INSTITUTE OF AGRICULTURAL RESEARCH STATISTICS

NATIONAL INDEX

OF

AGRICULTURAL

FIELD

EXPERIMENTS

VOL. 5 PART 2

KERALA

1954-59

PUBLISHED BY

INDIAN COUNCIL OF AGRICULTURAL RESEARCH
NEW DELHI
FOREWORD

Increase in agricultural production is one of the main objectives of our agricultural planning. It is only by the exploitation of scientific methods of agriculture that we can hope to increase our agricultural production to the level needed for maintaining a reasonable standard of living to the country's population. The technical worth of improvement measures is best judged from carefully conducted field experiments. While it is true that a large number of agricultural field experiments are conducted in the country, the results of these experiments have not been brought together in an integrated manner for the use of research workers. The absence of such a unified account has often led to duplication of work and delay in the utilisation of results for practical farming. The Institute of Agricultural Research Statistics has rendered a very valuable service by preparing a compendium of agricultural field experiments conducted in the country. The first series of compendium containing the results of all agricultural field experiments during the period 1948-53 have already been published by the Institute.

The present compendium is the second in the series covering the period 1954-59. As in the earlier compendium, the present series also contains critical summaries of results of experiments bearing on important agronomic factors, such as the response of crops to fertilizers and manures, inter-relationship of fertilizers, varieties and cultivation practices and other information of value for giving sound advice to farmers in different regions. Judging from the demand for the first series of the compendium, I am sure that the present series will also prove equally useful.

A Standing Committee consisting of the Agricultural Commissioner with the Government of India, the Director, Indian Agricultural Research Institute, and the Statistical Adviser, Indian Council of Agricultural Research, has been set up to provide general guidance to the work under this scheme. I congratulate the members of this Committee and, in particular, the Statistical Adviser and his associates at the Institute of Agricultural Research Statistics for bringing out this compendium. The preparation of this compendium has been made possible only by the wholehearted co-operation of the States and other organisations in making available the results of their experimental researches for this purpose. My thanks are due to the officers of the State Departments of Agriculture and other 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, in a consolidated form, of results of scientific experiments in agriculture in India may be maintained up-to-date.

A. D. PANDIT
Vice-President,
Indian Council of Agricultural Research.

NEW DELHI,
March 26, 1965.
PREFACE

The present set of volumes form Part II in the series of compendia of Agricultural Field Experiments being published by the Indian Council of Agricultural Research under the project for National Index of Field Experiments and contains a unified record of experiments conducted at agricultural research stations and institutes all over the country. Volumes in Part I in this series were published in 1962 and contained results of some 7,500 experiments conducted during the period 1948-53. The present set of volumes includes results of experiments conducted during the next period that is 1954-59. After the period, covered by Part I of the series, agricultural research and experimentation has expanded so much that for the period 1954-59, to which the present volumes refer, results of more than 15,000 experiments are available.

The present compendium is prepared on the same pattern as the previous one and is divided into 15 volumes each for (1) Andhra Pradesh, (2) Assam, Manipur and Tripura, (3) Bihar, (4) Gujarat, (5) Kerala, (6) Madhya Pradesh, (7) Madras, (8) Maharashtra, (9) Mysore, (10) Orissa, (11) Punjab, Jammu and Kashmir and Himachal Pradesh, (12) Rajasthan, (13) Uttar Pradesh (14) West Bengal and (15) All Central Institutes. In each volume, background information of the respective state regarding its division into different soils and agro-climatic regions, rainfall and cropping pattern followed in each region and agricultural production and area under different crops in the state is given. The experiments reported in each volume have been arranged crop-wise for each state. All the experiments belonging to a particular crop at various research stations are grouped together. For a particular crop, experiments are arranged according to the following classification:

- Manurial (M), Cultural (C), Irrigational (I), Diseases, pests and chemicals other than fertilizers (D), Rotational (R), Mixed cropping (X) and combinations of these wherever they occur (e.g. CM as Cultural-cum-Manurial). Experiments in which crop varieties also form a factor are denoted by adding V to their symbol and are grouped together (e.g. MV as Manurial-cum-Varietal).

This publication owes its origin to the guidance and help of Dr. D.J. Finney, F.R.S., Professor of Statistics, Aberdeen University, Scotland, in formulating the project during his stay at the Institute of Agricultural Research Statistics as an F.A.O. expert in 1952-53.

At the Institute of Agricultural Research Statistics the work under the scheme was carried out under the supervision of Shri. T.P. Abraham, Assistant Statistical Adviser. The actual working of the scheme was conducted by Shri G.A. Kulkarni, Statistician till he left the Institute in July, 1964. The work was subsequently taken over by Shri O.P. Kathuria, Assistant Statistician. Messrs. L.B.S. Somayazulu, P.P. Rao, M.L. Sahni, Harhhajan Singh, A.L. Punhani, M.K. Joshi, N.K. Worrier, H.C. Jain and J.K. Kapoor of the statistical staff of the Institute deserve special mention for careful and painstaking work in editing and scrutiny of the manuscript as well as proofs of the compendium.

The burden of collecting the data from the various research stations and the analysis of a large number of experiments once again fell on the regional staff of the Council placed in different States. They deserve to be congratulated for the hard work they have put in.

Thanks are due to the State Departments of Agriculture, the Central Institutes and the Commodity Committees who made the data of the experiments conducted under their jurisdiction readily available to the staff of the Institute. The present publication has become possible only through their unstinted co-operation. The Institute is also thankful to the various
officers in the States who worked as Regional Supervisors for the project from time to time and took keen interest in the working of the Scheme. The list of the names of the regional supervisors and the regional staff of the project is given on the following page.

V.G. Panse
Statistical Adviser,

NEW DELHI,
March 25, 1965.
# REGIONAL SUPERVISORS AND REGIONAL STAFF FOR THE NATIONAL INDEX OF FIELD EXPERIMENTS

<table>
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<th>Regional Supervisors</th>
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<td><strong>1. ANDHRA PRADESH</strong></td>
<td>S.K. Jilani, P.R. Yeri</td>
<td>Dr. Mohd. Quamruddin Khan, Joint Director of Agriculture, LAVD Dr. Syed Waheeduddin, Shri Md. Khasim Adoni, Joint Director of Extension, Shri N.V. Mohana Rao, Joint Director, Agricultural Research Institute, Rajendranagar, Shri L. Venkataratnam, Deputy Director of Agriculture (Research).</td>
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<tr>
<td>(HYDERABAD)</td>
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<tr>
<td><strong>2. MAHARASHTRA</strong></td>
<td>P.D. Mehta, B. Ramakrishnan</td>
<td>Shri D.S. Rangabaro, Statistician, Department of Agriculture.</td>
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<td>S.P. Doshi, S.N. Bajpai, M.P. Saxena, G.N. Bahuguna, A.C. Srivastava</td>
<td>Dr. D. K. Desai, Deputy Director of Agriculture (Statistics), Shri J.B. Trivedi, Deputy Director of Agriculture (Statistics).</td>
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<td><strong>4. UTTAR PRADESH</strong></td>
<td>T. Lokeswara Rao, H.C. Gupta</td>
<td>Shri A.G. Khare, Statistician, Department of Agriculture.</td>
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<td><strong>5. MADHYA PRADESH</strong></td>
<td>A.C. Kaitha, B.L. Kaitha, M.S. Batra, A.C. Srivastava</td>
<td>Shri Prata Singh Sahota, Director of Crop Insurance, Shri Mohinder Singh Pannu, Statistician, Department of Agriculture.</td>
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<td><strong>6. PUNJAB, JAMMU &amp; KASHMIR</strong></td>
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<td>Shri B.S. Somayazulu, Principal, Agricultural Research Institute, Bhubaneswar, Shri V.N. Nath, Statistical Officer, Directorate of Agriculture.</td>
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<td><strong>7. BIHAR</strong></td>
<td>M.K. Joshi, P.C. Khollia</td>
<td>Shri G.P. Singh, Statistician, Department of Agriculture, Shri R.S. Roy, Principal, Agricultural Research Institute, Sabour.</td>
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<td><strong>8. RAJASTHAN</strong></td>
<td>B.P. Dyundhi, N.K. Ohri</td>
<td>Shri H.C. Kothari, Statistician, Department of Agriculture, Shri S.N. Mukerjee, Statistical Officer, Directorate of Agriculture.</td>
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<td>(JAPUR)</td>
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<td><strong>9. ORISSA</strong></td>
<td>L.B.S. Somayazulu</td>
<td>Shri B. Misra, Deputy Director of Agriculture (Hq.), Shri D. Misra, Principal, Utkal Krushi Mahavidyalaya, Bhubaneswar.</td>
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<td>(Bhubaneswar)</td>
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<td><strong>10. WEST BENGAL</strong></td>
<td>S.N. Nath</td>
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<td>(CALUTTA)</td>
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<td>11</td>
<td>Madras</td>
<td>P. Prabhakara Rao</td>
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<tr>
<td></td>
<td>(Coimbatore)</td>
<td>V. Venkateswara Rao</td>
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<td>12</td>
<td>Assam</td>
<td>T.K. Gupta</td>
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<td>13</td>
<td>Mysore</td>
<td>K.A. Balakrishnan</td>
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<td></td>
<td>(Bangalore)</td>
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<td>14</td>
<td>Kerala</td>
<td>V.N. Iyer</td>
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<td></td>
<td>(Trivandrum)</td>
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</tbody>
</table>
ABBREVIATIONS COMMON TO EXPERIMENTS ON ANNUAL AND PERENNIAL CROPS AND EXPERIMENTS ON CULTIVATORS' FIELDS.

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

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

Abbreviations adopted for States are as follows:
1. A.P.—Andhra Pradesh
2. As.—Assam
3. Bh.—Bihar
4. Gj.—Gujarat
5. H.P.—Himachal Pradesh
7. K.—Kerala
8. M.P.—Madhya Pradesh
9. M.—Madras
10. Mh.—Maharashtra
11. Ms.—Mysore
12. Or.—Orissa
13. Ph.—Punjab
14. Rj.—Rajasthan
15. U.P.—Uttar Pradesh
16. W.B.—West Bengal

For the experiments conducted under the schemes sponsored by the Indian Council of Agricultural Research like the Model Agronomic Experiments or the 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 abbreviations MAE, SFT or TCM are given in the brackets against the year in which the experiment is conducted.

Site - Name of the Research Station is mentioned along with the place where it is located, e.g. Agri. Res. Stn. for Agricultural Research Station.

For Central Institutes, the corresponding standard abbreviations have been adopted e.g. I.A.R.I. for the Indian Agricultural Research 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. e.g. CM is to be read as Cultural-cum-manurial.

Object - A statement of the objective of the experiment is given indicating the main crop and type of the experiment. In case of M.A.E., S.F.T. and T.C.M. experiments, the type to which the experiment corresponds is also given, e.g. Type V, Type A or B or C etc.

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 S.E. of comparison(s).

Other abbreviations used in the text of experiments:
Nitro. Phos.—Nitrogen Phosphate
Ammo. Phos.—Ammonium Phosphate
A/S—Ammonium Sulphate
A/S/N—Ammonium Sulphate Nitrate
C/A/N—Calcium Ammonium Nitrate
A/N—Ammonium Nitrate
A/C—Ammonium Chloride
C/N—Chilean Nitrate
N—Nitrogen
P—Phosphate
Under the item (ii) (b) of the sub-heading 'Basal conditions' in the text of the experiment, the respective farm/station at which the experiment was conducted has been referred to for the soil analysis. The soil analysis of the farm, with other details of the research station is given under the background information of each state. The information regarding the details of experimental stations may be obtained under the respective items as given below:

DETAILS OF EXPERIMENTAL 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 monthly 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 as given below.

BASAL CONDITIONS

A. For experiments on annual crops:
   (i) (a) Crop rotation if any. (b) Previous crop. (c) Manuring of previous crop. (State amount and kind). (ii) (a) Soil type. (b) Soil analysis. (iii) Date of sowing/planting. (iv) Cultural practices. (a) Preparatory cultivation. (b) Method of sowing/planting. (c) Seed-rate. (d) Spacing. (e) No. of seedlings per hole. (v) Basal manuring with time and method of application. (vi) Variety. (vii) Irrigated or Unirrigated. (viii) Post-sowing/planting cultural operations. (ix) Rainfall during crop season (x) Date of harvest.

B. For experiments on perennial crops:
   (i) History of site including manuring and other operations. (ii) (a) Soil type. (b) Soil analysis. (iii) Method of propagation of plants. (iv) Variety. (v) Date and method of sowing/planting. (vi) Age of seedlings at the time of planting. (vii) Basal dressing with time and method of application. (viii) Cultural operations during the year. (ix) Inter cropping if any. (x) Irrigated or Unirrigated. (xi) Rainfall during crop season. (xii) Date of harvest.
C. For experiments on cultivators' fields:

(i) Crop rotation, if any. (b) Previous crop. (c) Manuring of previous crop. (ii) Soil type in general. (iii) Basal manuring with time and method of application. (iv) Variety. (v) Cultural practices. (a) Preparatory cultivation. (b) Method of sowing. (c) Seed-rate. (d) Spacing. (e) No. of seedlings per hole. (vi) Period of sowing/planting. (vii) Irrigated or Unirrigated. (viii) Post-sowing/planting cultural operations. (ix) Rainfall during crop season. (x) Period of harvesting.

DESIGN

A. For experiments on annual crops:

(i) Abbreviations for design: C.R.D.—Completely Randomised Design. R.B.D.—Randomised Block Design, L. Sq.—Latin Square, Conf.—Confounded, Fact.—Factorial. (other designs and modifications of the above to be indicated in full). (ii) (a) No. of plots per block. (b) Block dimensions. (iii) No. of replications. (iv) Plot size. (a) Gross. (b) Net. (v) Border or guard rows kept. (vi) Whether treatments are randomised (separately 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; Conf.—Confounded. (other designs and modifications of the above indicated in full). (ii) (a) No. of plots per block. (b) Block dimensions. (iii) No. of replications. (iv) No. of trees/plot. (v) Border or guard rows kept. (vi) Are treatments randomised.

C. For experiments on cultivators' fields:

(i) Method of selection of experimental sites. (ii) No. and distribution of experiments. (iii) Plot size. (a) Gross. (b) Net. (iv) Whether treatments are randomised.

GENERAL

A. For experiments on annual crops:

(i) Crop conditions during growth with date of lodging, if any. (ii) Incidence of pests and diseases with control measures taken. (iii) Quantitative observations taken. (iv) In case of repetition in successive years—(a) from what year to what year, (b) whether treatments were assigned to the same plots in the same manner every year, (c) reference to combined analysis, if any. (v) In case of repetition in other places (a) names of the places along with reference and (b) reference to combined analysis, if any. (vi) Abnormal occurrences like heavy rains, frost, storm etc., if any. (vii) Any other important information.

B. For experiments on perennial crops:

(i) Crop condition during the year. (ii) Incidence of pests and diseases with control measures taken. (iii) Quantitative observations taken. (iv) In case of repetition in successive years—(a) from what year to what year, (b) reference to combined analysis, if any. (v) Abnormal occurrences like heavy rains, frost, storm etc., if any. (vi) Any other important information.

C. For experiments on cultivators' fields:

(i) Crop condition during growth. (ii) Incidence of pests and diseases with control measures taken. (iii) Quantitative observations taken. (iv) In case of repetition in successive years, (a) from what year to what year, (b) whether treatments were assigned to the same plots in the same manner every year, (c) reference to combined analysis, if any. (v) In case of repetition in other places names of places along with reference. (vi) Abnormal occurrences, like heavy rains, frost, storm etc., if any. (vii) Any other important information.
<table>
<thead>
<tr>
<th>Unit</th>
<th>Metric Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 foot</td>
<td>304.8 mm</td>
</tr>
<tr>
<td>1 acre</td>
<td>0.404606 hectare</td>
</tr>
<tr>
<td>1 gram</td>
<td>0.035274 ounce = 0.085735 tola = 0.017147 chatak</td>
</tr>
<tr>
<td>1 kg</td>
<td>2.20462 pounds = 1.07169 seers</td>
</tr>
<tr>
<td>1 metric ton</td>
<td>0.907184 ton = 26.7923 maunds</td>
</tr>
<tr>
<td>1 maund</td>
<td>0.373242 quintal = 37.3242 kg</td>
</tr>
<tr>
<td>1 lb./ac.</td>
<td>1.12054 kg/hectare</td>
</tr>
<tr>
<td>1 md./ac.</td>
<td>92.23002 kg/hectare = 0.9223 quintal/hectare</td>
</tr>
<tr>
<td>1 ton/ac.</td>
<td>2.51071 metric tones/hectare</td>
</tr>
<tr>
<td>1 gallon (Imp.)</td>
<td>4.54609 litres</td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Name of Crop</td>
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<td>--------------</td>
</tr>
<tr>
<td>1.</td>
<td>Paddy</td>
</tr>
<tr>
<td>2.</td>
<td>Bhindi (Lady's finger)</td>
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<tr>
<td>3.</td>
<td>Sweet Potato</td>
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<tr>
<td>4.</td>
<td>Tapioca</td>
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<tr>
<td>5.</td>
<td>Sugarcane</td>
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<tr>
<td>7.</td>
<td>Tobacco</td>
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<tr>
<td>10.</td>
<td>Lemon Grass</td>
</tr>
<tr>
<td>11.</td>
<td>Mandarin orange</td>
</tr>
<tr>
<td>13.</td>
<td>Sapota</td>
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<td>14.</td>
<td>Arecanut</td>
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<td>Orange</td>
<td>242</td>
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<td>Mango</td>
<td>247</td>
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<td>Sapota</td>
<td>249</td>
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<tr>
<td>Arecanut</td>
<td>250</td>
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<tr>
<td>Coffee</td>
<td>251</td>
</tr>
<tr>
<td>Coconut</td>
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DISTRICT BOUNDARIES
WESTERN GHATS
DISTRICT H.Q.
AGRICULTURAL RESEARCH STATIONS.

LATERITE SOIL.
COASTAL SANDY ALLUVIUM
VIRGIN FOREST SOIL.
ALLUVIAL SOIL.
RED SOIL.
RED SANDY SOIL.
BLACK SOIL.
MIXED RED & BLACK SOIL
RED LOAM.
KARI SOIL.
KERALA

1. General:

Kerala, the southern most State of India, lies along the west coast. It stretches along the shores of the Arabian sea over a distance of about 360 miles with Mysore state flanking it on the north and north-east and Madras state on the east and south. The breadth varies from 20 miles in the extreme north and south to over 75 miles in the middle. The state is divided into 9 administrative districts. It has an area of about 9.6 million acres, of which the total cropped area is about 5.54 million acres. The land utilization statistics of this state are given in table 1 below:

TABLE I

<table>
<thead>
<tr>
<th>Land utilization statistics of Kerala State (1958—59)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Area in '000 acres.)</td>
</tr>
<tr>
<td>1. Total geographical area</td>
</tr>
<tr>
<td>2. Area by village papers</td>
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<tr>
<td>3. Forests</td>
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<tr>
<td>4. Land not available for cultivation</td>
</tr>
<tr>
<td>5. Permanent pastures and other grazing lands</td>
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<td>6. Miscellaneous tree-crops and grass</td>
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<td>7. Culturable waste</td>
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<td>8. Current fallows</td>
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<tr>
<td>9. Fallow land other than (8)</td>
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<tr>
<td>10. Net area sown</td>
</tr>
<tr>
<td>11. Total cropped area</td>
</tr>
<tr>
<td>12. Area sown more than once</td>
</tr>
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</table>

2. Topography:

The State, a strip of land running almost in north south direction is situated between the vast Arabian Sea on the west and ranges of Western Ghats and Nilgiri hills on the east both running parallel to each other. From the Western Ghats the country undulates to the west and presents a series of hills and valleys intersected by numerous rivers. On the west the country is more or less flat. These characteristics demarcate the state into three natural regions the high land, the mid land and the low land which, by virtue of the soil types, the agricultural practices and the climatic conditions, form the agro-climatic regions of the state. The characteristic features of these regions are as follows:

High land: The high land on the eastern portion of the state and containing most of the reserve forests occupies nearly 45 per cent of the total area of the state. The annual rainfall ranges between 350 to 500 cm. The ground under the forests is covered with vegetation and forest litter. The soils below the litter are black in colour containing a lot of organic matter. Below this are grey brown or greyish red soils. These soils being virgin are very rich in plant nutrients and pH is, however, low. Means of communication are poor and cultivation is largely limited to plantation crops like tea, coffee, rubber and cardamom.

