pepper.
Site :- Pepper Res. Stn., Taliparamba.

Object :- To determine the optimum pruning treatments of *Erythrina indica* standards for proper growth of Pepper vines.

1. **BASEL CONDITIONS** :
   (i) Scrub jungle cleared for planting pepper. (ii) Red laterite gravelly soil. (iii) Unrooted cuttings taken from the basal branches of vines. (iv) *Piper Nigrum* L. *Ka/luvally*. (v) Planted in June, 1952 with spacing 3'7 m. x 3'7 m. (vi) Fresh unrooted cuttings. (vii) Nil in 61(112); 500 gm. of pepper mixture to each standard in 63(9); 1 Kg. of pepper mixture to each vine in 64(129). (viii) 2 diggings, weeding, tying up the vines and mulching. (ix) *Ca/pagonium mucunoides* a cover crop is grown. (x) Unirrigated. (xi) 625 cms; 394 cms; 383 cms. (xii) January, 1962; 19.2.1964; February, 1965.

2. **TREATMENTS** :
   3 cultural treatments : C<sub>1</sub> = Complete lopping of all branches of the standards in March—April every year, C<sub>2</sub> = Lopping half the number of branches of the standard in March—April every year and C<sub>3</sub> = No lopping of the branches of the standards.

   The standards are trained during the first five years to develop a straight to a height of about 5.5 m. before the treatments are given.

3. **DESIGN** :
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) and (b) 3 standards having 2 vines in each standard. (v) N.A. (vi) Yes.

4. **GENERAL** :
   (i) Normal. (ii) Nil. (iii) Spike characters and yield of pepper. (iv) (a) 1956—64. (b) Nil. (v) and (vi) N.A. (vii) Nil. (viii) exp. for 62 N.A.

5. **RESULTS** :
   61(112)
   (i) 909 gm./plot. (ii) 427 gm./plot. (iii) Treatment differences are highly significant. (iv) Av. yield of pepper in gm./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C&lt;sub&gt;1&lt;/sub&gt;</th>
<th>C&lt;sub&gt;2&lt;/sub&gt;</th>
<th>C&lt;sub&gt;3&lt;/sub&gt;</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>426</td>
<td>897</td>
<td>1405</td>
</tr>
</tbody>
</table>

C.D. = 458 gm./plot.
Crop : Pepper  
Site : Pepper Res. Stn., Taliparamba. 

Object : To determine the best planting material for Pepper Crop.

1. BASAL CONDITIONS:  
(i) Some jungle cleared for planting Pepper. (ii) Red laterite gravelly soil. (iii) By rooted cuttings. (iv) Piper Nigrum, L. Kalluvally. (v) Planted in June, 1956 with spacing 3·7 m. x 3·7 m. (vi) 2 months. (vii) Nil. (viii) 2 diggings, weeding and looping of branches. (ix) Nil. (x) Unirrigated. (xi) 394 cms. for 63(8) 329 cms. for 64(132). (xii) 10.2.1964, February-March 65.

2. TREATMENTS:  
All combinations of (1) and (2)  
(i) 2 types of cutting : C<sub>1</sub>=Unrooted and C<sub>2</sub>=Rooted.  
(ii) 3 types of shoots used for cuttings : S<sub>1</sub>=lateral shoots (cuttings of growing shoots from top portion of vines), S<sub>2</sub>=Basal shoots (cuttings of long shoots that develop from the base of old vines) and S<sub>3</sub>=Hanging basal shoots (cutting of shoots hanging down from the top of vines).

3. DESIGN:  
(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 5. (iv) (a) and (b) 2 standards. (v) N.A. (vi) Yes.

4. GENERAL:  
(i) Satisfactory. (ii) Nil in 63(8); Insect Poilu attack 0·25%. DDT sprayed in 1964(134). (iii) Yield of Pepper. (iv) to (vi) N.A. (vii) and (viii) Nil.

5. RESULTS:  

<table>
<thead>
<tr>
<th>C&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S&lt;sub&gt;1&lt;/sub&gt;</th>
<th>S&lt;sub&gt;2&lt;/sub&gt;</th>
<th>S&lt;sub&gt;3&lt;/sub&gt;</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1290</td>
<td>1170</td>
<td>1634</td>
<td>1365</td>
<td></td>
</tr>
<tr>
<td>1955</td>
<td>1060</td>
<td>1860</td>
<td>1625</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1623</td>
<td>1115</td>
<td>1747</td>
<td>1495</td>
</tr>
</tbody>
</table>

Ref :- K. 63(8), 64(132).  
Type :- 'C'.
Crop: Pepper.  
Site: Pepper Res. Sta., Taliparamba.  
Object: To determine the optimum economic cultural requirement for Pepper crop.

1. BASAL CONDITIONS:
(i) Scrub jungle cleared for planting Pepper.  (ii) Red laterite gravelly soil.  (iii) Vegetative basal rooted cuttings.  (iv) Pepper Nigrum L. Kalluvally.  (v) Planted in June, 1955 at 3.66 m. x 3.66 m. spacings.  (vi) 90 days.  (vii) Nil in 61(111); 0.5 Kg. of Pepper mixture to each standard in 63(7); 1.5 Kg. of Pepper mixture per vine in 64(131).  (viii) Diggings as per treatments, weedings and tying of vines.  (ix) Nil.  (x) Unirrigated.  (xi) 625 ems. in 61(111); 394 ems. in 63(7) and 383 ems. in 64(131).  (xii) January 1962; 4.2.1964; March-April, 1965.

2. TREATMENTS:
5 cultural treatments:  
C1 = Digging twice for the culture plot in August—September and October—November.  
C2 = Digging twice round the vines in the plot to a distance of 1.83 m. in August—September and October—November.  
C3 = Digging once in the entire plot in October—November.  
C4 = Digging once round the vines in the plot to a distance of 1.83 m. in October—November.  
C5 = No digging giving a cover crop of Calapogonium muensevoides and Seything once a year in August—September and spreading the seythed leafy material all round the vines to a distance of 1.83 m.

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

4. GENERAL:
(i) Normal.  (ii) Nil in 61(111) and 63(7).  Insect pollu attack observed 0.25% DDT and 1.5% Bordeaux mixture with ceremon sprayed in 1964(131).  (iii) yield of pepper.  (iv) (a) 1961—64.  (v) and (vi) N.A.  (vii) Nil.  (viii) Exp. for 1962 N.A.  Missing value of the yield in C4 of 2nd replication of 1961 is estimated.

5. RESULTS:

61(111):  
(i) 2.1 Kg./plot.  (ii) 2.0 Kg./plot.  (iii) Treatment differences are not significant.  (iv) Av. yield of Pepper in Kg./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. Yield</td>
<td>3.0</td>
<td>3.2</td>
<td>1.1</td>
<td>1.8</td>
<td>1.3</td>
</tr>
</tbody>
</table>

63(7):  
(i) 6.6 Kg./plot.  (ii) 5.2 Kg./plot.  (iii) Treatment differences are not significant.  (iv) Av. yield of Pepper in Kg./plot.
Treatment c. c.  
Av. yield 8'2 5'9 10'2 5'4 3'2

64(131)
(i) 8'9 Kg/plot. (ii) 7'3 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of Pepper in Kg/plot.

Treatment
Av. yield

63(10)

C.D.=8 7 Kg./plot.

Crop :- Pepper.
Ref :- K. 62(26), 63(10), 64(110), 65(92).
Site :- Pepper Res. Stn., Thodupuzha. Type :- 'C'.
Object :- To determine the effect of digging as a cultural practice for Pepper.

1. BASAL CONDITIONS :
(i) Forest land cleared for planting pepper. (ii) Laterite soil. (iii) Vegetative rooted vines. (iv) Kari mundi. (v) Planted in June 1959 at 3'1 m. x 3'1 m. spacing. (vi) 3 months. (vii) 3'6 Kg/vine of compost + 227 gm./vine of A/S + 170 gm/vine of Mur. Pot. + 340 gm./vine of Super and lime mixture for 62(26). and 64(110); N.A. for 63(10); 4 Kg/vine of compost + lime at 1 Kg/vine applied during August, 1962 in 65(92). (viii) As per treatments. (ix) Nil. (x) Pot. Irrigated. (xi) 25.10.62 to 13.11.62; Nov. and Dec., 1964; Dec., Jan., 1965, Jan. 66.

2. TREATMENTS :
3 cultural treatments: C0=Control (no digging), C1=Digging round the vines to a diameter of 183 cm. once every year in October-November and C2 =Digging round the vines to a diameter of 183 cm. twice a year in August-September and in October-November.

3. DESIGN :
(i) R.B.D. (ii) 3. (b) N.A. (iii) 8. (iv) (a) and (b) 4. (v) N.A. (vi) Yes.

4. GENERAL :
(i) Satisfactory. (ii) Mild attack of wilt controlled by spraying Aretan. (iii) Yield of pepper. (iv) (a)1962 contd. (b) Nil. (v) N.A. (vi) Nil. (vii) In 62(26) one replication was completely dropped from the analysis as there were two missing treatments in that.

5. RESULTS :
62(26)
(i) 257 gm./plot. (ii) 237 gm./plot. (iii) Treatment differences are not significant. (iv) Av. yield of pepper in gm/plot.

Treatment
Av. yield

63(10)

(i) 729 gm./plot. (ii) 787 gm./plot. (iii) Treatment differences are not significant. (iv) Av. yield of pepper in gm/plot.

Treatment
Av. yield
Crop: Pepper.  
Ref: K. 64(109), 65(93).  
Site: Pepper Res. Sta., Thodupuzha.  
Type: 'C'.

Object:—To determine the best method of pruning and training the pepper Vines.

1. BASAL CONDITIONS:

2. TREATMENTS:
5 cultural treatments: C_0 = Control, C_1 = Pruning one year old vines to a height of 3 nodes above ground level, C_2 = Pruning one year old vines to a height of 6 nodes above ground level, C_3 = Stem of one year old vines detached from the standards and the stem completely buried in small trench at the base of the standard exposing only the terminal 15 cm. of the vine trained to the standard and C_4 = Stem of one year old vine detached from the standard made into coil and buried in a trench so that portions of the stem come just above ground and the terminal 15 cm. of the vine is trained to the standard.

3. DESIGN:
(i) R.B.D.  (ii) 5.  (b) N.A.  (iii) 6.  (iv) (a) N.A.  (b) 4  (v) N.A.  (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Incidence of wilt controlled by Aretan application for 64(109); N.A. for 65(93). (iii) Yield of pepper. (iv) 1964—N.A. (v) and (vi) N.A. (vii) Nil.

5. RESULTS:
64(109)
(i) 168 gm/plot.  (ii) 205 gm/plot. (iii) Treatment differences are not significant. (iv) Av. yield of pepper in gm/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C_0</th>
<th>C_1</th>
<th>C_2</th>
<th>C_3</th>
<th>C_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>48</td>
<td>323</td>
<td>216</td>
<td>177</td>
<td>76</td>
</tr>
</tbody>
</table>

65(92)
(i) 183 gm/plot.  (ii) 1085 gm/plot. (iii) Treatment differences are not significant. (iv) Av. yield of pepper in gm/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C_0</th>
<th>C_1</th>
<th>C_2</th>
<th>C_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2020</td>
<td>1781</td>
<td>1672</td>
<td></td>
</tr>
</tbody>
</table>
Crop: Pepper.

Site: Pepper Res. Sta., Thodupuzaha.

Ref: K. 62(25), 63(12), 64(111), 65(94).

Type: 'C'.

Object:—To determine the optimum number of vines to be trained to a standard for pepper yield.

1. BASAL CONDITIONS:
   (i) Forest land cleared for planting pepper. (ii) Laterite soil. (iii) Rooted vines. (iv) Mundi. (v) Planted in June, 1959. 3'1 m. x 3'1 m. spacing. (vi) 3 months. (vii) 2 Kg/vine of compost + 57 gm/vine of A/S + 113 gm/vine of super + 57 gm/vine of Muri of Pot. + 113 gm/vine of lime then Agarin manured in 1964. (viii) 2 diggings for 62(25) ; N.A. for 63(12), weeding and mulching for 64(111) ; N.A. for 65. (ix) Nil. (x) Unirrigated for 62(25); irrigated for others. (xi) 405 em. for 62(25); 363 em. for 63(12); 397 em. for 64(111) N.A. for 65. (xii) 25.10.62 to 14.11.62; Nov.-Dec., 1963; January 65; N.A. for 65.

2. TREATMENTS:
   5 number of vines per standard: \( S_1 = 1, S_2 = 2, S_3 = 3, S_4 = 4 \) and \( S_5 = 5 \).

3. DESIGN:
   (i) R.B.D. (ii) 'a'. (b) N.A. (iii) 5 for 62(25); 6 for others. (iv) (a) N.A. (b) 4. (v) N.A. (v) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Incidence of wilt and controlled by treating with Aretan uniformly for all plants. (iii) Yield of pepper. (iv) 1962—contd. (v) and (vi) N.A. (vii) Individual results are presented since the experiment is contd. beyond 65.

5. RESULTS:

64(25)
   (i) 247 gm/plot. (ii) 183 gm/plot. (ii) Treatment differences are not significant. (iv) Av. yield of pepper in gm/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( S_1 )</th>
<th>( S_4 )</th>
<th>( S_3 )</th>
<th>( S_2 )</th>
<th>( S_5 )</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>343</td>
<td>321</td>
<td>312</td>
<td>226</td>
<td>35</td>
</tr>
</tbody>
</table>

63(12)
   (i) 517 gm/plot. (ii) 330 gm/plot. (iii) Treatment differences are not significant. (iv) Av. yield of pepper in gm/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( S_1 )</th>
<th>( S_4 )</th>
<th>( S_3 )</th>
<th>( S_2 )</th>
<th>( S_5 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>446</td>
<td>560</td>
<td>530</td>
<td>523</td>
<td>525</td>
</tr>
</tbody>
</table>

63(111)
   (i) 661 gm/plot. (ii) 788 gm/plot. (iii) Treatment differences are not significant. (iv) Av. yield of pepper in gm/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( S_1 )</th>
<th>( S_4 )</th>
<th>( S_3 )</th>
<th>( S_2 )</th>
<th>( S_5 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>361</td>
<td>747</td>
<td>797</td>
<td>568</td>
<td>834</td>
</tr>
</tbody>
</table>
(i) 1477 gm/plot. (ii) 1016 gm/plot. (iii) Treatment differences are not significant. (iv) Av. yield of pepper in gm/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
<th>S₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>927</td>
<td>2272</td>
<td>1221</td>
<td>1949</td>
<td>1014</td>
</tr>
</tbody>
</table>

Crop: Pepper.  
Site: Pepper Res. Sta., Thodupuzha.  
Ref: K. 64(107).  
Type: 'C'.

Object: To determine the best type of planting material for obtaining better yield of Pepper.

1. BASAL CONDITIONS:

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 types of cuttings: C₁=Uarooted and C₂=Rooted.
(2) 3 types of shoots: S₁=Cuttings with fruiting lateral shoots, S₂=Cuttings without fruiting lateral shoots and S₃=Cuttings of hanging shoots.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) 4. (v) N.A. (vi) Yes.

4. GENERAL:

5. RESULTS:
(i) 471 gm/plot. (ii) 873 gm/plot. (iii) None of the effects is significant. (iv) Av. yield of pepper in gm/plot.

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>Mean</th>
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<tbody>
<tr>
<td>C₁</td>
<td>70</td>
<td>477</td>
<td>231</td>
<td>259</td>
</tr>
<tr>
<td>C₂</td>
<td>771</td>
<td>1037</td>
<td>238</td>
<td>682</td>
</tr>
<tr>
<td>Mean</td>
<td>421</td>
<td>757</td>
<td>235</td>
<td>471</td>
</tr>
</tbody>
</table>

Crop: Pepper.  
Site: Pepper Res. Sta., Taliparamba.  
Ref: K. 64(141).  
Type: 'CV'.

Object: To find out whether providing of a hardy root stock for important variety of Pepper will have any economic importance.
1. BASAL CONDITIONS:
(i) Scrub jungle cleared for planting pepper. (ii) Red laterite and gravelly. (iii) Grafting by inarching (iv) As per treatments. (v) Planted in pits in June, 1955 with one graft in each standard at a spacing of 3.7 m x 3.7 m. (vi) Eight months old graft. (vii) 1 Kg. vine of pepper mixture. (viii) 2 diggings, weeding and lopping. (ix) Nil. (x) Unirrigated. (xi) 333 m. (xii) February-March, 1965.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 varieties of pepper: \( V_1 = \text{Kalluvally}, V_2 = \text{Vally} \) and \( V_3 = \text{Karinkotta} \).
(2) 3 root stocks: \( R_0 = \text{Root cuttings (no root stocks)}, R_1 = \text{Piper Attenuatum} \) and \( R_2 = \text{Uthiramkotta} \).

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

4. GENERAL:
(i) Normal. (ii) Insect Poilu controlled by spraying 0.25% D.D.T. wilt and Poilu diseases controlled by spraying 1% Bordeaux mixture with wet ceresan. (iii) Yield of pepper. (iv) to (vi) N.A. (vii) Nil.

5. RESULTS:
(i) 1428 gm./plot. (ii) 2199 gm./plots. (iii) Main effect of R alone is highly significant. (iv) Av. yield of pepper in gm./plot.

<table>
<thead>
<tr>
<th></th>
<th>( R_0 )</th>
<th>( R_1 )</th>
<th>( R_2 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_1 )</td>
<td>3352</td>
<td>328</td>
<td>180</td>
<td>1287</td>
</tr>
<tr>
<td>( V_2 )</td>
<td>6470</td>
<td>122</td>
<td>482</td>
<td>2358</td>
</tr>
<tr>
<td>( V_3 )</td>
<td>1810</td>
<td>60</td>
<td>60</td>
<td>639</td>
</tr>
<tr>
<td>Mean</td>
<td>3877</td>
<td>170</td>
<td>236</td>
<td>1428</td>
</tr>
</tbody>
</table>

C.D. for R marginal means = 1622.5 gm./plot.

---

Crop :- Ginger (Summer).


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

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 1.4.1961. (iv) (a) to (e) N.A. (v) 112 Q./ha. of C.M. (vi) Wyanad local. (vii) Unirrigated. (viii) N.A. (ix) 311 em. (x) February, 1962.

2. TREATMENTS:
All combinations of (1), (2) and (3).
(1) 3 levels of N as A/S: \( N_0 = 0, N_1 = 56 \) and \( N_4 = 112 \) Kg/ha.
(2) 3 levels of \( P_2O_5 \) as Super: \( P_0 = 0, P_1 = 50.4 \) and \( P_2 = 100.9 \) Kg/ha.
(3) 3 levels of \( K_2O \) as Pot. Sul.: \( K_0 = 0, K_1 = 67.3 \) and \( K_2 = 134.5 \) Kg/ha.

\( P_2O_5 \) applied one month before planting as basal and \( N, K_2O \) applied one and a half month after planting as top dressing.

3. DESIGN:
(i) 3 partially confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) 6.7 m x 2.4 m. (b) 6.1 m x 1.8 m. (v) 30 cm x 30 cm. (vi) Yes.
4. GENERAL:

(c) Nil.  (v) to (vii) N.A.

5. RESULTS:

(i) 96-3 Q./ha.  (ii) 21-46 Q./ha.  (iii) Main effect of N alone is significant.  (iv) Av. yield of Ginger in Q./ha.

<table>
<thead>
<tr>
<th></th>
<th>K&lt;sub&gt;0&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;</th>
<th>P&lt;sub&gt;0&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N&lt;sub&gt;0&lt;/sub&gt;</td>
<td>89·0</td>
<td>92·1</td>
<td>107·8</td>
<td>106·6</td>
<td>94·9</td>
<td>87·3</td>
<td>96·3</td>
</tr>
<tr>
<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
<td>100·9</td>
<td>102·6</td>
<td>117·1</td>
<td>103·9</td>
<td>102·4</td>
<td>114·3</td>
<td>106·9</td>
</tr>
<tr>
<td>N&lt;sub&gt;2&lt;/sub&gt;</td>
<td>98·5</td>
<td>84·1</td>
<td>76·6</td>
<td>96·3</td>
<td>87·4</td>
<td>75·3</td>
<td>86·3</td>
</tr>
<tr>
<td>Mean</td>
<td>96·1</td>
<td>92·9</td>
<td>100·5</td>
<td>102·3</td>
<td>94·9</td>
<td>92·3</td>
<td>96·5</td>
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<td>105·3</td>
<td>96·0</td>
<td>105·7</td>
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<td>94·9</td>
<td>94·4</td>
<td>95·4</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>P&lt;sub&gt;2&lt;/sub&gt;</td>
<td>88·2</td>
<td>88·3</td>
<td>100·4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 14·8 Q./ha.

**Crop**: Ginger (*Summer*).  
**Site**: Agri. Res. Sta., Ambalavayal.  
**Ref**: K. 64(154).  
**Type**: 'M'.

Object:—To study the effect of different levels of N, P and K on Ginger.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 17.4.64. (iv) (a) 5 ploughings; (b) to (d) N.A. (e) — (v) 247 Q/ha. of C.M. (vi) Rio-de Janeiro. (vii) Unirrigated. (viii) 2 weedings, 2 earthing up and 2 mulching with 112 Q./ha. of G.L. (ix) 209 cm. (x) 7-1-65.

2. TREATMENTS:

All combinations of (1), (2) and (3) + one extra treatment.  
(1) 2 levels of N as A/S: N<sub>0</sub> = 0, N<sub>1</sub> = 62 Kg/ha.  
(2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super: P<sub>0</sub> = 0, P<sub>1</sub> = 62 Kg/ha.  
(3) 2 levels of K<sub>2</sub>O as Mar. Pot: K<sub>0</sub> = 0 and K<sub>1</sub> = 124 Kg/ha.  
Extra Treatment: E<sub>2</sub> = FACT Ginger Mixture at 494 Kg/ha.

3 DESIGN:

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 6·7 m. x 2·4 m. (b) 6·1 m. x 1·8 m. (v) 30 cm. x 30 cm.

4. GENERAL:

(i) Satisfactory. (ii) Soft rot incidence noticed. Drenching chestnut compound was done. (iii) Germination count, tiller count and yield of ginger. (iv) (a) and (b) N.A. (c) Nil. (v) to (vii) N.A.

RESULTS:

1814 Q/ha. (ii) 46·2 Q/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of ginger in Q/ha.
Crop: Ginger (Kharif).

Site: Ginger Res. Stn., Jhodupuzha.

Ref: K. 65(87).
Type: ‘M’.

Object: To study the effect of Nitrogen, Phosphoric acid, Potash and Lime alone and in combination of their vital ingredients at different levels.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil. (ii) Laterite. (iii) 22.5.1965. (iv) One digging and peg marking (b) Placing Rhizomes in pits. (c) 1120 to 1345 Kg/ha. of Rhizomes seed. (d) 23 cm. x 23 cm. (e) 1. (v) C.M. at 112.1 Q/ha. for the Experiment at the time of planting. Also 121.1 Q/ha. of a G.L. applied in pit. (vi) Local variety. (vii) Unirrigated. (viii) Earthing up and mulching. (ix) 254.8 cm. (x) 12.12.1965.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4)
   (1) 3 levels of N : N₀=0, N₁=56 and N₂=112 Kg/ha.
   (2) 3 levels of P₂O₅ : P₀=0, P₁=34 and P₂=67 Kg/ha.
   (3) 3 levels of K₂O : K₀=0, K₁=34 and K₂=67 Kg/ha.
   (4) 3 levels of Lime : L₀=0, L₁=half the normal dose, L₂=normal dose.

DESIGN:
   (i) 3⁴ confd. (ii) (a) 9 plots/black; 9 blocks/replication. (b) 43.9 m. x 8.5 m. (iii) 1. (iv) (a) 4.9 m. x 8.5 m. (b) 3.7 m. x 7.3 m. (v) 61 cm. x 61 cm. (vi) Yes.

4. GENERAL:
   (i) Normal growth. (ii) Soft rot disease was noticed. N₁ P₂ K₂ L₁ and N₀ P₁ K₁ L₁ and cheshunt compound was applied in all the treatments. (iii) Ginger yield. (iv) (a) N.A. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 83.2 Q/ha. (ii) 17.9 Q/ha. (iii) Main effect of P alone is highly significant. (iv) Av. yield of ginger in Q/ha.
Crop: Ginger (Kharif).
Site: Ginger Res. Stn., Thodupuzha.
Ref: K. 60(74).
Type: 'M'.

Object: To find out the manurial requirements of Ginger.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Laterite soil. (iii) 6.6.1960. (iv) (a) Digging and levelling. (b) Rhizomes are placed in the pits. (c) 1120 to 1345 Kg/ha. of seed rhizomes. (d) 23 cm. x 23 cm. (e) 1. (v) 10 C.L. of C.M.+5600 Kg/ha. of G.L. (vi) Local variety (Medium). (vii) Unirrigated. (viii) Weeding three times after planting, earthing up after 45 days of planting, manuring after 45 days of planting and mulching after 45 days of planting. (ix) 421.1 cm. (x) 12.1.1961.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N as A/S: N0=0, N1=56 and N2=112 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 Mur. Pot: K0=0, K1=13.6 and K2=67.2 Kg/ha.

3. DESIGN:
   (i) 3² confd. (ii) (a) 9 plots/block; 3 blocks/replcation. (b) 12/8 m. x 23/8 m. (iii) 1. (iv) (a) 4/3 m. x 7/9 m. (b) 3/7 m. x 7/3 m. (v) 30 cm. x 30 cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Mean No. of tillers, No. of modes, mean length of shoots, mean length and breadth of leaf and the yield plot. (iv) (a) 1959—N.A. (b) No. (c) Nil. (v) N.A. (vi) to (vii) Nil.

5. RESULTS:
   (i) 121.7 Q/ha. (ii) 25.1 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of Ginger in Q/ha.

C.D. for P marginal means=9.8 Q/ha.
Crop : Ginger (Kharif).
Site : Pepper Res. Stn., Thodupuzha.

Object : To study the effect of different levels of N in organic and inorganic forms on Ginger.

1. BASAL CONDITIONS:
   (i) N.A.
   (ii) Laterite soil.
   (iii) 11.6.61.
   (iv) (a) 1 digging and levelling.
   (b) Placed in pits in beds.
   (c) 1120 to 1345 Kg/ha. of seed rhizomes.
   (d) 23 cm. x 23 cm.
   (e) 12 C.I./ha. of G.M.+504 Kg/ha. of G.L.
   (vi) Local (medium).
   (vii) Unirrigated.
   (viii) 3 weedings and earthing up.

2. TREATMENTS:
   Main-plot treatments:
   All combination of (1) and (2) + control (2 plots)
   (1) 2 levels of N: N₁ = 112 and N₂ = 168 Kg/ha.

   Sub-plot treatments:
   3 times of application of N: T₁ = Full dose at planting, T₂ = Half dose at planting and remaining quantity in two equal doses 45 days and 65 days after planting.

3. DESIGN:
   (i) Split-plot.
   (ii) (a) 14 main-plots/replication and 3 sub-plots/main-plot.
   (b) 34.1 m. x 51.2 m.
   (iii) 3.
   (iv) (a) 4.9 m. x 8.5 m.
   (b) 3.7 m. x 7.3 m.
   (v) 61 cm. x 61 cms.

4. GENERAL:
   (i) Normal.
   (ii) Leaf spot disease and attack of shoot borer observed.
   (iii) Yield of Ginger.
   (iv) (a) 1961 only.
   (b) No.
   (c) Nil.
   (v) N.A.
   (vi) and (vii) Nil.

5. RESULTS:
   (i) 54.3 Q/ha.
   (ii) (a) 38.5 Q/ha.
   (b) 16.1 Q/ha.
   (iii) Main effect of N alone is significant.
   (iv) Av. yield of Ginger in Q/ha.
Crop: Ginger (Kharif).

Site: Pepper Res. Stn., Thodupuzha.

Object: To study the effect of different levels of N through organic and inorganic forms on Ginger.

1. BASAL CONDITIONS:
   (i) Nil. (ii) Laterite soil. (iii) 7.6.60. (iv) (a) 1 digging and levelling. (b) Placed in pits on the beds. (c) 1120 to 1345 Kg/ha. of seed rhizomes. (d) 23 cm. x 23 cm. (e) 1. (f) 2 C.L/ha. of C.M.+5604 Kg/ha. of G.L. (vi) Local (medium). (vii) Unirrigated. (viii) 3 weedings, earthing up and mulching. (ix) N.A.

2. TREATMENTS:
   All combinations of (1) and (2) + control (2 plots)
   (1) 2 levels of N: N₁ = 112 and N₂ = 168 Kg/ha.

   N applied in two instalments, at planting and 45 days after planting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 14. (b) 29.9 m. x 15.9 m. (iii) 4. (iv) (a) 4.3 m. x 7.9 m. (b) 3.7 m. x 7.3 m. (v) 30 cm. x 30 cm. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Attack of shoot borer, 50% D.D.T. sprayed twice. (iii) Yield of ginger. (iv) (a) 1958-60. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS:
   (i) 92 Q/ha. (ii) 19 8 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of ginger in Q/ha.

   Control=87 Q/ha.

<table>
<thead>
<tr>
<th>N₁</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
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C.D. for N marginal means=15.2 Q/ha.

Ref.: K. 60(76).

Type: 'M'.
Crop :- Ginger (Kharif).

Site :- Ginger Res. Stn., Thodupuzha.

Object :- To find out optimum time of application of manures.

1. BASAL CONDITIONS :
   (i) N.A. (ii) Lateritic soil. (iii) 17.6.60. (iv) N.A. (v) 5°C.L. of C.M. and 505 Kg/ha. of G.L. in two equal instalments half at planting and the other half after 45 days. (vi) Local (medium). (vii) Unirrigated. (viii) 3 weedings, earthing up and mulching. (ix) 42.1 cm. (x) 11.7.61.

2. TREATMENTS :
   6 times of application of fertilizer : T0=Control, T1=Full dose of manures at the time of planting, T2=Half at planting+half 45 days after planting, T3=Half at planting+1/3 dose 45 days after planting+1/3 dose after 65 days of planting and T4=1/3 at planting+2/3 30 days after planting+2/3 45 days after planting+2/3 65 days after planting.

3. GENERAL :
   (i) Normal. (ii) Shoot borer was noticed 50% D.D.T. was sprayed. (iii) Mean No. of tillers, modes, length of shoots, length and breadth of leaf and yield. (iv) to (vii) N.A.

RESULTS:
(i) 9215 Kg/ha. (ii) 1977 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of ginger in Kg/ha.

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<tr>
<th>Treatment</th>
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<th>T2</th>
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<td>10892</td>
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3. DESIGN:
   (i) R.B.D.  (ii) 5.  (b) N.A.  (iii) 6.  (iv) (a) 4·3 m. x 79 m.  (b) 3·7 m. x 73 m.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) Nil.  (iii) Mean No. of tillers/plant, modes, shoots and yield of ginger.  (iv) (a) 1959—N.A.  (b) and (c) N.A.  (v) to (vii) Nil.

5. RESULTS:
   (i) 118·6 Q/ha.  (ii) 15·3 Q/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of ginger in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_0</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
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<td>Av. yield</td>
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<td>111·9</td>
<td>110·8</td>
<td>130·8</td>
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Crop: Ginger (Kharif).
Site: Pepper Res. Stn., Thodupuzha.
Type: 'M'.

Object:—To study the effect of different levels of N, P, K and lime alone and in combinations on Ginger.

1. BASAL CONDITIONS:
   (i) (a) N.A.  (b) Ginger.  (c) N.A.  (ii) Laterite soil.  (iii) 16.5.1962; 18.5.1963; 27.5.1964.  (iv) (a) One digging.  (b) Placed in pits on the beds.  (c) 1120 to 1345 Kg/ha. of seed rhizomes.  (d) 21 cm. x 23 cm.
   (e) 1.  (v) 25 C.L./ha. of C.M.+504 Kg/ha. of C.L. for 62(9) and 63(63), and 25 C.L./ha. of C.M.+112 Q/ha. of G.L. for 64(165).  (vi) Local.  (vii) Unirrigated.  (viii) 3 weedings, earthing up and mulching.
   (ix) 405 cm. for 62(9) and 340 cm. for others.  (x) 5-12-1962, 6-2-1964 and 2-1-1965.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4).
   (1) 3 levels of N as A/S: N_0 = 0, N_1 = 56, and N_2 = 112 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.
   (4) 3 levels of lime: L_0 = 0, L_1 = 280 and L_2 = 560 Kg/ha.
Super and lime applied one month before planting. Half A/S applied at planting and other half with Mur. Pot. 45 days after planting.

3. DESIGN:
   (i) 3 rep/cond.  (ii) 9 plots/block; 9 blocks/replication.  (b) N.A.  (iii) I.  (iv) (a) 4·9 m. x 8·5 m.  (b) 3·7 m. x 7·3 m.  (v) 61 cm. x 61 cm.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) Leaf spot disease due to phyllusita and shoot borer noticed. Bordeaux mixture and Endrin 20 E.C. were sprayed.  (iii) Yield of ginger.  (iv) (a) 1962—N.A.  (b) No.  (c) Results of combined analysis presented under 5. Results.  (v) and (vi) N.A.  (vii) Error variances are heterogeneous and Treatments x years interaction is present.

5. RESULTS:
   (i) 87·4 Q/ha.  (ii) 22·7 Q/ha. (based on 84 d.f. made up of interactions of years with P, N, I, K, PN, PL, PK, NL and NK)  (iii) Main effect of P alone is significant.  (iv) Av. yield of ginger in Q/ha.
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<th>( N_2 )</th>
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<td>( L_2 )</td>
<td>90.3</td>
<td>85.0</td>
<td>82.9</td>
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C.D. for F marginal means = 6.1 Q/ha.

**Crop**: Ginger (*Kharif*).

**Site**: Pepper Res. Stn., Thodupuzha.

**Object**: To study the effect of different levels of N, P and K on Ginger.

1. **BASAL CONDITIONS**;
   (i) Nil. (ii) Laterite soil. (iii) 6.6.1960. (iv) (a) one digging and leveling. (b) Placed in the pits on the beds. (c) 1120 to 1345 Kg/ha. of seed rhizomes. (d) 23 cm. x 23 cm. (e) 1. (f) 25 C.L./ha. of C.M.+5604 Kg/ha. of G.L. (v) Local (medium) (vii) Unirrigated. (viii) 3 weedings, earthing up and mulching. (ix) 421 cm. (x) 12.1.1961.

2. **TREATMENTS**:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N as A/S: \( N_0 = 0 \), \( N_1 = 56 \) and \( N_2 = 112 \) Kg/ha.
   (2) 3 levels of \( P_{012} \) as Super: \( P_0 = 0 \), \( P_1 = 33.6 \) and \( P_2 = 67.2 \) Kg/ha.
   (3) 3 levels of \( K_{012} \) as Mur. Pot. \( K_0 = 0 \), \( K_1 = 33.6 \) and \( K_2 = 67.2 \) Kg/ha.
   P and K applied at planting. N applied in two equal doses half at planting and the other 45 days after planting.

3. **DESIGN**:
   (i) 3^2 confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) 12.8 m. x 23.8 m. (iii) i. (iv) (a) 4.3 m x 7.9 m. (b) 3.7 m x 7.3 m. (v) 30 cm x 30 cm. (vi) Yes.

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

5. **RESULTS**:
   (i) 122 Q/ha. (ii) 25-1 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of ginger in Q/ha.
Crop: Ginger (Kharif).

Site: Ginger Res. Sta., Thodupuzha.

Object: To study the effect of N and lime on Ginger.

1. BASAL CONDITIONS:
   (i) Nil. (ii) Laterite. (iii) 19.6.1960. (iv) (a) One digging and levelling. (b) Placed in pits on the bed. (c) 1120 to 1345 Kg/ha. of seed rhizomes. (d) 23 cm x 23 cm. (e) 1. (v) 25 C.L. ha. of C.M. + 5604 Kg/ha. of G.L. (vi) Local (medium) (vii) Unirrigated. (viii) Three weedings, earthing up and mulching. (ix) 421 cm. (x) 14.1.1961.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of N: N0 = 0, N1 = 56 and N2 = 122 Kg/ha.
   (2) 2 levels of lime as slaked lime: L0 = 0 and L1 = 224 Kg/ha.
   N applied as C.M. and G.L. in 1:1 ratio. Lime and N applied in two instalments at planting and 45 days after planting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) 12.8 m x 15.9 m. (iii) 6. (iv) (a) 4.3 m x 7.9 m. (b) 3.7 m x 7.3 m. (v) 30 cm x 30 cm. (vi) Yes.

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

5. RESULTS:
   (i) 95'6 Q/ha. (ii) 25'2 Q/ha. (iii) None of the effects in significant. (iv) Av. yield of ginger in Q/ha.

<table>
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<tr>
<th></th>
<th>N0</th>
<th>N1</th>
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Crop :- Ginger (Kharij).
Ref :- K. 60(78).
Site :- Pepper Res. Stn., Thodupuzha.
Type :- 'M'.

Object :- To find out the suitable time of application of N on Ginger.

1. BASAL CONDITIONS:
   (i) Nil. (ii) Laterite soil. (iii) 17.6.1960. (iv) (a) 1 digging and levelling. (b) Placed in pits on the beds. (c) 1120 to 1345 Kg/ha. of seed rhizomes. (d) 23 cm. x 23 cm. (e) I. (v) 12 C.L./ha. of C.M.+560 Kg/ha. of G.L.+448 Kg/ha. of Mur. Pot. (vii) Local (medium) (vii) Unirrigated. (viii) 3 weedings, earthing up and mulching. (ix) 410 em. (x) 19.1.1961.

2. TREATMENTS:
   5 times of application of 112 Kg/ha. of N : T0=Control (no application), T1=full dose at planting, T2=Half at planting+half 45 days after planting, T3=Half at planting and remaining quantity in 2 equal doses 45 days and 65 days after planting and T4= 1 dose at planting and remaining quantity in 3 equal doses 30 days, 45 days and 65 days after planting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 4 3 m. x 7'9 m. (b) 3.7 m. x 7'3 m. (v) 33 cm x 10 1/2 cm. (vi) Yes.

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

5. RESULTS:
   (i) 106 Q/ha. (ii) 13'7 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of ginger in Q/ha.

   Treatments  T0  T1  T2  T3  T4
   Av. yield   108'6 99'8 98'8 116'7 104'9

Crop :- Ginger.
Ref :- K. 63(46), 64(155).
Type :- 'C'.

Object :- To find out the best method of storing seed Ginger for obtaining healthy rhizomes.

1. BASAL CONDITIONS:
   (i) Nil. (ii) Sandy loam. (iii) 8.5.63, 11.4.64. (iv) (a) 5 ploughings with country plough. (b) to (e) N.A. (v) 24 Q/ha. of C.M. (vi) Wynad. (vii) Unirrigated. (viii) Weeding, mulching and earthing up. (ix) 139 cm., 209 em. (x) 25.1.64, 20.1.65.

2. TREATMENTS:
   6 methods of storing seed : S1=Control, S2=Heaping on the floor in a room, S3=Storing in gunny bags, S4=Storing in bamboo baskets, S5=Storing on the floor with sand below and above and S6=Storing on the floor with straw dust below and above.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 6'7 m. x 2'4 m. (b) 6'1 m. x 1'8 m. (v) 0'3 m. x 0'3 m. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Yield. (iv) (a) 1963-64. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is absent.
5. RESULTS:

(i) 105'8 Q/ha. (ii) 23'7 Q/ha. (based on 35 d.f. made up of Treatments x years interaction and pooled error).
(iii) Treatment differences are significant. (iv) Av. yield of ginger in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>113'3</td>
<td>130'6</td>
<td>104'0</td>
<td>102'0</td>
<td>85'4</td>
<td>99'2</td>
</tr>
<tr>
<td>C.D.</td>
<td>33'9 Q/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Ginger (Raib).

Object :- To find out the optimum stage for harvest of Ginger.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 9.11.61. (iv) (a) to (e) N.A. (v) C.M. at 168 Q/ha.
(vi) Wynad. (vii) Unirrigated. (viii) 2 weedings and 3 mulchings with G.L. (ix) 311 cm. (x) As per treatments.

2. TREATMENTS:

5 crop periods : H1=215, H2=230, H3=245, H4=260 and H5=275 days.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a) 6'7 m. x 2'4 m. (b) Æ 1 m. x 1'8 m. (v) 30 cm. x 30 cm. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Yield of Ginger. (iv) (a) 1961—only (changed in 1962). (b) and (c) Nil.
(v) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 158'0 Q/ha. (ii) 18'9 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of ginger in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>154'0</td>
<td>151'6</td>
<td>157'5</td>
<td>166'8</td>
<td>170'1</td>
</tr>
</tbody>
</table>

Crop :- Ginger (Kharif).

Object :- To find out the optimum stage for harvest of Ginger.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 25.4.62. 24.4.64. (iv) (a) 5 ploughings with country plough. (b) to (e) N.A. (v) 168 Q/ha. of C.M. for 62(13) and 247 Q/ha. of C.M. for 64(116). (vi) Wynad.
(vii) Unirrigated. (viii) 2 to 3 weedings, earthing and mulchings. (ix) N.A. for 62 and 139 cm. for 64(116). (x) As per treatments.

2. TREATMENTS:

5 crop periods : H1=215, H2=230, H3=245, H4=260 and H5=275 days.
3. DESIGN:
(i) R.B.D. (ii) S. (b) N.A. (iii) S. (iv) (a) 6.7 m.x2.4 m. (b) 6.1 m.x1.8 m. (v) 30 cm.x30 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Yield of ginger. (iv) (a) 1962—51. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) and (vii) Error variances are homogeneous and Treatments x years interaction is present.

5. RESULTS
(i) 168.8 Q/ha. (ii) 39.3 Q/ha. (based on 4 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of ginger in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>H_1</th>
<th>H_4</th>
<th>H_3</th>
<th>H_4</th>
<th>H_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>174.2</td>
<td>186.8</td>
<td>131.4</td>
<td>136.5</td>
<td>145.3</td>
</tr>
</tbody>
</table>

Crop: Ginger (Kharif).
Object: To find out optimum spacing to Ginger.

1. BASAL CONDITIONS:
(i) N.A. (c) Nil. (ii) Sandy loam. (iii) April 1962 for 62(12) and 21.4.61 for 61(79). (iv) (a) 5 ploughings in 62(12) and N.A. in 61(79). (b) to (e) As per treatments. (v) 163 Q/ha. of C.M. (vi) Wynad. (vii) Unirrigated. (viii) 2 weedings, 2 levellings and 3 mucking with G.L. (ix) 314 cm. in 61(79) and N.A. in 61(79). (x) February.

2. TREATMENTS:
5 spacings: S_1 = 15 cm.x15 cm., S_2 = 23 cm.x15 cm., S_3 = 23 cm.x23 cm., S_4 = 30 cm.x23 cm. and S_5 = 30 cm.x30 cm.
Spacings S_1 and S_2 have not been tried in 62(12).

3. DESIGN:
(i) R.B.D. (ii) (a) 5 [1 in 62(12)]. (b) N.A. (iii) 6 [8 in 62(12)]. (iv) (a) 3.7 m.x6.1 m. (b) 2.7 m.x5.5 m. (v) 46 cm.x30 cm.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of ginger. (iv) (a) 1961—52 (modified in 61). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
61(79)
(i) 124.1 Q/ha. (ii) 29.3 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of ginger in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
<th>S_5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>115.8</td>
<td>128.7</td>
<td>135.0</td>
<td>119.3</td>
<td>123.8</td>
</tr>
</tbody>
</table>

62(12)
(i) 198.5 Q/ha. (ii) 26.9 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of ginger in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>208.5</td>
<td>195.2</td>
<td>191.9</td>
</tr>
</tbody>
</table>
Crop: Ginger (Summer).
Ref: K. 61(78).
Type: ‘C’.

Object: To find out the effect of different modes of storage and time of planting on the yield of Ginger.

1. Basal Conditions:
   (i) (a) to (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 6 ploughings. (b) to (e) N.A. (v) 135 Q/ha. of C.M. (vi) Wynad. (vii) Unirrigated. (viii) 2 weedings, earthing up, mulching with G.L. at 224 Q/ha. (ix) 311 cm. (x) Feb., 1962.

2. Treatments:
   Main-plot treatments: 3 types of seed: S1=Seeds stored in pits, S2=Seeds stored in open and cool dry room and S3=Seeds stored in field (Reserving the previous season without harvest).
   Sub-plot treatments: 4 dates of planting: D1=1.4.61, D2=15.4.61, D3=1.5.61 and D4=15.5.61.

3. Design:
   (i) Split-plot. (ii) (a) 3 main-plots/replication and 4 sub-plots/main-plot. (b) N.A. (iii) 7. (iv) (a) 2.4 m. × 6.7 m. (b) 1.8 m. × 6.1 m. (v) Yes.

4. General:
   (i) N.A. (ii) Nil. (iii) Yield of ginger. (iv) (a) 1959-61. (b) No. (c) N.A. (v) to (vii) N.A.

5. Results:
   (i) 98.3 Q/ha. (ii) (a) 26.7 Q/ha. (b) 12.5 Q/ha. (iii) Main effect of D alone is significant. (iv) Av. yield of ginger in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>116</td>
<td>985</td>
<td>884</td>
<td>695</td>
<td>93.3</td>
</tr>
<tr>
<td>S2</td>
<td>124</td>
<td>109</td>
<td>931</td>
<td>840</td>
<td>102.6</td>
</tr>
<tr>
<td>S3</td>
<td>125</td>
<td>994</td>
<td>897</td>
<td>814</td>
<td>99.1</td>
</tr>
<tr>
<td>Mean</td>
<td>122.2</td>
<td>102.3</td>
<td>90.4</td>
<td>78.3</td>
<td>98.3</td>
</tr>
</tbody>
</table>

C.D. for D marginal means=7.7 Q/ha.

Crop: Ginger (Summer).
Ref: K. 62(14).
Type: ‘C’.

Object: To study the effect of the weight of seed bits used for planting on the yield of Ginger.

1. Basal Conditions:
   (i) (a) to (c) N.A. (ii) Sandy loam. (iii) 25.4.62. (iv) (a) 5 ploughings. (b) to (e) N.A. (v) 168 Q/ha. of C.M. at planting. (vi) Wynad. (vii) Unirrigated. (viii) 2 weedings, 2 earthing up, mulching thrice with G.L. at 168 Q/ha. (ix) N.A. (x) Feb., 1963.

2. Treatments:
   4 weights of seed bit planted: Ws=7, Ws=14, Ws=21 and Ws=28 gms.

3. Design:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 6.7 m. × 2.4 m. (b) 6.1 m. × 1.8 m. (v) Yes.
4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of Ginger. (iv) (a) 1962–N.A. (b) No. (c) N.A. (v) to (vii) N.A.

5. RESULTS:
   (i) 212.1 Q/ha. (ii) 35.5 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of Ginger in Q/ha.
   Treatment | W_1 | W_2 | W_3 | W_4 |
   Av. yield  | 127.4 | 179.4 | 265.5 | 276.3 |
   C.D. = 48.7 Q/ha.

Crop :- Ginger (Kharif).
Site :- Pepper Res. Stn., Thodupuzha.
Ref :- K. 61(85), 62(11), 63(65).
Type :- ‘C’.

Object :- To find out the suitable time for harvest of Ginger.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Ginger for 63(65); Nil for others. (c) N.A. for 63(65); Nil for others. (ii) Laterite soil.
   (iii) 17.6.61; 2.5.62; 15.5.63. (iv) (a) 1 digging and levelling. (b) Placed in pits on the beds. (c) 1120 to
   1345 Kg of seed rhizomes. (d) 23 cm. x 23 cm. (e) 1. (v) 25 C.L./ha. of C.M. + 5604 Kg/ha. of G.L.
   for 63(65); 25 C.L./ha. of C.M. + 5604 Kg/ha. of G.L. for others. (vi) Local (medium). (vii) Unirrigated.
   (viii) N.A. for 63(65); 3 weedings, earthing up and mulching for others. (ix) 429 cm.; 409 cm.; 340 cm.
   (x) As per treatments.

2. TREATMENTS:
   4 times of harvesting : H_1 = 200, H_2 = 215, H_3 = 230 and H_4 = 245 days after planting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) 9.8 m. x 7.1 m. (iii) 6. (iv) (a) 4.9 m. x 8.5 m. (b) 3.7 m. x 7.3 m. (v) 61 cm.
   x 61 cm.

4. GENERAL:
   (i) Normal. (ii) Incidence of leaf spot disease and attack of shoot borer. Bordeaux Mixture and Endrin
   sprayed. (iii) Yield of Ginger. (iv) (a) 1961–1963. (b) No. (c) Results of combined analysis presented
   under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years
   interaction is present.

5. RESULTS:
   (i) 52.5 Q/ha. (ii) 24.5 Q/ha. (based on 6 d.f. made up of Treatments x years interaction). (iii) Treatment
   differences are not significant. (iv) Av. yield of Ginger in Q/ha.
   Treatment | H_1 | H_2 | H_3 | H_4 |
   Av. yield  | 81.8 | 50.2 | 45.3 | 32.8 |

Crop :- Ginger.
Ref :- K. 64(167), 65(88).
Site :- Ginger Res. Stn., Thodupuzha.
Type :- ‘C’.

Object :- To test the comparative efficiency of early planting of Ginger for better yield.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil. (ii) Laterite. (iii) N.A. (iv) (a) Digging. (b) Placed in pits on the beds. (c) 1120 to
   1345 Kg/ha. (d) 30 cm. x 30 cm. (e) 1. (v) 25 C.L./ha. of C.M. + 112 Q/ha. of G.L. (vi) Local.
   (vii) Unirrigated. (viii) 3 weedings and earthing up. (ix) 397 cm. (x) 7.1.65; 5.12.65.
2. TREATMENTS:
4 dates of planting: $D_1 = 1.4.64$, $D_2 = 15.4.64$, $D_3 = 1.5.64$, and $D_4 = 15.5.64$.

3. DESIGN:
(i) R.B.D. (ii) (a) 4, (b) 34.1 m $\times$ 19.5 m. (iii) 6. (iv) (a) 2.1 m $\times$ 1.2 m. (b) 1.8 m $\times$ 0.9 m. (v) 15 cm $\times$ 15 cm. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of Ginger. (iv) (a) 1964-66, (b) No. (c) Nil. (v) and (vi) Nil. (vii) Experiment is continued beyond 1965. Hence the results of individual years are given under 5. Results.

5. RESULTS:

64(167)
(i) 167 Q/ha. (ii) 22.6 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of ginger in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$D_1$</th>
<th>$D_2$</th>
<th>$D_3$</th>
<th>$D_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>203</td>
<td>172</td>
<td>158</td>
<td>133</td>
</tr>
<tr>
<td>C.D.</td>
<td>27.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65(88)
(i) 724 Q/ha. (ii) 103 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of ginger in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$D_1$</th>
<th>$D_2$</th>
<th>$D_3$</th>
<th>$D_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>764</td>
<td>696</td>
<td>894</td>
<td>541</td>
</tr>
<tr>
<td>C.D.</td>
<td>126.7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Ginger (Kharif).  
Ref: K. 60(70), 61(84), 62(10).  
Site: Pepper Res. Stn., Thodupuzha.  
Type: 'CM'.  
Object: To study the effect of different spacings and sizes of seed material in combination with different levels of manures on Ginger.

1. BASAL CONDITIONS:
(i) (a) to (c) Nil. (ii) Laterite soil. (iii) 30.5.60; 23.6.61; 25.5.62. (iv) (a) 1 digging and levelling. (b) Placed in pits on the beds. (c) 1120 to 1345 Kg/ha. of seed rhizomes. (d) As per treatments. (e) L. (v) Nil. (vi) Local (medium). (vii) Unirrigated. (viii) 3 weedings, earthing up and mulching. (ix) 421 cm; 429 cm; 405 cm. (x) 3.1.61; 8.1.62; 6.12.62.

2. TREATMENTS:
Main-plot treatments:
6 spacings: $S_1 = 15$ cm $\times$ 15 cm, $S_2 = 15$ cm $\times$ 23 cm, $S_3 = 23$ cm $\times$ 23 cm, $S_4 = 23$ cm $\times$ 30 cm, $S_5 = 15$ cm $\times$ 30 cm and $S_6 = 30$ cm $\times$ 30 cm.