Mid land: The mid land region consists of uplands of varying elevations through which rivers have carved out long narrow valleys. It covers an area of about 37 per cent. Rainfall ranges between 300 to 450 cm. Laterite and lateritic type of soils are obtained in this region. These soils are generally poor in N, P, K, and organic matter, the pH ranging between 4.5 to 6.0. In parts of Malabar district red soils are also found, fairly deep and of uniform texture. Rice is grown in the valleys while tapioca, cashewnut, coconut, pepper, ginger and rubber are cultivated on the hill tops.
Low land: The low land covering about 18 per cent of the total area is narrow and irregular in shape. A series of back waters, the biggest of which is the Vembanad lake, is met with waters intruding from the sea into this region. These back waters are connected by navigable channels the whole forming a length of inland water communication extending over 250 miles. The rainfall varies between 250 to 350 cm. The soils are of alluvial type, coastal alluvium along the sea coast and alluvials of the river beds. The soils are peculiarly suited to cultivation of rice and coconut.

Along the coast-line the climate is equable and damp. The temperature seldom falls below 70°F. and hardly ever rises over 96°F. In the Ghat area it varies with the altitude and at higher elevation the climate is temperate in character.

3. Irrigation and Rainfall:

The state has a total irrigated area of 879 thousand acres which accounts for about 27.2 per cent of the total area. The extent of area irrigated through different sources is given in table 2 below:

![Table 2](image)

The normal annual rainfall throughout the state is about 300 cm. The state receives majority of the rainfall during the south west monsoon. The south west monsoon sets in early June and continues up to the end of September. The normal rainfall during this period is about 210 cm. During the months October to January, the normal rainfall is about 50 cm.

4. Agricultural Production and Normal cropping pattern.

The most important crops of the state are rice, coconut and tapioca. Rice and tapioca are the chief food crops and coconut besides being a food crop, is also a commercial crop. Besides these, Kerala holds practically a monopoly in the cultivation of rubber, cardamom, pepper etc. which cannot be easily grown elsewhere. The following table gives area, production and average yield per acre of principal crops in the state during the year 1963-64.

![Table 3](image)

*given in million nuts.
5. Agricultural Research and Experimentation.

There are 402 experiments reported from the State for the period 1954-59. The distribution of these experiments crop-wise and type-wise is provided in Table 4 below. Besides there are 89 experiments reported under the Model Agronomic Experiments and the Simple Fertilizer Trial Schemes of the Indian Council of Agricultural Research and on cultivators' fields which are included in the compendium.

Table 4

<table>
<thead>
<tr>
<th>Crop</th>
<th>M</th>
<th>MV</th>
<th>C</th>
<th>CV</th>
<th>CM</th>
<th>CMV</th>
<th>D</th>
<th>I</th>
<th>IM</th>
<th>IC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>89</td>
<td>16</td>
<td>23</td>
<td>4</td>
<td>9</td>
<td>4</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>155</td>
</tr>
<tr>
<td>Bhindi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Sweet Potato</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Tapioca</td>
<td>14</td>
<td>3</td>
<td>15</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Cotton</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Tobacco</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Ginger</td>
<td>10</td>
<td>10</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>Sesaminum</td>
<td>3</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Lemon Grass</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Mandarin Orange</td>
<td>7</td>
<td></td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Mango</td>
<td>3</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Sapota</td>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Arecanut</td>
<td></td>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Coffee</td>
<td>22</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>Coconut</td>
<td>48</td>
<td>36</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>91</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>210</td>
<td>21</td>
<td>114</td>
<td>6</td>
<td>24</td>
<td>4</td>
<td>18</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>402</td>
</tr>
</tbody>
</table>

From the above table it is clear that paddy and coconut account for the largest number of experiments accounting for 39 per cent and 23 per cent respectively of the total number of experiments conducted in the State. The remaining 38 per cent are conducted on crops like tapioca, sugarcane, coffee and ginger. 52 per cent of the experiments conducted are of purely, manurial type while 65 per cent of the experiments have manurial combination of treatments. The important agricultural research stations in the state are Ambalavayal, Mannuthy, Pattambi and Tiruvalla, which account for nearly two-third of the experiments conducted in the state. The block size varied from 2 to 39 in case of R.B.D. and replications from 1 to 8 in case of split-plot designs, no. of main-plots/block varied from 2 to 9 while no. of sub-plots/main-plot varied from 2 to 16. The size of net plot varied from 1/1200 to 1/20 ac. in case of R.B.D. and from 1/1700 ac. to 1/21 ac. in case of split-plot. In case of split-plot the no. of replications varied from 2 to 7.
PARTICULARS OF RESEARCH STATIONS AND SOIL ANALYSIS

A. Agricultural Research Station, Ambattavayal.

A. General information:


B. Normal rainfall in mm.:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>388</td>
<td>518</td>
<td>299</td>
<td>158</td>
<td>253</td>
<td>112</td>
<td>11</td>
<td>6</td>
<td>15</td>
<td>34</td>
<td>135</td>
<td>388</td>
<td>2734</td>
</tr>
</tbody>
</table>

(Average based on data for the period 1947–56).

C. Irrigation and drainage facilities:

(i) (a) Facilities are not available. (b) —. (ii) There is no proper drainage.

D. Soil type and soil analysis:

(i) Clay loam and red loam up to 6' depth and reddish brown colour with a good structure.

(ii) Chemical analysis:

<table>
<thead>
<tr>
<th>Moisture</th>
<th>Loss on Ignition</th>
<th>Lime (CaO)</th>
<th>K₂O</th>
<th>P₂O₅</th>
<th>N</th>
<th>K₂O</th>
<th>P₂O₅</th>
<th>Avl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet</td>
<td>0–9'</td>
<td>1.37</td>
<td>9.64</td>
<td>0.092</td>
<td>0.132</td>
<td>0.058</td>
<td>0.207</td>
<td>0.081</td>
</tr>
<tr>
<td>Level</td>
<td>9'–18'</td>
<td>2.54</td>
<td>3.50</td>
<td>0.064</td>
<td>0.185</td>
<td>0.030</td>
<td>0.085</td>
<td>0.021</td>
</tr>
<tr>
<td>Marshy</td>
<td>0–9'</td>
<td>1.11</td>
<td>3.66</td>
<td>0.078</td>
<td>0.225</td>
<td>0.051</td>
<td>0.130</td>
<td>0.014</td>
</tr>
<tr>
<td>Level</td>
<td>9'–18'</td>
<td>0.54</td>
<td>2.15</td>
<td>0.063</td>
<td>0.119</td>
<td>0.024</td>
<td>0.056</td>
<td>0.011</td>
</tr>
</tbody>
</table>

(iii) Mechanical analysis:

<table>
<thead>
<tr>
<th></th>
<th>Wet land</th>
<th>Marshy land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0–9'</td>
<td>9'–18'</td>
</tr>
<tr>
<td>Clay</td>
<td>16.93</td>
<td>13.80</td>
</tr>
<tr>
<td>Silt</td>
<td>6.97</td>
<td>18.80</td>
</tr>
<tr>
<td>Fine sand</td>
<td>50.47</td>
<td>30.99</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>28.85</td>
<td>42.17</td>
</tr>
<tr>
<td>Acid soluble</td>
<td>—</td>
<td>1.09</td>
</tr>
</tbody>
</table>

E. No. of experiments:

Paddy—5, Ginger—23, Orange—7, Total=33.
2. Tobacco Research Station, Kasaragod.

A. General information to D. Soil type and soil analysis :
Details N.A.

E. No. of experiments :
Tabacco—6, Total—6.

3. Central Coconut Research Station, Kasaragod.

A. General information :
(i) Kannur district, near Kasaragod R.S. Lat. 12°N/Long. 75°E/Alt. 35'. The land is sloping from east to west. Terraced land. (ii) Coastal tract. (iii) Started in 1916. (iv) Coconut plantation. (v) Research on botanical, agronomic and chemical aspects of coconut.

B. Normal rainfall in mm :

<table>
<thead>
<tr>
<th>Month</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>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>207</td>
<td>1043</td>
<td>1056</td>
<td>584</td>
<td>243</td>
<td>204</td>
<td>84</td>
<td>25</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>57</td>
<td>3456</td>
</tr>
</tbody>
</table>

(Average is based on records for over 20 years.)

C. Irrigation and drainage facilities :
(i) (a) Facilities available. (b) Wells. (ii) Soil well drained and no drainage system is necessary.

D. Soil type and soil analysis :
(i) Sandy loam and gravelly soil to a depth of 2' to 3' with greyish colour and light structure. (ii) Chemical analysis and (iii) Mechanical analysis are as under:

**Chemical Analysis :**

<table>
<thead>
<tr>
<th>Sand loam</th>
<th>Depth (in.</th>
<th>N%</th>
<th>P₂O₅</th>
<th>K₂O</th>
<th>Lime</th>
<th>Iron</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12'</td>
<td>0.04</td>
<td>Trace</td>
<td>0.13</td>
<td>0.004</td>
<td>0.02</td>
<td>4.00</td>
</tr>
<tr>
<td>12'-24'</td>
<td>0.03</td>
<td>0.003</td>
<td>0.11</td>
<td>Trace</td>
<td>Trace</td>
<td>4.50</td>
</tr>
<tr>
<td>24'-48'</td>
<td>0.03</td>
<td>0.060</td>
<td>0.70</td>
<td>Trace</td>
<td>Trace</td>
<td>7.12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Red loam</th>
<th>Depth (in.</th>
<th>N%</th>
<th>P₂O₅</th>
<th>K₂O</th>
<th>Lime</th>
<th>Iron</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12'</td>
<td>0.03</td>
<td>Trace</td>
<td>0.08</td>
<td>Trace</td>
<td>Trace</td>
<td>2.72</td>
</tr>
<tr>
<td>12'-24'</td>
<td>0.03</td>
<td>0.004</td>
<td>0.07</td>
<td>Trace</td>
<td>Nil</td>
<td>3.20</td>
</tr>
<tr>
<td>24'-48'</td>
<td>0.04</td>
<td>0.060</td>
<td>0.03</td>
<td>Trace</td>
<td>Trace</td>
<td>4.08</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sandy soil</th>
<th>Depth (in.</th>
<th>N%</th>
<th>P₂O₅</th>
<th>K₂O</th>
<th>Lime</th>
<th>Iron</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12'</td>
<td>0.04</td>
<td>0.070</td>
<td>0.11</td>
<td>Trace</td>
<td>Trace</td>
<td>2.48</td>
</tr>
<tr>
<td>12'-24'</td>
<td>0.04</td>
<td>0.050</td>
<td>0.07</td>
<td>Trace</td>
<td>Trace</td>
<td>2.48</td>
</tr>
<tr>
<td>24'-48'</td>
<td>0.04</td>
<td>0.060</td>
<td>0.03</td>
<td>Trace</td>
<td>Trace</td>
<td>3.12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Laterite gravelly soil</th>
<th>Depth (in.</th>
<th>N%</th>
<th>P₂O₅</th>
<th>K₂O</th>
<th>Lime</th>
<th>Iron</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12'</td>
<td>0.03</td>
<td>0.060</td>
<td>0.24</td>
<td>Trace</td>
<td>0.03</td>
<td>9.92</td>
</tr>
<tr>
<td>12'-24'</td>
<td>0.03</td>
<td>0.070</td>
<td>0.020</td>
<td>Trace</td>
<td>0.04</td>
<td>10.96</td>
</tr>
<tr>
<td>24'-48'</td>
<td>0.05</td>
<td>0.060</td>
<td>Trace</td>
<td>1.29</td>
<td>0.05</td>
<td>3.84</td>
</tr>
</tbody>
</table>

**Mechanical analysis :**

<table>
<thead>
<tr>
<th>Sandy Loam</th>
<th>Red Loam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse Sand</td>
<td>75.60</td>
</tr>
<tr>
<td>Fine Sand</td>
<td>10.52</td>
</tr>
<tr>
<td>Silt</td>
<td>1.00</td>
</tr>
<tr>
<td>Clay</td>
<td>12.75</td>
</tr>
<tr>
<td>pH</td>
<td>5.6</td>
</tr>
</tbody>
</table>
Sandy Loam Laterite gravelly

<table>
<thead>
<tr>
<th></th>
<th>0-12'</th>
<th>12'-24'</th>
<th>24'-48'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse sand %</td>
<td>81.50</td>
<td>83.25</td>
<td>87.50</td>
</tr>
<tr>
<td>Fine sand %</td>
<td>2.50</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Silt %</td>
<td>4.60</td>
<td>2.95</td>
<td>1.48</td>
</tr>
<tr>
<td>Clay %</td>
<td>10.05</td>
<td>11.20</td>
<td>10.30</td>
</tr>
<tr>
<td>pH</td>
<td>4.2</td>
<td>5.4</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Coarse sand %

<table>
<thead>
<tr>
<th></th>
<th>85.75</th>
<th>32.50</th>
<th>15.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine sand %</td>
<td>2.50</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Silt %</td>
<td>4.60</td>
<td>2.95</td>
<td>1.48</td>
</tr>
<tr>
<td>Clay %</td>
<td>10.05</td>
<td>11.20</td>
<td>10.30</td>
</tr>
<tr>
<td>pH</td>
<td>4.2</td>
<td>5.4</td>
<td>4.3</td>
</tr>
</tbody>
</table>

4. Central Coconut Research Station, Kayamkulam.

A. General information:
   (i) Alleppey district, 1 mile from Kayamkulam R.S. Lat. 9.8°N/Long. 76.3°E/Alt. 10'. Level plain land. ii) Sandy, coastal. (iii) Started in 1948. (iv) Coconut. (v) Studies in particular on the pests and diseases of coconut.

B. Normal rainfall in mm.:
   610 215 143 185 209 173 287 21 56 16 135 161 2211
   (Av. is based on data for the period June 1951 to May 1963.)

C. Irrigation and drainage facilities:
   (i) (a) Facilities N.A. (b) —. (ii) No proper drainage.

D. Soil type and soil analysis:
   (i) Sandy loam 3' to 13' depth, grey brown or light brown colour with single grained structure.
   (ii) Chemical analysis:

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Total</th>
<th>P2O5 %</th>
<th>K2O %</th>
<th>CaO %</th>
<th>MgO %</th>
<th>P2O5 %</th>
<th>K2O %</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.029</td>
<td>0.023</td>
<td>0.039</td>
<td>0.053</td>
<td>0.036</td>
<td>0.012</td>
<td>0.009</td>
<td>6.6</td>
</tr>
<tr>
<td>B</td>
<td>0.026</td>
<td>0.020</td>
<td>0.038</td>
<td>0.035</td>
<td>0.035</td>
<td>0.007</td>
<td>0.007</td>
<td>6.5</td>
</tr>
<tr>
<td>C</td>
<td>0.025</td>
<td>0.019</td>
<td>0.036</td>
<td>0.029</td>
<td>0.037</td>
<td>0.006</td>
<td>0.008</td>
<td>6.4</td>
</tr>
</tbody>
</table>

   (iii) Mechanical analysis—N.A.

E. No. of experiments:
   Coconut—21, Total=21.

5. Paddy Breeding Station, Kayamkulam.

A. General information:
   (i) and (ii) As in station no. 3 above. (iii) Started in 1939. (iv) Paddy—sesamum. (v) Agronomic and cultural practices of paddy breeding.

B. Normal rainfall to D. Soil type and soil analysis:
   Same as in station no. 3 above.

E. No. of experiments:

6. Regional Coconut Research Station, Kumarakom.

A. General information:
   (i) District Kottayam. The area is having a higher water level of 2' to 3'. Lat. 9.4°N/Long. 76.3°E/Alt. 5' to 10'. (ii) Reclaimed clay soils of back water areas. (iii) Started in 1947. (iv) Coconut only. (v) Manurial and cultural aspects of coconut.
B. Normal rainfall in mm:

<table>
<thead>
<tr>
<th>Month</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>Apr</th>
<th>May</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>883</td>
<td>549</td>
<td>319</td>
<td>55</td>
<td>267</td>
<td>173</td>
<td>54</td>
<td>3</td>
<td>6</td>
<td>39</td>
<td>120</td>
<td>140</td>
<td>2608</td>
</tr>
</tbody>
</table>

(Average based on data for the period 1957-1958).

C. Irrigation and drainage facilities:

(i) (a) and (b) No facilities are needed here. (ii) Proper drainage is available.

D. Soil type and soil analysis:

(i) Clay soil upto 9' to 2' with grey colour and friable clay structure. It has stiff clay and stiff and sticky clay at inner depths. (ii) Chemical analysis and (iii) Mechanical analysis—N.A.

E. No. of experiments:

Coconut—12, Total=12.

7. Agricultural Research Station, Mannuthy.

A. General information:

(i) Trichur district. Area is mostly undulating except in the wetland. Lat. 10°32'N/Long. 76°12'E/Alt. 28.84'. (ii) Laterite soil with hill slopes. (iii) Started in 1915. (iv) Paddy and fruit crops. (v) Experimentation on paddy and fruit crops.

B. Normal rainfall in mm:

N.A.

C. Irrigation and drainage facilities:

(i) (a) Facilities available since 1955. (b) Canal water. (ii) Proper drainage available for paddy fields only.

D. Soil type and soil analysis:

(i) Laterite and sandy loam soil upto 2' depth with brownish colour and coarse structure. (ii) Chemical and (iii) Mechanical analysis—N.A.

E. No. of experiments:


8. Rice Research Station, Monkompu.

A. General information:

(i) Alleppy district, 50 miles from Ernakulam R.S. Level lands about 4' below mean sea level. (ii) Paddy lands 2' to 10' below mean sea level and liable to incursion of saline waters from sea in February. (iii) Started in 1940. (iv) Paddy two crops. (v) Mainly breeding rice varieties is the research programme.

B. Normal rainfall in mm:

N.A.

C. Irrigation and drainage facilities:

(i) (a) and (b) Irrigation is not necessary. (ii) There is proper drainage.

D. Soil type and soil analysis:

(i) Alluvial to 2' depth, black colour and heavy structure. (ii) Chemical and (iii) Mechanical analysis—N.A.

E. No. of experiments:

Paddy—3. Total=3.
9. Regional Coconut Research Station, Neyyathinkara.

A. General information:
   (i) Trivendrum district, Plain land with deep red loam soil and on water level of about 150'. Lat. 8.15° N/Long. 77° E/Alt. 200'. (ii) Deep red loamy soil. (iii) Started in 1948. (iv) Coconuts. (v) Manural and cultural experiments on coconut.

B. Normal rainfall in mm.:

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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall</td>
<td>537</td>
<td>221</td>
<td>85</td>
<td>6</td>
<td>178</td>
<td>157</td>
<td>83</td>
<td>11</td>
<td>10</td>
<td>25</td>
<td>147</td>
<td>236</td>
<td>1697</td>
</tr>
</tbody>
</table>

(Rainfall data for the period June 1957 to May, 1958.)

C. Irrigation and drainage facilities:
   (i) (a) Facilities not available. (b) —. (ii) Normal drainage.

D. Soil type and soil analysis:
   (i) Loamy soil upto 12', with deep red colour and loamy structure. (ii) Chemical analysis and (iii) Mechanical analysis—NA.

E. No. of experiments:
   Coconut—11. Total—11.

10. Agricultural Research Station, Nileswar.

A. General information:
   (i) Cannanore district. The land is sloping towards the south. Lat. 13°N/Long. 75°E/Alt. 50'. (ii) It represents gravelly laterite soils of the west coast. (iii) Started in 1916. (iv) Coconuts. (v) Research on Agronomic, breeding and varietal trials of coconut.

B. Normal rainfall in mm.:

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<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall</td>
<td>1021</td>
<td>1105</td>
<td>527</td>
<td>263</td>
<td>267</td>
<td>59</td>
<td>12</td>
<td>6</td>
<td>—</td>
<td>3</td>
<td>3</td>
<td>269</td>
<td>3533</td>
</tr>
</tbody>
</table>

(Average is based on monthly rainfall for the period 1948-1957.)

C. Irrigation and drainage facilities:
   (i) (a) Facilities not available. (b) —. (ii) Proper drainage available.

D. Soil type and soil analysis:
   (i) Gravelly laterite soil upto 4' to 6' depth, brown colour and sticky structure.
   (ii) Chemical analysis.