Sub-plot treatments:
All combinations of (1) and (2)
(1) 3 seed sizes: $D_1 = 1.3$ cm to 2.5 cm, $D_2 = 2.5$ cm to 3.8 cm and $D_3 = 3.8$ cm to 5.1 cm.
(2) 2 levels of manure: $M_1 = 25$ and $M_2 = 50$ C.L./ha. of C.M.
M applied in two doses: At planting and 45 days after planting.

3. DESIGN:
(i) Split-plot. (ii) (a) 6 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. for 60(70); 29 3 m $\times$ 512 m for others. (iii) 3. (iv) (a) 43 m $\times$ 7.9 m for 60(70); 4.9 m $\times$ 8.5 m for others. (b) 3.7 m $\times$ 7.3 m, (v) 30 cm $\times$ 30 cm for 60(70); 61 cm $\times$ 61 cm for others.
4. GENERAL:
(i) Normal. (ii) Incidence of soft root disease for 60(70) was controlled by applying Chestnut Mixture; Incidence of leaf spot disease and attack of shoot borer for others for which Bordeaux Mixture and Endrin were sprayed. (iii) Yield of Ginger. (iv) (a) 1959—1962. (b) No. (c) Results of combined analysis presented under 5. Results (v) N.A. (vi) Nil. (vii) Expt. No. 59(25) is also taken into consideration while giving the combined analysis results. Error variances for main-plots and sub-plots are homogeneous and Treatments × years interaction is absent in main-plot and present in sub-plot treatments.

5. RESULTS:
(i) 52.9 Q/ha. (ii) (a) 26.3 Q/ha. (based on 55 d.f. made up of pooled error and Treatments × years interaction). (b) 18.1 Q/ha. (based on 60 d.f. made up of Treatments × years interaction). (iii) Main effects of S and D are highly significant. (iv) Av. yield of ginger in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>M₁</td>
<td>68</td>
<td>59</td>
<td>53</td>
<td>55</td>
<td>46</td>
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<td>Mean</td>
<td>69</td>
<td>58</td>
<td>57</td>
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<td>38</td>
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<td>65</td>
<td>53</td>
<td>54</td>
<td>40</td>
<td>41</td>
<td>51</td>
</tr>
<tr>
<td>Mean</td>
<td>60</td>
<td>51</td>
<td>53</td>
<td>45</td>
<td>49</td>
<td>52</td>
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<td>62</td>
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<tr>
<td>Mean</td>
<td>68</td>
<td>60</td>
<td>56</td>
<td>46</td>
<td>49</td>
<td>52</td>
</tr>
</tbody>
</table>

C.D. for S marginal means = 9.0 Q/ha.
C.D. for D marginal means = 4.3 Q/ha.

Crop: Ginger (Summer).
Type: 'D'

Object:—To find out the effect of treating the soils and the seeds with different fungicides in controlling the incidence of soft-rot disease on Ginger.

1. BASAL CONDITIONS:
(i) (a) to (c) Nil. (ii) Sandy loam. (iii) 4.5.1961 ;4.5.1962. (iv) (a) N.A. for 1961; 5 ploughings for 1962. (b) to (d) N.A. (e) N.A. for 1962; (v) 168 Q/ha. of C.M. (vi) Wynad. (vii) Unirrigated. (viii) 2 weedings, 2 earthing up and mulching thrice with G.L. for 1961; 2 weedings, earthing up and mulching thrice with 311 em for 1962. (ix) 168 Q/ha. of G.L. (x) January 1962; December 1962.

2. TREATMENTS:
5 fungicidal treatments: T₀=Control (untreated), T₁=Pouring Calxridal Copper 1 litre of stock solution in 13 litres of water, T₂=Pouring Chestnut Compound 25 gm in 9 litres of water, T₃=Pouring Wettable Ceresan 0.1% and T₄=Cupravit 0.4%.

Treatment T₁ is not applied in the year 1962.

3. DESIGN:
(i) R.B.D. (ii) 5 for 1961; 4 for 1962. (b) N.A. (iii) 6 for 1961; 4 for 1962. (iv) (a) 2.44 m × 0.71 m. (b) 183 m × 0.10 m. (v) 30 cm × 30 cm. (vi) Yes.

4. GENERAL:
(i) satisfactory. (ii) Nil, for 1961. Incidence of leaf spot disease was noticed for 1962. (iii) Yield of ginger. (iv) (a) 1961—1962. (b) No. (c) Nil. (v) to (vii) N.A.
5. RESULTS:

61/81

(i) 103 Q/ha. (ii) 12'15 Q/ha. (iii) Treatment differences are highly significant. (iv) Yield of ginger in Q/ha.

\[
\begin{array}{cccccc}
\text{Treatment} & T_0 & T_1 & T_2 & T_3 & T_4 \\
\text{Av. yield} & 96'3 & 96'0 & 118'7 & 116'3 & 79'2 \\
\end{array}
\]

C.D. = 14'6 Q/ha.

62/15

(i) 100'0 Q/ha. (ii) 20'69 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of ginger in Q/ha.

\[
\begin{array}{cccc}
\text{Treatment} & T_0 & T_1 & T_2 \\
\text{Av. yield} & 87'2 & 100'7 & 95'9 & 116'0 \\
\end{array}
\]

Crop :- Ginger.  
Site :- Pepper Res. Sta. Thodupuzha.  
Ref :- K 61(82), 62(8), 63(66), 65(35).

Type :- 'D'.

Object :- To find out the effect of different fungicides in controlling the incidence of soft-rot disease on Ginger.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Ginger for 63(66); Nil for others. (c) N.A. for 63(66); Nil for others. (ii) Laterite soil. (iii) 1.7, 1961; 22.6, 1962; 10.5, 1963; May, 1965. (iv) 1 digging and levelling. (b) Placed in pits on the beds. (c) 1120 to 1345 Kg/ha. of seed rhizomes. (d) 23 cm. x 23 cm. (e) 1. (v) 25 C.L./ha. of C.M.+5604 to 8967 Kg/ha. of G.L. for 62(8); 224'2 Q/ha. of C.M.+224'4 Q/ha. of G.L. for 65(35); 25 C.L./ha of C.M.+ 5604 Kg/ha. of G.L. for others. (vi) Local (medium) (vii) Unirrigated. (viii) N.A. for 63(66); 3 Weeding. earthing up and mulching for others. (ix) 429 cm.; 409 cm.; 340 cm.; 255 cm. (x) 12.1, 1962; 27.12, 1963; January, 1966.

2. TREATMENTS:

4 fungicidal treatments: T_0 = Control (untreated), T_1 = Colloidal Copper (1 litre of stock solution in 13 litres of water), T_2 = Chemicom pound (28 gm. in 9 litres) and T_3 = Wettable cerson 0'1% (1 gm. in 1 litre of water). The fungicides to be applied at 0'14 litres/pit in specified concentration once immediately before planting and the 2nd time 6 weeks later.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) 9'75 m. x 17'07 m. (iii) 6. (iv) (a) 4'88 m. x 8'53 m. (b) 3'66 m. x 7'32 m. (v) 61 cm. x 61 cm. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) No incidence for 65(35); Incidence of leaf spot disease and attack of short borer for others for which Bordeaux Mixture and Endrin were sprayed. (iii) Yield of Ginger. (iv) (a) 1961—1965 (Expt. for 1964 is N.A.). (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments x years interaction is present.

5. RESULTS:

(i) 52'8 Q/ha. (ii) 11'1 Q/ha. (based on 9 d.f. made up of Treatments x years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of ginger in Q/ha.
Crop :- Lemon grass.  
Ref :- K 60(92), 61(104), 62(66), 63(28).  
Site :- Lemon grass Res. Stn; Odakkali.  
Type :- 'M'.

Object :- To study the influence of fertiliser on yield and oil content of Lemon grass.

1. BASAL CONDITIONS:
   (i) Virgin land.  
   (ii) Laterite loam.  
   (iii) By vegetative multiplication and through seeds.  
   (iv) Local.  
   (v) 24.6.1959 to 28.6.1959, uniform size rooted slips were transplanted at a spacing of 30 cm. x 15 cm.  
   (vi) N.A.  
   (vii) Nil.  
   (viii) 2 to 3 weedings and 1 harrowing.  
   (ix) Nil.  
   (x) Unirrigated.  
   (xi) 428, 460, 430 and 298 cm. respectively.  
   (xii) 26.4.60 to 21.12.60; 9.5.61 to 13.12.61; once in 45 days during the season for 1962 and 1963.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N as A/S: N₀ =0, N₁ =112 and N₂ =224 Kg/ha.
   (2) 3 levels of P₂O₅ as Super: P₀ =0, P₁ =112 and P₂ =224 Kg/ha.
   (3) 3 levels of K₂O as Mur. Pot: K₀ =0, K₁ =112 and K₂ =224 Kg/ha.

3. DESIGN:
   (i) 3² fact in R.B.D.  
   (ii) (a) 9 plots/block, 3 blocks/replication.  
   (b) N.A.  
   (v) Gross-480 plants  
   Net-396 plants.  
   (vi) One row alround.  
   (vii) Yes.

4. GENERAL:
   (i) Good vegetative growth.  
   (ii) Nil.  
   (iii) Fresh weight of gross per plot.  
   (vi) 1959-63.  
   (v) N.A.  
   (vi) to (viii) Nil.

5. RESULTS:
   60(92)

(a) Grass yield
   (i) 242 Kg/plot.  
   (ii) 10·7 Kg/plot.  
   (iii) Main effects of N, P and K and their interactions N x P and N x K are highly significant. Interaction P x K is significant.  
   (iv) Av. yield of grass in Kg/plot.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
</tr>
</thead>
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<tr>
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<tr>
<td>N₂</td>
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<table>
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<tr>
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<td>203</td>
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<tr>
<td>K₁</td>
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<tr>
<td>K₂</td>
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<tr>
<td>Mean</td>
<td>214</td>
<td>245</td>
<td>257</td>
</tr>
</tbody>
</table>

C.D. for N, P or K marginal means = 7·40 Kg/plot.
C.D. for body of N x P, P x K or N x K table = 12·80 Kg/plot.

(b) Oil Content — N.A.

61(104)

(a) Grass yield
   (i) 186 Kg/plot.  
   (ii) 31·8 Kg/plot.  
   (iii) Main effects of N, P and K are highly significant. Interactions N x P and N x K are significant.  
   (iv) Av. yield of grass in Kg/plot.
<table>
<thead>
<tr>
<th></th>
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<th>$P_1$</th>
<th>$P_2$</th>
<th></th>
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<td>156</td>
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<td>207</td>
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</table>

C.D. for $N$, $P$ or $K$ marginal means = 21·8 Kg/plot.
C.D. for body of $N \times P$ or $N \times K$ table = 37 Kg/plot.

(b) Oil Content

(i) 55 Kg/plot.  (ii) 9·9 Kg/plot.  (iii) Main effect of $N$ is highly significant. Main of effect $P$ is significant.
(iv) Av. yield of oil in Kg/plot.

<table>
<thead>
<tr>
<th></th>
<th>$P_0$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th></th>
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<td>$N_1$</td>
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<td></td>
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<td>57</td>
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<tr>
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<td>58</td>
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<td>64</td>
<td>65</td>
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<td></td>
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<td>53</td>
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</table>

C.D. for $N$ or $P$ marginal means = 6·8 Kg/plot.

(b) Oil Contents

(i) 126 C.C./plot.  (ii) 22·4 C.C./plot.  (iii) Main effect of $N$ is significant.  (iv) Av. yield of oil in C.C./plot.

<table>
<thead>
<tr>
<th></th>
<th>$P_0$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th></th>
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<th>$K_1$</th>
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<td>128</td>
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<td>123</td>
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</table>

C.D. for $N$ marginal means = 15·3 C.C./plot.
276

(a) Grass Yield

(i) 403·1 Q/ha.
(ii) 64·7 Q/ha.
(iii) Main effects of N, P and K are highly significant.
(iv) Av. yield of grass in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>P&lt;sub&gt;0&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
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<tr>
<td>N&lt;sub&gt;0&lt;/sub&gt;</td>
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<td>218·8</td>
<td>276·3</td>
<td>237·4</td>
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<td>N&lt;sub&gt;1&lt;/sub&gt;</td>
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<td>533·6</td>
<td>621·6</td>
<td>451·7</td>
<td>562·6</td>
<td>595·7</td>
<td>536·7</td>
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<tr>
<td>Mean</td>
<td>350·8</td>
<td>405·3</td>
<td>453·2</td>
<td>349·9</td>
<td>416·6</td>
<td>442·7</td>
<td>403·1</td>
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</table>

C.D. for N, P or K marginal means = 44·3 Q/ha.

(b) Oil Contents

(i) 84·5 litres/ha.
(ii) 11·6 litres/ha.
(iii) Main effects of N, P and K are highly significant.
(iv) Av. yield of Oil Contents in litres/ha.

<table>
<thead>
<tr>
<th></th>
<th>P&lt;sub&gt;0&lt;/sub&gt;</th>
<th>P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;</th>
<th>K&lt;sub&gt;0&lt;/sub&gt;</th>
<th>K&lt;sub&gt;1&lt;/sub&gt;</th>
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<td>54·6</td>
<td>63·2</td>
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<td>55·9</td>
<td>57·2</td>
<td>65·8</td>
<td>59·6</td>
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<tr>
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<td>97·0</td>
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<td>83·2</td>
<td>98·5</td>
<td>94·6</td>
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<tr>
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<td>103·1</td>
<td>109·1</td>
<td>91·6</td>
<td>100·6</td>
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<td>76·9</td>
<td>85·4</td>
<td>91·2</td>
<td>84·5</td>
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</table>

C.D. for N, P or K marginal means = 13·9 litres/ha.

Crop: Lemongrass.

Site: Lemongrass Res. Stn; Odakkali.

Ref: K 63(23), 64(177), 65(89).

Type: 'C'

Object: To determine the optimum stage or interval to be given between harvest for the best yield.

1. BASAL CONDITIONS:
   (i) Grass compost at 5600 Kg/ha, in 1961 and 1962.
   (ii) Laterite.
   (iii) Vegetative propagation.
   (iv) Local
   (v) Transplanting from 31.7.1963 to 2.8.1963 and spacing 20 cms. x 20 cm.
   (vi) 3 months.
   (vii) Nil.
   (viii) Weeding and earthing.
   (ix) Nil.
   (x) Unirrigated.
   (xi) 691, 339 and 230 ems. respectively.
   (xii) Four cuttings in 1963; April to Dec, 1964; May to Feb, 1966.

2. TREATMENTS:
   4 intervals of cutting: I<sub>1</sub>=35, I<sub>2</sub>=45, I<sub>3</sub>=55 and I<sub>4</sub>=65 days.
3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) 513. (v) Nil. (vi) Yes.

4. GENERAL:

5. RESULTS:

63(23)

(a) Grass Yield
(i) 4244 Kg/ha. (ii) 857.5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grass in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
<th>I_4</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>2881</td>
<td>4286</td>
<td>4714</td>
<td>5095</td>
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<tr>
<td>C.D.</td>
<td>1055.0 Kg/ha.</td>
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</table>

(b) Oil Content
(i) 14.2 litres/ha. (ii) 434 litres/ha. (iii) Treatment differences are significant. (iv) Av. yield of Oil in litres/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
<th>I_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
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<td>14.0</td>
<td>15.7</td>
<td>18.0</td>
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<tr>
<td>C.D.</td>
<td>4.9 litres/ha.</td>
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</table>

64(177)

(a) Grass Yield
(i) 20800 Kg/ha. (ii) 3063.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grass in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
<th>I_4</th>
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<td>25980</td>
<td>27574</td>
<td>30531</td>
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<tr>
<td>C.D.</td>
<td>3656.4 Kg/ha.</td>
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(b) Oil Content
(i) 73.0 litres/ha. (ii) 936 litres/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Oil in litre/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>I_3</th>
<th>I_4</th>
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<tr>
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<td>73.8</td>
<td>77.4</td>
<td>68.1</td>
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65(89)

(a) Grass Yield
(i) 100 Kg/plot. (ii) 13.0 Kg/plot. (iii) Treatment differences are significant. (iv) Av. yield of grass in Kg/ha.

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<thead>
<tr>
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<tbody>
<tr>
<td>Av. yield</td>
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<td>110</td>
<td>99</td>
<td>104</td>
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<tr>
<td>C.D.</td>
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</table>

(b) Oil Content
(i) 320 c.c./plot. (ii) 341 c.c./plot. (iii) Treatment differences are highly significant. (iv) Av. yield of Oil in c.c./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>I_2</th>
<th>I_3</th>
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<tbody>
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<td>Av. yield</td>
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<td>368</td>
<td>312</td>
<td>290</td>
</tr>
<tr>
<td>C.D.</td>
<td>41.9 c.c./plot.</td>
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</table>
Crop: Lemongrass.
Site: Lemongrass Res. Stn., Odakkali.
Object: To study the effect of method of planting on the yield of Lemongrass.

1. BASAL CONDITIONS:
   (i) Virgin land. (ii) Laterite loam. (iii) By vegetative multiplication and through seeds. (iv) Local. 
   (v) 15.4.60 seeds for both the plots were sown on the same day and transplanted for the treatments T1 on 
   19.7.60. (vi) 94 days. (vii) Nil. (viii) 2 to 3 weedings and 2 earthings. (ix) Nil. (x) Unirrigated. (xi) 
   428, 460, 430 and 298 cm. respectively. (xii) N.A.

2. TREATMENTS:
   2 methods of planting: T1 = Direct sowing and T2 = Transplanting.

3. DESIGN:
   (i) Paired-plot. (ii) 2. (iii) 12. (iv) and (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Good vegetative growth. (ii) Nil. (iii) Grass yield, oil content and citral percentage. (iv) 1960-63 
   (v) N.A. (vi) to (viii) Nil.

5. RESULTS:

   (a) Grass yield
   (i) 14058 Kg/ha. (ii) 1268'5 Kg/ha. (iii) Treatment difference is significant. (iv) Av. yield of grass 
   in Kg/ha.
   Treatment   T1  T2
   Av. yield   16310 11805
   C.D.=1142'4 Kg/ha.
   (b) Oil Content—N.A.

   (a) Grass yield
   (i) 30402 Kg/ha. (ii) 2266'4 Kg/ha. (iii) Treatment difference is highly significant. (iv) Av. yield of grass 
   in Kg/ha.
   Treatment   T1  T2
   Av. yield   37348 23456
   C.D.=2041'1 Kg/ha.
   (b) Oil Content—N.A.

   (a) Grass yield
   (i) 15114 Kg/ha. (ii) 1425'1 Kg/ha. (iii) Treatment difference is highly significant. (iv) Av. yield of grass 
   in Kg/ha.
   Treatment   T1  T2
   Av. yield   13714 16513
   C.D.=1283'3 Kg/ha.
   (b) Oil Content
   (i) 38'7 litre/ha. (ii) 4'3 litre/ha. (iii) Treatment difference is not significant. (iv) Av. yield of Oil in 
   c.c./ha.
   Treatment   T1  T2
   Av. yield   37'3 40'0
(a) Grass Yield

(i) 3398 Kg/ha. (ii) 3399.8 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of grass in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
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<td>Av. yield</td>
<td>35047</td>
<td>36930</td>
</tr>
</tbody>
</table>

(b) Oil Content

(i) 1012 litre/ha. (ii) 9.1 litre/ha. (iii) Treatment difference is not significant. (iv) Av. yield of Oil in litre/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T_1</th>
<th>T_2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>99.9</td>
<td>102.4</td>
</tr>
</tbody>
</table>

Crop: Lemongrass.
Site: Lemongrass Res. Stn., Odakkali.

Object: To find out the best interval of cutting Lemongrass.

1. Basal Conditions:

(i) Grass compost at 5000 Kg/ha. in 1961 and 62. (ii) Typical laterite. (iii) Transplanting seedlings. (iv) N.A. (v) July, 63. (vi) 3 months. (vii) to (ix) Nil. (x) Unirrigated. (xi) 691 cm. (average). (xii) 3 cuttings.

2. Treatments:

3 intervals of harvesting: \( I_1 = 35, I_2 = 45 \) and \( I_3 = 55 \) days.

3. Design:

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 513. (v) Nil (vi) Yes.

4. General:

(i) Satisfactory. (ii) Nil. (iii) Yield of grass, Oil contents. (iv) N.A. (v) to (viii) Nil.

5. Results:

(a) Grass Yield

(i) 2698 Kg/ha. (ii) 381.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grass in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2595</td>
<td>2857</td>
<td>2643</td>
</tr>
</tbody>
</table>

(b) Oil Content

(i) 10952 c.c./ha. (ii) 2110.5 c.c. (iii) Treatment differences are not significant. (iv) Av. yield of Oil in c.c./ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>8952</td>
<td>11095</td>
<td>12809</td>
</tr>
</tbody>
</table>

Crop: Lemongrass.
Site: Lemongrass Res. Stn., Odakkali.

Object: To see the effect of drying and chopping Lemongrass before distillation on yield and quality of oil.
1. BASAL CONDITIONS:
   (i) Grass compost at 56 Q/ha. in 1961 and 62.  (ii) Laterite.  (iii) Vegetative.  (iv) Local.  (v) and (vi) N.A.  (vii) to (ix) Nil.  (x) Unirrigated.  (xi) 691, 320 and 230 cm. for 1963, 64 and 65.  (xii) N.A. for 63 and 64; May to Dec. end; an interval of 45 days for 65.

2. TREATMENTS:
   Main-plot treatments:
   4 times of distillations: \( T_0 = \) Immediately after harvest, \( T_1 = 48 \), \( T_2 = 96 \) and \( T_3 = 144 \) hrs. after harvest.
   Sub-plot treatments:
   4 lengths of chopping: \( C_1 = 3 \), \( C_2 = 10 \), \( C_3 = 20 \) cm. and \( C_4 = \) Without chopping.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 4 main-plots/replication; 4 sub-plots/main-plot.  (b) N.A.  (iii) 3 for 63, 5 for 64(179) and 65(90).  (iv) and (v) N.A.  (vi) Yes.

4. GENERAL:

5. RESULTS:
   63(27)
   (i) 86 c.c./plot.  (ii) (a) 9.2 c.c./plot.  (b) 5.4 c.c./plot.  (iii) Main effect of \( C \) alone is highly significant.  (iv) Av. yield of Oil in c.c./plot.

   \[
   \begin{array}{|c|c|c|c|c|}
   \hline
   & C_1 & C_2 & C_3 & C_4 & \text{Mean} \\
   \hline
   T_0 & 100 & 87 & 84 & 78 & 86 \\
   T_1 & 99 & 89 & 83 & 71 & 83 \\
   T_2 & 95 & 89 & 84 & 75 & 86 \\
   T_3 & 94 & 92 & 84 & 78 & 87 \\
   \hline
   \text{Mean} & 97 & 89 & 84 & 75 & 86 \\
   \hline
   \end{array}
   \]
   C.D. for \( C \) marginal means=4.6 c.c./plot.

   64(179)
   (i) 96 c.c./plot.  (ii) (a) 7.6 c.c./plot.  (b) 4.0 c.c./plot.  (iii) Main effects of \( T \) is significant.  Main effect of \( C \) is highly significant.  (iv) Av. yield of Oil in c.c./plot.

   \[
   \begin{array}{|c|c|c|c|c|}
   \hline
   & C_1 & C_2 & C_3 & C_4 & \text{Mean} \\
   \hline
   T_0 & 104 & 98 & 94 & 82 & 94 \\
   T_1 & 106 & 102 & 97 & 92 & 99 \\
   T_2 & 103 & 102 & 96 & 89 & 98 \\
   T_3 & 95 & 92 & 92 & 85 & 91 \\
   \hline
   \text{Mean} & 102 & 98 & 95 & 87 & 96 \\
   \hline
   \end{array}
   \]
   C.D. for \( T \) marginal means=5.2 c.c./plot.
   C.D. for \( C \) marginal means=2.6 c.c./plot.

   65(90)
   (i) 59 c.c./plot.  (ii) (a) 12.3 c.c./plot.  (b) 5.7 c.c./plot.  (iii) Main effect of \( C \) is highly significant.  (iv) Av. yield of Oil in c.c./plot.
Crop :- Lemon-grass.

Site :- Lemon-grass Res. Stn., Odakkali.

Object :- To study the effect of Nitrogen, Phosphorus and Potash at the levels on yield and quantity of Oil.

1. BASAL CONDITIONS :
   (i) Nil. (ii) N.A. (iii) Vegetative. (iv) O.D.—19. (v) Planted on 25 to 29.5.65. (vi) N.A. (vii) Nil. (viii) Weeding and earthing up. (ix) Nil. (x) Unirrigated. (xi) 230°0 cm. (xii) 3 harvest during the year at an interval of about 45 days.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4)
   (1) 3 levels of N: N₁ = 84, N₂ = 112 and N₃ = 140 Kg/ha.
   (2) 3 levels of P₂O₅: P₁ = 56, P₂ = 78 and P₃ = 100 Kg/ha.
   (3) 3 levels of K₂O: K₁ = 84, K₂ = 112 and K₃ = 140 Kg/ha.
   (4) 3 spacings: S₁ = 15 cm × 15 cm, S₂ = 23 cm × 15 cm and S₃ = 30 cm × 15 cm.

3. DESIGN:
   (i) ³ confd. Fact. (ii) 9 plots/block; 9 blocks/replication. (b) N.A. (iii) and (iv) N.A. (v) 1 row at each end of all plots. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Quantity of Grass and Oil. (iv) 1965—68. (v) and (vi) N.A. (vii) and (viii) Nil.

5. RESULTS:
   (i) 154.7 c.c./plot. (ii) 22.5 c.c./plot. (iii) Main effect of K is highly significant and interaction P × K is significant. (iv) Av. yield of Lemongrass oil in c.c./plot.

<table>
<thead>
<tr>
<th></th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
<th>C₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₁</td>
<td>69</td>
<td>56</td>
<td>59</td>
<td>45</td>
<td>57</td>
</tr>
<tr>
<td>T₂</td>
<td>67</td>
<td>69</td>
<td>60</td>
<td>47</td>
<td>61</td>
</tr>
<tr>
<td>T₃</td>
<td>63</td>
<td>67</td>
<td>62</td>
<td>52</td>
<td>61</td>
</tr>
<tr>
<td>T₄</td>
<td>63</td>
<td>60</td>
<td>54</td>
<td>44</td>
<td>55</td>
</tr>
<tr>
<td>Mean</td>
<td>66</td>
<td>63</td>
<td>59</td>
<td>47</td>
<td>59</td>
</tr>
</tbody>
</table>

C.D. for C marginal means = 3.6 Kg/ha.

---

Ref. :- K. 65(91).

Type :- ‘CM’.

C.D. for K marginal means = 12.2 c.c./plot.

C.D. for the body of P × K table = 21.4 c.c./plot.
Crop :- Vanilla. 
Observation Site :- To study the effect of measures on blossom fruit setting and crop yield.

1. BASAL CONDITIONS :
(i) Nil. (ii) Sandy loam. (iii) By rooted cuttings. (iv) Vanilla planifolia. (v) 2-7 m. in between plants and 1-8 m. between rows. (vi) N.A. (vii) Weeding thrice a year and mulching with 13-6 Kg/vine of G.L. every year. Training the vines once in 60 days. (ix) Nil. (x) Unirrigated. (xi) 162 cm. in 63 and 265 cm. in 64. (xii) N.A.

2. TREATMENTS :
All combinations of (1) and (2)+a control
(1) 2 sources of 113 gm/vine of N : $S_1$ = Leaf compost and $S_2$ = Well rotten C.M.
(2) 2 levels of lime: $L_0$ = 0 and $L_1$ = 454 gm.

3. DESIGN :
(i) Fact. in R.B.D. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a)−(b) 6. (v) 1 row alround. (vi) Yes.

4. GENERAL :

5. RESULTS :
63(54)
No. of leaves
(i) 27 leaves/vine. (ii) 6 leaves/vine. (iii) None of the effects is significant. (iv) Av. number of leaves/vine.

Control=26 leaves/vine.

<table>
<thead>
<tr>
<th></th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L_1$</td>
<td>30</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>$L_2$</td>
<td>25</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Mean</td>
<td>28</td>
<td>26</td>
<td>27</td>
</tr>
</tbody>
</table>

Length of vines
(i) 131·5 cm. (ii) 41·9 cm. (iii) None of the effects is significant. (iv) Av. length of vines in cm.

Control=122·0 cm.

<table>
<thead>
<tr>
<th></th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L_1$</td>
<td>154·5</td>
<td>122·9</td>
<td>138·7</td>
</tr>
<tr>
<td>$L_2$</td>
<td>129·6</td>
<td>128·4</td>
<td>129·0</td>
</tr>
<tr>
<td>Mean</td>
<td>142·0</td>
<td>125·7</td>
<td>133·9</td>
</tr>
</tbody>
</table>

64(100)
Length of vines
(i) 346·4 cm. (ii) 117·5 cm. (iii) None of the effects is significant. (iv) Av. length of vines in cm.
Control = 328.5 cm.

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₁</td>
<td>338.5</td>
<td>373.8</td>
<td>356.1</td>
</tr>
<tr>
<td>L₂</td>
<td>389.5</td>
<td>301.5</td>
<td>345.5</td>
</tr>
<tr>
<td>Mean</td>
<td>364.0</td>
<td>337.6</td>
<td>350.8</td>
</tr>
</tbody>
</table>

Girth of vine

(i) 2.7 cm.  (ii) 0.2 cm.  (iii) None of the effects is significant.  (iv) Av. girth of vines in cm.

Control = 2.8 cm.

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₁</td>
<td>2.7</td>
<td>2.8</td>
<td>2.7</td>
</tr>
<tr>
<td>L₂</td>
<td>2.6</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Mean</td>
<td>2.7</td>
<td>2.7</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Number of leaves

(i) 58 leaves/vine.  (ii) 12 leaves/vine.  (iii) None of the effects is significant.  (iv) Av. number of leaves/vine.

Control = 53 leaves/vine.

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₁</td>
<td>60</td>
<td>64</td>
<td>62</td>
</tr>
<tr>
<td>L₂</td>
<td>63</td>
<td>49</td>
<td>56</td>
</tr>
<tr>
<td>Mean</td>
<td>62</td>
<td>56</td>
<td>59</td>
</tr>
</tbody>
</table>

Crop : Vanilla.


Object : To determine the optimum length of planting materials required for better growth and its influence on the pre-leaving period of the vine.

1. BASAL CONDITIONS :
   (i) The area was planted with Coffee previously. No manures were applied. (ii) Sandy loam. (iii) By rooted cuttings. (iv) Vanilla planifolia. (v) 2.9.60 with 1.8 m. x 2.7 m. spacings. (vi) As per treatments. (vii) Nil. (viii) 3 weedings and mulching the vines with 23 Kg/vine of G. L. Training the vine once in 60 days. (ix) Nil. (x) Unirrigated. (xi) and (xii) N.A.

2. TREATMENTS :
   4 lengths of rooted cuttings : C₁=30, C₂=61, C₃=91 and C₄=122 cm.

3. DESIGN :
   (i) R.B.D  (ii) (a) 4.  (b) N.A.  (iii) 5.  (iv) (a) — (b) 12.  (v) Nil.  (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Number of leaves and length of vines etc. (iv) 1960—62. (v) N.A.
(vi) to (viii) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th>60(48)</th>
<th>Length of vines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(i) 92 cm./vine. (ii) 19.2 cm/vine. (iii) Treatment differences are highly significant. (iv) Av. length of vines in cm./vine.</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
</tr>
<tr>
<td>Av. length</td>
<td>46</td>
</tr>
<tr>
<td>C.D.</td>
<td>$26.5$ cm./vine.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Number of leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(i) 17 leaves/vine. (ii) 2 leaves/vine. (iii) Treatment differences are highly significant. (iv) Av. number of leaves/vine.</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
</tr>
<tr>
<td>Av. number</td>
<td>12</td>
</tr>
<tr>
<td>C.D.</td>
<td>$2.8$ leaves/vine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>61(120)</th>
<th>Length of vines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(i) 296 cm./vine. (ii) 76.0 cm./vine. (iii) Treatment differences are highly significant. (iv) Av. length of vines in cm./vine.</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
</tr>
<tr>
<td>Av. length</td>
<td>173</td>
</tr>
<tr>
<td>C.D.</td>
<td>$104.7$ cm./vine.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Number of leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(i) 42 leaves/vine. (ii) 9 leaves/vine. (iii) Treatment differences are highly significant. (iv) Av. number of leaves/vine.</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
</tr>
<tr>
<td>Av. number</td>
<td>25</td>
</tr>
<tr>
<td>C.D.</td>
<td>$12.4$ leaves/vine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>62(56)</th>
<th>Length of vines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(i) 587 cm./vine. (ii) 121.6 cm./vine. (iii) Treatment differences are highly significant. (iv) Av. length of vines in cm./vine.</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
</tr>
<tr>
<td>Av. length</td>
<td>395</td>
</tr>
<tr>
<td>C.D.</td>
<td>$167.5$ cm./vine.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Number of leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(i) 76 leaves/vine. (ii) 16 leaves/vine. (iii) Treatment differences are significant. (iv) Av. number of leaves/vine.</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
</tr>
<tr>
<td>Av. number</td>
<td>51</td>
</tr>
<tr>
<td>C.D.</td>
<td>$22.1$ leaves/vine.</td>
</tr>
</tbody>
</table>
Crop: Vanilla.  
Ref: K. 60(102), 61(123), 62(60), 63(55).

Site: Agri. Res. Stn., Ambalavayal. Type: 'O'.

Object: To determine the best method of training the Vanilla Vines.

1. BASAL CONDITIONS:
   (i) The area was planted with coffee previously. No manures were applied. (ii) Sandy loam. (iii) By rooted cuttings. (iv) Vanilla planifolia. (v) 30.8.60 with 1.8 m. x 2.7 m. spacings. (vi) Rooted cuttings of 30 cm. length with 4 months nursery growth. (vii) Nil. (viii) 8 weedings and training the vines in 60 days. (ix) Nil. (x) Unirrigated. (xi) 162 cm. for 63. N.A. for other years. (xii) Nil.

2. TREATMENTS:
   3 methods of training Vines: M1 = Training the vines erect on wooden posts upto a height of 1.8 m. and then training horizontally on wooden trellis, M2 = Training the vines horizontally on wooden trellis when they reach 1.2 m. high and M3 = Training the vines horizontally in loops when they reach 1.2 m. height.

3. DESIGN:
   (i) R B.D. (ii) 3. (a) N.A. (iii) 7. (iv) (a) -(b) 6. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Length of vines and number of leaves etc. (iv) 1960-63. (v) N.A. (vi) to (viii) Nil.

5. RESULTS:

   60(102)
   Length of vines
   (i) 73 cm./vine. (ii) 18.7 cm./vine. (iii) Treatment differences are not significant. (iv) Av. length of vines in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. length</td>
<td>88</td>
<td>65</td>
<td>67</td>
</tr>
</tbody>
</table>

   Number of leaves
   (i) 21 leaves/vine. (ii) 4 leaves/vine. (iii) Treatment differences are not significant. (iv) Av. number of leaves/vine.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. number</td>
<td>24</td>
<td>19</td>
<td>20</td>
</tr>
</tbody>
</table>

   61(123)
   Length of vines
   (i) 212 cm./vine. (ii) 81.0 cm./vine. (iii) Treatment differences are not significant. (iv) Av. length of vines in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. length</td>
<td>266</td>
<td>178</td>
<td>191</td>
</tr>
</tbody>
</table>

   Number of vines
   (i) 37 leaves/vine. (ii) 8 leaves/vine. (iii) Treatment differences are not significant. (iv) Av. number of leaves/vine.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. number</td>
<td>39</td>
<td>36</td>
<td>35</td>
</tr>
</tbody>
</table>

   62(60)
   Length of vines
   (i) 456 cm. (ii) 127 cm. (iii) Treatment differences are significant. (iv) Av. length of vines in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. length</td>
<td>544</td>
<td>350</td>
<td>473</td>
</tr>
</tbody>
</table>

   C.D. = 147.9 cm./vine.
Number of leaves

(i) 52 leaves/vine. (ii) 13 leaves/vine. (iii) Treatment differences are not significant. (iv) Av. number of leaves/vine.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>57</td>
<td>47</td>
<td>52</td>
</tr>
</tbody>
</table>

Length of vines

(i) 782 cm./vine. (ii) (i) and (iii) N.A. (iv) Av. length of vines in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. length</td>
<td>841</td>
<td>755</td>
<td>751</td>
</tr>
</tbody>
</table>

Number of leaves

(i) 76 leaves/vine. (ii) and (iii) N.A. (iv) Av. number of leaves/vine.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>81</td>
<td>75</td>
<td>73</td>
</tr>
</tbody>
</table>

Crop: Vanilla. Ref: K. 63(57), 64(123).


Object: To determine the best standard for Vanilla.

1. BBSAL CONDITIONS:

(i) N.A. (ii) Sandy loam. (iii) By rooted cuttings. (iv) Vanilla planifolia. (v) 27.6.61 with 1.8 m x 2.7 m spacings. (vi) 4 months. (vii) Nil. (viii) 3 weedings and mulching the vines with 23 Kg/vine of G.L. Training the vines once in 60 days. (ix) Nil. (x) Unirrigated. (xi) 162 cm. in 1963 and 265 cm. in 1964. (xii) N.A.

2. TREATMENTS:

5 types of standards: T₁=Limbing cuttings of Glyricidia, T₂=Limbing cuttings of Plumania Alba, T₃=Limbing cuttings of Erythrina Lithosperma, T₄=Limb cuttings of Indigofera Termania and T₅=Dead wood cuttings.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a)—(b) 6. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Quantitative growth data of vines. (iv) 1961—64. (v) to (vii) Nil. (viii) Expts. of other years—N.A.

5. RESULTS:

Length of vines

(i) 131 cm. (ii) 41.0 cm. (iii) Treatment differences are not significant. (iv) Av. length of vines in cm.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. length</td>
<td>115</td>
<td>129</td>
<td>165</td>
<td>94</td>
<td>152</td>
</tr>
</tbody>
</table>

Number of leaves

(i) 27 leaves/vine. (ii) 6 leaves/vine. (iii) Treatment differences are not significant. (iv) Av. number of leaves/vine.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. length</td>
<td>25</td>
<td>27</td>
<td>32</td>
<td>20</td>
<td>31</td>
</tr>
</tbody>
</table>
Crop : Vanilla.  
Ref : K. 60(101), 61(122), 62(58), 63(60).
Site : Agri. Res. Stn., Ambalavayal. Type : 'IC'.

Object : To study the effect of pot watering during summer months and mulching throughout the year on Vanilla vines.

1. BASAL CONDITIONS:
(i) The area was planted with coffee previously. No manures were applied. (ii) Sandy loam. (iii) By rooted cuttings. (iv) Vanilla planifolia. (v) 14.9.60 with 1'8 m × 2'7 m. spacings. (vi) Rooted cuttings of 30 cm. length with 5 months nursery growth. (vii) Nil. (viii) 3 weedings and training of vines once in 60 days. (ix) Nil. (x) Irrigated. (xi) 152 cm. in 1963. (xii) Nil. N.A. for other years.

2. TREATMENTS:
All combinations of (1) and (2) + a control
(1) 4 frequencies of irrigations : \( I_1 = 2 \), \( I_2 = 4 \), \( I_3 = 8 \) and \( I_4 = 12 \) days interval during summer.
(2) 2 cultural treatments : \( T_1 \) = No mulching and \( T_2 \) = Mulching.

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) (iii) 4. (iv) (a) N.A. (b) 6. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Length of vines and number of leaves etc. (iv) 1960—63. (v) to (viii) Nil.

60(101)

Length of vine
(i) 84 cm./vine. (ii) 31'8 cm./vine. (iii) None of the effects is significant. (iv) Av. length of vines in cm.

<table>
<thead>
<tr>
<th>Control=92 cm.</th>
<th>( I_1 )</th>
<th>( I_2 )</th>
<th>( I_3 )</th>
<th>( I_4 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( T_1 )</td>
<td>92</td>
<td>49</td>
<td>51</td>
<td>97</td>
<td>72</td>
</tr>
<tr>
<td>( T_2 )</td>
<td>77</td>
<td>97</td>
<td>100</td>
<td>104</td>
<td>94</td>
</tr>
<tr>
<td>Mean</td>
<td>84</td>
<td>73</td>
<td>76</td>
<td>104</td>
<td>83</td>
</tr>
</tbody>
</table>
Number of leaves
(i) 19 leaves/vine.  (ii) 5 leaves/vine.  (iii) None of the effects is significant.  (iv) Av. number of leaves/vine.

Control=17 leaves/vine.

<table>
<thead>
<tr>
<th></th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
<th>I₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₁</td>
<td>21</td>
<td>16</td>
<td>13</td>
<td>21</td>
<td>18</td>
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<td>17</td>
<td>22</td>
<td>22</td>
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<td>20</td>
</tr>
<tr>
<td>Mean</td>
<td>19</td>
<td>19</td>
<td>18</td>
<td>21</td>
<td>19</td>
</tr>
</tbody>
</table>

61(122)

Length of vine
(i) N.A.  (ii) 72.6 cm./vine.  (iii) Main effect of T is highly significant.  (iv) Av. length of vines in cm.

Control=N.A.

<table>
<thead>
<tr>
<th></th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
<th>I₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₁</td>
<td>155</td>
<td>111</td>
<td>99</td>
<td>162</td>
<td>132</td>
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<tr>
<td>N₂</td>
<td>187</td>
<td>228</td>
<td>199</td>
<td>215</td>
<td>207</td>
</tr>
<tr>
<td>Mean</td>
<td>171</td>
<td>170</td>
<td>149</td>
<td>188</td>
<td>170</td>
</tr>
</tbody>
</table>

C.D. for T marginal means=53.0 cm./vine

Number of leaves
(i) 29 leaves/vine.  (ii) 7 leaves/vine.  (iii) Main effect of T is highly significant.  (iv) Av. number of leaves/vine.

Control=29.

<table>
<thead>
<tr>
<th></th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
<th>I₄</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>T₁</td>
<td>28</td>
<td>25</td>
<td>20</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>T₂</td>
<td>35</td>
<td>32</td>
<td>35</td>
<td>33</td>
<td>34</td>
</tr>
<tr>
<td>Mean</td>
<td>32</td>
<td>28</td>
<td>28</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

C.D. for T marginal means=5.1 leaves/vine.

62(58)

Length of vine
(i) 458 cm./vine.  (ii) 184.8 cm./vine.  (iii) Main effect of T is highly significant.  (iv) Av. length of vines in cm.

Control=288 cm./vine.

<table>
<thead>
<tr>
<th></th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
<th>I₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₁</td>
<td>411</td>
<td>263</td>
<td>327</td>
<td>460</td>
<td>365</td>
</tr>
<tr>
<td>T₂</td>
<td>540</td>
<td>545</td>
<td>690</td>
<td>598</td>
<td>593</td>
</tr>
<tr>
<td>Mean</td>
<td>476</td>
<td>404</td>
<td>508</td>
<td>529</td>
<td>479</td>
</tr>
</tbody>
</table>

C.D. for T marginal means=134.8 cm./vine.
Number of leaves/vine

(i) 57 leaves/vine. (ii) 16 leaves/vine. (iii) None of the effects is significant. (iv) Av. number of leaves/vine.

<table>
<thead>
<tr>
<th></th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>54</td>
<td>35</td>
<td>40</td>
<td>49</td>
<td>44</td>
</tr>
<tr>
<td>T2</td>
<td>60</td>
<td>74</td>
<td>77</td>
<td>82</td>
<td>73</td>
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<tr>
<td>Mean</td>
<td>57</td>
<td>54</td>
<td>58</td>
<td>66</td>
<td>59</td>
</tr>
</tbody>
</table>

Length of vines

(i) 643 cm./vine. (ii) and (iii) N.A. (iv) Av. length of vines in cm./vine.

<table>
<thead>
<tr>
<th></th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>605</td>
<td>450</td>
<td>416</td>
<td>469</td>
<td>485</td>
</tr>
<tr>
<td>T2</td>
<td>890</td>
<td>898</td>
<td>840</td>
<td>882</td>
<td>878</td>
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<tr>
<td>Mean</td>
<td>748</td>
<td>674</td>
<td>628</td>
<td>676</td>
<td>682</td>
</tr>
</tbody>
</table>

Number of leaves/vine

(i) 72 leaves/vine. (ii) and (iii) N.A. (iv) Av. number of leaves/vine.

<table>
<thead>
<tr>
<th></th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>70</td>
<td>49</td>
<td>50</td>
<td>55</td>
<td>56</td>
</tr>
<tr>
<td>T2</td>
<td>87</td>
<td>97</td>
<td>91</td>
<td>101</td>
<td>94</td>
</tr>
<tr>
<td>Mean</td>
<td>78</td>
<td>73</td>
<td>70</td>
<td>78</td>
<td>75</td>
</tr>
</tbody>
</table>

Crop: Vettiver.

Site: Lemongrass Res. Stn., Odakkali.

Ref: K. 63(52), 65(73).

Type: 'M'.

Object: To see the effect of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O singly and in combination on yield and quality of oil over a dose of 5 C.L. of C.M.

1. BASAL CONDITIONS:

   (i) (a) to (c) N.A. (ii) Laterite. (iii) 16.7.63, N.A. (iv) (a) to (c) N.A. (v) 12.4 C.L. of F.Y.M./ha. (vi) Local. (vii) Unirrigated. (viii) Gap-filing. (ix) 583 cm. in 63; 331 cm. in 65. (x) 9 to 17.11.64; N.A.

2. TREATMENTS:

   All combinations of (1) and (2)
   (1) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>1</sub>=0, P<sub>2</sub>=22.4 and P<sub>3</sub>=33.5 Kg/ha.
   (2) 3 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>1</sub>=0, K<sub>2</sub>=22.4, K<sub>3</sub>=33.6 Kg/ha.
3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) and (b) 7.5 m. x 7.5 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Blast like spots due to fungi on leaves. (iii) Wet root yield and oil contents.
(iv) (a) 1963—N.A. (b) No. (c) Nil. (v) Vertiver Sub.—Stn., Thrissur, Kollam district. (vi) Nil. (vii) Expt. for 64 in N.A.

5. RESULTS:

Root yield

(i) 9584 Kgm/ha. (ii) 1323.6 Kgm/ha. (iii) Interaction P x K is highly significant. (iv) Av. yield of wet roots in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>K0</td>
<td>8813</td>
<td>7822</td>
<td>10773</td>
<td>9136</td>
</tr>
<tr>
<td>K1</td>
<td>8387</td>
<td>11058</td>
<td>9271</td>
<td>9572</td>
</tr>
<tr>
<td>K2</td>
<td>10264</td>
<td>10707</td>
<td>9142</td>
<td>10044</td>
</tr>
</tbody>
</table>

Mean 9161 9662 9729 9584

C.D. for body of table=1932.0 Kgm/ha.

Oil yield of wet roots

(i) 40.3 c.c./25 Kg. (ii) 10.1 c.c./25 Kg. (iii) None of the effects is significant. (iv) Av. yield of oil in c.c./25 Kg.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>K0</td>
<td>33.5</td>
<td>44.3</td>
<td>40.3</td>
<td>39.3</td>
</tr>
<tr>
<td>K1</td>
<td>48.5</td>
<td>45.0</td>
<td>37.3</td>
<td>43.6</td>
</tr>
<tr>
<td>K2</td>
<td>33.5</td>
<td>39.3</td>
<td>40.6</td>
<td>37.8</td>
</tr>
</tbody>
</table>

Mean 38.5 42.8 39.4 40.3

Root yield

(i) 3134 Kgm/ha. (ii) 2770 Kgm/ha. (iii) None of the effects is significant. (iv) Av. yield of roots in Kgm/ha.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
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</thead>
<tbody>
<tr>
<td>K0</td>
<td>2954</td>
<td>2666</td>
<td>3085</td>
<td>3002</td>
</tr>
<tr>
<td>K1</td>
<td>3157</td>
<td>3582</td>
<td>3294</td>
<td>3338</td>
</tr>
<tr>
<td>K2</td>
<td>3085</td>
<td>3111</td>
<td>3294</td>
<td>3163</td>
</tr>
</tbody>
</table>

Mean 3059 3120 3224 3134

Oil yield

(i) 7.523 litres/ha. (ii) 1.89 litres/ha. (iii) Main effect of P and interaction P x K are significant. (iv) Av. yield of oil contents in litres/ha.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>K0</td>
<td>7.313</td>
<td>6.117</td>
<td>7.372</td>
<td>7.267</td>
</tr>
<tr>
<td>K1</td>
<td>8.679</td>
<td>8.052</td>
<td>6.954</td>
<td>7.895</td>
</tr>
<tr>
<td>K2</td>
<td>8.836</td>
<td>5.019</td>
<td>8.365</td>
<td>7.407</td>
</tr>
</tbody>
</table>

Mean 8.609 6.396 7.564 7.523

C.D. for P marginal means=1.524 litres/ha.
C.D. for body of the table=2.640 litres/ha.
Crop: Vettiver.  
Site: Vettiver Sub-Stn., Thiruvambadi.  
Object: To find out the effect of P and K singly and in combinations on yield and quality of Oil.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Laterite.  (iii) 21.10.64 to 27.10.64.  (iv) (a) Digging, levelling.  (b) to (e) N.A.  (v) 5 C.L. of C.M./ha.  (vi) Local (medium).  (vii) Unirrigated.  (viii) Weeding and earthing up twice.  (ix) N.A.  (x) 6.3.66 to 28.3.66.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of P₂O₅ applied as S/P: P₀=0, P₁=22·4, P₂=33·6 Kg/ha.
   (2) 3 levels of K₂O applied as Mur. Pot.: K₀=0, K₁=22·4, K₂=33·6 Kg/ha.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 9 (per replication or block).  (b) 78 m × 7·5 m.  (iii) 4.  (iv) (a) and (b) 8·0 m × 7·5 m.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Fair.  (ii) Attack of serek insects was noticed and sprayed with 'Parmar 50'.  (iii) Quantity of Root and Oil.  (iv) (a) No.  (b) and (c) N.A.  (v) Lemongrass Res. Stn., Odakkali.  (vi) and (vii) Nil.

5. RESULTS:
   Root yield
   (i) 1032.9 Kg/ha.  (ii) 145·3 Kg/ha.  (iii) Main effect of P and the interaction P×K are significant.  (iv) Av. yield of Vettiver roots in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
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<td>1041</td>
<td>1166</td>
<td>1111.1</td>
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<td>1020.8</td>
<td>1006.9</td>
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<td>K₂</td>
<td>1129.2</td>
<td>854.2</td>
<td>958.3</td>
<td>980.6</td>
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<tr>
<td>Mean</td>
<td>1077.8</td>
<td>972.2</td>
<td>1048.6</td>
<td>1032.9</td>
</tr>
</tbody>
</table>

C.D. for P marginal means=122.4 Kg/ha.
C.D. for body of the table=212.1 Kg/ha.

Oil yield
   (i) 9·7 litre/ha.  (ii) 1·9 litre/ha.  (iii) None of the effects is significant.  (iv) Av. yield of Vettiver oil in litres/ha.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
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<td>8.3</td>
<td>11.0</td>
<td>9.4</td>
</tr>
<tr>
<td>K₂</td>
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<td>8.2</td>
<td>8.7</td>
<td>9.4</td>
</tr>
<tr>
<td>Mean</td>
<td>10.2</td>
<td>8.6</td>
<td>10.3</td>
<td>9.7</td>
</tr>
</tbody>
</table>
**Crop:** Vettiver.  
**Ref.:** K. 64(152).  
**Site:** Lemongrass Res. Stn., Odakkali.  
**Type:** ‘C’.

Object:--To determine the best time for planting Vettiver so as to get the maximum yield.

1. **BASAL CONDITIONS:**
   (i) (a) No. (b) Lemongrass. (c) Nil. (ii) N.A.; As per treatments.  (iv) (a) Digging and levelling. (b) Planted in raised beds. (c) to (e) N.A. (v) 217 Q/ha. of Cowdung applied during the second week of May before planting. (vi) Nilambar (medium). (vii) Unirrigated. (viii) 2 weedings and 2 earthing-ups. (ix) 545 cm. (x) 3rd week of July to December, 65.

2. **TREATMENTS:**
   6 times of planting: T₁=May, T₂=June, T₃=July, T₄=August, T₅=September and T₆=October.