<table>
<thead>
<tr>
<th>Component</th>
<th>Top soil</th>
<th>Sub-soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic matter</td>
<td>5.39</td>
<td>5.76</td>
</tr>
<tr>
<td>Total P₂O₅</td>
<td>0.08</td>
<td>0.06</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>0.08</td>
<td>0.07</td>
</tr>
<tr>
<td>Total K₂O</td>
<td>0.17</td>
<td>0.20</td>
</tr>
<tr>
<td>Avl. P₂O₅</td>
<td>0.01</td>
<td>0.01</td>
</tr>
</tbody>
</table>

(iii) Mechanical analysis.

<table>
<thead>
<tr>
<th>Component</th>
<th>0—12&quot;</th>
<th>12&quot;—24&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>27.73</td>
<td>32.41</td>
</tr>
<tr>
<td>Silt</td>
<td>6.90</td>
<td>7.60</td>
</tr>
<tr>
<td>Fine sand</td>
<td>22.43</td>
<td>18.28</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>44.35</td>
<td>42.70</td>
</tr>
</tbody>
</table>
E. No. of experiments:
Coconut—5, Total=5.

11. Lemongrass Research Station, Odakkali.

A. General information:
(i) Ernakulam district. Hillocks with plains more or less undulating. (ii) Sloping hilly tract. (iii) Started in 1951. (iv) Perennial crops. (v) Experimentation on Lemongrass.

B. Normal rainfall in mm:

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>675</td>
<td>611</td>
<td>733</td>
<td>140</td>
<td>376</td>
<td>188</td>
<td>173</td>
<td>17</td>
<td>66</td>
<td>372</td>
<td>565</td>
<td>3916</td>
<td></td>
</tr>
</tbody>
</table>

(Figures relate to 1957—1958.)

C. Irrigation and drainage facilities:
(i) Facilities available. (b) N.A. (ii) There is proper drainage.

D. Soil type and soil analysis:
(i) Laterite soil to a depth of 6° to 10° with reddish brown colour and grain structure.
(ii) Chemical analysis.

<table>
<thead>
<tr>
<th>Nitrogen</th>
<th>P₂O₅</th>
<th>K₂O</th>
<th>Lime (CaO)</th>
<th>T.S.S.</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.08</td>
<td>0.05</td>
<td>0.23</td>
<td>Trace</td>
<td>0.02</td>
<td>6.4</td>
</tr>
</tbody>
</table>

(iii) Mechanical analysis—N.A.

E. No. of experiments:
Lemongrass—12. Total=12.

12. Agricultural Research Station, Pattambi.

A. General information:
(i) Palghat district. 1 mile from Pattambi R.S. Lat. 10°48'N/Long. 76°12'E/Alt. 83.2'.
(ii) The type of tract represented by the lands is of lateritic origin. (iii) Started in 1927. (iv) 3 crops of paddy rainfed. (v) Manurial and cultural trials on paddy.

B. Normal rainfall in mm:

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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>715</td>
<td>250</td>
<td>154</td>
<td>350</td>
<td>376</td>
<td>116</td>
<td>9</td>
<td>4</td>
<td>24</td>
<td>1</td>
<td>111</td>
<td>305</td>
<td>2415</td>
</tr>
</tbody>
</table>

(Figures relate to the period June 1955 to May 1956.)

C. Irrigation and drainage facilities:
(i) Facilities available June 1955—1956. (b) Paddy irrigation. (ii) Drainage is not necessary for the tract.

D. Soil type and soil analysis:
(i) Red soil up to 8° to 10°, red colour and gravelly sometime. (ii) Chemical analysis and (iii) Mechanical analysis—N.A.

E. No. of experiments:

13. Agricultural Research Station, Pilicode.

A. General information:
(i) Cannanore district. Lat. 13°N/Long. 75°E/Alt. 50'. (ii) N.A. (iii) Started in 1916. (iv) Coconut. (v) Breeding, manurial and cultural trials on coconut.
B. Normal rainfall in mm.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1124</td>
<td>1217</td>
<td>533</td>
<td>282</td>
<td>248</td>
<td>57</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>70</td>
<td>303</td>
<td></td>
<td>3853</td>
</tr>
</tbody>
</table>

(Period—N.A.)

C. Irrigation and drainage facilities:

(i) (a) Facilities available since 1952. (b) Pump irrigation. (ii) Proper drainage available.

D. Soil type and soil analysis:

(i) Pure littoral sandy soils to a depth of 20', white colour and coarse sand and clay structure.

(ii) Chemical analysis:

<table>
<thead>
<tr>
<th>Org. matter</th>
<th>Total P₂O₅</th>
<th>Total K₂O</th>
<th>Nitrogen</th>
<th>Avl. P₂O₅</th>
<th>Avl. K₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>0—6'</td>
<td>0.78</td>
<td>0.62</td>
<td>0.04</td>
<td>0.03</td>
<td>0.001</td>
</tr>
<tr>
<td>Sub soil (3' depth)</td>
<td>0.47</td>
<td>0.01</td>
<td>0.04</td>
<td>0.02</td>
<td>0.004</td>
</tr>
</tbody>
</table>

(iii) Mechanical analysis—N.A.

E. No. of experiments:


A. General information:

(i) Cannanore district. 11 miles from Poppinisseri R.S. The area is undulating. Soils are laterite in nature. (ii) This represents the sub-mountain tract of Cannanore. (iii) Started in 1905. (iv) Paddy and perennials crops like mango, sapota, cocoa, etc. (v) Experimentation on perennial crops and paddy.

B. Normal rainfall in mm.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1224</td>
<td>1070</td>
<td>556</td>
<td>118</td>
<td>172</td>
<td>169</td>
<td>16</td>
<td></td>
<td>27</td>
<td>267</td>
<td>3619</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Figures relate to data of 1957—1958.)

C. Irrigation and drainage facilities:

(i) (a) Facilities available. (b) N.A. (ii) N.A.

D. Soil type and soil analysis:

(i) Laterite soil 6' to 9' depth, red colour and fairly compact structure. (ii) Chemical analysis and (iii) Mechanical analysis—N.A.

E. No. of experiments:


15. Ginger Research Station, Thodupuzha.

A. General information:

(i) Ernakulum district, 42 miles from Alwaye R.S. Lat. 9°45’N/Long. 76°45’E/Alt. 600’. Area is undulating with hills and valleys. (ii) Hilly tract. (iii) Started in 1958. (iv) Ginger crops. (v) Technical and organic aspects of Ginger.

B. Normal rainfall in mm.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>456</td>
<td>903</td>
<td>648</td>
<td>606</td>
<td>389</td>
<td>349</td>
<td>256</td>
<td>4</td>
<td>1</td>
<td>51</td>
<td>45</td>
<td>256</td>
<td>570</td>
<td>4625</td>
</tr>
</tbody>
</table>

(Figures relate to the year 1958—1959.)
C. **Irrigation and drainage facilities:**
   (i) (a) Facilities available. (b) N.A. (ii) Drainage available.

D. **Soil type and soil analysis:**
   (i) Laterite soil to 3' depth, of blackish red colour and loamy structure.
   (ii) Chemical analysis.

<table>
<thead>
<tr>
<th>(% of constituents)</th>
<th>Org. carbon</th>
<th>Avl. (P_2)O_5</th>
<th>Avl. (K_2)O</th>
<th>pH</th>
<th>Total sol. salts</th>
</tr>
</thead>
<tbody>
<tr>
<td>(medium) Trace Trace 4.9 (Acidic) 0.10 (Normal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
   (iii) Mechanical analysis—N.A.

E. **No. of experiments**

16. **Regional Coconut Research Station, Thodupuzha.**

A. **General information:**
   (i) Ernakulam district. Latitude 10°N/Long. 77°E/Alt. 600'. The area is uneven and undulating. (ii) Laterite soil tract of the hill slopes, (iii) Started in 1948. (iv) Coconut (v) Manurial and cultural experiments on coconut.

B. **Normal rainfall in mm.**
   Details—N.A. Total=3175 mm. per year on the average.

C. **Irrigation and drainage facilities:**
   (i) (a) Facilities available. (b) N.A. (ii) No proper drainage.

D. **Soil type and soil analysis:**
   (i) Laterite soil details—N.A. (ii) Chemical analysis—See Appendix no I. on page xxx (iii) Mechanical analysis—N.A.

E. **No. of experiments**

17. **Tapioca Research Station, Tiruvalla.**

A. **General information:**
   (i) Alleppey district. Lat. 9.5°N/Long. 76.3°E/Alt. 12' to 14'. Plain land subjected to floods by which deposits of silt are brought to the field. (ii) Typical low-lying area. (iii) Started in 1957. (iv) Sugarcane, paddy and tuber crops. (v) Varietal and manurial trials on various crops.

B. **Normal rainfall in mm.**
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</thead>
<tbody>
<tr>
<td>763</td>
<td>403</td>
<td>300</td>
<td>222</td>
<td>347</td>
<td>158</td>
<td>33</td>
<td>7</td>
<td>7</td>
<td>61</td>
<td>185</td>
<td>347</td>
<td>2653</td>
</tr>
</tbody>
</table>
   (Figures based on rainfall data for the period 1954—1958.)

C. **Irrigation and drainage facilities:**
   (i) (a) Facilities available since 1957. (b) Lift irrigation with electric motor pump. (ii) Normal drainage.

D. **Soil type and soil analysis:**
   (i) Loam and alluvial soil to a depth of 8' to 10', of higher-red colour and loose structure. (ii) Chemical analysis.
( xxviii )

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Avl.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>P₂O₅</td>
</tr>
<tr>
<td>Loam</td>
<td>0.13</td>
<td>0.16</td>
</tr>
<tr>
<td>Alluvial</td>
<td>0.29</td>
<td>0.29</td>
</tr>
</tbody>
</table>

(ii) Mechanical analysis—N.A.

E. No. of experiments:

18. Tapioca Research Station, Trivendrum.

A. General information:
(i) Trivendrum district. Lat. 8°30' N/Long 77° E/Alt. 175'. Land levelled to different terraces of width 60' to 70'. (ii) Laterite tract. (iii) Started in 1944. (iv) Tapioca. (e) Cultural and manurial aspects and chemical analysis of tapioca tubers.

B. Normal rainfall in mm.:

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</thead>
<tbody>
<tr>
<td></td>
<td>118</td>
<td>200</td>
<td>121</td>
<td>115</td>
<td>272</td>
<td>178</td>
<td>63</td>
<td>29</td>
<td>19</td>
<td>39</td>
<td>116</td>
<td>223</td>
<td>1448</td>
</tr>
</tbody>
</table>

C. Irrigation and drainage facilities:
(i) (a) Facilities not available. (b) —. (ii) Drainage is not necessary.

D. Soil type and soil analysis:
(i) Sandy soil to a depth of 3' to 5', of pale red to reddish brown colour and loose gravelly structure.
(ii) Chemical analysis.

<table>
<thead>
<tr>
<th></th>
<th>Moisture 2.84</th>
<th>Insoluble minerals 71.34</th>
<th>Total N 0.994</th>
<th>Total P₂O₅ 0.47</th>
<th>Total K₂O 0.066</th>
<th>CaO 0.043</th>
<th>Avl. P₂O₅ 0.0003</th>
<th>Avl. K₂O 0.0004</th>
<th>pH 7.0</th>
</tr>
</thead>
</table>

(iii) Mechanical analysis.

|        | Sand 33.79% | Fine sand 19.97% | Clay 33.55% | Silt 8.65% | Moisture 3.06% |

E. No. of experiments:

19. Agricultural College and Research Institute, Vellalial.

A. General information:
(i) Trivendrum district. Lat. 8°30'N/Long. 76°50' E/Alt.105'. The land has both undulating and level areas. (ii) It represents lateritic and alluvial region. (iii) Started in 1955. (iv) Annual, perennial, fruit and vegetable crops; Pulses, cotton, tapioca, coconut, cashewnut, rubber and pepper, etc. (v) Agronomical, chemical and botanical aspects of several crops.
B. Normal rainfall in mm:

<table>
<thead>
<tr>
<th></th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>600</td>
<td>126</td>
<td>247</td>
<td>16</td>
<td>168</td>
<td>166</td>
<td>4</td>
<td></td>
<td>34</td>
<td>12</td>
<td>129</td>
<td>481</td>
</tr>
</tbody>
</table>

C. Irrigation and drainage facilities:

(i) (a) Facilities available since 1955. (b) Lift irrigation from tanks. (ii) Normal drainage.

D. Soil type and soil analysis:

(i) Lateritic and alluvial soil.

(ii) Chemical analysis.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>CaO</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateritic</td>
<td>0.06</td>
<td>0.05</td>
<td>Trace</td>
<td>Trace</td>
<td>4.9</td>
</tr>
<tr>
<td>Alluvial</td>
<td>0.09</td>
<td>0.05</td>
<td>0.03</td>
<td>Trace</td>
<td>4.2</td>
</tr>
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</table>

(iii) Mechanical analysis.

<table>
<thead>
<tr>
<th></th>
<th>(Lateritic soil)</th>
<th>Moisture</th>
<th>Loss on Ignition</th>
<th>Clay</th>
<th>Silt</th>
<th>Fine sand</th>
<th>Coarse sand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateritic</td>
<td></td>
<td>3.60</td>
<td>0.51</td>
<td>29.5</td>
<td>11.5</td>
<td>15.8</td>
<td>32.1</td>
</tr>
</tbody>
</table>

E. No. of experiments:

Paddy—9, Bhindi—1, Tapioca—3. Total=13.

29. Coffee Estate, Wynad.

A. General information to D. Soil type and soil analysis:

Details—N.A.

E. No. of experiments:

Coffee—22. Total=22.
### Appendix No. I

**Thodpuzha :— Chemical Analysis.**

<table>
<thead>
<tr>
<th>Locality</th>
<th>Horizon</th>
<th>Moisture %</th>
<th>Loss on Ignition %</th>
<th>CaO %</th>
<th>MgO %</th>
<th>P2O5 %</th>
<th>K2O %</th>
<th>FeO %</th>
<th>N %</th>
<th>Available P2O5 %</th>
<th>Available K2O %</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hill</td>
<td>0-12&quot;</td>
<td>3.82</td>
<td>13.56</td>
<td>Trace</td>
<td>0.044</td>
<td>0.051</td>
<td>0.116</td>
<td>11.76</td>
<td>0.046 Trace</td>
<td>0.007</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>Hill</td>
<td>12-24&quot;</td>
<td>3.66</td>
<td>13.50</td>
<td>&quot;</td>
<td>0.042</td>
<td>Trace</td>
<td>0.165</td>
<td>11.04</td>
<td>0.119 &quot;</td>
<td>0.008</td>
<td>7.2</td>
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</tr>
<tr>
<td>Nursery area</td>
<td>24-36&quot;</td>
<td>3.81</td>
<td>13.83</td>
<td>&quot;</td>
<td>0.098</td>
<td>0.046</td>
<td>0.103</td>
<td>13.12</td>
<td>0.070 &quot;</td>
<td>0.003</td>
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<tr>
<td>Hill top</td>
<td>0-9&quot;</td>
<td>4.41</td>
<td>13.24</td>
<td>&quot;</td>
<td>0.052</td>
<td>0.052</td>
<td>0.061</td>
<td>5.64</td>
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<td>Trace</td>
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<tr>
<td>Hill top</td>
<td>9-18&quot;</td>
<td>4.23</td>
<td>12.75</td>
<td>&quot;</td>
<td>0.069</td>
<td>0.053</td>
<td>0.134</td>
<td>8.66</td>
<td>0.074 &quot;</td>
<td>&quot;</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>Hill slope</td>
<td>0-9&quot;</td>
<td>4.60</td>
<td>13.00</td>
<td>&quot;</td>
<td>0.042</td>
<td>Trace</td>
<td>0.172</td>
<td>9.28</td>
<td>0.008 &quot;</td>
<td>&quot;</td>
<td>7.4</td>
<td></td>
</tr>
<tr>
<td>N.E. Corner</td>
<td>9-18&quot;</td>
<td>4.73</td>
<td>13.61</td>
<td>&quot;</td>
<td>0.050</td>
<td>&quot;</td>
<td>0.155</td>
<td>9.60</td>
<td>0.111 &quot;</td>
<td>&quot;</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>Corner</td>
<td>18-36&quot;</td>
<td>4.70</td>
<td>21.21</td>
<td>&quot;</td>
<td>0.032</td>
<td>0.042</td>
<td>0.185</td>
<td>11.20</td>
<td>0.096 &quot;</td>
<td>&quot;</td>
<td>6.4</td>
<td></td>
</tr>
</tbody>
</table>

**Note** (1) Low Calcium status-Addition of lime recommended 1-2 lb. per tree.
(2) High fixation of P2O5 and K2O-Addition of organic fertile F. Y. M. or compost or green manure.
Crop: Paddy (1st crop).  
Ref: K. 55(1)
Type: M'.

Object: To test the efficiency of different phosphatic fertilizers in increasing the yield of Paddy.

1. BASAL CONDITIONS:

(i) Nil. (b) Paddy. (c) G.L. at 5000 lb/ac. + Super at 150 lb/ac. as B.D. Top dressing with A/S at 100 lb/ac. one month after planting. (ii) (a) Sandy loam. (b) Refer soil analysis, Ambalavayal. (iii) 26.4.1958-6.6.1958. (iv) (a) Eight ploughings. (b) Planted in lines. (c) —— (d) 6' x 6'. (e) N.A. (v) Nil. (vi) WND-1 (medium, improved) (vii) Unirrigated. (viii) Normal. (ix) 69.76'. (x) 13.10.1958.

2. TREATMENTS:

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

1. Levels of G.L.: G0 = 0 and G1 = 7500 lb/ac.
2. Levels of Lime: L0 = 0 and L1 = 3000 lb/ac.
3. 4 sources of P2O5: P0 = 0, P1 = Super, P2 = Hyper and P3 = B.M.

Phosphate applied at 45 lb/ac. of P2O5. G.L. and Lime applied 15 days before planting and P2O5 one day before planting.

3. DESIGN:

(i) R.B.D. (ii) (a) 16. (b) 56'. (iii) 4. (iv) (a) and (b) 14' x 14'. (v) Nil. (vi) Yes.

4. GENERAL:

(i) No lodging. (ii) A mild attack of Leptocosa noticed at milk stage. Dusting with 10% BHC. (iii) Tiller count, height, grain and straw yield. (iv) (a) 1958—N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) (vii) Nil.

5. RESULTS:

(i) 2046 lb/ac. (ii) 213 lb/ac. (iii) Effect of G is highly significant. Other effects are not significant.

<table>
<thead>
<tr>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>Mean</th>
<th>G0</th>
<th>G1</th>
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<tr>
<td>L0</td>
<td>1569</td>
<td>1840</td>
<td>2031</td>
<td>2049</td>
<td>1972</td>
<td>1844</td>
</tr>
<tr>
<td>L1</td>
<td>2038</td>
<td>2156</td>
<td>2077</td>
<td>2205</td>
<td>2119</td>
<td>2004</td>
</tr>
<tr>
<td>Mean</td>
<td>2004</td>
<td>1998</td>
<td>2054</td>
<td>2127</td>
<td>2046</td>
<td>1924</td>
</tr>
</tbody>
</table>

S.E. of G or L marginal mean = {eq}27 lb/ac.
S.E. of P marginal mean = {eq}53 lb/ac.
S.E. of body of G x P or L x P table = {eq}75 lb/ac.
S.E. of body of G x L table = {eq}53 lb/ac.

---

Crop: Paddy (1st crop).  
Ref: K. 55(2)
Type: M'.

Object: To test the efficiency of different phosphatic fertilizers in increasing the yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) G.L. at 1000 lb/ac. and top dressing with C/A/N at 100 lb/ac. (ii) (a) N.A. (b) Refer soil analysis, Ambalavayal. (iii) 9.6.1959. (iv) (a) to (e) N.A. (v) Nil. (vi) Late variety. (vii) Unirrigated. (viii) Weeding. (ix) 107.87'. (x) 27.10.1959.

2. TREATMENTS:

Same as in exp: no. 1 above.
3. DESIGN:
(i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) and (b) 14'×14'. (v) Border left. (vi) Yes.