3. **DESIGN:**
   (i) R.B.D. (ii) (a) 6. (b) 17·0 m.×15·9 m. (iii) 4. (iv) (a) 8 m.×6 m. (b) 7·5 m.×5·2 m. (v) 25 cm.×40 cm. (vi) Yes.

4. **GENERAL:**
   (i) Satisfactory. (ii) Attack of mealy bugs and sprayed with 0·05%. Folidol; Blast like spots appeared on leaves and sprayed with 1% Bordeaux mixture. (iii) Root and oil yield. (iv) (a) No. (b) and (c) Nil. (v) to (vii) N.A.

5. **RESULTS:**
   **Root yield**
   (i) 2916 Kg/ha.  (ii) 573·4 Kg/ha.  (iii) Treatment differences are highly significant. (iv) Av. yield of roots in Kg/ha.
   
<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3782</td>
<td>3513</td>
<td>2789</td>
<td>2763</td>
<td>2500</td>
<td>2147</td>
</tr>
<tr>
<td>C.D.</td>
<td>864 Kg/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   **Oil yield**
   (i) 14·7 litre/ha.  (ii) 3·0 litre/ha.  (iii) Treatment differences are highly significant. (iv) Av. yield of oil in litres/ha.
   
<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>20·2</td>
<td>16·7</td>
<td>14·6</td>
<td>13·5</td>
<td>12·8</td>
<td>10·7</td>
</tr>
<tr>
<td>C.D.</td>
<td>45 litres/ha.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

---

**Crop:** Vettiver.  
**Ref.:** K. 63(50), 65(71).  
**Site:** Lemongrass Res. Stn., Odakkali.  
**Type:** ‘C’.

Object:--To determine the most economic system of planting of Vettiver.

1. **BASAL CONDITIONS:**
   (i) (a) to (c) N.A. (ii) Lateritic. (iii) 22·7.63 ; 15, 16 and 19.7.65. (iv) (a) to (e) N.A. (v) 22·4 Kg/ha. of N as A/S, 22·4 Kg/ha. of P₂O₅ as Super and 28 0 Kg/ha. of K₂O as Mur. Pot. (vi) Local. (vii) Unirrigated. (viii) Gap filling, weeding and earthing-up. (ix) 583 cm.; 316 cm. (x) 7 to 16.12.64 ; 8.9.66 to 24.9.66.

2. **TREATMENTS:**
   4 methods of planting : M₁=Beds with 61 cm. width and height 46 cm., M₂=Beds with 69 cm. width and height 30 cm., M₃=Ridges at distance 46 cm. and height 41 cm. and M₄=Local practice of ridges.
3. DESIGN:
(i) R.B.D. (ii) 5 (b) N.A. (iii) 4. (iv) (a) and (b) 7·9 m. x 7·0 m. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Blast like spots on leaves noted and protective measures were taken. (iii) Yield of root and oil. (iv) (a) 196, —contd. (Expt. for 64 N.A.) (b) N.A. (c) Nil. (v) Vettiver Sub-Stn., Thiruvambadi and Kozhikode. (vi) Nil and (vii) Nil.

5. RESULTS:
63(50)
Wet root yield
(i) 6473 Kg/ha. (ii) 1205·1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of roots in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>6571</td>
<td>7179</td>
<td>6357</td>
<td>5786</td>
</tr>
</tbody>
</table>

Oil yield of wet roots
(i) 50·3 c.c./25 Kg. (ii) 13·0 c.c./25 Kg. (iii) Treatment differences are not significant. (iv) Av. yield of oil in c.c./25 Kg.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>46·6</td>
<td>45·2</td>
<td>61·0</td>
<td>48·2</td>
</tr>
</tbody>
</table>

65(71)
Root yield
(i) 3960 Kg/ha. (ii) 680·0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of roots in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3725</td>
<td>4195</td>
<td>4087</td>
<td>3834</td>
</tr>
</tbody>
</table>

Oil yield of roots
(i) 11·5 litres/ha. (ii) 2·714 litres/ha. (iii) Treatment differences are not significant. (iv) Av. yield of oil in litres/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>11·21</td>
<td>10·66</td>
<td>13·44</td>
<td>10·77</td>
</tr>
</tbody>
</table>

Crop :- Vettiver. Ref :- K: 64(191).
Site :- Vettiver Sub-Stn., Thiruvambadi. Type :- 'C'.

Object :- To determine the most economic system of planting.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Laterite. (iii) 12·9.64 to 14·9.64. (iv) (a) Digging, levelling. (b) to (e) N.A. (v) 1 ton of C.M. applied uniformly in the area before planting. (vi) Local (medium). (vii) Unirrigated. (viii) Weeding and earthing up twice. (ix) N.A. (x) 2·3.66 to 26·2.66.

2. TREATMENTS:
4 treatments planting on: T1=Ridges, T2=Beds of 70 cm. wide, T3=Beds of 60 cm. wide, T4=Local practice.

3. DESIGN:
(i) R.B.D. (ii) 4 (per replication or block). (b) 33·5 m. x 6·5 m. (iii) 5. (iv) (a) and (b) 8 m. x 6·5 m. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Fair. (ii) Attack of scale insects was noticed and sprayed with 'Paramar 50'. (iii) Quantity of Root and Oil. (iv) (a) No. (b) and (c) N.A. (v) Lemongrass Res. Stn., Odakkali. (vi) and (vii) N.A.

5. RESULTS:
(i) 1317.3. (ii) 174.9. (iii) Treatments differences are not significant. (iv) Mean yield of Vettiver root in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1446.2</td>
<td>1173.1</td>
<td>1423.1</td>
<td>1326.9</td>
</tr>
</tbody>
</table>

63(25)

5. RESULTS:
63(25)

Crop :- Vettiver.

Site :- Lemongrass Res. Stn., Odakkali.

Ref :- K. 63(25), 64(150), 65(72).

Object :- To determine the correct stage of harvest of Vettiver for maximum yield.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Laterite. (iii) 20.7.63; 25 to 27.6.64; June 65. (iv) (a) Preparation of beds. (b) Planting on raised beds. (c) to (e) N.A. (v) 22 Kg/ha. of N as A/S, 22 Kg/ha. of P2O5 as Super and 28 Kg/ha. of K2O Mur. Pot. for 63(25) and 52'3 Q/ha. of C.M. for 64(150) and 65(72). (vi) Local. (vii) Unirrigated. (viii) 2 weedings and 1 earthing up. (ix) 454 em. for 63(25), N.A. for 64(150) and 536 em. for 65(72). (x) As per treatments.

2. TREATMENTS:
8 stages of harvest: A1 =11, A2 =12, A3 =13, A4 =14, A5 =15, A6 =16, A7 =17 and A8 =18 months.

3. DESIGN:
(i) R.B.D. (ii) (a) 8. (b) N.A. for 63; 37.5 m. x 12.8 m. for 64. (iii) 4. (iv) (a) and (b) 7.5 m. x 5.0 m. for 63 and 9.0 m. x 6.0 m. for 64. (v) Nil for 63; 50 cm. x 75 cm. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Incidence of blast during 63 was noticed and phytolan was sprayed. During 64 there was attack of scale insects and Paramar-50 was sprayed. (iii) Yield of roots and oil. (iv) 1963—contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:

63(25)

Root yield
(i) 11348 Kg/ha. (ii) 2409.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of root in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>A6</th>
<th>A7</th>
<th>A8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>13387</td>
<td>10253</td>
<td>12440</td>
<td>12467</td>
<td>13467</td>
<td>12890</td>
<td>9887</td>
<td>5900</td>
</tr>
<tr>
<td>C.D. = 3345.0 Kg/ha.</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Oil yield of wet roots
(i) 64.9 c.c./25 Kg. (ii) 16.6 c.c./25 Kg. (iii) Treatment differences are not significant. (iv) Av. yield of Oil in c.c./25 Kg. of wet roots.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>A6</th>
<th>A7</th>
<th>A8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>75.3</td>
<td>61.5</td>
<td>65.3</td>
<td>56.5</td>
<td>56.0</td>
<td>55.0</td>
<td>70.5</td>
<td>81.3</td>
</tr>
</tbody>
</table>

64(150)

Root yield
(i) 3300 Kg/ha. (ii) 7805 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of root in Kg/ha.
Crop :- Banana.  
Ref:- K. 62(1).  

Type :- 'M'.

Object :- To find out the optimum manurial requirements for Banana.

1. BASAL CONDITIONS:
   (viii) Mammuthy weeding and earthing. (ix) N.A. (x) Irrigated. (xi) 159 em. (xii) N.A.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4)
   (1) 2 levels of C.M. : Cₐ=0 and C₁=11·3 Kg/ha.
   (2) 2 levels of A/S in 4 doses : Nₐ=0 and N₁=0·9 Kg/plant.
   (3) 2 levels of Super in 2 doses : Pₐ=0 and P₁=0·5 Kg/plant.
   (4) 2 levels of Mur. Pot. in 2 doses : Kₐ=0 and K₁=0·9 Kg/plant.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 5. (iv) (a) 9·1 m. x 3·1 m. (b) 10·7 m. x 4·6 m. (v) 76 cm.

4. GENERAL:
   (i) Satisfactory. (ii) Slight incidences of Banana disease. (iii) Yield of banana. (iv) to (viii) N.A.

5. RESULTS:
   (i) 12·1 Kg/plant. (ii) 2·3 Kg/plant. (iii) None of the effects is significant. (iv) Mean and differential response in Kg/plant.
Crop: Banana.  
Site: Banana Res. Stn., Mannuthy.  
Ref: K. 65(74).  
Type: 'M'.

Object: To study the comparative merits of existing and new types of phosphatic fertilizers.

1. BASAL CONDITIONS:
   (i) N.A.  (ii) Loam.  (iii) Preliminary preparation by ploughing two rounds, making pits of 75 cm. x 75 cm. x 45 cm. as specified spacings.  (iv) Nendran (medium).  (v) 18.11.65 planting single medium sized sucker in a pit.  (vi) N.A.  (vii) 300 Kg. G.L. manure applied at 5 Kg. per plant in the pits at the time of planting.  (viii) 2 weedings.  (ix) No.  (x) Irrigated.  (xi) 264'6 cm.

2. TREATMENTS:
   All combinations of (i) and (2)+control (2 plots)
   (1) 2 levels of $P_2O_5$: $P_1$=34 and $P_2$=68 Kg/ha.
   (2) 5 sources of $P_2O_5$: $S_1$=Super, $S_2$=Fused Magnesium Phos., $S_3$=Deflorinated Phos., $S_4$=Multi Phos. and $S_6$=Thomas basic slag.

3. DESIGN:
   (i) Fact. in R.B.D.  (ii) (a) 12.  (b) 39.6 m. x 16.5 m.  (iii) 4.  (iv) (a) and (b) 5.9 m. x 1.8 m.  (v) 1 row around the plot.

4. GENERAL:
   (i) Satisfactory.  (ii) Nil.  (iii) No. of fruits and weight of bunches.  (iv) N.A.  (v) to (viii) Nil.

5. RESULTS:

Yield in number
   (i) 104630 No./ha.  (ii) 11364 No./ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of fruits in No./ha.

<table>
<thead>
<tr>
<th>$S_i$</th>
<th>104419</th>
<th>99589</th>
<th>98899</th>
<th>109019</th>
<th>107639</th>
<th>103913</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>105569</td>
<td>103496</td>
<td>101774</td>
<td>109834</td>
<td>107754</td>
<td>105684</td>
</tr>
</tbody>
</table>

Yield in weight
   (i) 94.1 Q/ha.  (ii) 22.7 Q/ha.  (iii) Treatment differences are not significant.  (iv) Av. yield of fruits in Q/ha.
**Crop:** Banana.  
**Site:** Banana Res. Sta., Mannuthy.  

Object—To study the effect of N, P and K at different levels applied singly and in combinations on Banana.

1. **BASAL CONDITIONS:**

2. **TREATMENTS:**
   All combinations of (1), (2) and (3)
   (1) 3 levels of N : N₀ = 0, N₁ = 35.6 and N₂ = 71.2 Kg/ha.
   (2) 3 levels of P : P₀ = 0, P₁ = 35.6 and P₂ = 71.2 Kg/ha.
   (3) 3 levels of K : K₀ = 0, K₁ = 71.2 and K₂ = 142.4 Kg/ha.

3. **DESIGN:**
   (i) 3⁰ Confld. fact. (ii) (a) 9 plots/block; 3 blocks/replication. (b) 54 m x 20 m. (iii) 2. (iv) (a) 16 m x 2 m. (b) N.A. (v) One row all round each plot.

4. **GENERAL:**
   (i) Satisfactory. (ii) Nil. (iii) Number of fruits and weight of bunches. (iv) to (viii) N.A.

5. **RESULTS:**
   **Yield in Number:**
   (i) 105343 no./ha. (ii) 7913 no./ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of fruits in no./ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
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</tr>
</thead>
<tbody>
<tr>
<td>P₀</td>
<td>93385</td>
<td>109270</td>
<td>113437</td>
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<td></td>
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<tr>
<td>P₁</td>
<td>95260</td>
<td>106510</td>
<td>107504</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>P₂</td>
<td>95260</td>
<td>111614</td>
<td>114844</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Mean</td>
<td>94635</td>
<td>109131</td>
<td>111962</td>
<td></td>
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</tr>
<tr>
<td>K₀</td>
<td>100312</td>
<td>108958</td>
<td>106823</td>
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<tr>
<td>K₁</td>
<td>103564</td>
<td>103281</td>
<td>100729</td>
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<tr>
<td>K₂</td>
<td>100804</td>
<td>109323</td>
<td>109791</td>
<td></td>
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<tr>
<td>Mean</td>
<td>102760</td>
<td>107187</td>
<td>105781</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C.D. for N marginal means = 5469.972 Kg/ha.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Yield in weight:

(i) 198.7 Q/ha. (ii) 19.4 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of fruits in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>K0</th>
<th>K1</th>
<th>K2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>172.5</td>
<td>205.5</td>
<td>206.8</td>
<td>188.4</td>
<td>202.0</td>
<td>194.3</td>
<td>194.9</td>
</tr>
<tr>
<td>P1</td>
<td>182.4</td>
<td>209.7</td>
<td>224.5</td>
<td>200.1</td>
<td>212.9</td>
<td>205.8</td>
<td>206.3</td>
</tr>
<tr>
<td>P2</td>
<td>184.7</td>
<td>208.4</td>
<td>211.5</td>
<td>194.6</td>
<td>205.6</td>
<td>195.9</td>
<td>198.7</td>
</tr>
<tr>
<td>Mean</td>
<td>179.9</td>
<td>204.8</td>
<td>211.5</td>
<td>194.6</td>
<td>205.6</td>
<td>195.9</td>
<td>198.7</td>
</tr>
</tbody>
</table>

C.D. for N marginal means = 13.5 Q/ha.

Crop <- Banana.

Site <- Banana Res. Stn., Mannuthy.

Object: To study the effect of lime application for banana at different levels of manuring.

1. BASAL CONDITIONS:
   (i) 27.00 Kg. Cowdung and 5400 Kg. of G.L. manure. (ii) Black loam. (iii) Planting single sucker in pits. (iv) Neendran (medium) (v) 22.11.1965. (vi) N.A. (vii) 5400 Kg. G.L. manure applied at the time of planting in the basins at 5 Kg. per plant. (viii) Digging pits. (ix) Nil. (x) Irrigated. (xi) 264.6 cm. (x) October, 1966.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of lime: L0=0, L1=½ Kg./plant and L2=1 Kg./plant.
   (2) 3 levels of fertilizers: M0=0, M1=114 gm. of N + 114 gm. of P + 228 gm. of K per plant applied as (8:8:16) as mixture, and M2=228 gm. of N + 228 gm. of P + 456 gm. of K per plant as (8:8:16).

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 9. (b) 54 m. x 20 m. (iii) 4. (iv) (a) 16 m. x 2m. (b) N.A. (v) One row around each net plot.

4. GENERAL:
   (i) Satisfactory. (ii) Slight stem borer attack-controlled by applying B.H.C. (iii) Number of fruits and weight of bunches. (iv) to (viii) N.A.

5. RESULTS:

Yield in numbers

(i) 107161 fruits/ha. (ii) 10315 fruits/ha. (iii) Main effect of M alone is highly significant. (iv) Av. Banana fruits per/ha.
Crop :- Banana.

Site :- Banana Res. Stn., Trichur.

Type :- ‘M’.

Object :- To study the effect of N, P and K applied singly and in combination on the yield of Banana.

1. BASAL CONDITIONS:
(i) Farmer crop site newly acquired. (ii) Red loam. (iii) Preparatory cultivation by ploughing rounds. (iv) Nendran (medium). (v) Planting pits of size 61cm. x 61 cm. x 61 cm. at 2 em. x 2 em. spacing; 18.10.63; 4.11.1964. (vi) N.A. (vii) 4418 Kg. of F.Y.M. applied at 2·7 Kg/plant in pits, 8100 Kg. of G.L. applied at 5 Kg/plant at the time of planting. (viii) Intercultivation twice and weeding twice. (ix) N.A. (x) Irrigated. (xi) N.A. (xii) 3.9.1964; 25.9.1965.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N : N₀=0, N₁=114 and N₂=228 gm./plant.
(2) 3 levels of P₀=0, P₁=114 and P₂=228 gm./plant.
(3) 3 levels of K₀=0, K₁=228 and K₂=456 gm./plant.

3. DESIGN:
(i) 3² Confé. (ii) 9 plots/block; 9 blocks/replication. (b) 54 cm. x 20 cm. (iii) 2. (iv) (a) 20 m. x 20 m. (b) 6 m. x 2 m. (v) One row around each plot. (vi) Yes.

4. GENERAL:
5. RESULTS:

61(45)

(i) 143.9 Q/ha. (ii) 35.9 Q/ha. (iii) Main effects of N and K are highly significant and interaction N x P x K is significant. (iv) Av. yield of fruits in Q/ha.

<table>
<thead>
<tr>
<th>N</th>
<th>N</th>
<th>N</th>
<th>P</th>
<th>P</th>
<th>P</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>93</td>
<td>123</td>
<td>131</td>
<td>99</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>K2</td>
<td>128</td>
<td>185</td>
<td>170</td>
<td>149</td>
<td>155</td>
<td>179</td>
</tr>
<tr>
<td>K3</td>
<td>132</td>
<td>142</td>
<td>170</td>
<td>137</td>
<td>173</td>
<td>145</td>
</tr>
<tr>
<td>Mean</td>
<td>118</td>
<td>154</td>
<td>159</td>
<td>118</td>
<td>152</td>
<td>150</td>
</tr>
</tbody>
</table>

C.D. for N or K marginal means =24.9 Q/ha.

64(250)

(i) 152.3 Q/ha. (ii) 26.0 Q/ha. (iii) Main effects of N and K are highly significant. (iv) Av. yield of fruits in Q/ha.

<table>
<thead>
<tr>
<th>N</th>
<th>N</th>
<th>N</th>
<th>P</th>
<th>P</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>K1</td>
<td>106</td>
<td>130</td>
<td>135</td>
<td>129</td>
<td>114</td>
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<tr>
<td>K2</td>
<td>142</td>
<td>192</td>
<td>180</td>
<td>169</td>
<td>168</td>
</tr>
<tr>
<td>K3</td>
<td>130</td>
<td>169</td>
<td>181</td>
<td>138</td>
<td>185</td>
</tr>
<tr>
<td>Mean</td>
<td>126</td>
<td>164</td>
<td>165</td>
<td>145</td>
<td>156</td>
</tr>
</tbody>
</table>

C.D. for N or K marginal means=18.0 Q/ha.

Crop: Banana.  Ref: K. 61(38), 64(126).
Site: Banana Res. Stn., Trichur.  Type: ‘M’.
Object: —To find the effect of lime and N, P and K fertilizers on Banana.

1. BASAL CONDITIONS:
(i) Previous year or farmer’s Banana crop was there and information about manuring is N.A. (ii) Red loam. (iii) 2 ploughings as preparatory cultivation. Digging pits of 6 cm. cube. Planting of one sucker (medium size)/pit. (iv) Nelidran (medium). (v) 30, 31.10.1963. One sucker (medium size) was planted per pit with spacing 2 m x 2 m., 11.11.1964. (vi) N.A. (vii) 2.7 Kg/plant of F.Y.M.+5 Kg/plant of G.L. (viii) Inter-cultivations and weeding twice. Earthing up basins just before commencement of monsoon. (ix) N.A. (x) Irrigated. (xi) N.A. (xii) 10.9.1964 onwards; 27.9.1965.
2. TREATMENTS:

All combinations of (1) and (2)
(1) 3 levels of lime: $L_0 = 0, L_1 = 0.5$ and $L_2 = 1$ Kg/plant.
(2) 3 levels of manures: $M_0 = 0, M_1 = 114$ gm/tree of $N + 114$ gm/tree of $P_2O_5 + 228$ gm/tree of $K_2O$ and $M_2 = 2 M_1$.

3. DESIGN:

(i) Fact. in R.B.D. (ii) 9. (b) 54 m. $\times$ 20 m. (iii) 4. (iv) 30 m. $\times$ 6 m. (net) (v) 2 m. $\times$ 2 m. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Leaf eating caterpillars really seen were controlled by spraying Endrin. Incidence of Kokkar disease. Endrin sprayed twice to control insect vector. (iii) Yield and number of fruits. (i) (a) 1963—contd. (b) Yes. (c) Nil. (v) to (viii) Nil.

5. RESULTS:

63(38)
Fruit yield.

(i) 167.9 Q/ha. (ii) 30.9 Q/ha. (iii) Main effect of $M$ alone is highly significant. (iv) Av. yield of fruits in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>$L_0$</th>
<th>$L_1$</th>
<th>$L_2$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M_0$</td>
<td>116.6</td>
<td>132.5</td>
<td>117.2</td>
<td>122.1</td>
</tr>
<tr>
<td>$M_1$</td>
<td>187.5</td>
<td>177.2</td>
<td>195.3</td>
<td>186.7</td>
</tr>
<tr>
<td>$M_2$</td>
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<td>208.8</td>
<td>195.0</td>
</tr>
<tr>
<td>Mean</td>
<td>161.8</td>
<td>168.2</td>
<td>173.8</td>
<td>167.9</td>
</tr>
</tbody>
</table>

C.D. for $M$ marginal means=26.0 Q/ha.

Number of fruits.

(i) 94479 fruits/ha. (ii) 12500 fruits/ha. (iii) Main effect of $M$ alone is highly significant. (iv) Av. number of fruits/ha.

<table>
<thead>
<tr>
<th></th>
<th>$L_0$</th>
<th>$L_1$</th>
<th>$L_2$</th>
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</tr>
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<tr>
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<td>$M_1$</td>
<td>100312</td>
<td>96250</td>
<td>100000</td>
<td>98584</td>
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<td>$M_2$</td>
<td>107500</td>
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<td>106875</td>
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<td>Mean</td>
<td>93333</td>
<td>95000</td>
<td>95104</td>
<td>94479</td>
</tr>
</tbody>
</table>

C.D. for $M$ marginal means=10532 fruits/ha.

64(126)
Fruit yield.

(i) 163.7 Q/ha. (ii) 19.5 Q/ha. (iii) Main effect of $M$ is highly significant and that of $L$ is significant. (iv) Av. yield of fruits in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>$L_0$</th>
<th>$L_1$</th>
<th>$L_2$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M_0$</td>
<td>131.2</td>
<td>111.8</td>
<td>133.0</td>
<td>125.3</td>
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<tr>
<td>$M_1$</td>
<td>161.8</td>
<td>170.9</td>
<td>200.0</td>
<td>177.6</td>
</tr>
<tr>
<td>$M_2$</td>
<td>174.1</td>
<td>192.4</td>
<td>198.3</td>
<td>188.3</td>
</tr>
<tr>
<td>Mean</td>
<td>155.7</td>
<td>158.4</td>
<td>177.1</td>
<td>163.7</td>
</tr>
</tbody>
</table>

C.D. for $M$ or $L$ marginal means=16.4 Q/ha.
Crop :- Banana.  
Site :- Banana Res. Stn., Trichur.  
Ref :- K. 63(42), 64(165).  
Type :- 'M'.

Object :- To study the effect of N, P and K on Banana.

1. BASAL CONDITIONS :
(i) 1.8 Kg/plant of Cowdung + 5 Kg/plant of G.L. was given to previous Banana crop at the time of planting. 
(ii) Red loam. (iii) N.A.  
(iv) Neendran (medium).  
v) One sucker (medium size) per pit of 60 em. cube was planted on 18.10.63 for 63(42); 4.11.64 for 64(165).  
(vi) N.A.  
vii) 2'7 Kg/plant of F.Y.M. + 5 Kg/plant of G.L. for 63(42); 3 Kg/plant of G.M. for 64(165). (viii) 2 interculturings 2 weedings and earthing.  
(ix) N.A.  
x) Irrigated.  
(xi) N.A.; 222 cm.  
(xii) 3.9.64; 25.9.65.

2. TREATMENTS :
All combinations of (1), (2) and (3)
(1) 3 levels of N : N0 =0, N1 =144 and N2 =228 gm/plant.
(2) 3 levels of P0 : P0 =0, P1 =114 and P2 =228 gm/plant.
(3) 3 levels of K0 : K0 =0, K1 =228 and K2 =455 gm/plant.

3. DESIGN :
(i) 3 factorial confd. 
(ii) 9 plots/block; 3 blocks/repllication.  
(b) 54 cm. x 20 cm.  
(iii) 2. 
(iv) (a) 16 m. x 2 m.  
(b) 20 m. x 6 m.  
(v) 2 m. x 2 m.

4. GENERAL :
(i) Normal.  
(ii) Sporadic attack of leaf eating catter pillar and incidence of kokkan disease for 63(42) controlled by spraying Endrin. Incidence of kokkan disease for 64(165). Endrin and Fytolan were sprayed.  
(iii) Number and weight of fruits.  
(iv) 1963—contd.  
(v) to (viii) N.A.

5. RESULTS:

Yield of fruits
(i) 143.9 Q/ha. (ii) 35.9 Q/ha. (iii) Main effects of N and K are highly significant and interaction N x P x K is significant. (iv) Av. yield of fruits in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>123.9</td>
<td>131.8</td>
<td>116.4</td>
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<tr>
<td>K1</td>
<td>128.3</td>
<td>185.3</td>
<td>170.9</td>
<td>155.7</td>
</tr>
<tr>
<td>K2</td>
<td>132.2</td>
<td>154.1</td>
<td>174.7</td>
<td>153.8</td>
</tr>
<tr>
<td>Mean</td>
<td>118.1</td>
<td>154.4</td>
<td>159.1</td>
<td>143.9</td>
</tr>
</tbody>
</table>

C.D. for N or K marginal means = 24.8 Q/ha.

C.D. for M or L marginal means = 8889 fruits/ha.
Number of fruits

(i) 88125 fruits/ha. (ii) 18766 fruits/ha. (iii) Main effect of N alone is highly significant. (iv) Av. no. of fruits/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>Mean</th>
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</thead>
<tbody>
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<td>83125</td>
</tr>
<tr>
<td>Mean</td>
<td>77396</td>
<td>88125</td>
<td>98854</td>
<td>83229</td>
</tr>
</tbody>
</table>

C.D. for N marginal means=12972 Q/ha.

Yield of fruits

(i) 152.3 Q/ha. (ii) 26.0 Q/ha. (iii) Main effects of N and K are highly significant. (iv) Av. yield of fruits in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>Mean</th>
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</thead>
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<td>92500</td>
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<td>P₁</td>
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<td>102812</td>
<td>87188</td>
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<td>P₂</td>
<td>76250</td>
<td>83125</td>
<td>101250</td>
<td>82396</td>
</tr>
</tbody>
</table>

C.D. for N or K marginal means=18.0 Q/ha.

Number of fruits

(i) 92928 fruits/ha. (ii) 13368 fruits/ha. (iii) Main effects of N and K and interaction N x P x K are highly significant. Main effect of P is significant. (iv) Av. number of fruits/ha.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>Mean</th>
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</thead>
<tbody>
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<td>K₁</td>
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<td>103437</td>
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</tr>
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<td>K₂</td>
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<td>81753</td>
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<td>86094</td>
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</table>

C.D. for N, K or P marginal means=92.4 Q/ha.
Crop :- Banana.  
Site :- Banana Res. Stn., Mannuthy.  
Object :- To ascertain the best season for planting Banana.

1. BASAL CONDITIONS:
   (i) Previous banana crop was manured with 6·8 Kg/plant of G.L., + 6·8 Kg/plant of F.Y.M., + 1·8 Kg/plant of (8 : 8 : 16) fertilizer mixture. (ii) Laterite and loam. (iii) N.A. (iv) Nendran (medium). (v) Planting in pits of size 60 cm. cube as per treatments. (vi) N.A. (vii) 6·8 Kg/plant of G.L., + 6·8 Kg/plant of F.Y.M. at planting and 1·8 Kg/plant of (8 : 8 : 16) fertilizer mixture later. (viii) Interculturing, weeding and earthing up. (ix) N.A. (x) Irrigated. (xi) N.A. (xii) May, 62 onwards.

2. TREATMENTS:
   3 seasons of planting: S1 = May to June, S2 = August to September and S3 = October to November.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) 36·6 m. x 12·2 m. (iii) 8. (iv) (a) 7·3 m. x 7·3 m. (9 plants). (b) 12·2 m. x 12·2 m. (25 plants). (v) 2·4 m. x 2·4 m.

4. GENERAL:
   (i) Satisfactory. (ii) Incidence of kokkan disease. (iii) Number and weight of fruits. (iv) No. (v) Trichur. (vi) to (viii) Nil.

5. RESULTS:
   (i) 120·9 Q/ha. (ii) 14 0 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of fruits in Q/ha.

   Treatment   | S1  | S2  | S3  
-------------|-----|-----|-----
Av. yield    | 139·6 | 117·8 | 105·3 
C.D. = 15·0 Q/ha.

Crop :- Banana.  
Site :- Banana Res. Stn., Trichur.  
Object :- To ascertain the best season for planting Banana.

1. BASAL CONDITIONS:
   (i) Fallow land for 63(34); 1·8 Kg/plant of Cowdung + 5 Kg/plant of G.L. at planting and 2 Kg/plant of 8 : 8 : 16 mixture later were given to previous banana crop for 64(124). (ii) Red loam. (iii) N.A. (iv) Nendran (medium). (v) Planting of suckers (medium size) in pits of 60 cm. cube as per treatments with spacing 2·4 m. x 2·4 m. (vi) N.A. (vii) 2·7 Kg/plant of F.Y.M., + 5 Kg/plant of G.L. for 63(34); 5 Kg/plant of G.L. for 64(124). (viii) 2 interculturings, 2 weeding and 1 earthing. (ix) N.A. (x) Irrigated. (xi) N.A.; 222 cm. (xii) 19·664 ; 3, 22·9·64 ; 14·6 65; 6.8.65 ; 3.9.65.

2. TREATMENTS:
   3 seasons of planting: S1 = May to June, S2 = August to September and S3 = October to November.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) 36·6 m. x 12·2 m. (iii) 8. (iv) Gross : 12·2 m. x 12·2 m. (25 plants). Net : 7·3 m. x 7·3 m. (9 plants). (v) 2·4 m. x 2·4 m. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Sporadic attack of leaf eating caterpillar and incidence of kokkan for 63(34) was controlled by spraying Endrin. Incidence of kokkan for 64(124). (iii) Number and weight of fruits. (iv) (a) 1962—64. (b) and (c) Nil. (v) to (viii) Nil.
5. RESULTS:

63 (34)

Weight of fruits

(i) 120·1 Q/ha. (ii) 17·4 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of fruit in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>102·6</td>
<td>123·3</td>
<td>134·4</td>
</tr>
</tbody>
</table>

C.D. = 18·7 Q/ha.

Number of fruits

(i) 68669 fruits/ha. (ii) 6344 fruits/ha. (iii) Treatment differences are highly significant. (iv) Av. number of fruits/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>61391</td>
<td>69602</td>
<td>75013</td>
</tr>
</tbody>
</table>

C.D. = 6804 fruits/ha.

64/12

Weight of fruits

(i) 126·6 Q/ha. (ii) 8·8 Q/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of fruit in Q/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>106·8</td>
<td>148·8</td>
<td>142·3</td>
</tr>
</tbody>
</table>

C.D. = 9·4 Q/ha.

Number of fruits

(i) 71533 fruits/ha. (ii) 5372 fruits/ha. (iii) Treatment differences are highly significant. (iv) Av. number of fruits/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>71533</td>
<td>79187</td>
<td>78346</td>
</tr>
</tbody>
</table>

C.D. = 5761 fruits/ha.

Crop :- Banana.  
Ref :- K. 64(182).  
Site :- Banana Res. Sta., Mananthwy.  
Type :- 'CM'.

Object :- To find out optimum manuriial dose and plant population of Banana.

1. BASAL CONDITIONS:

(i) 25 Kg. Cowdung and 5 Kg. G.L. manure per plant. (ii) Black loam. (iii) Nil. (iv) Nendran (medium). (v) 5·11·64. (vi) N.A. (vii) Nil. (viii) Interculture and weeding. (ix) N.A. (x) Irrigated. (xi) 264·6 cm. (xii) N.A.

2. TREATMENTS:

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

(1) 2 spacings : S_1 =2·0 m. x 2·0 m. and S_2 =2·5 m. x 2·5 m.
(2) 2 number of plants per plot : N_1 =1 and N_2 =2.
(3) 2 manuriial treatments : M_1 =114 gm./plant of N+114 gm./plant of P+228 Kg/plant of L and M_2 =2 M_1.
3. DESIGN:
(i) Fallow land. (ii) (a) 36 m x 30 m (maximum). (iii) 4. (iv) (a) For S1, 12 m x 8 m, for S2, 15 m x 10 m. (b) For S3, 8 m x 4 m, for S4, 10 m x 5 m. (v) 1 row around each net plot. (vi) Yes.

4. GENERAL:
(i) Not very healthy since ratoon. (ii) Rhizome borer attack controlled by BHC application. (iii) Number of fruits and weight of bunches. (iv) 1964—only. (v) to (viii) N.A.

5. RESULTS:

Yield of fruits
(i) 171.1 Q/ha. (ii) 26.1 Q/ha. (iii) Main effects of N, S, and M are significant. (iv) Av. yield of fruit in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>M1</th>
<th>M2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>216.5</td>
<td>205.2</td>
</tr>
<tr>
<td>S2</td>
<td>100.6</td>
<td>173.3</td>
<td>127.1</td>
<td>146.7</td>
<td>136.9</td>
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<tr>
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<td>126.2</td>
<td>216.2</td>
<td>160.5</td>
<td>181.6</td>
<td>171.1</td>
</tr>
</tbody>
</table>

C.D. for N, S, or M marginal means = 19.2 Q/ha.

Number of fruits
(i) 95057 No./ha. (ii) 14452 No./ha. (iii) Main effects of N and S are significant. (iv) Av. number of fruits in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>M1</th>
<th>M2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>107000</td>
<td>123125</td>
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<tr>
<td>S2</td>
<td>54950</td>
<td>95150</td>
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<tr>
<td>Mean</td>
<td>69075</td>
<td>121038</td>
<td>88500</td>
<td>101613</td>
<td>95057</td>
</tr>
</tbody>
</table>

C.D. for N or S marginal means = 10626 fruits/ha.

Crop: Banana. Ref: K. 63(40).
Site: Banana Res. Stn., Trichur. Type: 'CM'.

Object: To study the comparative merits of suckers of different sizes under fresh and dry conditions.

1. BASAL CONDITIONS:
2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 sizes of suckers: S1 = Large (35 to 45 cm. girth), S2 = Medium (25 to 35 cm. girth) and S3 = Small (15 to 25 cm. girth).
(2) 2 types of suckers: T1 = Fresh suckers at collar and T2 = Dried suckers dipped in cowdung emulsion, dried and stored for 15 days.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 6. (b) 22 m. x 20 m. (iii) 6. (iv) (a) 8 m. x 4 m. (b) 12 m. x 8 m. (v) 2 m. x 2 m. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Sporadic attack of leaf eating caterpillar in the early stages of growth was controlled by spraying Endrin. (iii) Number and weight of fruits. (iv) to (viii) Nil.

5. RESULTS:
Weight of fruits
(i) 213.0 Q/ha. (ii) 22.2 Q/ha. (iii) Main effects of T and S are significant. (iv) Av. yield of fruit in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
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</tr>
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<tbody>
<tr>
<td>T1</td>
<td>226.2</td>
<td>191.9</td>
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<td>202.6</td>
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<td>T2</td>
<td>240.9</td>
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<td>233.6</td>
<td>204.8</td>
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</table>

C.D. for T marginal means=15.2 Q/ha.
C.D. for S marginal means=18.7 Q/ha.

Number of fruits
(i) 116875 fruits/ha. (ii) 9688 fruits/ha. (iii) Main effect of T alone is significant. (iv) Av. number of fruits/ha.

<table>
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<tr>
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<td>116875</td>
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C.D. for T marginal means=6652.3 No./ha.

Crop: Banana.
Site: Banana Res. Stn., Trichur.
Object: To study the effect of cultural and manurial treatments on Banana crop.

1. BASAL CONDITIONS:
2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 2 spacings: \( S_1 = 2 m \times 2 m \) and \( S_2 = 2.5 m \times 2.5 m \).
(2) 2 follower types: \( C_1 \) = Single follower and \( C_2 \) = Double follower.
(3) 2 levels of manure: \( M_1 = 114 gm/plant \) of \( P_{2}O_{5} + 228 gm/plant \) of \( K_{2}O \) and \( M_2 = 2M_1 \).

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 8, (b) 36 m. x 30 m. (iii) 4, (iv) (a) 8 m. x 4 m. for \( S_1 \); 10 m. x 5 m. for \( S_2 \), (b) 12 m. x 8 m. for \( S_1 \); 15 m. x 10 m. for \( S_2 \) (v) One row placed each plot. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Incidence of kokkan. Endrin and Fyto'an sprayed. (iii) Weight and number of fruits. (iv) 1964—only. (v) to (viii) N.A.

5. RESULTS:
Number of fruits
(i) 91044. (ii) 3972. (iii) Main effects of \( S \) and \( M \) are significant. (iv) Av. number of fruits/ha.

<table>
<thead>
<tr>
<th></th>
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<th>( M_1 )</th>
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<td>( C_2 )</td>
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<td>( M_2 )</td>
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</table>

C.D. for \( S \) or \( M \) marginal means = 2920.9 fruits/ha.

Yield of fruits
(i) 169.8 Q/ha. (ii) 77 Q/ha. (iii) Main effects of \( S \) and \( M \) are significant. (iv) Av. yield of fruit in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>( S_1 )</th>
<th>( S_2 )</th>
<th>( M_1 )</th>
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C.D. for \( S \) or \( M \) marginal means = 5.6 Q/ha.

Crop: Pineapple.
Ref: K. 63(145), 64(186).
Site: Banana and Pineapple Res. Sta., Kannara, Type ‘M’.
Trichur Dist.

Object: To find out optimum cultivation of major nutrients (N, P and K).

1. BASAL CONDITIONS:
(xi) N.A. (xii) Continuous harvest.
2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N : N<sub>1</sub>=0, N<sub>2</sub>=80, N<sub>3</sub>=160 kg/ha.
(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>1</sub>=0, P<sub>2</sub>=40, P<sub>3</sub>=80 kg/ha.
(3) 3 levels of K<sub>2</sub>O : K<sub>1</sub>=0, K<sub>2</sub>=80, K<sub>3</sub>=240 kg/ha.

3. DESIGN:
(i) 3<sup>3</sup> Conf. fact. (ii) 9. (b) 21·6 m x 21·6 m. (iii) 2. (iv) (a) 7·2 m x 6·4 m. (b) 108 suckers.
(v) Nil. (vi) Yes.

4. GENERAL:

5. RESULTS:
63(145)
Number of fruits
(i) 8986 fruits/ha. (ii) 1837 fruits/ha. (iii) Main effects of N and K are highly significant. (iv) Av. number of fruits/ha.

<table>
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<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
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</table>

C.D. for N or K marginal means=1250 fruits/ha.

Yield of fruits
(i) 105·2 Q/ha. (ii) 29·9 Q/ha. (iii) Main effects of N and K are highly significant. (iv) Av. yield of fruit in Q/ha.

<table>
<thead>
<tr>
<th></th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
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<td>130·2</td>
<td>126·1</td>
<td>77·6</td>
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</table>

C.D. for N or K marginal means=20·3 Q/ha.

64(186)
Number of fruits
(i) 16521 fruits/ha. (ii) 4994 fruits/ha. (iii) Main effect of N is significant. (iv) Av. number of fruits/ha.
Yield of fruits
(i) 193·8 Q/ha. (ii) 74·4 Q/ha. (iii) Main effect of N is highly significant. (iv) Av. yield of fruit in Q/ha.

<table>
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</table>

C.D. for N marginal means=3398·9 fruits/ha.

Crop :- Pineapple.  
Ref :- K. 63(85), 64(183).  
Site :- Banana and Pineapple Res. Stn., Kannara.  
Type :- 'M'.  
Object :- To find out the effect of liming and optimum dose of fertilizers.

1. BASEAL CONDITIONS:
(i) N.A. (ii) Black loam. (iii) Planting in double rows in trenches. (iv) Kew. (v) 6, 7, 13 and 14.11.63 for 63(85); 6, 7.10.64; spacing 40 cm.×50 cm. (vi) N.A. (vii) Cowdung at 100 Q/ha. (viii) Weeding and earthing up twice. (ix) Nil. (x) Unirrigated. (xi) N.A. (xii) Continuous harvest.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 levels of lime: L₄=No lime, L₁=600 and L₃=1200 Kg/ha. of basal dose.
(2) 3 levels of manure: M₄=No manure, M₁=700 and M₃=1400 Kg/ha. of fertilizers mixture as basal dose.
Lime applied before planting and fertilizer mixture in two split doses.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 9. (b) 43·2 m.×16 m. (iii) 4. (iv) (a) 16 m.×4·8 m. (b) Net plot size 15·2 m.×4·8 m. (v) Nil. (vi) Yes.
4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Number of fruits and yield. (iv) 1963—70 (1965—N.A.) (v) to (viii) Nil.

5. RESULTS:

63(85)
Number of fruits
(i) 6320 fruits/ha. (ii) 1445 fruits/ha. (iii) None of the effects is significant. (iv) Av. number of fruits/ha.

<table>
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Yield of fruits
(i) 5951 Kg/ha. (ii) 1573.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of fruit in Kg/ha.

<table>
<thead>
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<th>M₂</th>
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64(183)
Number of fruits
(i) 3750 fruits/ha. (ii) 1524 fruits/ha. (iii) Main effect of L and interaction L×M are significant. (iv) Av. number of fruits/ha.

<table>
<thead>
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<th>M₃</th>
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</table>

C.D. for L marginal means = 1284.0 fruits/ha.
C.D. for means in the body of the table = 2224.2 fruits/ha.

Yield of fruits
(i) 3474 Kg/ha. (ii) 1474 Kg/ha. (iii) Main effect of L is significant and that of M is highly significant. (iv) Av. yield of fruit in Kg/ha.

<table>
<thead>
<tr>
<th></th>
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<th>M₂</th>
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C.D. for L or M marginal means = 1242.0 Kg/ha.
Crop :- pineapple.
Site :- Banana and Pineapple Res. Stn., Kannara.
Object :- To find out optimum spacing and best level of fertilizers.

1. BASAL CONDITIONS:
(i) (a) N.A. (ii) Black loam. (iii) Planting in double rows in trenches. (iv) Kew. (v) 17 kg 20.9 63, 23, 24, 25.9 63; 10, 11.8 64. Spacings as per treatments. (vi) and (vii) N.A. (viii) Weeding and earthing up twice. (ix) Nil. (x) Unirrigated. (a) N.A. (xii) Continuous.

2. TREATMENTS:
Main-plot treatments:
3 spacings: S1 = 45 cm. x 60 cm., S2 = 37 cm. x 53 cm. and S3 = 30 cm. x 46 cm.
Sub-plot treatments:
2 manurial levels:
M1 = 50 Kg/ha. of N+25 Kg/ha. of P2O5 +100 Kg/ha. of K2O and M2 = 100 Kg/ha. of N+50 Kg/ha. of P2O5 +200 Kg/ha. of K2O.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 2 sub-plots/main-plot. (b) 19'8 m. x 6'1 m. for S1, 19'5 m. x 6'1 m. for S2, 19'2 m. x 6'1 m. for S3. (iii) 6. (iv) (a) 6'1 m. x 9'9 m. for S2, 6'1 m. x 9'9 m. for S3, 6'1 m. x 9'6 m. for S1. (b) 6'1 m. x 9'0 m. (v) Nil. (vi) Yes.

4. GENERAL:

5. RESULTS:

63(87)
Number of fruits
(i) 5351 fruits/ha. (ii) (a) 1441'3 fruits/ha. (b) 1727'8 fruits/ha. (iii) None of the effects is significant. (iv) Av. number of fruits/ha.

<table>
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<tr>
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</table>

Yield of fruits
(i) 4023 Kg/ha. (ii) (a) 912'2 Kg/ha. (b) 1549'0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of fruit in Kg/ha.

<table>
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<td>M2</td>
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<td>4470</td>
<td>4178</td>
<td>4433</td>
</tr>
<tr>
<td>Mean</td>
<td>4014</td>
<td>4269</td>
<td>3786</td>
<td>4023</td>
</tr>
</tbody>
</table>

64(178)
Number of fruits
(i) 6141 fruits/ha. (ii) (a) 2671'1 fruits/ha. (b) 1751'5 fruits/ha. (iii) None of the effects is significant. (iv) Av. number of fruits/ha.
Object:—To determine the optimum dose of C.M. for Eucalyptus Citriodore.

1. BASAL CONDITIONS:
   (i) Virgin land. (ii) Red loam. (iii) Raised from seeds. (iv) Eucalyptus Citriodore. (v) July 1959 at a spacing of 4·6 m. x 4·6 m. (vi) One year. (vii) Nil. (viii) Sickle weeding and cleaning the basins of the plants. (ix) Nil. (x) Unirrigated. (xi) 143 cm. for 63(49), 209 cm. for 64(157). (xii) N.A.

2. TREATMENTS:
   4 levels of C.M.: \(N_0=0, N_1=22·4, N_2=33·6\) and \(N_4=44·8\) Kg/plant.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 4. (v) and (vi) Yes.

4. GENERAL:

5. RESULTS:
   63(49)
   Leaf yield
   (i) 30·7 Kg/plot. (ii) 11·9 Kg/plot. (iii) Treatment differences are significant. (iv) Av. yield of leaf in Kg/plot.

   Treatment  \(N_0\)  \(N_1\)  \(N_2\)  \(N_4\)
   Av. yield  30·7  43·3  45·1  63·6
   C.D. = 14·6 Kg/plot

   Oil content
   (i) 0·752 litres/plot. (ii) 0·166 litres/plot. (iii) Treatment differences are significant. (iv) Av. yield of oil in litres/plot.
Treatment

<table>
<thead>
<tr>
<th>N_0</th>
<th>N_1</th>
<th>N_4</th>
<th>N_6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>0.781</td>
<td>0.634</td>
<td>0.660</td>
</tr>
</tbody>
</table>

C.D. = 0.204 litres/plot

Leaf yield

(i) 57.2 Kg/plot. (ii) 10.4 Kg/plot. (iii) Treatment differences are highly significant. (iv) Av. yield of leaf in Kg/plot.

Treatment

<table>
<thead>
<tr>
<th>N_0</th>
<th>N_1</th>
<th>N_4</th>
<th>N_6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>51.2</td>
<td>46.3</td>
<td>51.9</td>
</tr>
</tbody>
</table>

C.D. = 12.8 Kg/plot

Oil content

(i) 0.724 litres/plot. (ii) 0.154 litres/plot. (iii) Treatment differences are not significant. (iv) Av. yield of oil in litre/plot.

Treatment

<table>
<thead>
<tr>
<th>N_0</th>
<th>N_1</th>
<th>N_4</th>
<th>N_6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>0.810</td>
<td>0.592</td>
<td>0.717</td>
</tr>
</tbody>
</table>

---

**Crop :- Eucalyptus.**

**Site :- Agri. Res. Stn., Ambalavayal.**

**Object :- To determine the height at which the trees should be maintained to obtain maximum yield.**

1. **BASEL CONDITIONS :**


2. **TREATMENTS :**

   6 heights for topping: L_1 = 1.5 m, L_2 = 3.0 m, L_3 = 4.6 m, L_4 = 5.1 m, L_5 = 7.6 m, and L_6 = 9.1 m.

3. **DESIGN :**

   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 2. (v) N.A. (vi) Yes.

4. **GENERAL :**

   (i) Good. (ii) Nil. (iii) Leaf and oil yield. (iv) 1963 only. (v) and (vi) N.A. (vii) and (viii) Nil.

5. **RESULTS :**

**Leaf yield**

(i) 15.2 Kg/plot. (ii) 7.8 Kg/plot. (iii) Treatment differences are highly significant. (iv) Av. yield of leaf in Kg/plot.

Treatment

<table>
<thead>
<tr>
<th>L_1</th>
<th>L_2</th>
<th>L_3</th>
<th>L_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>7.1</td>
<td>10.5</td>
<td>13.8</td>
</tr>
</tbody>
</table>

C.D. = 5.0 Kg/plot

**Oil content**

(i) 0.175 litre/plot. (ii) 0.061 litre/plot. (iii) Treatment differences are highly significant. (iv) Av. yield of oil in litre/plot.

Treatment

<table>
<thead>
<tr>
<th>L_1</th>
<th>L_2</th>
<th>L_3</th>
<th>L_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>0.060</td>
<td>0.139</td>
<td>0.150</td>
</tr>
</tbody>
</table>

C.D. = 0.080 litre/plot
Crop : Eucalyptus.


Ref : K. 63(47), 64(159).

Type : "C".

Object : To determine the optimum interval for pruning of Eucalyptus for obtaining maximum oil yield.

1. BASAL CONDITIONS :
   (i) Virgin land.  (ii) Red loam.  (iii) Raised from seeds.  (iv) Eucalyptus Citriodora.  (v) 21.8.58 at a spacing of 4.6 m x 4.6 m.  (vi) 1 year.  (vii) Nil.  (viii) Sickle weeding and cleaning the basins of the plants.  (ix) Nil.  (x) Unirrigated.  (xi) 143 cm.; 209 cm.  (xii) N.A.

2. TREATMENTS :
   10 intervals of pruning : 1,=3, I,=4, I,=5, I,=6, I,=7, I,=8, I,=9, I,=10, I,=11 and I,=12 months.

3. DESIGN :
   (i) R.B.D.  (ii) (a) 10.  (b) N.A.  (iii) 5.  (iv) (a) N.A.  (b) 4.  (v) N.A.  (vi) Yes.

4. GENERAL :
   (i) Good.  (ii) Nil.  (iii) Leaf and oil yield.  (iv) 1963—64.  (v) to (vii) Nil.  (viii) Expt. for 1962—N.A.

5. RESULTS :

63(47)

Leaf yield
   (i) 39.1 Kg/plot.  (ii) 12.0 Kg/plot.  (iii) Treatment differences are highly significant.  (iv) Av. yield of leaf in Kg/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I,</th>
<th>I,</th>
<th>I,</th>
<th>I,</th>
<th>I,</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>28.1</td>
<td>32.2</td>
<td>38.4</td>
<td>53.0</td>
<td>23.7</td>
</tr>
<tr>
<td></td>
<td>1,</td>
<td>I,</td>
<td>I,</td>
<td>I,</td>
<td>I,</td>
</tr>
<tr>
<td></td>
<td>40.4</td>
<td>44.3</td>
<td>28.8</td>
<td>53.4</td>
<td>48.6</td>
</tr>
<tr>
<td>C.D.</td>
<td>15.4 Kg/plot.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Oil contents
   (i) 0.480 litre/plot.  (ii) 0.144 litre/plot.  (iii) Treatment differences are highly significant.  (iv) Av. yield of oil in litre/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>I,</th>
<th>I,</th>
<th>I,</th>
<th>I,</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>0.270</td>
<td>0.358</td>
<td>0.514</td>
<td>0.699</td>
<td>0.369</td>
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<tr>
<td>I,</td>
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<td>I,</td>
<td>I,</td>
<td>I,</td>
<td>I,</td>
</tr>
<tr>
<td></td>
<td>0.435</td>
<td>0.469</td>
<td>0.378</td>
<td>0.722</td>
<td>0.591</td>
</tr>
<tr>
<td>C.D.</td>
<td>0.184 litre/plot.</td>
<td></td>
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</tbody>
</table>

64(159)

Leaf yield
   (i) 80.7 Kg/plot.  (ii) 23.8 Kg/plot.  (iii) Treatment differences are highly significant.  (iv) Av. yield of leaf in Kg/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I,</th>
<th>I,</th>
<th>I,</th>
<th>I,</th>
<th>I,</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>40.0</td>
<td>76.3</td>
<td>55.7</td>
<td>96.7</td>
<td>75.6</td>
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<td>I,</td>
<td>I,</td>
<td>I,</td>
<td>I,</td>
<td>I,</td>
<td>I,</td>
</tr>
<tr>
<td></td>
<td>119.8</td>
<td>84.5</td>
<td>53.3</td>
<td>97.2</td>
<td>107.6</td>
</tr>
<tr>
<td>C.D.</td>
<td>30.4 Kg/plot.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Oil contents
   (i) 1.001 litre/plot.  (ii) 0.295 litre/plot.  (iii) Treatment differences are highly significant.  (iv) Av. yield of oil in litre/ha.
Crop :- Coffee.
Site :- Coffee Demons. Farm, Kalpetta.
Type :- 'M'.