4. GENERAL:
(i) Nil lodging. (ii) Nil. (iii) Yield. (iv) (a) 1958—contd. (b) Nil. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 3260 lb/ac. (ii) 420.4 lb/ac. (iii) Main effects of P and interaction G×P are highly significant. Others are not significant. (iv) Avg. yield of grain in lb/ac. Mean of P, Mean of G, Mean of L = 3160, 3511, 2809

<table>
<thead>
<tr>
<th>P</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>Mean</th>
<th>G0</th>
<th>G1</th>
</tr>
</thead>
<tbody>
<tr>
<td>L0</td>
<td>3458</td>
<td>2556</td>
<td>3272</td>
<td>3354</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>3521</td>
<td>2910</td>
<td>3500</td>
<td>3507</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3489</td>
<td>2713</td>
<td>3386</td>
<td>3430</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G0</td>
<td>3570</td>
<td>3376</td>
<td>3618</td>
<td>3562</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G1</td>
<td>3410</td>
<td>2090</td>
<td>3154</td>
<td>3299</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of G or L marginal mean = 75.3 lb/ac.
S.E. of P marginal mean = 105.1 lb/ac.
S.E. of body of G×P or L×P table = 148.6 lb/ac.
S.E. of body of G×L table = 105.1 lb/ac.

Crop: Paddy.
Site: Paddy Breeding Stn., Kayamkulam.
Object: To study the effect of manuring on the incidence of stem-borer.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 1½ cwt/ac. of B.M. as B.D. at the time of ploughing, 5 cwt/ac. of wood ash top dressed one month after planting. (ii) (a) Sandy loam. (b) —. (iii) 28.6.1957/28.8.1957. (iv) (a) 4 ploughings. (b) Planting in lines. (c) —. (d) 9'×9'. (e) 2. (f) C.M. at 45 cwt/ac. at the time of ploughing. (vi) U.R-19 (late, improved). (vii) Unirrigated. (viii) 2 weedings. (ix) 34.82°. (x) 16.1.1958.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N as A/S: N1=0, N2=25 and N3=50 lb/ac.
(2) 3 levels of P2O5 as Super: P1=0, P2=20 and P3=40 lb/ac.
(3) 3 levels of K2O as Pot. Sul.: K0=0, K1=20 and K2=40 lb/ac.
Half the dose applied as B.D. before planting and the remaining half top dressed one month after planting.

3. DESIGN:
(i) 39 partially confounded. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 21'×10'. (b) 21'×9'. (v) One row all round the plot. (vi) Yes.

4. GENERAL:
(i) Good; lodged on 6.1.1958. (ii) Attacked by blast and stem-borer, 2 sprays with shell copper fungicide at 1 lb. in 35 gallons of water. (iii) % damage due to stem-borer and grain yield. (iv) (a) 1957—contd. (b) Nil. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) The percentage of attack was estimated from an area of 9 square feet selected from the worst affected spots in each treatment with help of a wooden square. The number of tillers produced from that sample were first counted and then the number of tillers affected was recorded and the % damage assessed.
5. RESULTS:

A. (i) 1512 lb./ac. (ii) 317 lb./ac. (iii) main effect of N is highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>( N_0 )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>Mean</th>
<th>( K_0 )</th>
<th>( K_1 )</th>
<th>( K_2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>F_0</td>
<td>1505.</td>
<td>1522</td>
<td>1245</td>
<td>1424</td>
<td>1282</td>
<td>1572</td>
</tr>
<tr>
<td>F_1</td>
<td>1516</td>
<td>1641</td>
<td>1331</td>
<td>1496</td>
<td>1505</td>
<td>1374</td>
</tr>
<tr>
<td>F_2</td>
<td>1765</td>
<td>1757</td>
<td>1317</td>
<td>1615</td>
<td>1548</td>
<td>1590</td>
</tr>
<tr>
<td>Mean</td>
<td>1597</td>
<td>1640</td>
<td>1298</td>
<td>1512</td>
<td>1445</td>
<td>1512</td>
</tr>
</tbody>
</table>

B. (i) 12.42 percent. (ii) 4.05 percent. (iii) Effect of N alone is highly significant. (iv) Percentage of incidence of stem-borer.

<table>
<thead>
<tr>
<th>( N_0 )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>Mean</th>
<th>( K_0 )</th>
<th>( K_1 )</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>F_0</td>
<td>7.26</td>
<td>14.94</td>
<td>13.31</td>
<td>11.70</td>
<td>11.70</td>
<td>8.52</td>
</tr>
<tr>
<td>F_1</td>
<td>9.32</td>
<td>11.92</td>
<td>17.89</td>
<td>13.04</td>
<td>12.83</td>
<td>13.81</td>
</tr>
<tr>
<td>Mean</td>
<td>8.74</td>
<td>12.72</td>
<td>15.80</td>
<td>12.42</td>
<td>12.21</td>
<td>11.32</td>
</tr>
</tbody>
</table>

Crop: Paddy (2nd crop).
Site: Paddy Breeding Stn., Kayamkulam.
Object:—To study the effect of manuring on the incidence of stem-borer.

Ref: K. 58(4).
Type: ‘M’.

1. BASAL CONDITIONS:

2. TREATMENTS:
   Same as in exp. no. 3 on page 2.

3. DESIGN:
   (i) 3x partially confounded. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 18’x14’. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Lodged on 3.1.1958.  (ii) Slight attack of blast. 3 sprays with shell copper.  (iii) Grain yield.  (iv) (a) 1957- contd.  (b) No.  (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
(i) 2932 lb./ac.  (ii) 300 lb./ac.  (iii) None of the effects is significant.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>Mean</th>
<th>K0</th>
<th>K1</th>
<th>K2</th>
</tr>
</thead>
<tbody>
<tr>
<td>F0</td>
<td>2836</td>
<td>2910</td>
<td>3119</td>
<td>2888</td>
<td>2956</td>
<td>2819</td>
<td>2849</td>
</tr>
<tr>
<td>F1</td>
<td>2805</td>
<td>3153</td>
<td>2913</td>
<td>2957</td>
<td>2920</td>
<td>2993</td>
<td>2958</td>
</tr>
<tr>
<td>F2</td>
<td>2984</td>
<td>2227</td>
<td>3043</td>
<td>2951</td>
<td>3030</td>
<td>2863</td>
<td>2960</td>
</tr>
<tr>
<td>Mean</td>
<td>2808</td>
<td>2963</td>
<td>3025</td>
<td>2922</td>
<td>2969</td>
<td>2906</td>
<td>2922</td>
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</tr>
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<td>2944</td>
<td>2976</td>
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<td>2969</td>
<td>3088</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 7 lb./ac.
S.E. of body of any table = 123 lb./ac.

Crop = Paddy (1st crop).
Site = Paddy Breeding Stn., Kayamkulam.
Object: To find out the best dose of N for dry sown Paddy.

1. BASAL CONDITIONS:
(i) (a) to (c) Nil.  (ii) (a) Sandy loam.  (b) N.A.  (iii) 22.4.1958.  (iv) (a) Ploughing.  (b) Broadcasting.
(c) 1 lb./plot.  (d) —.  (e) —.  (f) 30 lb./ac. of P₂O₅ as B.M. + 30 lb./ac. of K₂O as wood ash.  (vi) Kochuvinthu (early, local).  (vii) Unirrigated.  (viii) One intercultivation and 2 weedings.  (ix) 53.3°.  (x) 4.8.1958.

2. TREATMENTS:
4 levels of N : N₀=0, N₁=15, N₂=30 and N₃=45 lb./ac.
N supplied through organic and the rest through inorganic manures half dose of N applied as B.D. and ½
top dressed after sowing.

3. DESIGN:
(i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 6.  (iv) (a) N.A.  (b) 24'×19'².  (v) Nil.  (vi) Yes.

4 GENERAL:
(i) Good.  (ii) Nil.  (iii) Grain yield.  (iv) (a) 1958—contd.  (b) No.  (c) Nil.  (v) (a) and (b) Nil.  (vi) Nil.
(vii) No reasons given for low yields.

5. RESULTS:
(i) 904 lb./ac.  (ii) 58 lb./ac.  (iii) Treatment differences are highly significant.  (iv) Av. yield of grain in lb./ac.

<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>700</td>
<td>836</td>
<td>1017</td>
<td>1065</td>
</tr>
<tr>
<td>S.E. mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Paddy (2nd crop).  
Site: Rice Res. Sta., Kayamkulam.  
Ref: K. 59(7).  
Type: 'M'.  

Object: To find out the best dose of N, P and K for Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) 15 lb./ac. of C.M. and 10 lb./ac. of B.M. as B.D. and 25 lb./ac. of Urea top dressed. (ii) (a) and (b) N.A. (iii) 4.7.1959/8.8.1959. (iv) (a) Puddled. (b) N.A. (c) N.A. (d) 9’x6’. (e) Doubles. (v) 4000 lb. of C.M. ploughed in. (vi) U.R. 19 (late). (vii) Unirrigated. (viii) Two hand weedicings. (ix) 31.5°. (x) 14.1.1960.

2. TREATMENTS:

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

(1) 2 levels of N as A/S: N₁ = 30 and N₂ = 60 lb./ac.
(2) 3 levels of P₂O₅ as Super: P₁ = 0, P₂ = 15 and P₃ = 30 lb./ac.
(3) 3 levels of K₂O as Pot. Sul.: K₁₀ = 0, K₁₁ = 15 and K₁₂ = 30 lb./ac.
Half dose of N and full dose of P₂O₅ and K₂O applied as B.D. and the other half of N one month after planting.

3. DESIGN:

(i) 3’x2 partially confounding PK and NPK interactions. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 31°x15’. (b) 50°x15’. (v) One row all round. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Serious attack of helminthosporium, spraying with cupravit. (iii) Vegetative and productive tiller counts and grain yield. (iv) (a) 1959—N.A. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) Nil.

5. RESULTS:

(i) 2216 lb./ac. (ii) 145.2 lb./ac. (iii) Main effect of N is highly significant. Interaction NP is significant. Others are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>K₁₀</th>
<th>K₁₁</th>
<th>K₁₂</th>
<th>Mean</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
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<tr>
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<td>2113</td>
<td>2130</td>
<td>2146</td>
<td>2130</td>
<td>2057</td>
<td>2130</td>
</tr>
<tr>
<td>N₂</td>
<td>2292</td>
<td>2364</td>
<td>2251</td>
<td>2302</td>
<td>2299</td>
<td>2323</td>
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<tr>
<td>Mean</td>
<td>2203</td>
<td>2247</td>
<td>2199</td>
<td>2216</td>
<td>2178</td>
<td>2227</td>
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<tr>
<td>P₁</td>
<td>2180</td>
<td>2189</td>
<td>2166</td>
<td>2189</td>
<td>2189</td>
<td>2189</td>
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<tr>
<td>P₂</td>
<td>2293</td>
<td>2342</td>
<td>2247</td>
<td>2299</td>
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<tr>
<td>P₃</td>
<td>2336</td>
<td>2211</td>
<td>2183</td>
<td>2336</td>
<td>2211</td>
<td>2183</td>
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S.E. of K or P marginal mean = 29.6 lb./ac.
S.E. of N marginal mean = 24.2 lb./ac.
S.E. of body of NxP or NxK table = 41.9 lb./ac.
S.E. of body of PxK table = 51.3 lb./ac.

Crop: Paddy (1st crop).  
Site: Rice Res. Sta., Kayamkulam.  
Ref: K. 59(7).  
Type: 'M'.  

Object: To find out the best dose of N for Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) 4000 lb./ac. of C.M. as B.D. and 50 lb./ac. of A/S and 55 lb./ac. of Pot. Sul. top dressed. (c) N.A. (i) and (b) N.A. (ii) 21.4.1959. (iv) (a) N.A. (b) Dibbling (c) N.A. (d) 6’x6’. (e) N.A. and 150 lb. of wood ash given as B.D. (v) Kochuvithu (early). (vi) Unirrigated. (vii) 2 interculturcs and 2 weedings. (ix) 58.3°. (x) 29.7.1929.
2. TREATMENTS:
   4 levels of N: N₀=0, N₁=15, N₂=30 and N₃=45 lb./ac.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) and (b) 24' x 19'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Cupravit sprayed. (iii) Grain yield. (iv) (a) 1958-1960. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1296 lb./ac. (ii) 202.9 lb./ac. (iii) Treatment differences are significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
</tr>
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<tr>
<td>Av. yield</td>
<td>1183</td>
<td>1150</td>
<td>1349</td>
<td>1503</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>= 82.8 lb./ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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Crop: Paddy (1st crop).
Site: Rice Res. Stn., Kayamkulam.
Object: To find out the effect of organic and inorganic manures on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 4000 lb. of C.M. as B.D. and 50 lb. of A/S and 56 lb. of Pot. Sul. as top dressing. (ii) (a) and (b) N.A. (iii) 21.4.1959. (iv) (a) N.A. (b) Dibbling the seed in the plough. (c) N.A. (d) 6' x 6'. (e) N.A. (f) 150 lb./ac. of B.M. and 2000 lb./ac. of wood ash applied at sowing. (vi) Kochuvithu (early). (vii) Unirrigated. (viii) Two intercultivations and two weedings. (ix) 58.3°. (x) 29.7.1959.

2. TREATMENTS:
   1. 30 lb. of N of which 1 applied as C.M. and 1 as A/S.
   2. 30 lb. of N applied as A/S.

3. DESIGN:
   (i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 6. (iv) (a) and (b) 24' x 19'. (v) Nil. (vi) No.

4. GENERAL:
   (i) Normal. (ii) Cupravit sprayed. (iii) Grain yield. (iv) (a) 1959—N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1018 lb./ac. (ii) 207.0 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>967</td>
<td>1169</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>= 84.5 lb./ac.</td>
<td></td>
</tr>
</tbody>
</table>

---

Crop: Paddy.
Object: To evolve the best combination of A/S, B.M., ash and F.Y.M. to get the highest yield of Paddy.
I. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) 18.9.1954. (iv) (a) 3 ploughings with country plough. (b) Transplanting. (c) —. (d) 6"x6". (e) 20 seeds for each dibbling. (v) Nil. (vi) Varieties (medium, local) (vii) Unirrigated. (viii) One weeding 4 weeks after sowing when A/S was top dressed. (ix) 7.05". (x) 16.1.1955.

2. TREATMENTS:

1. Control.
2. Ash at 1 ton/ha.
3. F.Y.M. at 24 ton/ha.+
4. (2) + (3).
5. (4) + A/S at 20 lb./ac. of N.
6. (4) + A/S at 40 lb./ac. of N.
7. (4) + A/S at 60 lb./ac. of N.
8. (5) + B.M. at 20 lb./ac. of P2O5.
9. (6) + B.M. at 20 lb./ac. of P2O5.
10. (7) + B.M. at 20 lb./ac. of P2O5.
11. (5) + B.M. at 40 lb./ac. of P2O5.
12. (6) + B.M. at 40 lb./ac. of P2O5.
13. (7) + B.M. at 40 lb./ac. of P2O5.
14. (5) + B.M. at 60 lb./ac. of P2O5.
15. (6) + B.M. at 60 lb./ac. of P2O5.
16. (7) + B.M. at 60 lb./ac. of P2O5.

3. DESIGN:

(i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) Varies slightly from 2½ to 3 cent approximately. (b) 2½ cents. (v) A central area of 2½ cent in each plot was harvested leaving the rest for border effects. (vi) Yes.

4. GENERAL:

(i) N.A. (ii) N.A. (iii) Grain yield. (iv) (a) 1953 (Mundakan)—1955 (Mundakan). (b) Yes. (c) Nil. (v) (a) Nil. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 1956 lb./ac. (ii) 240 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1 2 3 4 5 6 7 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1582 1918 2040 1746 1886 2039 2087 2013</td>
</tr>
<tr>
<td>Treatment</td>
<td>9 10 11 12 13 14 15 16</td>
</tr>
<tr>
<td>Av. yields</td>
<td>2061 1986 1959 1852 1916 2074 2148</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>120 lb./ac.</td>
</tr>
</tbody>
</table>

Crop := Paddy (2nd crop).
Object := To evolve the best combination of A/S, B.M., ash and F.Y.M. to get the highest yield of Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) 18.9.1954. (iv) (a) 3 ploughings with country plough and levelling. (b) Transplanting. (c) —. (d) 6"x6". (e) 2 to 3 (v) Nil. (vi) Cochin I (medium, local). (vii) Unirrigated. (viii) One weeding 4 weeks after sowing when A/S was top dressed. (ix) 7.05". (x) 16.1.1955.

2. TREATMENTS:

Same as in exp. no. 9 above.

3. DESIGN:

(i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) Varies from 2½ to 3 cents. (b) 2½ cents. (v) A central area of 2½ cent was harvested leaving the rest for border effects. (vi) Yes.

4. GENERAL:

(i) N.A. (ii) N.A. (iii) Grain yield. (iv) (a) 1953 (Mundakan)—1955 (Mundakan). (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 2497 lb./ac. (ii) 372 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.
Crop :- Paddy (1st crop).

Object :- To compare the efficacy of different phosphatic manures alone and in combination with lime and G.M. on Paddy.

1. BASAL CONDITIONS :
(i) (a) Nil. (b) Sesbania. (c) Nil. (ii) (a) Sandy loam. (b) N.A. (iii) 28.4.1958/6 and 7.6.1958. (iv) (a) 6 to 8 ploughings and 2 diggings. (b) Transplanting. (c) --. (d) 6'x9'. (e) 2. (f) Nil. (vi) PTB=32 (medium, improved). (vii) Unirrigated. (viii) One weeding and filling up of gaps. (ix) 104.7'. (x) 13.10.1958.

2. TREATMENTS :
All combinations of (1), (2) and (3)
(1) 2 levels of G.L. : C_0=0 and C_2=7500 lb./ac.
(2) 2 levels of lime : L_0=0 and L_1=3000 lb./ac.
(3) 3 sources to give 45 lb./ac. of P_2O_5 : S_1=Super, S_2=Hyper and S_3=No P_2O_5.

3. DESIGN :
(i) R.B.D. (ii) (a) 16. (b) 60'x120'. (iii) 4. (iv) (a) 15'x30'. (b) 14'x28'. (v) 9'x6'. (vi) Yes.

4. GENERAL :
(i) Uniform growth. Lodged at the beginning of Oct. (ii) Leaf roller—dusting with BHC 10%. (iii) Height, tiller count and yield of grain and straw. (iv) (a) 1958 (2nd crop)—contd. (b) Yes. (c) Nil. (v) (a) Taliparamba and Ambalavayal. (b) Nil. (vi) and (vii) Nil.

5. RESULTS :
(i) 2069 lb./ac. (ii) 164 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
<th>Mean</th>
<th>L_0</th>
<th>L_1</th>
</tr>
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<td>2107</td>
<td>2117</td>
<td>2088</td>
<td>2063</td>
<td>2091</td>
<td>2073</td>
</tr>
<tr>
<td>C_1</td>
<td>2005</td>
<td>2006</td>
<td>2130</td>
<td>2125</td>
<td>2067</td>
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<td>2056</td>
<td>2056</td>
<td>2109</td>
<td>2094</td>
<td>2079</td>
<td>2065</td>
</tr>
<tr>
<td>L_0</td>
<td>2092</td>
<td>2008</td>
<td>2136</td>
<td>2025</td>
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<td></td>
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<tr>
<td>L_1</td>
<td>2020</td>
<td>2103</td>
<td>2082</td>
<td>2164</td>
<td></td>
<td></td>
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</table>

S.E. of G or L marginal mean =-29 lb./ac.
S.E. of S marginal mean =-41 lb./ac.
S.E. of body of GxS or LxS table =-58 lb./ac.
S.E. of body of GxL table =-41 lb./ac.
Crop :- Paddy (2nd crop).

Object :- To compare the efficacy of different phosphatic manures alone and in combination with lime and G.M. on Paddy.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) 11.9.1958/22, 24, 25.10.1958. (iv) (a) 4 diggings. (b) Transplanting. (c) —. (d) 9"x6". (e) 2. (f) Nil. (v) PTB—27 (medium, improved). (vi) Unirrigated. (vii) Weeding and filling up of gaps. (x) 17.69". (x) 27 to 30.1.1959.

2. TREATMENTS:
   Same as in expt. No. 11 on page 8.

3. DESIGN:
   (i) R.B.D. (ii) (a) 16. (b) 60' x 120'. (iii) 4. (iv) a) 15' x 30'. (b) 14' x 28'. (v) 9"x6". (vi) Yes.

4. GENERAL:
   (i) Satisfactory. Lodged on 10.1.1959. (ii) Stem burner—Foliodol sprayed. (iii) Height, tiller count, grain and straw yield. (iv) 1958 (1st crop)—Costrd. (b) Yes. (c) Nil. (v) (a) Taliparamba and Ambalavayal. (b) Nil. (vi and viii) Nil.