Object :- To study the effect of dose and time of application of N, P and K on Coffee.

1. **BASAL CONDITIONS**:

2. **TREATMENT**:
   **Main-plot treatments**:
   5 levels of N, P and K in Kg/ha. :
   - M1 = 60 N + 30 P + 40 K
   - M1 = 100 N + 60 P + 80 K
   - M1 = 140 N + 120 P + 180 K
   - M1 = 180 N + 120 P + 220 K
   - M1 = 220 N + 150 P + 200 K

   **Sub-plot treatments**:
   3 numbers of application :
   - T1 = Twice in a year (pre-monsoon and post-monsoon)
   - T2 = 3 applications in a year (pre-blossom, pre-monsoon and post-monsoon)
   - T3 = Four applications in a year (pre-blossom, pre-monsoon, monsoon break and post-monsoon)

3. **DESIGN**:
   (i) Split-plot. (ii) (a) 5 main-plots/replication and 3 sub-plots/lin plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) Gross : 144, Net : 36. (v) and (vi) Yes.

4. **GENERAL**:

5. **RESULTS**:

   **64(85)**
   (i) 34.4 Kg/plot. (ii) (a) 17.6 Kg/plot. (b) 13.3 Kg/plot. (iii) Interaction M×T is significant. (iv) Av. yield of Coffee seeds in Kg/plot.

<table>
<thead>
<tr>
<th></th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>39.6</td>
<td>39.5</td>
<td>36.1</td>
<td>28.2</td>
<td>36.2</td>
<td>35.9</td>
</tr>
<tr>
<td>T2</td>
<td>34.6</td>
<td>28.5</td>
<td>40.2</td>
<td>47.4</td>
<td>17.9</td>
<td>35.0</td>
</tr>
<tr>
<td>T3</td>
<td>24.9</td>
<td>37.6</td>
<td>24.2</td>
<td>41.5</td>
<td>39.9</td>
<td>32.2</td>
</tr>
<tr>
<td>Mean</td>
<td>33.0</td>
<td>32.9</td>
<td>35.5</td>
<td>39.2</td>
<td>31.3</td>
<td>34.4</td>
</tr>
</tbody>
</table>

   C.D. for T means at the same level of M =19.2 Kg/plot.
   C.D. for M means at the same level of T =22.1 Kg/plot.

   **65(86)**
   (i) 13.7 Kg/plot. (ii) (a) 10.0 Kg/plot. (b) 6.52 Kg/plot. (iii) None of the effects is significant. (iv) Av. yield of coffee seeds in Kg/plot.
Crop: Coffee.  
Site: Chellote Estate, Kalpetta.  

Object: To study the effects of manuring on Coffee.

1. BASAL CONDITIONS:
   (i) N.A.  
   (ii) Reddish coloured latosol.  
   (iii) By seedlings.  
   (iv) Robusta.  
   (v) Square method of planting at 3 m. x 3 m. spacings.  
   (vi) N.A.  
   (vii) Nil.  
   (viii) Weeding, shade regulations, soil cultivation and desuckering.  
   (ix) Nil.  
   (x) Unirrigated.  
   (xi) 485 cm.; 518 cm.  
   (xii) January to March.

2. TREATMENTS:
   Main plot treatments:  
   4 levels of N: N\(_1\) = 45, N\(_2\) = 67, N\(_3\) = 90 and N\(_4\) = 112 Kg/ha.

   Sub-plot treatments:  
   4 methods of application of manures:  
   M\(_1\) = N applied in two equal doses once in the pre-blossom and once in the post-blossom period,  
   M\(_2\) = N applied in 3 equal doses once in pre-blossom, once in pre-monsoon and once in post-monsoon period,  
   M\(_3\) = M\(_1\) + 34 Kg/ha. of P\(_2\)O\(_5\) applied in 2 doses, once in pre-blossom and once in post-blossom season and M\(_4\) = M\(_1\) + 45 Kg/ha. of K\(_2\)O applied in 2 equal doses, once in the pre-blossom and once in post-blossom season. N applied as A/S, P\(_2\)O\(_5\) as Rock Phos. and K\(_2\)O as Mur. Pot.

3. DESIGN:
   (i) Split-plot.  
   (ii) (a) 4 main-plots/replication; 4 sub-plots/main-plot.  
   (b) N.A. (iv) (a) N.A.  
   (b) Gross-42, Net-24.  
   (v) One row all around.  
   (vi) Yes.

4. GENERAL:
   (i) Fair.  
   (iii) Yield of coffee seeds.  
   (v) At several places.  
   (vi) to (viii) Nil.

5. RESULTS:
   Ref: K. 60(95), 61(110).  
   Type: 'M'.

<table>
<thead>
<tr>
<th>M(_1)</th>
<th>M(_2)</th>
<th>M(_3)</th>
<th>M(_4)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T(_1)</td>
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<td>8.1</td>
<td>12.1</td>
<td>12.6</td>
</tr>
<tr>
<td>T(_2)</td>
<td>9.2</td>
<td>10.6</td>
<td>21.2</td>
<td>13.1</td>
</tr>
<tr>
<td>T(_3)</td>
<td>12.5</td>
<td>16.2</td>
<td>15.9</td>
<td>16.2</td>
</tr>
<tr>
<td>Mean</td>
<td>10.6</td>
<td>14.3</td>
<td>16.4</td>
<td>14.0</td>
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</table>

Mean 13.7

<table>
<thead>
<tr>
<th>N(_1)</th>
<th>N(_2)</th>
<th>N(_3)</th>
<th>N(_4)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M(_1)</td>
<td>6781</td>
<td>6719</td>
<td>5075</td>
<td>8186</td>
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<tr>
<td>M(_2)</td>
<td>7263</td>
<td>8308</td>
<td>6629</td>
<td>5840</td>
</tr>
<tr>
<td>M(_3)</td>
<td>5204</td>
<td>7554</td>
<td>7043</td>
<td>6787</td>
</tr>
<tr>
<td>M(_4)</td>
<td>8247</td>
<td>6174</td>
<td>6601</td>
<td>7385</td>
</tr>
<tr>
<td>Mean</td>
<td>6874</td>
<td>7189</td>
<td>6337</td>
<td>7000</td>
</tr>
</tbody>
</table>
Crop :- Coffee.  
Site :- Krishna Estate, Kalpetta.  

Object :- To study the effect of manuring on Coffee.

1. BASAL CONDITIONS to 4. GENERAL :
   Same as in expt. No. 60(95) and 61(110) on page 317.

5. RESULTS :

60(97)  
(i) 6624 Kg/ha. (ii) (a) 1642.8 Kg/ha. (b) 2031.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of coffee seeds in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>2659</td>
<td>2712</td>
<td>2834</td>
<td>2348</td>
<td>2638</td>
</tr>
<tr>
<td>M2</td>
<td>3333</td>
<td>2652</td>
<td>2854</td>
<td>2688</td>
<td>2894</td>
</tr>
<tr>
<td>M3</td>
<td>3067</td>
<td>3573</td>
<td>3406</td>
<td>2030</td>
<td>3019</td>
</tr>
<tr>
<td>M4</td>
<td>3421</td>
<td>2991</td>
<td>3817</td>
<td>3000</td>
<td>3307</td>
</tr>
<tr>
<td>Mean</td>
<td>3132</td>
<td>2982</td>
<td>3228</td>
<td>2516</td>
<td>2964</td>
</tr>
</tbody>
</table>

Ref :- K. 60(97), 61(108).  
Type :- 'M'.

61(108)  
(i) 2794 Kg/ha. (ii) (a) 1214.2 Kg/ha. (b) 592.7 Kg/ha. (iii) Main effect of M is highly significant. (iv) Av. yield of coffee seeds in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>8232</td>
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<td>M3</td>
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<td>M4</td>
<td>5539</td>
<td>7671</td>
<td>6086</td>
<td>6895</td>
<td>6553</td>
</tr>
<tr>
<td>Mean</td>
<td>6162</td>
<td>7647</td>
<td>6730</td>
<td>5956</td>
<td>6624</td>
</tr>
</tbody>
</table>

(i) 2964 Kg/ha. (ii) (a) 557.7 Kg/ha. (b) 577.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of coffee seeds in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
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<td>2118</td>
<td>1935</td>
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<td>2266</td>
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<td>M2</td>
<td>2768</td>
<td>2650</td>
<td>2934</td>
<td>2035</td>
<td>2602</td>
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<tr>
<td>M3</td>
<td>2919</td>
<td>2824</td>
<td>3201</td>
<td>2699</td>
<td>2911</td>
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<tr>
<td>M4</td>
<td>3609</td>
<td>3681</td>
<td>2934</td>
<td>3365</td>
<td>3397</td>
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<td>2854</td>
<td>2818</td>
<td>2751</td>
<td>2752</td>
<td>2794</td>
</tr>
</tbody>
</table>

C.D. for M marginal means = 499.4 Kg/ha.
Crop: Coffee. Ref: K. 60(96), 61(107).

Site: North Carolina Estate, Kalpetta. Type: 'M'.

Object: To study the effect of manuring on Coffee.

1. BASAL CONDITIONS to 4. GENERAL:
   Same as in expt. No. 60(95), 61(110) on page 317.

5. RESULTS:

60(96)

   (i) 6917 Kg/ha. (ii) (a) 2368.7 Kg/ha. (b) 1452.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of coffee seeds in Kg/ha.

   \[
   \begin{array}{cccc|c}
   & N_1 & N_3 & N_5 & \text{Mean} \\
   M_1 & 6328 & 6846 & 7686 & 6606 & 6864 \\
   M_2 & 5472 & 6438 & 7816 & 7214 & 6735 \\
   M_3 & 5202 & 5657 & 7383 & 8888 & 6835 \\
   M_4 & 5869 & 6894 & 6056 & 10113 & 7233 \\
   \text{Mean} & 5718 & 6511 & 7235 & 8205 & 6917 \\
   \end{array}
   \]

61(107)

   (i) 3747 Kg/ha. (ii) (a) 907.1 Kg/ha. (b) 630.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of coffee seeds in Kg/ha.

   \[
   \begin{array}{cccc|c}
   & N_1 & N_3 & N_5 & \text{Mean} \\
   M_5 & 3293 & 3403 & 4484 & 3067 & 3562 \\
   M_2 & 3929 & 4134 & 4087 & 3615 & 3941 \\
   M_3 & 4196 & 3884 & 3641 & 3264 & 3746 \\
   M_4 & 4010 & 3408 & 3865 & 3675 & 3739 \\
   \text{Mean} & 3857 & 3707 & 4019 & 3405 & 3747 \\
   \end{array}
   \]

---


Site: Coffee Res. Stn., Malamthottom Estate, Paderipare. Type: 'M'.

Object: To study the effect of manuring on Coffee.

1. BASAL CONDITIONS:
   (i) N.A. (ii) Reddish coloured latosol. (iii) By seedlings. (iv) Robusta. (v) Square method of planting at 2.7 m. x 2.7 m. spacings. (vi) N.A. (vii) Nil. (viii) Weedings, shade regulation, self cultivation, and desuckering. (ix) Nil. (x) Unirrigated. (xi) 485 cm.; 518 cm. (xii) January to March.

2. TREATMENTS:

   Main-plot treatments:
   4 levels of N : N_1=45, N_3=67, N_5=90 and N_7=112 Kg/ha.
320

Sub-plot treatments

4 methods of application of manures

- $M_1 = N$ applied in two equal doses once in the pre-blossom and once in the post-blossom period.
- $M_2 = N$ applied in 3 equal doses once in pre-blossom, once in pre-monsoon and once in post-monsoon period.
- $M_3 = M_1 + 34$ Kgf/ha of $P_2O_5$ applied in 2 doses, once in pre-blossom and once in post-blossom season and
- $M_4 = M_3 + 45$ Kgf/ha of $K_2O$ applied in 2 equal doses, once in the pre-blossom and once in post blossom season.

N applied as A/S, $P_2O_5$ as Rock Phos. and $K_2O$ as Muri. Pot.

3. DESIGN:

(i) Split-plot. (ii) 4 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) Gross—42, Net—24. (v) One row around. (vi) Yes.

4. GENERAL:


5. RESULTS:

60(8)

(i) 7045 Kg/ha. (ii) (a) 2328'7 Kgf/ha. (b) 1937 Kgf/ha. (iii) None of the effects is significant. (iv) Av. yield of coffee seeds in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$N_3$</th>
<th>$N_4$</th>
<th>Mean</th>
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<tr>
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<td>8884</td>
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<td>Mean</td>
<td>7241</td>
<td>7750</td>
<td>6706</td>
<td>6484</td>
<td>7045</td>
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</table>

61(109)

(i) 1946 Kg/ha. (ii) (a) 981'4 Kgf/ha. (b) 1018'0 Kgf/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of coffee seeds in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$N_1$</th>
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<th>$N_3$</th>
<th>$N_4$</th>
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<td>$M_2$</td>
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<tr>
<td>Mean</td>
<td>4025</td>
<td>4051</td>
<td>3760</td>
<td>3949</td>
<td>3946</td>
</tr>
</tbody>
</table>

C.D. for M marginal means= 857'8 Kg/ha.

62(109)

(i) 1946 Kg/ha. (ii) (a) 981'4 Kgf/ha. (b) 1018'0 Kgf/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of coffee seeds in Kg/ha.

<table>
<thead>
<tr>
<th></th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$N_3$</th>
<th>$N_4$</th>
<th>Mean</th>
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<tbody>
<tr>
<td>$M_1$</td>
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<td>4525</td>
<td>3741</td>
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<tr>
<td>$M_4$</td>
<td>4307</td>
<td>4483</td>
<td>4125</td>
<td>4826</td>
<td>4435</td>
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<tr>
<td>Mean</td>
<td>4025</td>
<td>4051</td>
<td>3760</td>
<td>3949</td>
<td>3946</td>
</tr>
</tbody>
</table>

C.D. for M marginal means= 857'8 Kg/ha.

Crop = Coffee.
Site = Coffee Demons. Farm, Kalpetta.
Object — To find out optimum spacing for Coffee.
I. BASAL CONDITIONS:

(i) N.A. (ii) Laterite, generally acidic in reaction. (iii) By seedlings. (iv) Arabica (S-795 selection) 
(v) Planted in Sept. 1960. (vi) 7 months. (vii) N : P : K at 40 : 75 : 40 in March 64; 20 : 0 : 0 in June 64; 20 : 0 : 40 in Oct. 64 and Zinc Sulphate-Urea spray in April and Nov., 64. (viii) Shade regulation, weeding, 

2. TREATMENTS:

6 spacings: $S_1 = 0.91 \, \text{m.} \times 0.91 \, \text{m.} ; \ S_2 = 0.91 \, \text{m.} \times 1.22 \, \text{m.} ; \ S_3 = 1.22 \, \text{m.} \times 1.22 \, \text{m.} ; \ S_4 = 1.83 \, \text{m.} \times 0.91 \, \text{m.} ; \ S_5 = 1.83 \, \text{m.} \times 1.22 \, \text{m.} ; \ S_6 = 1.83 \, \text{m.} \times 1.83 \, \text{m.}$

3. DESIGN:


4. GENERAL:


5. RESULTS:

64(83)

(i) 2597 Kg/ha. (ii) 1356.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Coffee seeds in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>$S_3$</th>
<th>$S_4$</th>
<th>$S_5$</th>
<th>$S_6$</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3992</td>
<td>2707</td>
<td>3068</td>
<td>2191</td>
<td>1631</td>
<td>1973</td>
</tr>
</tbody>
</table>

65(85)

(i) 5040 Kg/ha. (ii) 133.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of coffee in Kg/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>$S_3$</th>
<th>$S_4$</th>
<th>$S_5$</th>
<th>$S_6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>7104</td>
<td>5679</td>
<td>5658</td>
<td>5113</td>
<td>4134</td>
<td>2554</td>
</tr>
<tr>
<td>C.D. = 1593.3 Kg/ha.</td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

Crop := Rubber. 

Ref := K. 63(5), 64(120). 

Site := Rubber Res. Instt. of India, Mundakayam 

Type := 'M'.

Estate, Kottayam.

Object := To find out the optimum requirements of N, P and K for Rubber crop.

1. BASAL CONDITION:

(i) Replanted area. (ii) Laterite soil. (iii) Budding. (iv) P.B. 5/60. (v) Planted in 1956 at a spacing of 4.9 m. x 4.9 m. (vi) 10 months. (vii) N.A. (viii) Weeding. (ix) Nil. (x) Unirrigated. (xi) 340 cm. for 63(3); N.A. for 64(120). (xii) Tapping started in March, 1964.

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 Rock Phos. : $P_0 = 0, P_1 = 44.8$ and $P_2 = 89.6$ Kg/ha.

(3) 3 levels of $K_2O$ as Mur. Pot. : $K_0 = 0, K_1 = 44.8$ and $K_2 = 89.6$ Kg/ha.

N applied as A/S/N is 1964(120).

3. DESIGN:

(i) 3 Confd. (ii) (a) 9 plots/block ; 3 blocks/repllication. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 12. (v) 8. (vi) Yes.
4. GENERAL:
   (v) Malankara, Pudukada and Vaikundam estates. (vi) and (vii) Nil. (viii) Assuming 3rd order interactions to be insignificant, they are pooled with error.

5. RESULTS:

<table>
<thead>
<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
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</tr>
<tr>
<td>N₁</td>
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</tr>
<tr>
<td>N₂</td>
<td>54.8</td>
<td>57.0</td>
<td>56.2</td>
<td>54.1</td>
</tr>
</tbody>
</table>

C.D. for P marginal means = 1.9 cm./tree.

<table>
<thead>
<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
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<tbody>
<tr>
<td>N₀</td>
<td>51.3</td>
<td>53.9</td>
<td>53.2</td>
<td>52.7</td>
</tr>
<tr>
<td>N₁</td>
<td>55.3</td>
<td>54.4</td>
<td>56.5</td>
<td>55.7</td>
</tr>
<tr>
<td>N₂</td>
<td>54.8</td>
<td>57.0</td>
<td>56.2</td>
<td>56.6</td>
</tr>
</tbody>
</table>

C.D. for P marginal means = 2.1 cm./tree.

6. RESULTS:

<table>
<thead>
<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>N₀</td>
<td>55.3</td>
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<tr>
<td>N₁</td>
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<td>55.2</td>
<td>55.1</td>
</tr>
<tr>
<td>N₂</td>
<td>52.7</td>
<td>55.1</td>
<td>54.5</td>
<td>54.7</td>
</tr>
</tbody>
</table>

C.D. for P marginal means = 2.1 cm./tree.

Crop: Rubber.
Site: Rubber Res. Inst. of India, Malankara Estate, Kottayam.
Object: To find out the optimum requirements of N, P and K for Rubber.

Ref: K. 63(3), 64(119).
Type: ‘M’.

1. BASAL CONDITIONS:
   (xi) 380 cm. for 63(3) and N.A. for 1964. (xii) Tapping started in Sept. 1962.
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 Rock Phos.: 
P₀ = 0, P₁ = 44.8 and P₂ = 89.6 kg/ha.
(3) 3 levels of K₂O as Mur. Pot.: 
K₀ = 0, K₁ = 44.8 and K₂ = 89.6 kg/ha.
N applied as A/S/N in 64(119).

3. DESIGN:
(i) 3 rep. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) Nil (b) 6. (v) 14.
(vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Sprayed against abnormal leaf fall. (iii) Girth measurements. (iv) 1963-64.
(v) Mundakayar, Pudukade and Vaikundam estate. (vi) and (vii) Nil. (viii) Assuming the 3rd interactions
to be insignificant, they are pooled with error.

5. RESULTS:
64(3)
(i) 52.2 cm./tree. (ii) 40.0 cm./tree (iii) Main effect of N is significant and the main effect of P is highly
significant. (iv) Av. girth in cm./tree.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>K₀</th>
<th>K₁</th>
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</tr>
</thead>
<tbody>
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<tr>
<td>P₁</td>
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</tr>
<tr>
<td>P₂</td>
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<td>56.0</td>
<td>54.9</td>
<td>54.8</td>
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<td>53.8</td>
<td>51.1</td>
<td>51.7</td>
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</tr>
</tbody>
</table>

C.D. for N or P marginal means = 2.7 cm./tree.

64(19)
(i) 53.1 cm./tree. (ii) 3.3 cm./tree. (iii) Main effect of P is highly significant and the main effect of K and
interaction N x K are significant. (iv) Av. girth in cm./tree.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>K₀</th>
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<td>52.2</td>
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C.D. for P or K marginal means = 2.2 cm./tree.
C.D. for the body of N x K table = 3.9 cm./tree.
Crop :- Rubber.  
Ref :- K. 61(125), 62(54).

Site :- Thodupuzha (c.f.) Dist. Ernakulam.  
Type :- 'M'.

Object :- To find out the optimum requirement of N, P and K for Rubber crop.

1. BASAL CONDITIONS:

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N as A/S/N : N_0=0, N_1=33.6 and N_2=67.2 Kg/ha.
   (2) 3 levels of P as Rock. Phos. : P_0=0, P_1=44.8 and P_2=89.6 Kg/ha.
   (3) 3 levels of K as Mur. Pot. : K_0=0, K_1=44.8 and K_2=89.6 Kg/ha.
   Fertilizers broadcast in bases around the trees and light forking in.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 2. (iv) (a) Nil. (b) 6. (v) N.A. (vi) Yes.

4. GENERAL:

5. RESULTS:

61(125)
   (i) 38.3 cm./tree. (ii) 4.3 cm./tree. (iii) Main effect of P alone is highly significant. (iv) Av. girth in cm./tree.

<table>
<thead>
<tr>
<th></th>
<th>N_0</th>
<th>N_1</th>
<th>N_2</th>
<th>K_0</th>
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<td>37.7</td>
<td>38.1</td>
<td>38.3</td>
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</tbody>
</table>

62(54)
   (i) 45.7 cm./tree. (ii) 3.7 cm./tree. (iii) Main effect of P is highly significant and interaction N X K is significant. (iv) Av. girth in cm./tree.

C.D. for P marginal means = 2.9 cm./tree.
Crop : Rubber.  
Ref. : K. 61(127), 62(57).

Site : Kanjirapally (c.f.), Kottayam.  
Type : ‘M’.

Object :—To find out the optimum requirement of N, P and K for Rubber crop.

1. BASAL CONDITIONS :
(vi) N.A. (vii) Nil. (viii) Weeding. (ix) Nil. Pueraria Phascoloides grown as a cover crop in between 
rubber rows. (x) Unirrigated. (xi) N.A. (xii) N.A.

2. TREATMENTS :
All combinations of (1), (2) and (3) 
(1) 3 levels of N as A/S/N : N₀ = 0, N₁ = 33.6 and N₂ = 67.2 K₂O ha.
(2) 3 levels of P₀, as Rock. Phos. : P₀ = 0, P₁ = 44.8 and P₂ = 89.6 K₂O ha.
(3) 3 levels of K₀, as Mur. Pot. : K₀ = 0, K₁ = 44.8 and K₂ = 89.6 K₂O ha.
Fertilizers broadcast in annular bands round the tree and light forking in April-May and Sept.-Oct.

3. DESIGN :
(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 12. (v) 18. (vi) Yes.

4. GENERAL :
(i) Satisfactory. (ii) Control measures adopted for secondary leaf fall and pink disease. (iii) Girth measure- 
ments. (iv) 1961—62. (v) At many places. (vi) to (viii) Nil.

5. RESULTS :
61(127)
(i) 40'1 cm./tree. (ii) 2'3 cm./tree. (iii) Main effect of P alone is highly significant. (iv) Av. girth in cm./tree.
<table>
<thead>
<tr>
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<th>$N_0$</th>
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<th>$K_0$</th>
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</tr>
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C.D. for $P$ marginal means=1.6 cm./tree.

62(57)

(i) 47.7 cm./tree. (ii) 1.9 cm./tree. (iii) Main effect of $P$ is highly significant. Interaction $N \times K$ is significant. (iv) Av. girth in cm./tree.

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C.D. for $P$ marginal means=1.3 cm./tree.

C.D. for the body of $N \times K$ table=2.3 cm./tree.

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**Crop:** Rubber.  
**Site:** Rubber Res. Inst. of India.  
**Vaikundam Estate, Kottayam.**  
**Type:** 'M'.  
**Ref:** K. 63(6), 64(118).

Object:-To find out the optimum requirements of $N$, $P$ and $K$ for Rubber crop.

1. **BASAL CONDITIONS:**

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 $P_0$ as Rock. Phos.: $P_0=0$, $P_1=44.8$ and $P_2=89.6$ Kg/ha.  
   (3) 3 levels of $K_0$ as Mur. Pot.: $K_0=0$, $K_1=44.8$ and $K_2=89.6$ Kg/ha.

$N$ applied as A/S/N in 64(118).
3. DESIGN:
(i) P confid. (ii) (a) 9 plots/block; 3 blocks/repetition. (b) N.A. (iii) 1. (iv) (a) Nil: (b) About 20. (v) N.A. (vi) Yes.

4. GENERAL:

5. RESULTS:

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C.D. for P marginal means = 1.8 cm./tree.
C.D. for the body of N x P table = 3.1 cm./tree.