5. RESULTS:
   (i) 980 lb./ac. (ii) 108 lb./ac. (iii) Main effects of G and L are significant. Others are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Mean</th>
<th>I1</th>
<th>I2</th>
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<tbody>
<tr>
<td>G1</td>
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<td>983</td>
<td>914</td>
<td>944</td>
<td>944</td>
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<td>950</td>
<td>1015</td>
<td>980</td>
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<td>1012</td>
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<td>990</td>
<td>964</td>
<td>1070</td>
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</table>

S.E. of G or L marginal mean = 19 lb./ac.
S.E. of S marginal mean = 27 lb./ac.
S.E. of body of G x S or L x S table = 51 lb./ac.
S.E. of body of G x L table = 27 lb./ac.

Crop :- Paddy (2nd crop).

Object :- To compare the efficacy of different phosphatic manures alone and in combination with lime and G.M. on Paddy.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) 3 tons of C.M. and 100 lb. of A/S. (ii) (a) Sandy loam. (b) N.A. (iii) 22.9.1959/26, 27 and 30.10.1959. (iv) (a) Four ploughings. (b) Line planting. (c) 48-50 lb./ac. (d) 10"x6". (e) 2. (f) As per treatments. (v) PTB—4 (medium). (vi) Irrigated. (vii) Three weeding after planting. (ix) 22.23". (x) 18 and 19.2.1960.

2. TREATMENTS:
   Same as in expt. no. 11 on page 8.
3. RESULTS:

(i) 1170 lb./ac. (ii) 223. 0 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>S₀</th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
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<td>1248</td>
<td>1269</td>
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</table>

S.E. of G or L marginal mean = 39.4 lb./ac.
S.E. of S marginal mean = 55.8 lb./ac.
S.E. of G×S or L×S table = 78.8 lb./ac.
S.E. of G×L table = 55.8 lb./ac.

p => Paddy (2nd crop).

Ref. => K. 54(14).
Type => 'M'.

To find out the best combination of N, P and K for Paddy crop.

L CONDITIONS:
(a) Nil. (b) Paddy. (c) 30 tons of C.M. and 100 lbs. of A/S. (ii) (a) Sandy loam. (b) N.A. (iii) 1.1959/25.10.1959. (iv) (a) Four ploughings. (b) Line planting. (c) 48 to 60 lbs. (d) 10' x 6'.
2. (v) As per treatments. (vi) PTB—21 (medium). (vii) Irrigated. (viii) 3 weedings. (ix) 21.18'.

TREATMENTS:
All combinations of (1), (2) and (3)
(1) 2 levels of N : N₁=30 and N₂=60 lb./ac.
(2) 3 levels of P₀ : P₀=0, P₁=15 and P₂=30 lb./ac.
(3) 3 levels of K₀ : K₀=0, K₁=15 and K₂=30 lb./ac.

Source of N, P and K—N.A.

3. DESIGN:
(i) 3x2 confounded. (ii) 6. (b) 104' x 39'. (iii) 4. (iv) (a) 16' x 33'. (b) 15' x 35'. (v) One row only. (vi) Yes.

4. GENERAL:
(i) Lodged soon after flowering. (ii) Attack of case worm, leaf roller, rice bug and stem borer—Endrin sprayed. (iii) Tiller habit, height measurements, straw and grain yield. (iv) (a) 1959—N.A. (b) No. (c) Nil. (v) (a) Pattambi. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2031 lb./ac. (ii) 248.3 lb./ac. (iii) Only NK interaction is highly significant. (iv) Av. yield of grain in lb./ac.
1. **BASAL CONDITIONS:**

   (i) (a) Nil. (b) Paddy. (c) 1 cwt./ac. of B.M. and 1 cwt./ac. of G.N.C.
   (ii) (a) Clayey soil. (b) N.A.
   (iii) 10.11.1954
   (iv) (a) Two ploughings and levelling. (b) Sprouted seeds broadcast. (c) 350 lb./ac.
   (d) and (e) --
   (v) Nil. (vi) Mo. 2 (early, improved). (vii) Irrigated. (viii) 5 weedings. (ix) N.A.
   (x) 12.2.1955.

2. **TREATMENTS:**

   (1) 3 cwt./ac. of Hyper phosphate.
   (2) 3 cwt./ac. of B.M.

   *Mamue* applied 22 days after sowing.

3. **DESIGN:**

   (i) 2×2 L. Sq. (ii) (a) 2. (b) N.A. (iii) 4. (iv) (a) 68’×30’. (b) 66’×28’. (v) 1’ size round. (vi) Yes.

4. **GENERAL:**

   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1952-1954. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. **RESULTS:**

   (i) 630 lb./ac. (ii) 34 lb./ac. (iii) Treatment difference is not significant. (iv) Av. yield in lb./ac.

   **Treatment** | 1 | 2
   688 | 572
   S.E./mean | 17 lb./ac.

---

**Crop:** Paddy (2nd crop).  
**Site:** Rice Res. Stn., Monkompu.  
**Ref:** K. 54(15).  
**Type:** 'M'.

**Object:** To compare the relative efficiencies of Hyper phosphate and B.M. when applied to Paddy.

---

**Basal Conditions:**

(i) (a) Nil. (b) Paddy. (c) 1 cwt./ac. of B.M. and 1 cwt./ac. of G.N.C. (ii) (a) Clayey soil. (b) N.A. (iii) 10.11.1954 (iv) (a) Two ploughings and levelling. (b) Sprouted seeds broadcast. (c) 350 lb./ac. (d) and (e) --. (v) Nil. (vi) Mo. 2 (early, improved). (vii) Irrigated. (viii) 5 weedings. (ix) N.A. (x) 12.2.1955.

**Treatments:**

(1) 3 cwt./ac. of Hyper phosphate.
(2) 3 cwt./ac. of B.M.

*Mamue* applied 22 days after sowing.

**Design:**

(i) 2×2 L. Sq. (ii) (a) 2. (b) N.A. (iii) 4. (iv) (a) 68’×30’. (b) 66’×28’. (v) 1’ size round. (vi) Yes.

**General:**

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1952-1954. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

**Results:**

(i) 630 lb./ac. (ii) 34 lb./ac. (iii) Treatment difference is not significant. (iv) Av. yield in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>688</td>
<td>572</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>17 lb./ac.</td>
<td></td>
</tr>
</tbody>
</table>
2. TREATMENTS:
All combinations of (1), (2) and (3)+an extra treatment ($B_3$).
(1) 2 levels of basal dressing: $B_0=0$ and $B_1=450$ lb./ac. of lime+3 ton/ac. of F.Y.M. as super.
(2) 2 sources of N: $S_1=C/N$ and $S_2=A/S$.
(3) 2 levels of N: $N_1=40$ and $N_2=60$ lb./ac.
$B_3$=basal dose as in (1).
Lime applied 2 to 3 weeks before planting as basal dose, F.Y.M. applied at the time of preparation of the field as basal dose. A/S and C/N were applied one month after planting as top dressing.

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 5. (iv) 18’x21’. (v) Nil. Uniform interspace of about 14’ between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Uniform dusting of BHC given against stemborer. (iii) Yield of grain. (iv) (a) 1952 (1st crop)—1954 (2nd crop) (b) Yes. (c) N.A. (d) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 266 lb./ac. (ii) 13~ lb./ac. (iii) Effects of $B$, $S$, $N$ and interaction $S\times N$ are highly significant while others are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>$S_1$</th>
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S.E. of any marginal mean = 30.0 lb./ac.
S.E. of body of any table or $B_1$ = 42.4 lb./ac.

Crop: Paddy (2nd crop).
Object: To find out the comparative effects of C/N and A/S on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
(iii) 6.9.1954/17.10.1954, (iv) (a) 6 puddlings and 3 levellings. (b) 1 month old seedlings transplanted from wet nursery. (v) and (d) N.A. (e) 2 to 3. (vi) Nil. (vii) FYB—20 (medium, improved). (viii) Uniformed.
(ix) Two weeding first one month and 2nd two months after planting. (x) 15.69”. (x) 19.1.1955

2. TREATMENTS:
Same as in exp. no. 54(16) above.

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 5. (iv) (a) and (b) 18’x21’. (v) Nil. Uniform interspace of about 14’ between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Uniform dusting of BHC against stemborer. (iii) Yield of grain. (iv) (a) 1952 (1st crop)—1954 (2nd crop) (b) Yes. (c) Nil. (d) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 2056 lb./ac. (ii) 164.0 lb./ac. (iii) Effects of $B$ and $S$ are highly significant. The difference between $B_1$ and other treatments is significant. (iv) Av. yield of grain in lb./ac.
Crop: Paddy (2nd crop).

Object: To compare the efficiency of C/N and A/S as B.D. to Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. + 10 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 1.10.1958. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanted. (c) —. (d) 6'x10'. (e) 2. (v) 5000 lb./ac. of G.L. at puddling. (vi) PTB-20 (improved). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 13'. (x) 26.2.1959.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 sources to give 40 lb./ac. of N: S1=C/N and S2=A/S.
   (2) 6 times of application: T1=Full dose before planting, T2=Full dose 2 weeks after planting, T3=Full dose 4 weeks after planting, T4=½ dose before planting+½ dose 2 weeks after planting, T5=½ dose before planting+½ dose 4 weeks after planting, T6=½ dose 2 weeks after planting+½ dose 4 weeks after planting.

3. DESIGN:
   (i) 2x6 Fact. in R.B.D. (ii) (a) 12. (b) 56'x45'. (iii) 4. (iv) (a) N.A. (b) 15'x14'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1958 (2nd crop)—Contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1632 lb./ac. (ii) 162 lb./ac. (iii) None of the effects is significant (iv) Av. yield of grain in lb./ac.

<table>
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<tr>
<th></th>
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<td>1576</td>
<td>1615</td>
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</tbody>
</table>

S.E. of T marginal mean = 57 lb./ac.
S.E. of S marginal mean = 33 lb./ac.
S.E. of body of table = 81 lb./ac.
Crop :- Paddy (1st crop).
Object :- To compare the efficiency of C/N and A/S in B.D. to Paddy.

1. BASAL CONDITIONS:
(i) (a) No. (b) Paddy. (c) As per treatments. (ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 26.5.1959/30.6.1959. (iv) (a) 6 puddlings and 4 levellings. (b) Transplanting. (c) —. (d) to (e) N.A. (v) G.L. at 5000 lb./ac.+20 lb./ac. of P2O5 as super+20 lb./ac. of K2O as Pot. Sul. (vi) PTB-2 (medium). (vii) Unirrigated. (viii) Nil. (ix) 109.6". (x) 20.10.1959.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 sources to give 40 lb./ac. of N : S1=C/N and S2=A/S.
(2) 6 times of application : T1=Full dose before planting, T2=Full dose 2 weeks after planting, T3=dose before planting+1/2 dose 2 weeks after planting, T4=dose before planting+1/2 dose 4 weeks after planting and T5=dose 2 weeks after planting+1 dose 4 weeks after planting.

3. DESIGN:
(i) 2 x 6 Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) and (b) 15' x 14'. (v) An inter-space of 2' is left between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—Contd. (b) Nil. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2549 lb./ac. (ii) 165.7 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
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<th>T3</th>
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</table>

S.E. of marginal mean of S =33.8 lb./ac.
S.E. of marginal mean of T =58.6 lb./ac.
S.E. of body of table =82.8 lb./ac.

Crop :- Paddy (2nd Crop).
Object :- To compare the efficiency of C/N and A/S in B.D. to Paddy.

1. BASAL CONDITIONS:
(i) (a) No. (b) Paddy. (c) As per treatments. (ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 26.9.59/7.11.59. (iv) (a) 6 puddlings and 4 levellings. (b) Transplanting. (c) —. (d) and (e) N.A. (v) G.L. at 5000 lb./ac.+20 lb./ac. of P2O5 as super+20 lb./ac. of K2O as Pot. Sul. (vi) PTB-20 (medium). (vii) Unirrigated. (viii) Nil. (ix) 35.6". (x) 17.2.1960.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 sources to give 40 lb./ac. of N : S1=C/N and S2=A/S.
(2) 6 times of application : T1=Full dose before planting, T2=Full dose 2 weeks after planting, T3=Full dose 4 weeks after planting, T4=dose before planting+1/2 dose 2 weeks after planting, T5=dose before planting+1/2 dose 4 weeks after planting and T6=dose 2 weeks after planting+1 dose 4 weeks after planting.
3. DESIGN:
(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) and (b) 15' x 14'. (v) An inter-space of 2' is left between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—Contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1614 lb./ac. (ii) 112.3 lb./ac. (iii) Main effect of T and interaction S x T are highly significant. (vi) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
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<td>1511</td>
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</table>

- S.E. of marginal mean of S = 22.9 lb./ac
- S.E. of marginal mean of T = 39.7 lb./ac
- S.E. of body of table = 56.2 lb./ac


Ref. : K. 57(21) Type : 'M'.

Object :— To find out the comparative efficiency of A/S and Urea in increasing the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) G.L. 5000 lb./ac. at puddling as basal dose. A/S at 50 lb./ac. top dressed one month after planting. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 8.5.57/10.6.57. (iv) (a) 8 ploughings and 3 diggings. (b) Transplanting. (c) —. (d) 10' x 6'. (e) 3 to 4. (v) PTB-2 (late, improved). (vi) Unirrigated. (vii) One hand weeding a month after planting. (viii) 84.64. (ix) 13.10.57.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 levels of N as Urea : U_1 = 30, U_2 = 60 and U_3 = 90 lb./ac.
(2) 4 levels of N as A/S : N_0 = 0, N_1 = 30, N_2 = 60 and N_3 = 90 lb./ac.
Fertilizers applied in two equal doses 20 and 40 days after planting.

3. DESIGN:
(i) 3 x 4 Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) 10' x 20' (v) Nil. An interspace of 2' between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) BHC dusted against case worms. (iii) Yield of grain. (iv) (a) 1957—Contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 3389 lb./ac. (ii) 142 lb./ac. (iii) Effect of N is highly significant while U and U x N are significant. (iv) Av. yield of grain in lb./ac.
Crop: Paddy (2nd crop).

Object: To find out the comparative efficiency of A/S and Urea in increasing the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 9.9.57/30.10.57. (iv) (a) 4 ploughings and 4 diggings. (b) Transplanted. (c) (d) 10"x6". (e) 3 to 4 seedlings per hole. (v) 5000 lb./ac. G.L. at puddling. (vi) PTB-20 (medium, improved). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 19.97'. (x) 14.2.58.

2. TREATMENTS:
   Same as in exp. no. 21 on page 15.

3. DESIGN:
   (i) 3x4 Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) 10'x20'. (v) Nil. About 2' interspace between plots. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) BHC dusted against case worms. (iii) Yield of grain. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5 RESULTS:
   (i) 238 lb./ac. (ii) 353 lb./ac. (iii) Only the interaction U x N is highly significant. (iv) Av. yield of grain in lb./ac.

<table>
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<tr>
<th>N6</th>
<th>N7</th>
<th>N8</th>
<th>N9</th>
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Mean: 3512 3510 3330 3203 3389

S.E. of U marginal mean = 35.5 lb./ac.
S.E. of N marginal mean = 41.0 lb./ac.
S.E. of body of table = 71.0 lb./ac.

Ref.: K. 57(22) Type: 'M'.

Crop: Paddy.

Object: To find out the comparative efficiency of A/S and Urea in increasing the yield of Paddy.

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Mean: 2302 2223 2481 2451 2384

S.E. of U marginal mean = 88.2 lb./ac.
S.E. of N marginal mean = 101.9 lb./ac.
S.E. of body of table = 176.5 lb./ac.

Ref.: K. 58(22) Type: 'M'.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 21.4.1958/12.6.1958. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanted. (c) —. (d) 6'.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 levels of N as Urea: U1=30, U2=60 and U3=90 lb./ac.
(2) 4 levels of N as A/S: N0=0, N1=30, N2=60 and N3=90 lb./ac.
Fertilizers applied in two equal doses 20 and 40 days after planting.

3. DESIGN:
(i) 3x4 Factor. in R.B.D.s (ii) (a) 12. (b) 120'x20'. (iii) 4. (iv) (a) and (b) 10'x20'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1957—contd. (b) Yes. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2709 lb./ac. (ii) 226 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

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S.E. of U marginal mean = 55.5 lb./ac.
S.E. of N marginal mean = 65.2 lb./ac.
S.E. of body of table = 113.0 lb./ac.

Crop => Paddy.  
Ref => K. 58(24).  
Type => 'M'.

Object => To find out the comparative efficiency of A/S and Urea in increasing the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 17.5.1958 and 4.11.1958. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanting in lines. (c) —. (d) 6'.
(e) N.A. (f) Nil. (g) PTB-20 (improved). (vii) Unirrigated. (viii) One weeding one month after planting. (ix) About 15'. (x) 17.2.1959.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 levels of N as Urea: U1=30, U2=60 and U3=90 lb./ac.
(2) 4 levels of N as A/S: N0=0, N1=30, N2=60 and N3=90 lb./ac.
Half of the manures applied three weeks after planting and the other half five weeks after planting.

3. DESIGN:
(i) 3x4 Factor. in R.B.D. (ii) (a) 12. (b) 120'x20'. (iii) 4. (iv) (a) and (b) 10'x20'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.
5. RESULTS:

(i) 2177 lb./ac.  (ii) 182 lb./ac.  (iii) Main effect of N alone is highly significant.  (iv) Av. yield of grain in lb./ac.

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S.E. of U marginal mean $= 53$ lb./ac.
S.E. of N marginal mean $= 153.5$ lb./ac.
S.E. of body of table $= 53$ lb./ac.

Crop :- Paddy (1st crop).
Object:- To find out the comparative efficiency of A/S and Urea in increasing the yield of Paddy.

Ref :- K. 59(25).
Type :-  'M'.

1. BASAL CONDITIONS:

(i) (a) Nil.  (b) Paddy.  (c) As per treatments.  (ii) (a) N.A.  (b) Refer soil analysis, Pattambi.  (iii) 3.5.1959/18.6.1959.  (iv) (a) and (b) N.A.  (c) Transplanting.  (d) and (e) N.A.  (v) G.L. at 5000 lb./ac.  (vi) PTB-20 (medium).  (vii) One hand weeding one month after planting.  (ix) 110°.  (x) 3.10.1959.

2. TREATMENTS:

Same as in exp. no 21 on page 15.
Half of the manures applied three weeks after planting and the other half five weeks after planting.

3. DESIGN:

(i) 3×4 Fact. in R.B.D.  (ii) (a) 12.  (b) N.A.  (iii) 4.  (iv) (a) and (b) 20'×10'  (v) 2' left between plots.  (vi) Yes.

4. GENERAL:

(i) Normal.  (ii) B.H.C. dusted against case worm.  (iii) Yield of grain.  (iv) (a) 1957—contd.  (b) Yes.  (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:

(i) 2777 lb./ac.  (ii) 307.0 lb./ac.  (iii) Main effects of N and U and their interaction are highly significant.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$N_3$</th>
<th>$N_4$</th>
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<tbody>
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<td>30/2</td>
<td>30/2</td>
<td>27/3</td>
<td>29/2</td>
<td>2956</td>
</tr>
<tr>
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<td>28/5</td>
<td>27/4</td>
<td>23/4</td>
<td>2761</td>
</tr>
<tr>
<td>$U_3$</td>
<td>29/6</td>
<td>26/3</td>
<td>26/7</td>
<td>22/7</td>
<td>2616</td>
</tr>
<tr>
<td>Mean</td>
<td>2996</td>
<td>2840</td>
<td>2716</td>
<td>2558</td>
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S.E. of U marginal mean $= 76.8$ lb./ac.
S.E. of N marginal mean $= 88.6$ lb./ac.
S.E. of body of table $= 153.5$ lb./ac.
Crop: Paddy (2nd crop).  
Ref.:- K. 58(26).  
Type:- 'M'.  


Object:- To find out the comparative efficiency of A/S and Urea in increasing the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 10.9.1959-27.10.1959. (iv) (a) N.A. (b) Transplanting. (c) to (e) N.A. (v) G.L. at 5000 lb./ac. as B.D. (vi) FTB—20 (medium). (vii) Unirrigated. (viii) One hand weeding one month after planting. (ix) 35.63'. (x) 10.2.1960.

2. TREATMENTS:
   Same as in exp. no. 21 on page 15.
   Half of the manures applied three weeks after planting and the other half after five weeks after planting.

3. DESIGN:
   (i) 3 X 4 Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) and (b) 20' X 10'. (v) 2' left between plots. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) B.H.C. dusted against case worm. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2680 lb./ac. (ii) 189 lb./ac. (iii) Main effects of N and U' are highly 'significant. Interaction is not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>N₁</th>
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<th>N₃</th>
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<td>Mean</td>
<td>2533</td>
<td>2630</td>
<td>2721</td>
<td>2638</td>
</tr>
</tbody>
</table>

S.E. of U marginal mean =47 lb./ac.
S.E. of N marginal mean =55 lb./ac.
S.E. of body of table =94 lb./ac.

Crop: Paddy (1st crop).  
Ref.:- K. 58(27).  
Type:- 'M'.  


Object:- To compare the effect of split application of manures individually and in pre-mixed form.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb. of G.L. + 30 lb./ac. of N as A/S. (iii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 24.5.1958-7.7.1958. (iv) (a) Six puddlings and 3 levelings. (b) Transplanting. (c) — (d) 10'' X 6''. (a) 2 seedlings/hole. (v) N/L. (vi) PTB—2 (medium). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) G'. (x) 25.10.58.

2. TREATMENTS:
   Main-plot treatments:
   All combinations of (1), (2) and (3)
   (1) 2 levels of N as A/S: N₁ = 20 and N₂ = 40 lb./ac.
   (2) 2 levels of P₂O₅: P₁ = 20 and P₂ = 40 lb./ac.
   (3) 2 levels of K₂O as Pot. Sol.: K₁ = 20 and K₂ = 40 lb./ac.

Sub-plot treatments:
   2 methods of application: M₁—Individual and M₂—Pre-mixed.
   Half the quantity of individual treatments applied as basal and the other half as top dressing one month after planting. Mixture applied as B.D.
3. DESIGN:
(i) Split-plot. (ii) (a) 8 main-plots/block and 2 sub-plots/main-plot. (b) 104'x67'. (iii) 4. (iv) (a) and (b) 13'x33.5'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1958 (1st crop)—1958 (2nd crop). (b) Yes. (c) Nil. (d) (a) and (b) Nil. (vi) Nil. (vii) Nil.

5. RESULTS:
(i) 234 lb./ac. (ii) (a) 137 lb./ac. (b) 114 lb./ac. (iii) Nil. (iv) (a) 1958 (1st crop)—1958 (2nd crop). (b) Yes. (c) Paddy. (d) Nil. (e) and (f) Nil. (vi) Nil.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>Mean</th>
<th>P1</th>
<th>P2</th>
<th>K1</th>
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<td>2602</td>
<td>2538</td>
<td>2533</td>
<td>2542</td>
<td>2508</td>
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<tr>
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<td>2534</td>
<td>2512</td>
<td>2556</td>
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<td>2516</td>
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</table>

S.E. of difference of two:
1. N, P or K marginal means = 34 lb./ac.
2. M marginal means = 28 lb./ac.
3. M means at the same level of N, P or K = 40 lb./ac.
4. N, P or K means at the same level of M = 44 lb./ac.
S.E. of body of N×P, N×K or P×K tables = 34 lb./ac.

Object:—To compare the effect of split application of manures individually and in pre-mixed form.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) Late rice. (b) Refer soil analysis, Pattambi. (iii) 17.9.1958/11.11.1958. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting. (c) → (d) 10"x6". (e) 2 seedlings/hole. (v) 5000 lb. of G.L. at puddling. (vi) PTB—20 (medium). (vii) Unirrigated. (viii) One weeding a month after transplanting. (ix) 15'. (x) 18.2.1959.

2. TREATMENTS:
Same as in expt. no. 27 on page 19.
Half the quantity of individual treatments applied as basal and the other half as top dressing one month after planting. Mixture applied as B.D. Top dressing with Pot. Sul. and A/S done on 13.12.1958.

3. DESIGN:
(i) Split-plot. (ii) (a) 8 main-plot/block and 2 sub-plots/main-plot. (b) 104'x67'. (iii) 4. (iv) (a) and (b) 13'x33.5'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1958 (1st crop)—1958 (2nd crop). (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.
5. RESULTS:

(i) 1834 lb./ac.  (ii) (a) 168 lb./ac.  (b) 160 lb./ac.  (iii) Main effect of P is highly significant and interaction NPK is significant. Others are not significant. (iv) Av. yield of grain in lb./ac.

<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>Mean</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;1&lt;/sub&gt;</th>
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<td>1803</td>
<td>1726</td>
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<td>1788</td>
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<tr>
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<td>1947</td>
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</table>

S.E. of difference of two
1. N, P or K marginal means = 2 lb./ac.
2. M marginal means = 3 lb./ac.
3. M means at the same level of N, P or K = 2 lb./ac.
4. N, P or K means at the same level of M = 3 lb./ac.
S.E. of body of N×P, N×K or P×K tables = 2 lb./ac.

Crop :- Paddy (1st crop).
Ref :- K. 58(29).
Type :- 'M'.

Object :- To find out the effect of Sodium Chloride as a fertilizer and as a weedicide.

1. BASAL CONDITIONS:
   (i) (a) No. (b) Gingelly, (c) 5 tons/ac. of F.Y.M.  (ii) (a) N.A. (b) Refer soil analysis, Pattambi.  (iii) 3.5.1959.  (iv) (a) 8 ploughings.  (b) to (e) N.A.  (vi) Nil.  (vi) PTB=28 (medium).  (vii) Unirrigated.  (viii) Nil.  (ix) 110'.  (x) 27.8.1959.

2. TREATMENTS:
   Main-plot treatments :
   3 levels of Sodium Chloride : A<sub>0</sub>=0, A<sub>1</sub>=100 and A<sub>2</sub>=200 lb./ac.
   Sub-plot treatments :
   3 doses of A/S and Pot. Sul. : M<sub>0</sub>=No manure, M<sub>1</sub>=100 lb./ac. of A/S+50 lb./ac. of Pot. Sul. and M<sub>2</sub>=200 lb./ac. of A/S+100 lb./ac. of Pot. Sul.

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) 20'×10'.  (v) Inter space of 2' is left between plots.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) NIL  (iii) Yield of grain and count of weeds.  (iv) (a) 1959 (1st crop)—contd.  (b) Yes.  (c) NIL.  (v) (a) and (b) No.  (vi) and (vii) NIL.

5. RESULTS:
   (i) 1791 lb./ac.  (ii) (a) 234.3 lb./ac.  (b) 191.1 lb./ac.  (iii) Only M effect is significant.  (iv) Av. yield of grain in lb./acre.
Object: To compare the manurial value of B.M. with A/S, Super and G.L.

1. BASAL CONDITIONS:
   (i) Nil. (b) Paddy. (c) 500 lb./ac. of G.L.+10 lb./ac. of N as A/S. (ii) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 17.9.1958/13.11.1958. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting (e) ---. (d) 10"×6". (e) N.A. (v) G.L. at $5000 lb./ac. at puddling. (vi) PTB—20 (medium). (vii) Unirrigated. (viii) One weeding. (ix) 15". (x) 23.2.1959.

2. TREATMENTS:
   M1 = B.M., M2 = G.L., M3 = A/S, M4 = Super and M5 = A/S+Super. M1 is applied at 150 lb./ac. while the others are applied to give either N or P or as much as is given by M1.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) 33½′×65′. (iii) 2. (iv) (a) N.A. (b) 33½′×15′. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1775 lb./ac. (ii) 64 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac,

<table>
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<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
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<tr>
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<td>1196</td>
<td>1329</td>
<td>1239</td>
<td>1315</td>
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<tr>
<td>S.E./mean</td>
<td>45 lb./ac.</td>
<td></td>
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Ref: K. 58(30).


Ref: K. 58(31).

Object: To compare the manurial value of B.M. with A/S, Super and G.L.
2. TREATMENTS:
Same as in expt. no. 30 on page 22. 
M₂ is applied at 150 lb./ac. while others are applied to give either N or P₂O₅ as much as is given by M₁.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 20' x 10'. (v) Interspace of 2' left between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) B.H.C. dusted against case worm. (iii) Grain yield. (iv) (a) 1959 (1st crop)—contd. (b) Yes. (c) Nil. (d) A/S. (e) and (f) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2038 lb./ac. (ii) 211.1 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
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<td>1913</td>
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<td>S.E./mean</td>
<td>-8.2 lb./ac.</td>
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</table>


Object :- To compare the manurial value of B.H. with A/S, Super and G.L.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) B.D. of 5000 lb./ac. of G.L. + 50 lb./ac. of Super. Top dressing 150 lb./ac. of A/S one month after planting. (ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 26.9.1959/21.11.1959. (iv) (a) to (e) N.A. (f) N.A. (g) PTB—20 (medium). (h) Unirrigated. (i) One weeding a month after planting. (j) 30'. (k) 15.2.1960.

2. TREATMENTS:
Same as in expt. no. 30 on page 22. 
M₄ is applied at 150 lb./ac. while the others are applied to give either N or P₂O₅ as much as is given by M₄.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 20' x 10'. (v) Interspace of 2' left between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) B.H.C. dusted against case worm. (iii) Grain yield. (iv) (a) 1959 (1st crop)—contd. (b) Yes. (c) Nil. (d) A/S. (e) and (f) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1405 lb./ac. (ii) 112.6 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>M₂</th>
<th>M₃</th>
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<td>-45.7 lb./ac.</td>
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Object :- To compare the relative merits of Ammo. Chloride and A/S.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb. of G.L.+30 lb. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 10.3.1956/17.6.1956. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanting in lines. (c) —. (d) 10"x6". (e) 2 seedlings/hole. (f) 5000 lb. of G.L.+30 lb./ac. of P₂O₅ as Super. (vi) PTB-26 (medium, improved). (vii) Unirrigated. (viii) One weeding. (ix) 80°. (x) 10.10.1956.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 sources of N: S₁=A/S and S₂=Ammo. Chloride.
   (2) 5 levels of N: N₀=0, N₁=15, N₂=30, N₃=45 and N₄=60 lb./ac.
   Manures top dressed one month after planting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 10. (b) 100'x32'. (iii) 5. (iv) (a) N.A. (b) 10'x32'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2641 lb./ac. (ii) 171.2 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.
   Control = 2525 lb./ac.

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<td>2641</td>
<td>2743</td>
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</table>

   S.E. of marginal mean of N' = 54.1 lb./ac.
   S.E. of marginal mean of S = 38.3 lb./ac.
   S.E. of body of table = 76.6 lb./ac.
   S.E. of control mean = 54.1 lb./ac.

Crop := Paddy (2nd crop).
Object := To compare the relative merits of Ammo. Chloride and A/S.

Ref := K. 56/34.
Type := 'M'.

---

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
   (iii) 19.9.1956/26.10.1956. (iv) 6 puddlings and 3 levellings. (b) Transplanting in lines. (c) —. (d) 10"x6".
   (e) 2 seedlings/hole. (f) 5000 lb. of G.L.+150 lb./ac. of Super. (vi) PTB-15 (improved). (vii) Unirrigated.
   (viii) One weeding. (ix) 11.3". (x) 2nd week of Feb., 1957.

2. TREATMENTS:
   Same as in exp. no. 33 on page 23.

3. DESIGN:
   (i) R.B.D. (ii) (a) 10. (b) 100'x32'. (iii) 5. (iv) (a) and (b) 10'x32'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 261 lb./ac. (ii) 161.0 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.
Control = 3138 lb./ac.

<table>
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S.E. of marginal mean of N = 79.0 lb./ac.
S.E. of marginal mean of S = 36.0 lb./ac.
S.E. of body of table = 72.0 lb./ac.
S.E. of control mean = 1848 lb./ac.

Crop: Paddy (1st crop).
Object: To compare the relative merits of Ammon. Chloride and A/S.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments.
   (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
   (iii) 16.5.1957/27.6.1957. (iv) 3 ploughings and 4 diggings.
   (v) Planting in lines. (a) 10'x6'. (e) 3 to 4. (vi) G.L. 5000 lb./ac. at the time of puddling.
   (vii) P.M.26 (improved, medium). (viii) Unirrigated. (viii) One weeding one month after planting before top dressing.
   (ix) E2.8'. (x) 5,10,1957.

2. TREATMENTS:
   Same as in exp. no. 33 on page 24.

3. DESIGN:
   (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 10'x32'. (v) Nil; interspace of 1½ feet between plots.
   (vi) Yes.

4. GENERAL:
   (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1850 lb./ac. (ii) 250.0 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

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S.E. of marginal mean of N = 79.0 lb./ac.
S.E. of marginal mean of S = 44.1 lb./ac.
S.E. of body of table = 111.8 lb./ac.
S.E. of control mean = 79.0 lb./ac.

Ref: K. 57(35).
Type: 'M'.
Crop: Paddy (2nd crop).  

Object: To compare the relative merits of Ammo. Chloride and A/S.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 3.0.1957/19.10.1957. (iv) (a) 3 ploughings and 4 diggings. (b) Planting in lines. (c) 3 to 4. (v) G.L. 5000 lb./ac. at the time of puddling. (vi) PB-15 (improved). (vii) Unirrigated. (viii) One weeding a month after planting before top dressing. (ix) 20°. (x) 23.1.1958.

2. TREATMENTS:
   Same as in exp. no. 31 on page 24.

3. DESIGN:
   (i) R.B.D. (ii) (a) 10. (b) 1/217.8 ac. (iii) 5. (iv) (a) and (b) 10'x32'. (v) Interspace of 1.5 feet between plots. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Folidol sprayed against stem-borer. (iii) Grain yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2915 lb./ac. (ii) 206.0 lb./ac. (iii) Control vs. others alone is highly significant. (iv) Av. yield of grain in lb./ac.

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S.E. of marginal mean of N = 65.1 lb./ac.
S.E. of marginal mean of S = 46.0 lb./ac.
S.E. of body of table = 92.1 lb./ac.
S.E. of control mean = 65.1 lb./ac.

---

Crop: Paddy (1st crop).  

Object: To compare the relative merits of Ammo. Chloride and A/S.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 2.5.1958/3.7.1958. (iv) (a) 6 ploughings and 3 levellings. (b) Transplanting in lines. (c) 10°x6'. (d) 2. (v) 5000 lb. of G.L. + 30 lb. of P2O5 as Super before planting. (vi) PB-25 (improved). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 90°. (x) Last week of Oct. 1958.

2. TREATMENTS:
   Same as in exp. no. 33 on page 24.

3. DESIGN:
   (i) R.B.D. (ii) (a) 10. (b) 120'x32'. (iii) 5. (iv) (a) N.A. (b) 10'x32'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.
5. RESULTS:

(i) 2428 lb./ac. (ii) 280.0 lb./ac. (iii) Control vs. others alone is significant. (iv) Av. yield of grain in lb./ac.

\[
\text{Control} = 2174 \text{ lb./ac.}
\]

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S.E. of marginal mean of \(N\) or control mean = 88.5 lb./ac.
S.E. of marginal mean of \(S\) = 62.6 lb./ac.
S.E. of body of table = 125.2 lb./ac.

Crop :- Paddy (2nd crop).
Object :- To compare the relative merits of Ammo. Chloride and A/S.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
(iii) 17.9.1958/1.11.1958. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanting. (c) - (d) 10' x 5' double. (e) N.A. (v) Nil. (vi) PTB-15 (improved). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 15'. (x) 1.2.1959.

2. TREATMENTS:
Same as in exp. no. 33 on page 24.

3. DESIGN:

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 10' x 32'. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1956—contd. (b) Yes. (c) Nil.
(v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 2536 lb./ac. (ii) 411.0 lb./ac. (iii) Main effect of \(N\) and interaction \(N \times S\) are significant. Control vs. others is not significant. (iv) Av. yield of grain in lb./ac.

\[
\text{Control} = 2564 \text{ lb./ac.}
\]

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<td>2410</td>
<td>2872</td>
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S.E. of marginal mean of \(N\) or control mean = 130.0 lb./ac.
S.E. of marginal mean of \(S\) = 91.9 lb./ac.
S.E. of body of table = 183.8 lb./ac.
Crop :- (1st crop)

Object :- To compare the efficiency of P_{2}O_{5} and K_{2}O applied at different times.

1. BASAL CONDITIONS :
(i) (a) Nil. (b) Paddy. (c) G.L. 8000 lb./ac. at the time of puddling. A/S 50 lb./ac. top dressed one month after planting. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 11.5.1957/7.3.1957. (iv) (a) 6 ploughings and 3 duggings. (b) Transplanting. (c) (d) 10" x 6". (e) 3 to 4. (v) 4000 lb./ac. of G.L. at the time of puddling. (vi) PB-2 (improved). (vii) Unirrigated. (viii) One hand weeding one month after planting. (ix) 85°. (x) 14.10.1957.

2. TREATMENTS :
All combinations of (1), (2) and (3) 
(1) 3 levels of P_{2}O_{5} : P_{1}=0, P_{1}=30 and P_{1}=60 lb./ac. 
(2) 3 levels of K_{2}O : K_{1}=15, K_{2}=30 and K_{3}=45 lb./ac. 
(3) 3 times of application of manures : T_{1}=B.D., T_{3}=15 days after sowing and T_{4}=30 days after sowing.

3. DESIGN :
(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 10"x20". (v) Nil ; interspace of 2' between plots. (vi) Yes.

4. GENERAL :
(i) Normal. (ii) B.H.C. dusted against case-worm. (iii) Grain yield. (iv) (a) 1957- contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS :
(i) 2881 lb./ac. (ii) 158 lb./ac. (iii) Main effect of P alone is significant. (iv) Av. yield of grain in lb./ac.

<table>
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<th>P_{1}</th>
<th>P_{2}</th>
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<th>K_{1}</th>
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<td>2990</td>
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| Mean | 2819  | 2859  | 2964 | 2881 | 2874 | 2894 | 2874 |

S.E. of any marginal mean = 26 lb./ac.
S.E. of body of any table = 46 lb./ac.

Crop :- Paddy (2nd crop).

Object :- To compare the efficiency of P_{2}O_{5} and K_{2}O applied at different times.

1. BASAL CONDITIONS :
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 9.9.1957/31.10.1957. (iv) (a) 4 ploughings and 4 duggings. (b) Transplanting. (c) (d) 10"x6". (e) 3 to 4. (v) 4000 lb./ac. of G.L. at the time of puddling. (vi) PB-20 (improved). (vii) Unirrigated. (viii) One hand weeding one month after planting. (ix) 85°. (x) 17.2.1958.
2. TREATMENTS:
Same as in exp. no. 39 on page 28.

3. DESIGN:
(i) R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 10'×20'. (v) 'Nil. Inter space of 2' between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Foliock sprayed against stemborer. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1554 lb./ac. (ii) 225 lb./ac. (iii) Effect of P alone is highly significant. (iv) Av. yield of grain in lb./ac.

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S.E. of any marginal mean =38 lb./ac.
S.E. of body of any table =65 lb./ac.

Crop : Paddy,

Ref. to K. 58(41).

Type =-M'.

Object :—To compare the efficiency of P₂O₅ and K₂O applied at different times.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 23.4.1958/15.6.1958. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanting in lines. (c) —. (d) 6'×6'.
(e) 2. (v) G.L. at 4000 lb./ac. (vi) PTB-2 (Improved). (vii) Unirrigated. (viii) One weeding. (ix) 80'.
(x) 17.10.1958.

2. TREATMENTS:
Same as in exp. no. 39 on page 28.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 27. (b) 60'×90'. (iii) 4. (iv) (a) N.A. (b) 10'×20'. (v) 'Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2690 lb./ac. (ii) 161 lb./ac. (iii) Effects of P and T are highly significant. Interaction P×T is significant.
(iv) Av. yield of grain in lb./ac.
Crop—Paddy (1st Crop).

Object:—To compare the efficiency of P₂O₅ and K₂O applied at different times.

1. BASAL CONDITIONS:
   (i) (a) No. (b) Paddy. (c) As per treatments.
   (ii) (a) N.A. (b) Refer soil analysis, Pattambi.
   (iii) 26.5.1959/4.7.1959.
   (iv) (a) to (e) N.A. (v) N.A. (vi) YTB-2 (medium).
   (vii) Unirrigated. (viii) One hand weeding one month after planting.

2. TREATMENTS:
   Same as in exp. no. 39 on page 29.

3. DESIGN:
   (i) Fact. in R.B.D.
   (ii) (a) 27. (b) N.A.
   (iii) 4.
   (iv) (a) and (b) 20'x10'.
   (v) No; inter space of 2' left between the plots.
   (vi) Yes.