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C.D. for N or P marginal means = 1.8 cm./tree.
C.D. for the body of N x P table = 3.1 cm./tree.

Crop: Rubber.
Site: Rubber Res. Instt. of India, Pudukade Estate, Kottayam.
Object: To find out the optimum requirements of N, P and K for Rubber crop.

Ref: K. 63(4), 64(117).
Type: 'M'.

Object: To find out the optimu requirements of N, P and K for Rubber crop.
1. BASAL CONDITIONS:
   (i) Replanted area. (ii) Sandy loam. (iii) By budding. (iv) P.B. 86. (v) Planted in 1956 at a spacing of 4.9 m. x 4.9 m. (vi) 10 months. (vii) N.A. (viii) Weedings. (ix) Nil. (x) Unirrigated. (xi) Tapping not commenced.

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 Rock. Phos.: P₀ = 0, P₁ = 44.8 and P₂ = 89.6 Kg/ha.
   (3) 3 levels of K₂O as Mur. Pot.: K₀ = 0, K₁ = 44.8 and K₂ = 89.6 Kg/ha.
   In 64(117) N applied as A/S/N.

3. DESIGN:
   (i) 33 confd. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) Nil. (b) 14 to 16. (v) and (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Treated against pink disease by Bordeaux spraying against phytophthera. (iii) Girth measurement. (iv) 1963–64. (v) Malankara, Mundakayam and Vaikendam Estates. (vi) to (viii) Nil.

5. RESULTS:

63(4)
   (i) 47.9 cm./tree. (ii) 2.8 cm./tree. (iii) None of the effects is significant. (iv) Av. girth in cm./tree.

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<th>N₂</th>
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64(117)
   (i) 48.6 cm./tree. (ii) 2.6 cm./tree. (iii) None of the effects is significant. (iv) Av. girth in cm./tree.

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Crop :- Rubber.  
Ref :- K. 61(126), 62(55).
Site :- Mukundapuram (c.f), Trichur.  
Type :- 'M'.
Object :- To find out the optimum requirement of N, P and K for Rubber crop.

1. BASAL CONDITIONS :
   (vi) N.A.  (vii) Nil.  (viii) Weeding.  (ix) Nil, Pueraria Phascoloides grown as a cover crop in between rubber rows.  (x) Unirrigated.  (xi) N.A.  (xii) N.A.

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 Rock. Phos.: P₀=0, P₁=44·8 and P₂=89·6 Kg/ha.
   (3) 3 levels of K₂O as Mur. Pot.: K₀=0, K₁=44·8 and K₂=89·6 Kg/ha.
   Fertilisers broadcast in annular bands round the tree and light forking in April-May and September-October.

3. DESIGN :
   (i) Fact. in R.B.D.  (ii) (a) 27. (b) N.A.  (iii) 2. (iv) (a) Nil.  (b) 18 trees/plot in the 1st replication and 16 trees/plot in the 2nd replication.  (v) N.A.  (vi) Yes.

4. GENERAL :

5. RESULTS :

61(126)
   (i) 35·9 cm/tree.  (ii) 3·8 cm/tree.  (iii) None of the effects is significant.  (iv) Av. girth in cm/tree.

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62(55)
   (i) 41·6 cm/tree.  (ii) 3·1 cm/tree.  (iii) None of the effects is significant.  (iv) Av. girth in cm/tree.

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Crop :- Coconut.  
Ref :- K. 60(88).  
Type :- 'M'.

Object :-To determine a suitable and economic dose of N, P and K for Coconut.

1. BASAL CONDITIONS :
   (i) The area was standardised for three years prior to the expt. and during this period 19-6 cubic metres/ha. of sand and 11 Kg/ha. of ash was applied uniformly. (ii) Reclaimed clayey soil. (iii) Nil. (iv) Tipica (ordinary tall). (v) Nil. (vi) N.A. (vii) River sand at 19-6 cubic m./ha. and lime at 12-6 Q/ha. spread over the area and dug in during October—November. (viii) Digging the plots with mammuthy annually in October—November. (ix) Nil. (x) Unirrigated. (xi) 330 cm. (xii) Monthly harvest.

2. TREATMENTS :
   6 manurial treatments : M 0 =Control (no manure), M 1 =0·1 Kg of N+0·1 Kg of P 2 O 5 +0·2 Kg of K 2 O per tree, M 2 =0·1 Kg of N+0·1 Kg of P 2 O 5 +0·5 Kg of K 2 O per tree, M 3 =0·2 Kg of N +0·1 Kg of P 2 O 5 +0·5 Kg of K 2 O per tree, M 4 =0·2 Kg of N+0·3 Kg of P 2 O 5 +0·7 Kg of K 2 O per tree.

3. DESIGN :
   (i) L. Sq. (ii) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 8. (v) Guard trees are left between rows as deep channels separate them. (vi) Yes.

4. GENERAL :
   (i) Satisfactory. (ii) No serious incidence of pests. 30% of the trees are affected with leaf and root diseases. Trees are sprayed with fungicides twice a year. (iii) Number of nuts and leaves per tree annually. (iv) 1952—60. (v) to (viii) N.A.

5. RESULTS :
   (i) 420 nuts/plot. (ii) 11 nuts/plot. (iii) Treatment differences are significant. (iv) Av. yield of coconut in nuts/plot.
   Treatment  T 1  T 2  T 3  T 4  T 5  T 6 
   Av. yield 437 400 417 497 459 311
   C.D. =13·1 nuts/plot.

Crop :- Coconut.  
Ref :- K. 64(190), 65(78).  
Type :- 'M'.

Object :-To assess the effect of Manik compound in regard to incidence in yellowing of leaves and/or disease condition and recovery of coconut palms.

1. BASAL CONDITIONS :
   (i) N.A. (ii) Reclaimed clayey. (iii) By seedlings. (iv) West coast tall. (v) 6'1 m. to 7'6 m. spacings (vi) N.A. (vii) As per treatments. (viii) One digging. (ix) No. (x) Unirrigated. (xi) N.A. for 1964; 183 cm. for 1965. (xii) Monthly harvest.

2. TREATMENTS :
   4 manurial treatments : M 0 =Control (no manure), M 1 =2 Kg Manik applied basally once in a year per tree, M 2 =2 Kg Manik as spray (4 sprayings of £ Kg each) per tree and M 3 =1 Kg Manik basally and 1 Kg Manik as spray (2 sprayings of £ Kg each) per tree.
   N : P : K (8 : 8 : 16) mixture at 3·2 Kgtree per year applied to all the treatments.

3. DESIGN :
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) 8. (v) Nil. (vi) Yes.
4. GENERAL:
   (i) Good. (ii) Two sprayings with Copper fungicides and D.D.T. (iii) Yield of nuts and female flowers.
   (iv) 1964—contd. (v) to (viii) Nil.

5. RESULTS:

   64(190)
   (i) 237° nuts/plot. (ii) 19'4 nuts/plot. (iii) Treatment differences are not significant. (iv) Av. number of nuts/plot.
   Treatment  M₄  M₅  M₆  M₇
   Av. number  238'0  230'5  244'5  235'2

   65(78)
   (i) 249'8 nuts/plot. (ii) 70'8 nuts/plot. (iii) Treatment differences are not significant. (iv) Av. number of nuts/plot.
   Treatment  M₄  M₅  M₆
   Av. number  215'2  190'4  276'0  317'6

---

Crop: Coconut.  Ref: K. 62(131), 63(16), 64(121), 65(79).
Type: 'M'.

Object:—To study the length of period of residual effect of manures under local conditions.

1. BASAL CONDITIONS:
   (i) The area was under a manurial trial from 1952 to 1959. (ii) Reclaimed clayey. (iii) By weeding
   (iv) West coast tall. (v) and (vi) N.A. (vii) Lime at 740 Kg/ha. in 1953 and 1954. (viii) One digging.
   (xii) Monthly harvests.

2. TREATMENTS:
   6 manurial treatments: T₀=Control (no manure), T₁=0'11 Kg of N+0'11 Kg of P₀₂₀₁+0'23 Kg of K₀, per tree,
   T₂=0'11 Kg of N+0'11 Kg of P₀₂₀₁+0'45 Kg of K₀ per tree, T₃=0'23 Kg of N+0'11 Kg of P₀₂₀₁+0'45 Kg of K₀ per tree,
   T₄=0'23 Kg of N+0'34 Kg of P₀₂₀₁+0'45 Kg of K₀ per tree and T₅=0'23 Kg of N+0'34 Kg of P₀₂₀₁+0'68 Kg of K₀ per tree.

3. DESIGN:
   (i) R.B.D. (ii) 6. (b) N.A. (iii) 6. (iv) 8. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. 2 sprayings of fungicides in 1964. (iii) Yield of number of nuts and female
   Nursing plot technique is used in T₀ of Replication II of 1962.

5. RESULTS:

   62(131)
   (i) 282'4 nuts/plot. (ii) 65'6 nuts/plot. (iii) Treatment differences are highly significant. (iv) Av. number of nuts/plot.
   Treatment  T₀  T₁  T₂  T₃  T₄  T₅
   Av. number  200'3  284'0  243'8  275'0  314'0  377'3
   C.D.=78'2 nuts/plot.
332

(i) 248·8 nuts/plot. (ii) 63·3 nuts/plot. (iii) Treatment differences are highly significant. (iv) Av. number of nuts/plot of 8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>177·1</td>
<td>220·6</td>
<td>217·5</td>
<td>261·6</td>
<td>268·5</td>
<td>327·6</td>
</tr>
<tr>
<td>C.D.</td>
<td>75·1 nuts/plot.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(i) 198·6 nuts/plot. (ii) 63·4 nuts/plot. (iii) Treatment differences are significant. (iv) Av. number of nuts/plot of 8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>135·6</td>
<td>188·3</td>
<td>177·1</td>
<td>205·0</td>
<td>217·5</td>
<td>268·3</td>
</tr>
<tr>
<td>C.D.</td>
<td>75·4 nuts/plot.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(i) 182·0 nuts/plot. (ii) 58·8 nuts/plots. (iii) Treatment differences are significant. (iv) Av. number of nuts/plot of 8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>131·1</td>
<td>166·0</td>
<td>156·3</td>
<td>184·1</td>
<td>197·6</td>
<td>257·0</td>
</tr>
<tr>
<td>C.D.</td>
<td>69·9 nuts/plot.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop := Coconut.  
Ref := K. 62(129), 63(166), 64(188), 65(80).  
Type := ‘M’.  
Object := To assess the effect of the application of fertilizers with and without a dose of trace elements on yield and disease condition of plants.

1. BASAL CONDITIONS:
   (i) N.A. (ii) Reclaimed clayey. (iii) By seedlings. (iv) West coast tall. (v) 6·1 m to 7·1 m spacings. (vi) and (vii) N.A. (viii) One digging. (ix) Nil. (x) Unirrigated. (xi) N.A. (xii) Monthly harvests.

2. TREATMENTS:
9 manural treatments: T0 = Control, T1 = 0·25 Kg of N+0·35 Kg of P2O5+70 Kg of K2O per tree, T2 = 50 Kg of N+70 Kg of P2O5+40 Kg of K2O, T3 = NPK+Boron (200 gm Borax per palm), T4 = NPK+Manganese (200 gm Mn. Sul. per palm), T5 = NPK+Copper (200 gm Cu. Sul. per palm), T6 = NPK+Molybdenum (2 gm Ammonium Molybdate per palm), T7 = NPK+Zinc (200 gm Zinc Sulphate) and T8 = NPK+all the above 5 trace elements.

NPK=0·25 Kg of N+0·35 Kg of P2O5+70 Kg of K2O.

3. DESIGN:
   (i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) 8. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) 2 sprayings with Copper fungicides. (iii) Yield of nuts and female flowers produced. (iv) 1962—contd. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
62(129)
(i) 294·2 nuts/plot. (ii) 63·1 nuts/plot. (iii) Treatment differences are not significant. (iv) Av. number of nuts/plot of 8 trees.
Crop :- Coconut.  
Type :- 'M'.  

Object :- To study the residual effect of N, P and K applied in the previous years to Coconut.

1. BASAL CONDITIONS:
(i) The area is given a uniform digging raising a green manure crop and burying in situ between the trees for a period of three years. (ii) Deep red loam. (iii) By seedlings. (iv) West coast variety. (v) and (vi) N.A. (vii) G.M. at 23 Kg/tree was given in 1961, 0.11 Kg/tree of N+0.11 Kg/tree of P +0.23 Kg/tree of K$_2$O, M$_2$=0.11 Kg/tree of N+0.11 Kg/tree of P$_2$O$_5$+0.23 Kg/tree of K$_2$O, M$_3$=0.23 Kg/tree of N+0.11 Kg/tree of P$_2$O$_5$+0.45 Kg/tree of K$_2$O and M$_4$=0.23 Kg/tree of N+0.34 Kg/tree of P$_2$O$_5$+0.45 Kg/tree of K$_2$O and M$_5$=0.23 Kg/tree of N+0.34 Kg/tree of P$_2$O$_5$+0.68 Kg/tree of K$_2$O.  

P$_2$O$_5$ as B.M. was applied at the time of sowing of G.M. crop.

2. TREATMENTS:
6 manurial treatments : M$_0$=Control, M$_1$=0.11 Kg/tree of N+0.11 Kg/tree of P$_2$O$_5$+0.23 Kg/tree of K$_2$O, M$_2$=0.11 Kg/tree of N+0.11 Kg/tree of P$_2$O$_5$+0.45 Kg/tree of K$_2$O, M$_3$=0.23 Kg/tree of N+0.11 Kg/tree of P$_2$O$_5$+0.45 Kg/tree of K$_2$O, M$_4$=0.23 Kg/tree of N+0.34 Kg/tree of P$_2$O$_5$+0.45 Kg/tree of K$_2$O and M$_5$=0.23 Kg/tree of N+0.34 Kg/tree of P$_2$O$_5$+0.68 Kg/tree of K$_2$O.  
P$_2$O$_5$ as B.M. was applied at the time of sowing of G.M. crop.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6 in 1960, 4 in 1961 and 2 in 1962. (iv) S. (v) N.A. (vi) Yes.

4. GENERAL:

5. RESULTS:
60(87)
(i) 664 nuts/plot. (ii) and (iii) N.A. (iv) Av. number of nuts/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M$_0$</th>
<th>M$_1$</th>
<th>M$_2$</th>
<th>M$_3$</th>
<th>M$_4$</th>
<th>M$_5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>398</td>
<td>621</td>
<td>568</td>
<td>769</td>
<td>755</td>
<td>876</td>
</tr>
</tbody>
</table>
(i) 656 nuts/plot.  (ii) 117 nuts/plot.  (iii) Treatment differences are highly significant.  (iv) Av. number of nuts/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>416</td>
<td>576</td>
<td>688</td>
<td>728</td>
<td>712</td>
<td>816</td>
</tr>
<tr>
<td>C.D. = 176 nuts/plot.</td>
<td></td>
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</tbody>
</table>

62(16)

(i) 569·5 nuts/plot.  (ii) 73·3 nuts/plot.  (iii) Treatment differences are not significant.  (iv) Av. number of nuts/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
<th>M₅</th>
<th>M₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>431·0</td>
<td>477·5</td>
<td>600·5</td>
<td>663·0</td>
<td>558·5</td>
<td>686·5</td>
</tr>
</tbody>
</table>

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**Crop:** Coconut.  
**Ref.** - K. 61(137), 62(128), 63(15), 65(81).  
**Site:** Agr. Res. Sta., Pillicode.  
**Type:** 'M'.

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

1. **BASAL CONDITIONS:**
   (i) The experimental area received uniform cultural and manurial operation in the pre-experimental period.
   (ii) Gravelly laterite soil.
   (iii) Seedlings.
   (iv) West coast tall.
   (v) C and D 1918, E 1919—Triangular planting 9·14 m spacing.
   (vi) One year old.
   (vii) 1 Kg of Mur. Pot. and 25 Kg of green stuff/tree per year were applied in the basins dug round the trees.
   (viii) 2 ploughings. Basins 1·5 meter radius dug round the trees with mazum in July.
   (ix) Nil.
   (x) Unirrigated: 623 cm. in 1961; 540 cm. in 1962; N.A. for 1963; 285 cm. in 1965.
   (xi) Monthly harvests.

2. **TREATMENTS:**
   Main-plot treatments:
   4 levels of N as A/S: N₀ = 0, N₁ = 0·250, N₂ = 0·375 and N₃ = 0·500 Kg/ha.
   Sub-plot treatments:
   4 levels of P₂O₅ as Super: P₀ = 0, P₁ = 0·125, P₂ = 0·250 and P₃ = 0·375 Kg/ha.

3. **DESIGN:**
   (i) Split-plot.
   (ii) 4 main-plots/replication, 4 sub-plots/main-plot.
   (b) N.A.
   (iii) 4. (iv) (a) N.A.
   (b) 8. (v) and (vi) Yes.

4. **GENERAL:**
   (i) Satisfactory.
   (ii) N.A.
   (iii) Monthly yield of nuts, female flowers production etc.
   (iv) 1961—contd.
   (v) N.A.
   (vi) and (vii) Nil.
   (viii) Expt. for 1964—N.A.

5. **RESULTS:**
61(137)

(i) 48 nuts/tree.  (ii) (a) 20·1 nuts/tree.  (b) 18·5 nuts/tree.

<table>
<thead>
<tr>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>N₀</td>
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<td>53</td>
<td>36</td>
<td>50</td>
</tr>
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<td>N₃</td>
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<td>52</td>
</tr>
<tr>
<td>Mean</td>
<td>47</td>
<td>47</td>
<td>49</td>
<td>50</td>
</tr>
</tbody>
</table>
62(128)
(i) 34 nuts/tree. (ii) (a) 11·6 nuts/tree. (b) 13·1 nuts/tree. (iii) None of the effects is significant. (iv) Av. number of nuts/tree.

<table>
<thead>
<tr>
<th>N_4</th>
<th>P_e</th>
<th>P_1</th>
<th>P_3</th>
<th>P_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
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<td>40</td>
<td>39</td>
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<td>21</td>
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<tr>
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</tr>
<tr>
<td>33</td>
<td>35</td>
<td>43</td>
<td>38</td>
<td></td>
<td>37</td>
</tr>
</tbody>
</table>

Mean 35 36 35 29 34

63(15)
(i) 458 nuts/plot. (ii) (a) 162·5 nuts/plot. (b) 64·2 nuts/plot. (iii) None of the effects is significant. (iv) Av. number of nuts/plot.

<table>
<thead>
<tr>
<th>N_4</th>
<th>P_e</th>
<th>P_1</th>
<th>P_3</th>
<th>P_3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>438</td>
<td>482</td>
<td>421</td>
<td>523</td>
<td></td>
<td>466</td>
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<tr>
<td>440</td>
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<td>431</td>
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<td>412</td>
<td>422</td>
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<tr>
<td>430</td>
<td>487</td>
<td>415</td>
<td>475</td>
<td></td>
<td>452</td>
</tr>
</tbody>
</table>

Mean 435 486 437 472 455

65(81)
(i) 80 nuts/plot. (ii) (a) 31·3 nuts/plot. (b) 32·4 nuts/plot. (iii) None of the effects is significant. (iv) Av. number of nuts/plot.

<table>
<thead>
<tr>
<th>N_1</th>
<th>N_2</th>
<th>N_3</th>
<th>N_4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>87</td>
<td>73</td>
<td>69</td>
<td>80</td>
<td>77</td>
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</tr>
<tr>
<td>86</td>
<td>75</td>
<td>83</td>
<td>94</td>
<td>84</td>
</tr>
</tbody>
</table>

Mean 84 74 76 85 80

Crop: Coconut.

Crop: Coconut.
Ref: K. 62(130), 63(167), 64(189), 65(77).


Type: 'C'.

Object:—To study whether cultural practices have any effect on the performance of Coconut.

1. BASAL CONDITIONS:
(i) N.A. (ii) Reclaimed clayey soil. (iii) By seedlings. (iv) West coast tall. (v) 6·1 to 7·6 m. spacing.
(vi) N.A. (vii) Nil. (viii) As per treatments. (ix) N.A. (x) Unirrigated. (xi) 183 cm. in 1965; N.A. for others. (xii) 12 monthly harvests.

2. TREATMENTS:
4 cultural treatments: C_1=2 diggings annually with mammoth. First in August-Sept. and 2nd in December-January, C_2=Clean surface removal of grass, C_3=Perennial cover of leguminous crop and C_4=Perennial cover of grass.
3. DESIGN:
   (i) R.B.D. (ii) 4 (b) N.A. (iii) 6. (iv) I2. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) 2 sprayings with Copper fungicides and D.D.T (iii) Number of nuts per tree. (iv) 1962—
   contd. (v) No. (vi) to (viii) Nil.

5. RESULTS:
   62(130)
   (i) 312.8 nuts/plot. (ii) 63.8 nuts/plot. (iii) Treatment differences are not significant. (iv) Av. number of
   nuts/plot.
   Treatment  C1  C2  C3  C4
   Av. number  340.8 339.5 266.8 304.3

   63(167)
   (i) 428.6 nuts/plot. (ii) 60.8 nuts/plot. (iii) Treatment differences are significant. (iv) Av. number of nuts/
   plot.
   Treatment  C1  C2  C3  C4
   Av. number  487.5 441.9 379.5 405.6
   C.D. = 74.8 nuts/plot.

   64(189)
   (i) 469.1 nuts/plot. (ii) 71.4 nuts/plot. (iii) Treatment differences are significant. (iv) Av. number of nuts/
   plot.
   Treatment  C1  C2  C3  C4
   Av. number  521.6 515.6 410.0 429.1
   C.D. = 87.8 nuts/plot.

   65(77)
   (i) 461.7 nuts/plot. (ii) 2.8 nuts/plot. (iii) Treatment differences are significant. (iv) Av. number of nuts/
   plot.
   Treatment  C1  C2  C3  C4
   Av. number  431.0 537.0 446.5 392.3
   C.D. = 77.2 nuts/plot.

Crop :- Coconut.
Ref :- K. 60(89),61(114), 62(17).
Site :- Reg. Coconut Res. Stn., Kumarakam. Type :- 'C'.

Object :- To evaluate various intercultural operations for Coconut with special reference to clayey soils of
the back water area.

1. BASAL CONDITIONS :
   (i) Area standardised for three years before the trial. (ii) Clayey loam. (iii) By seedlings. (iv) Ordinary
tall. (v) Trees stand on long and narrow bunds with channels in between them spacings ranges from 7.6 m.
to 9.1 m. (vi) N.A. (vii) River sand at 19.6 cubic m./ha. + Lime at 12.6 Q/ha. and ash at 4.3 Kg/tree
spread over the area before the cultural operation in 1960. 250 gm of N + 350 gm. of P<sub>2</sub>O<sub>5</sub> + 450 gm. of K<sub>2</sub>O
per tree broadcast in Dec. 1961. Lime at 740 Kg/ha. was also applied. No manures applied in 1962.
(ix) Nil. (x) Unirrigated. (xi) 330 cm. in 1960, 349 cm. in 1961 and 284 cm. in 1962. (xii) 12 monthly
harvest.

2. TREATMENTS:
   4 cultural treatments : C<sub>0</sub>—Uncultivated (control) ; C<sub>1</sub>—Forming mounds around the trees in August—
Sept. and levelling them in Dec.—Jan., C<sub>2</sub>—Shallow diggings with local mammathies and C<sub>3</sub>—Deep diggings with koonthalees.
3. DESIGN:
(i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 8.  (iv) 8.  (v) No.  (vi) Yes.

4. GENERAL:
(i) Satisfactory.  (ii) Trees are affected with leaf and root diseases. Sprayed with Copper fungicides annually.  
(iii) Number of nuts and female flowers.  (iv) 1952–62.  (v) No.  (vi) to (viii) Nil.

5. RESULTS:
60(89)
(i) 382 nuts/plot.  (ii) and (iii) N.A.  (iv) Av. number of nuts per plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₀</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>273</td>
<td>304</td>
<td>315</td>
<td>271</td>
</tr>
</tbody>
</table>

61(114)
(i) 273 nuts/plot.  (ii) 54.7 nuts/plot.  (iii) Treatment differences are not significant.  (iv) Av. number of nuts per plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₀</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>273</td>
<td>274</td>
<td>253</td>
<td>291</td>
</tr>
</tbody>
</table>

62(17)
(i) 229 nuts/plot.  (ii) 55.8 nuts/plot.  (iii) Treatment differences are not significant.  (iv) Av. number of nuts per plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₀</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. number</td>
<td>254</td>
<td>247</td>
<td>207</td>
<td>206</td>
</tr>
</tbody>
</table>

**Crop:** Tapioca and Horsegram.  
**Ref:** K. 64(172).  
**Site:** Pulses Res. Stn., Sasthamcottha.  
**Type:** 'X'.

Object:—To find out the economics of mixed cropping of Tapioca with Horse gram.

1. BASAL CONDITIONS:
(i) (a) Nil.  (b) Pulses.  (c) Super at 100 Kg/ha.  (ii) N.A.  (iii) Tapioca 23.9.64 and horse gram on 21.9.64  
(iv) (a) 2 diggings.  (b) Horsegram on broad ridges and topioca in furrows between ridges.  (c) to (e) N.A.  
(v) Super at 100 Kg/ha. for Horse gram and tapioca mixture at the rate of 500 Kg/ha. for Tapioca.  
(vi) Local.  (vii) Unirrigated.  (viii) After the harvest of horse gram the ridges are dismantled and hoeing of topioca is done twice.  
(ix) N.A.  (x) Tapioca on 17.9.65 and Horsegram on 13.11.64.

2. TREATMENTS:
3 treatments : T₁=Tapioca alone, T₂=Horsegram alone, T₃=Horsegram and Tapioca mixed.

3. DESIGN:
(i) R.B.D.  (ii) (a) 3.  (b) N.A.  (iii) 8.  (iv) (a) and (b) 6 m. x 9 m.  (v) N. A.  (vi) Yes.

4. GENERAL:
(i) Satisfactory.  (ii) N.A.  (iii) Yield of mixed cropping.  (iv) (a) 1964—only.  (b) and (c) Nil.  (v) to (vii) N.A.

5. RESULTS:
(i) 79.6 Rs./ha.  (ii) 67.7 Rs./ha.  (iii) Treatment differences are highly significant.  (iv) Av. profit in Rs./ha.

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