4. GENERAL:
   (i) Normal.
   (ii) B.H.C. dusted against case worm.
   (iii) Grain yield.
   (iv) (a) 1957—1959. (b) Yes. (c) Nil. (v) (a) and (b) No.
   (vi) and (vii) Nil.

5. RESULTS:
   (i) 2662 lb./ac. (ii) 293.4 lb./ac. (iii) None of the effects is significant.
   (iv) Av. yield of grain in lb./ac.

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S.E. of any marginal mean = 27 lb./ac.
S.E. of body of any table = 46 lb./ac.
Crop: Paddy (2nd crop).  

Object: To compare the efficiency of P<sub>0</sub>O<sub>3</sub> and K<sub>2</sub>O applied at different times.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments.  
   (ii) (a) N.A. (b) Refer soil analysis, Pattambi.  
   (iv) (a) to (c) N.A. (v) N.A. (vi) PTB-20 (medium).  
   (vii) Unirrigated.  
   (viii) One hand weeding one month after planting.  
   (ix) 35.6'.  
   (x) 16.2.1960.

2. TREATMENTS:
   Same as in exp. no. 28 on page 28.

3. DESIGN:
   (i) Fact. in R.B.D.  
   (ii) (a) 27. (b) N.A.  
   (iii) 4. (iv) (a) and (b) 20' X 10'.  
   (v) No. Inter space of 2' left between the plot.  
   (vi) Yes.

4. GENERAL:
   (i) Normal.  
   (ii) B.H.C. dusted against case worm.  
   (iii) Yield of grain.  
   (iv) (a) 1957-1959. (b) Yes. (c) Nil.  
   (v) (a) and (b) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1481 lb./ac.  
   (ii) 115.3 lb./ac.  
   (iii) Interaction T x K alone is significant.  
   (iv) Av. yield of grain in lb./ac.

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<td>T&lt;sub&gt;2&lt;/sub&gt;</td>
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<td>1493</td>
<td>1500</td>
<td>1476</td>
<td>1479</td>
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<td>T&lt;sub&gt;3&lt;/sub&gt;</td>
<td>1470</td>
<td>1471</td>
<td>1530</td>
<td>1490</td>
<td>1510</td>
<td>1437</td>
<td>1524</td>
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<tr>
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<td>1446</td>
<td>1496</td>
<td>1502</td>
<td>1481</td>
<td>1478</td>
<td>1486</td>
<td>1478</td>
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<td>K&lt;sub&gt;1&lt;/sub&gt;</td>
<td>1458</td>
<td>1476</td>
<td>1500</td>
<td></td>
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<tr>
<td>K&lt;sub&gt;2&lt;/sub&gt;</td>
<td>1444</td>
<td>1518</td>
<td>1498</td>
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<tr>
<td>K&lt;sub&gt;3&lt;/sub&gt;</td>
<td>1435</td>
<td>1492</td>
<td>1507</td>
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</tbody>
</table>

S.E. of any marginal mean = 19.2 lb./ac.  
S.E. of body of any table = 33.3 lb./ac.

---

Crop: Paddy (1st crop).  

Object: To find out the effect of pre-soaking Paddy seeds and sowing with and without manures.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb. G.L. +75 to 150 lb./ac. of A/S.  
   (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.  
   (iv) /a Six puddlings 3 levellings. (b) Transplanting in lines.  
   (c) —. (d) 10' x 6'. (e) 2. (f) Nil. (v) PTB-2 (medium).  
   (vi) Unirrigated.  
   (vii) One weeding.  
   (ix) 63.95'.  
   (x) 15.10.1955.

2. TREATMENTS:
   Make-plot treatments:
   2 manures: M<sub>0</sub>—No manure and M<sub>2</sub>=5000 lb. G.L. at puddling+10 lb. N as A/S top dressed on 27.7.55.
   Sub-plot treatments:
   5 soaking treatments: S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub>, S<sub>4</sub> and S<sub>5</sub>—Details N.A.
3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/block and 8 sub-plots/main-plot. (b) 40'X7'. (iii) 4. (iv) (a) and (b) 48'X30'. (v) No. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1955—1956. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2777 lb./ac. (ii) (a) 138 lb./ac. (b) 152 lb./ac. (iii) Main effect of M, S and interaction MxS are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Mean</th>
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<td>M0</td>
<td>3131</td>
<td>3209</td>
<td>3189</td>
<td>3131</td>
<td>2450</td>
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<tr>
<td>M1</td>
<td>2509</td>
<td>2606</td>
<td>2569</td>
<td>2625</td>
<td>2353</td>
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<tr>
<td>Mean</td>
<td>2920</td>
<td>2907</td>
<td>2878</td>
<td>2878</td>
<td>2402</td>
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</tbody>
</table>

S.E. of difference of two
1. M marginal means = 56 lb./ac.
2. S marginal means = 76 lb./ac.
3. S means at the same level of M = 107 lb./ac.
4. M means at the same level of S = 111 lb./ac.

Crop :— Paddy (2nd crop).
Site :— Agri. Res. Sta., Pattambi.
Object :— To find out the effect of pre-soaking Paddy seed and sowing with and without manures.

Ref.: K.55(45)
Type :— 'M'.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 lb. G.L. and 30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 8.9.1955/28 and 29.10.1955. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting in lines. (c) —. (d) 10'X6'. (e) 2 seedlings/hold. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) One weeding. (ix) 28.36". (x) 25.1.1956.

2. TREATMENTS:
Main-plot treatments:
M0—No manure and M1—5000 lb. G.L. as basal before planting+30 lb. N as A/S top dressed one month after planting.

Sub-plot treatments:
8 soaking treatments: S1, S2, S3, S4, S5, S6, S7 and S8—Details N.A.

Site: Agri. Res. Stn., Pattambi.  Type: 'M'.

Object: To find out the effect of pre-soaking Paddy seeds and sowing with and without manures.

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) Paddy.  (c) 5000 lb./ac. of G.L. + 30 lb./ac. of N as A/S.  (ii) (a) Laterite loam.  (b) Refer soil analysis, Pattambi.  (iii) 28.6.1956/30.7.1956.  (iv) (a) Six puddlings and 3 levellings.  (b) Transplanting.  (c) 2.  (v) Nil.  (vi) PTB-2 (medium).  (vii) Unirrigated.  (viii) One weeding.  (x) 80°.  <t>18.10.1956.

2. TREATMENTS:
   Main-plot treatments:
   2 manures: Mo=No manures, M1=4000 lb./ac. of G.L.+150 lb./ac. of A/S.
   Sub-plot treatments:
   9 chemicals for soaking: C0=Control, C1=Waler, C2=Pot. Sul. M/2, C3=Indole acetic acid 50 ppm., C4=Naphthalene acetic acid 50 ppm., C5=C4+Indole acetic acid 50 ppm., C6=C4+Naphthalene acetic acid 50 ppm., C7=Foliar spraying with Indole acetic acid and C8=C7+C9.
   G.L. applied as basal and A/S as top dressing one month after planting.

3. DESIGN:
   (i) Split-plots.  (ii) (a) 2 main-plots/block and 9 sub-plots/main-plot.  (b) 90'x30'.  (iii) 4.  (iv) (a) and (b) 5'x30'.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  (ii) Nil.  (iii) Grain yield.  (iv) (a) 1955 (1st crop)—1956 (1st crop).  (b) No.  (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 3185 lb./ac.  (ii) (a) 366 lb./ac.  (b) 238 lb./ac.  (iii) M effect alone is highly significant.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>C0</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>C7</th>
<th>C8</th>
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<td>Mo</td>
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<td>3267</td>
<td>3321</td>
<td>3212</td>
<td>3576</td>
<td>3412</td>
<td>3666</td>
<td>3321</td>
<td>3630</td>
<td>3454</td>
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<td>M1</td>
<td>2777</td>
<td>2795</td>
<td>3013</td>
<td>2868</td>
<td>2958</td>
<td>2904</td>
<td>2904</td>
<td>3013</td>
<td>3013</td>
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<td>3031</td>
<td>3167</td>
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<td>3267</td>
<td>3153</td>
<td>3285</td>
<td>3267</td>
<td>3322</td>
<td>3185</td>
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S.E. of difference of two
<table>
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<tr>
<th></th>
<th>M marginal means</th>
<th>C marginal means</th>
<th>C means at the same level of M</th>
<th>M means at the same level of C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mo</td>
<td>= 91 lb./ac.</td>
<td>= 66 lb./ac.</td>
<td>= 119 lb./ac.</td>
<td>= 168 lb./ac.</td>
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<tr>
<td>2. C</td>
<td></td>
<td></td>
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</tbody>
</table>


Object: To compare the manurial value of compost prepared from Jack leaf, Gliricidia leaf and Sesbania leaf with Sesbania green leaf.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb/ac. of C.L. + 100 to 150 lb/ac. of A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 1st week of June/1st week of July 1954. (iv) (a) Six puddlings and 1 levellings. (b) Transplanted. (c) —. (d) 10"x6". (e) 2. (v) Nil. (vi) PTB-2 (Medium). (vii) Unirrigated. (viii) One weeding one month after planting. (ix) 25.10.1954.

2. TREATMENTS:
   1. No manure.
   2. A/S at 30 lb/ac. of N 14 days after transplanting.
   3. Sesbania leaf at 30 lb/ac. of N applied as B.D.
   4. Sesbania compost at 30 lb/ac. of N as B.D.
   5. Gliricidia compost at 30 lb/ac. of N as B.D.
   6. Jack leaf compost at 30 lb/ac. of N as B.D.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 17"x26". (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1954 (1st crop)—1956 (2nd crop). (b) Yes. (c) Nil. (v) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1426 lb/ac. (ii) 188 lb/ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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</thead>
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<tr>
<td>Av. yield</td>
<td>1240</td>
<td>1571</td>
<td>1388</td>
<td>1454</td>
<td>1380</td>
<td>1421</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>77 lb/ac.</td>
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Object: To compare the manurial value of compost prepared from Jack leaf, Gliricidia leaf and Sesbania leaf with Sesbania green leaf.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 1954/31.10.1954. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting. (c) —. (d) 10"x6". (e) 2. (v) Nil. (vi) PTB-4. (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 15.69.

2. TREATMENTS:
   Same as in expt. no. 47 above.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 17"x26". (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1954 (1st crop)—1956 (2nd crop). (b) Yes. (c) Nil. (v) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1723 lb/ac. (ii) 305 lb/ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb/ac.
Treatments

<table>
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<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
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<tr>
<td>Av. yield</td>
<td>1659</td>
<td>1749</td>
<td>1811</td>
<td>1680</td>
<td>1729</td>
<td>1712</td>
</tr>
<tr>
<td>S.E./mean</td>
<td></td>
<td>-125 lb./ac.</td>
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</table>

Crop: Paddy (2nd crop).
Object: To compare the manurial value of compost prepared from Jack leaf, Gliricidia leaf and Sesbania with Sesbania green leaf.

1. **BASEL CONDITIONS**:
   (i) (a) Nil. (b) Paddy. (c) Basal dressing of 5000 lb. of G.L. and top dressing of 150 lb. of A.S. one month after planting. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 4.9.1954/11.10.1954. (iv) (a) Six puddlings 3 levellings. (b) Transplanting. (c) —. (d) N.A. (e) 2 to 3. (v) Nil. (vi) PTB—4 (medium, improved). (vii) Unirrigated. (viii) Hand weeding twice. 

2. **TREATMENTS**:
   Same as in expt. no. 47 on page 34.
   A/S applied as top dressing two weeks after planting. G.L. applied at the time of puddling as basal dressing.

3. **DESIGN**:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 17'x26'. (v) Nil. A uniform inter space of 1½' left on all sides of each plot. (vi) Yes.

4. **GENERAL**:
   (i) Normal. (ii) Dusting against stemborer with BHC given uniformly to the plots. (iii) Grain yield. (iv) (a) 1954 (1st crop)—1956 (2nd crop). (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) (vii) Nil.

RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tr>
<td>Av. yield</td>
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<td>1752</td>
<td>1822</td>
<td>1603</td>
<td>1891</td>
<td>1723</td>
</tr>
<tr>
<td>S.E./mean</td>
<td></td>
<td>143.3 lb./ac.</td>
<td></td>
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</table>

Crop: Paddy (1st crop).
Object: To compare the manurial value of compost prepared from Jack leaf, Gliricidia leaf and Sesbania with Sesbania green leaf.

1. **BASEL CONDITIONS**:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 21.5.1955/15.7.1955. (iv) (a) 4 ploughings, 2 mummy digging and levellings. (b) Planted in lines. (c) N.A. (d) Rows 10" apart. (e) 3 to 4. (v) Nil. (vi) PTB—2 (medium, improved). (vii) Unirrigated. (viii) 2 weeding. (ix) 68.93'. (x) 25.10.1955.

2. **TREATMENTS**:
   Same as in expt. no. 47 on page 34.

3. **DESIGN**:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) 17'x26'. (v) Nil; about 2' inter space left between plots. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) Preventive dusting with B.H.C. (iii) Yield of grain. (iv) (a) 1954 (1st crop)—1956 (2nd crop). (b) Yes. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 1428 lb./ac. (ii) 187.0 lb./ac. (iii) Treatment differences are significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>Av. yield</td>
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<td>1670</td>
<td>1377</td>
<td>1468</td>
<td>1382</td>
<td>1417</td>
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<tr>
<td>S.E./mean</td>
<td>76.3 lb./ac.</td>
<td></td>
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</tr>
</tbody>
</table>

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1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 11.8.1955/23.11.1955. (iv) (a) 4 ploughings and 2 manurary diggings, levelling. (b) Planted in lines. (c) —. (d) N.A. (e) 3 to 4. (v) Nil. (vi) PTB-4 (medium, improved). (vii) Unirrigated. (viii) One weeding. (ix) 29.10.56. (x) 2.2.1956.

2. TREATMENTS:
Same as in exp. no. 47 on page 34.

3. DESIGN:
(i) R.B.D. (ii) 6. (b) N.A. (iii) 6. (iv) (a) and (b) 17'x26'. (v) Nil.; About 2' inter space between plots. (vi) Yes

4. GENERAL:
(i) Normal. (ii) Spraying with D.D.T. against stem borer. (iii) Yield of grain. (iv) (a) 1954 (1st crop)—1956 (2nd crop). (b) Yes. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 478 lb./ac. (ii) 175 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>467</td>
<td>503</td>
<td>383</td>
<td>508</td>
<td>457</td>
<td>552</td>
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<tr>
<td>S.E./mean</td>
<td>71.4 lb./ac.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 28.5.1956/12.7.1956. (iv) (a) Six ploughings, 3 levellings. (b) Transplanting in lines. (c) N.A. (d) 10'x6'. (e) N.A. (v) Nil. (vi) PTB-2 (improved). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) At about 80°. (x) 26.10.1956.

2. TREATMENTS:
Same as in exp. no. 47 on page 34.

A/S applied on 28.7.1956, compost on 12.7.56 and leaf applied before planting.
3. DESIGN:
   (i) R.B.D. (ii) 6. (b) 26' × 120'. (iii) 6. (iv) (a) and (b) 17' × 26'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1954 (1st crop) — 1956 (2nd crop). (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2006 lb./ac. (ii) 20.1 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

   Treatment | 1 | 2 | 3 | 4 | 5 | 6
   Av. yield  | 1971 | 2119 | 2028 | 2119 | 2077 | 2201
   S.E./mean  | ~5.7 lb./ac.

---

Crop: Paddy (2nd crop).  
Ref: K. 56(53).  
Type: 'M'.

Object: To compare the manurial value of compost prepared from Jack leaf, Gleadia leaf and Sesbania leaf with Sesbania green leaf.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 28.9.1956/7.11.1956. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting in line. (c) N.A. (d) 10' × 4'. (e) N.A. (f) Nil. (g) PTB-12 (improved). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 2.62'. (x) 5.2.1957.

2. TREATMENTS:
   Same as in exp. no. 47 on page 34.

3. DESIGN:
   (i) R.B.D. (ii) 6. (b) 102' × 120'. (iii) 6. (iv) (a) and (b) 17' × 26'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1954 (1st crop) — 1956 (2nd crop). (b) Yes. (c) Nil. (d) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1959 lb./ac. (ii) 158 lb./ac. (iii) Treatment differences are significant. (iv) Av. yield of grain in lb./ac.

   Treatment | 1 | 2 | 3 | 4 | 5 | 6
   Av. yield  | 1766 | 1815 | 1831 | 1987 | 2063 | 2094
   S.E./mean  | ~6.5 lb./ac.

---

Object: To test the efficacy of compost prepared by re-enforcement with phosphates.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 4000 lb. G.L. + 50 lb. A/S as R.D. and another 50 lb. A/S as top dressing one month after planting. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 8.9.1955/9.11.1955. (iv) (a) 4 ploughings, 2 mammarty diggings and levellings. (b) Transplanting. (c) —. (d) 10' spacing. (e) 3 to 4 (v) Nil. (vi) PTB-20 (medium, improved). (vii) Unirrigated. (viii) 2 weedicings. (ix) 34'. (x) 1.5.1956.
2. TREATMENTS:

(I) A/S at 30 lb./ac. of N + compost at N given by reinforced compost in tr. 2.

(2) A/S at 30 lb./ac. of N + compost reinforced with super at 33 lb./ac. of P2O5.

(3) A/S at 30 lb./ac. of N + compost reinforced with rock phosphate to supply 30 lb./ac. of P2O5.

(4) A/S at 30 lb./ac. of N + compost at N given by reinforced compost in tr. 3.

(5) A/S at 30 lb./ac. N + compost at N given by reinforced compost in tr. 3.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 5' × 40'. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Preventive dusting and spraying given to all plots against pests. (iii) Grain yield. (iv) (a) and (b) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 1359 lb./ac. (ii) 133 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1387</td>
<td>66 lb./ac.</td>
</tr>
<tr>
<td>2</td>
<td>1327</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1332</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1390</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1338</td>
<td></td>
</tr>
</tbody>
</table>


Object: To find out the manurial value of wild rubber leaf as compared to Sesbania leaf.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) 5000 lb. G.L. +10 C.L. of C.M. +50 lb./ac. of A/S applied as B.D. at the time of puddling. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 23.4.1955/30.6.1955. (iv) (a) 4 ploughings, 1 digging and levelling. (b) Transplanted. (c) —. (d) 10' × 6'. (e) 3 to 4. (v) Nil. (vi) PTB—2 (medium). (vii) Unirrigated. (viii) Weeding. (ix) 69'. (x) 16.10.1955.

2. TREATMENTS:

(I) No G.L.

(2) Wild rubber leaf at 6000 lb./ac.

(3) Sesbania leaf at 6000 lb./ac.

A/S at 30 lb./ac. as top dressing to all treatments one month after planting. G.L. applied as basal at the time of ploughing.

3. DESIGN:

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 15' × 10'. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Preventive dusting of B.H.C. (iii) Grain yield. (iv) (a) 1954 (1st crop)—1955 (1st crop). (b) Yes. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 1816 lb./ac. (ii) 135 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1679</td>
<td>48 lb./ac.</td>
</tr>
<tr>
<td>2</td>
<td>1849</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1919</td>
<td></td>
</tr>
</tbody>
</table>
Crop: Paddy (1st crop).

Object:—To study the response of G.M. and A/S alone and in combination.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 16.5.1957/26.6.1957. (iv) (a) 6 ploughings and 3 diggings. (b) Planting in lines. (c) —. (d) 10"x6". (e) 3 to 4. (v) Nil. (vi) PTB-2 (improved). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 85°. (x) 17.10.1957.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of G.M.: L₁=2000, L₂=5000 and L₃=8000 lb./ac.
   (2) 3 levels of N as A/S: N₁=60, N₂=120 and N₃=180 lb./ac.
   G.M. applied at the time of puddling as B.D. and A/S in two equal doses 20 and 40 days after planting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 15"x25". (v) Nil. 2' inter space between plots (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) B.H.C. dusted against case worms. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2593 lb./ac. (ii) 342 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₁</td>
<td>2670</td>
<td>2667</td>
<td>2673</td>
<td>2673</td>
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<tr>
<td>N₂</td>
<td>2835</td>
<td>2604</td>
<td>2692</td>
<td>2710</td>
</tr>
<tr>
<td>N₃</td>
<td>2352</td>
<td>2450</td>
<td>2563</td>
<td>2455</td>
</tr>
<tr>
<td>Mean</td>
<td>2619</td>
<td>2517</td>
<td>2643</td>
<td>2593</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 99 lb./ac.
S.E. of body of table = 171 lb./ac.

Crop: Paddy (2nd crop).

Object:—To study the response of G.M. and A/S alone and in combination.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 3.9.1957/11.1.1957. (iv) (a) 4 ploughings and 4 diggings. (b) Planting in lines. (c) —. (d) 10"x6". (e) 3 to 4. (v) Nil. (vi) PTB-20 (improved). (vii) Unirrigated. (viii) One hand weeding a month after planting. (ix) 19.97°. (x) 15.1.1958.

2. TREATMENTS:
   Same as in expt. no. 56 above.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 15"x25". (v) Nil. 2' inter space between plots. (vi) Yes.
4. GENERAL:

(i) Normal. (ii) Folidol sprayed against stemborer. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes.
(c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

3. RESULTS:

(i) 1763 lb./ac. (ii) 247 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
<th>Mean</th>
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<tbody>
<tr>
<td>N₁</td>
<td>1606</td>
<td>1813</td>
<td>2040</td>
<td>1820</td>
</tr>
<tr>
<td>N₂</td>
<td>1675</td>
<td>1766</td>
<td>1982</td>
<td>1808</td>
</tr>
<tr>
<td>N₃</td>
<td>1644</td>
<td>1717</td>
<td>1623</td>
<td>1661</td>
</tr>
<tr>
<td>Mean</td>
<td>1642</td>
<td>1765</td>
<td>1882</td>
<td>1763</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 71 lb./ac.
S.E. of body of table = 124 lb./ac.

Crop: Paddy (1st crop).

Object: To study the effect of response of G.M. and A/S alone and in combination.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Lateritic loam. (b) Refer soil analysis, Pattambi. (iii) 5.5.1958/23.6.1958. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanting in lines. (c)—. (d) 10'x5'. (e) 1. (v) Nil. (vi) FFB-2 (improved). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) About 90'. (x) 28.10.1958.

2. TREATMENTS:

Same as in exp. no. 56 on page 39.

3. DESIGN:

(i) Fact. in R.B.D. (ii) 9. (b) 135'x25'. (iii) 4. (iv) 15'x25'. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 2162 lb./ac. (ii) 207 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₁</td>
<td>2024</td>
<td>2078</td>
<td>2247</td>
<td>2116</td>
</tr>
<tr>
<td>N₂</td>
<td>2267</td>
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<td>2293</td>
<td>2193</td>
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<td>N₃</td>
<td>2195</td>
<td>2127</td>
<td>2199</td>
<td>2174</td>
</tr>
<tr>
<td>Mean</td>
<td>2162</td>
<td>2077</td>
<td>2246</td>
<td>2162</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 60 lb./ac.
S.E. of body of table = 104 lb./ac.
Crop := Paddy (2nd crop).
Object := To study the response of G.M. and A/S alone and in combination.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 17.9.1958/6.11.1958. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanting in lines. (c) —. (d) 15'x6". (e) 2. (f) Nil. (g) PTB-20 (improved). (v) Nil. (vi) One weeding month after planting. (vii) Nil. (x) 15'.
   19.2.1959.

2. TREATMENTS:
   Same as in exp. no. 56 on page 39.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) and (b) 15'x25'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) yield of grain and straw. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (d) Nil. (e) Nil. (f) and (vii) Nil.

5. RESULTS:
   (i) 1708 lb./ac. (ii) 139 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₁</td>
<td>1499</td>
<td>1648</td>
<td>1667</td>
<td>1605</td>
</tr>
<tr>
<td>N₂</td>
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<td>1676</td>
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<tr>
<td>N₃</td>
<td>1896</td>
<td>1811</td>
<td>1839</td>
<td>1849</td>
</tr>
<tr>
<td>Mean</td>
<td>1672</td>
<td>1712</td>
<td>1739</td>
<td>1708</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 40 lb./ac.
S.E. of body of table = 70 lb./ac.

Crop := Paddy (1st crop).
Object := To study the response of G.M. and A/S alone and in combination.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 3.5.1958/25.6.1959. (iv) (a) to (c) N.A. (v) Nil. (vi) PTB-2. (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 109'. (x) 24.10.1959.

2. TREATMENTS:
   Same as in exp. no. 56 on page 39.
   G.M. applied as B.D. and A/S in two equal doses 30 and 45 days after planting.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) and (b) 25'x15'. (v) No. only inter space of 2' between plots. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) B.H.C. dusted against case worms. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (d) Nil. (e) and (vii) Nil.

5. RESULTS:
   (i) 1316 lb./ac. (ii) 293.6 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.
Crop : Paddy (2nd crop).

Object :- To study the response of G.M. and A/S alone and in combination.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 26.9.1959-91.1959. (iv) (b) to (c) N.A. (v) Nil. (vi) PTB-20 (medium). (vii) Unirrigated. (viii) One weeding. (ix) 3.56°. (x) 23.2.1960.

2. TREATMENTS:
   Same as in expt. no. 56. on page 39.
   G.M. applied as B.D. and A/S in two equal doses 30 and 45 days after planting.

3. DESIGN :
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) and (b) 25'x15'. (v) No. Only an inter space of 2' left between plots. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) B.H.C. dusted against case worm. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1377 lb./ac. (ii) 231.4 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₁</td>
<td>1258</td>
<td>1396</td>
<td>1532</td>
<td>1395</td>
</tr>
<tr>
<td>N₂</td>
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<td>1243</td>
<td>1268</td>
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<tr>
<td>N₃</td>
<td>1405</td>
<td>1025</td>
<td>1427</td>
<td>1286</td>
</tr>
<tr>
<td>Mean</td>
<td>1341</td>
<td>1207</td>
<td>1401</td>
<td>1236</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 84.7 lb./ac.
S.E. of body of table = 146.8 lb./ac.

Crop : Paddy (1st crop).
Site : Agri Res. Stn., Pattambi.

Object :- To compare the effect of giving Dhaincha along with Paddy and trampling it later with application of G.L. brought from outside.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. +30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 13.4.1958. (iv) (a) 8 to 10 ploughings. (b) Broadcast. (c) Paddy—80 lb./ac. Dhaincha—45 lb./ac. (d) and (e) —. (v) Wood ash at 1000 lb./ac. by broadcasting. (vi) PTB-25 (improved). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 89.69°. (x) 13.8.1958.
2. TREATMENTS:
1. Broadcasting a mixture of Paddy and dhaincha and later on trampling in dhaincha.
2. Broadcasting Paddy and applying *gliricidia* leaves brought from outside equal to dhaincha.
3. Applying 2500 lb./ac. of *gliricidia* leaves before broadcasting Paddy.
4. Local practice of broadcasting paddy.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) 60′×25′. (iii) 6. (iv) (a) N.A. (b) 15′×25′. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) and (b) Nil. (c) Nil. (v) (a) and (b) Nil. (vi) Nil.
   (vii) This extpt. has been conducted in clayey area.

5. RESULTS:
   (i) 634 lb./ac. (ii) 114 lb./ac. (iii) Treatment differences are significant. (iv) Av. yield of grain in lb./ac.
   Treatment 1 2 3 4
   Av. yield 605 5 773 575
   S.E./mean =47 lb./ac.

Ref : K. 58(83). Type : "M".

Object : To compare the effect of sowing *dhaincha* along with Paddy and trampling it later with application of *G.L.* brought from outside.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. +30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 15.4.1958. (iv) (a) 8 to 10 ploughings. (b) Broadcast. (c) Paddy—80 lb./ac. *dhaincha*—45 lb./ac. (d) and (e) -. (v) Wood ash applied at 1000 lb./ac. (vi) PTB-25 (Improved). (vii) Unirrigated. (viii) One weeding a month after sowing. (ix) 89.69′. (x) 11.8.1958.

2. TREATMENTS:
   Same as in extpt. no. 62 above.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) 100′×15′. (iii) 6. (iv) (a) N.A. (b) 15′×25′. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) to (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) Nil.
   (viii) This extpt. has been conducted in sandy area.

5. RESULTS:
   (i) 813 lb./ac. (ii) 61 lb./ac. (iii) Treatment differences are significant. (iv) Av. yield of grain in lb./ac.
   Treatment 1 2 3 4
   Av. yield 797 786 884 786
   S.E./mean =25 lb./ac.

Ref : K. 59(64). Type : "M".

Object : To compare the effect of sowing *dhaincha* along with Paddy and trampling it later with application of *G.L.* brought from outside.

1. BASAL CONDITIONS:
   (i) (a) No. (b) Paddy. (c) G.L. at 4000 lb./ac.+A/S at 1000 lb./ac. as top dressing. (ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 12.5.1959. (iv) (a) Six puddlings and 4 levellings. (b) Broadcast. (c) N.A. (d) and (e) -. (v) Ash applied at 1000 lb./ac. (vi) PTB-25 (medium). (vii) Unirrigated. (viii) N.A. (ix) 10.98′. (x) 24.8.1959.
2. TREATMENTS:

Same as in expl. no. 62 on page 43.

3. DESIGN:

(i) R.B.D. (ii) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 25' x 15'. (v) An inter space of 1 foot between plots as border. No guard rows left. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—contd. (b) Yes. (c) Nil. (v) (a) and (b) No. (vi) and (vii) Nil.

5. RESULTS:

(i) 505.7 lb./ac. (ii) 81.1 lb./ac. (iii) Treatment differences are significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>426.5</td>
<td>506.8</td>
<td>602.1</td>
<td>487.3</td>
<td>=33.11 lb./ac.</td>
</tr>
</tbody>
</table>


Object: —To find out the effect of applying continuously A/S and G.L. alone and in combination.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) G.L. at 8000 lb. at the time of ploughing; 50 lb./ac. of A/S one month after planting. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (ii) 8.5.1957/10.6.1957. (iv) (a) 6 puddlings and 3 diggings. (b) Transplanting. (c) —. (d) 8' x 10'. (e) 3 to 4. (v) Nil. (vi) FYB 20—improved—135 days. (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 85.75". (x) 15.10.1957.

2. TREATMENTS:

1. G.L. at 30 lb./ac. of N.
2. G.L. at 60 lb./ac. of N.
3. G.L. at 30 lb./ac. of N + A/S at 15 lb./ac. of N.
4. A/S at 30 lb./ac. of N.
5. A/S at 60 lb./ac. of N.

G.L. applied as B.D. at the time of puddling. A/S top dressed one month after planting.

3. DESIGN:

(i) R.B.D. (ii) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 15' x 20'. (v) 2' inter space between plots. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) B.H.C. dusted against case worms. (iii) Grain yield. (iv) (a) 1957—contd. (b) and (c) Yes. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 3161 lb./ac. (ii) 124 lb./ac. (iii) Treatments do not differ significantly. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3173</td>
<td>3149</td>
<td>3157</td>
<td>3166</td>
<td>3160</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=51 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Paddy (2nd crop).
Ref: K. 57(69).
Type: ".

Object: To find out the effect of applying continuously A/S and G.L. alone and in combination.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatment. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 9.9.1957/30.10.1957. (iv) (e) 4 ploughings and 4 diggings. (b) Planting in lines. (c) —. (d) 6'x10'. (e) 3 to 4. (v) Nil. (vi) PTB-20 (Medium improved). (vii) Unirrigated. (viii) One weeding a month after planting. (ix) 1957'. (x) 12.2.1958.

2. TREATMENTS:
   Same as in exp. no. 65 on page 44.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 15'x20'. (v) Nil ; 2' inter space between plots. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Fol. sprayed against stemborer. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1875 lb./ac. (ii) 259 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1580</td>
<td>1774</td>
<td>1974</td>
<td>2051</td>
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</tr>
<tr>
<td>S.E./mean</td>
<td>=106 lb./ac.</td>
<td></td>
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</tbody>
</table>

Crop: Paddy (1st crop).
Ref: K. 58(67).
Type: "M."

Object: To find out the effect of applying continuously A/S and G.L. alone and in combination.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 23.4.1958/6.10.1958. (iv) (a) 6 ploughings and 8 levellings. (b) Transplanting in lines. (c) —. (d) 10'x6'. (e) 2. (v) Nil. (vi) PTB-2 (improved). (vii) Unirrigated. (viii) One weeding one month after planting. (ix) 77.35'. (x) 10.10.1958.

2. TREATMENTS:
   Same as in exp. no. 65 on page 44.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 15'x20'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2510 lb./ac. (ii) 229 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
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<td>2707</td>
<td>2556</td>
<td>2462</td>
<td>2514</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=93 lb./ac.</td>
<td></td>
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</table>
Crop := Paddy (2nd crop).  
Ref := K. 58(68).  
Type := 'M'.

Object := To find out the effect of applying continuously A/S and G.L. alone and in combination.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments.  
   (ii) (a) Silt loam. (b) Refer soil analysis, Pattambi.  
   (iv) (a) 6 paddings and 3 dellings. (b) Transplanted in lines. (c) —. (d) 10'x6'.  
   (e) 2. (v) Nil. (vi) PTB-20 (improved).  
   (vi) Unirrigated. (viii) One weeding one month after planting.  
   (ix) 15'. (x) 17.2.1959.

2. TREATMENTS:
   Same as in expt no. 65 on page 44.

3. DESIGN:
   (i) R.B.D.  
   (ii) (a) 5. (b) 75'x20'.  
   (iii) 6. (iv) (a) and (b) 15'x20'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) (vii) and (viii) Nil.

5. RESULTS:
   (i) 120 lb./ac. (ii) 149 lb./ac. (iii) Treatments not significantly different. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>5</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>1137</td>
<td>1229</td>
<td>1185</td>
<td>1149</td>
<td>1305</td>
</tr>
</tbody>
</table>

S.E./mean = 61 lb./ac.

---

Crop := Paddy (1st crop).  
Ref := K. 59(69).  
Type := 'M'.

Object := To find out the effect of applying continuously A/S and G.L. alone and in combination.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments.  
   (ii) (a) N.A. (b) Refer soil analysis, Pattambi.  
   (iii) 3.5.1959/20.6.1959.  
   (iv) (a) to (e) N.A. (v) N.A. (vi) PTB—20 (medium). (vii) Unirrigated. (viii) One weeding a month after planting.  
   (ix) 109'. (x) 14.10.1959.

2. TREATMENTS:
   Same as in expt no. 65 on page 44.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 20'x15'. (v) No. 2' left between plots. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) B.H.C. dusted against caseworm. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 225 lb./ac. (ii) 221.0 lb./ac. (iii) Treatments differ significantly. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
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<tr>
<td>Av. yield</td>
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<td>2565</td>
<td>2201</td>
<td>2100</td>
<td>2235</td>
</tr>
</tbody>
</table>

S.E./mean = 90.2 lb./ac.
Crop: Paddy (2nd crop).  Ref: K. 59(70).
Site: Agri. Res. Stn., Pattambi.  Type: 'M'.

Object: To find out the effect of applying continuously A/S and G.L. alone and in combination.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments.  (ii) (a) N.A. (b) Refer soil analysis, Pattambi.  (iii) 10.9.1959/27.10.1959.  (iv) (a) to (d) N.A. (v) N.A. (vi) PTB-20 (medium).  (vii) Unirrigated.  (viii) One weeding a month after planting.  (a) 35.63'. (b) 9.1.1960.

2. TREATMENTS:
Same as in expl. no. 65 on page 44.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A.  (iii) 6.  (iv) (a) and (b) 20' x 15'.  (v) 2' between plots.  (vi) Yes.

4. GENERAL:
(i) Normal.  (ii) B.H.C. dusted against caseworm.  (iii) Grain yield.  (iv) (a) 1957—contd.  (b) Yes. (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
(i) 1698 lb./ac. (ii) 157.3 lb./ac.  (iii) Treatment differences are significant.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>2</th>
<th>3</th>
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<td>Av. yield</td>
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<td>1710</td>
<td>1709</td>
<td>1675</td>
<td>1860</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>-64.2 lb./ac.</td>
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Object: To compare the effect of different phosphatic manures along with G.L. and A/S on Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. + 30 lb./ac. of N as A/S.  (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.  (iii) 19.5.1956/20.6.1956.  (iv) (a) 6 puddlings and 3 levelings. (b) Transplanting.  (c) 10' x 4'.  (d) Gliricidia at 5000 lb./ac.  (e) PTB-2 (improved).  (vi) Unirrigated.  (vii) TT B.  (viii) One weeding one month after planting.  (a) 30'. (b) 18.10.1956.

2. TREATMENTS:
All combinations of (1), (2) and (3) + 3 extra treatments:
(1) 4 levels of P2O5: P1 = 15, P2 = 30, P3 = 45 and P4 = 60 lb./ac.
(2) 3 sources of P2O5: S1 = Super, S2 = Hyper and S3 = Di-calcium phosphate.
(3) 3 levels of N as A/S: N1 = 30, N2 = 45, and N3 = 60 lb./ac.
3 extra treatments: T1 = 30, T2 = 45 and T3 = 60 lb./ac. of N.
P2O5 applied on 20.6.1956 and A/S top dressed one month after planting.

3. DESIGN:
(i) R.B.D. (ii) (a) 39. (b) 150' x 72'. (iii) 4.  (iv) (a) N.A. (b) 50' x 8'. (v) Nil.  (vi) Yes.

4. GENERAL:
(i) Satisfactory.  (ii) Nil.  (iii) Grain yield.  (iv) (a) 1956—contd.  (b) Yes.  (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
(i) 3713 lb./ac. (ii) 228.6 lb./ac.  (iii) None of the effects is significant.  (v) Av. yield of grain in lb./ac.
Object: To compare the effects of different phosphatic manures along with G.L. and A/S on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 21.9.1956/31.10.1956. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanting in lines. (c) — (d) 10'x6'. (f) 2. (y) 5000 lb./ac. of G.L. (vi) PTB-20 (improved). (vii) Unirrigated. (viii) One weeding. (ix) 2.62'. (x) 31.1.1957.

2. TREATMENTS:
   Same as in expt. no. 71 on page 47.

3. DESIGN:
   (i) R.B.D. (ii) (a) 39. (b) 36' x 325'. (iii) 4. (iv) (a) N.A. (b) 12' x 25'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) In the analysis extra treatments are excluded and error is based on 105 d.f.

5. RESULTS:
   (i) 2267 lb./ac. (ii) 184 lb./ac. (iii) Only main effect of S's significant. (iv) Av. yield of grain in lb./ac.
   $T_1 = 3452$ lb./ac., $T_2 = 3755$ lb./ac. and $T_3 = 3687$ lb./ac.

<table>
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<tr>
<th></th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$P_3$</th>
<th>$P_4$</th>
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<td>2120</td>
<td>2365</td>
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<td>2232</td>
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<td>$N_3$</td>
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</tbody>
</table>
Crop: Paddy (1st crop).  
Object:—To compare the effects of different phosphatic manures along with G.L. and A/S on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 11.5.1957/5.7.1957. (iv) (a) 4 ploughings and 4 diggings. (b) Planting in lines. (c) —. (d) 10° x 15°. (e) 3 to 4. (v) 5000 lb./ac. of G.L. at the time of puddling. (vi) PTB-2 (improved). (vii) Unirrigated. (viii) One weeding before top dressing. (ix) 84.69. (x) 14.10.1957.

2. TREATMENTS:
   Same as in extp. no. 71 on page 47.

3. DESIGN:
   (i) R.B.D. (ii) (a) 39. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 12° x 25°. (v) Nil; inter space 2' between plots. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) B.H.C. dusted against case worm. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2747 lb./ac. (ii) 245 lb./ac. (iii) Interaction N x P alone is significant. T effect is highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>Mean</th>
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<td>2811</td>
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<td>2757</td>
<td>2821</td>
<td>2756</td>
<td>2692</td>
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</table>

Object:—To compare the effects of different phosphatic manures along with G.L. and A/S on Paddy.
1. **BASAL CONDITIONS:**
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 11.5.1956/5.7.1957. (iv) (a) 4 ploughings and 4 diggings. (b) Planting in lines. (c) —. (d) 10′x6′. (e) 3 to 4. (v) 5000 lb./ac. G.L. at the time of puddling. (vi) PTB-2 (improved). (vii) Unirrigated. (viii) One weeding one month after planting. (ix) 19.07′. (x) 19.2.1958.

2. **TREATMENTS:**
   Same as in exp. no. 71 on page 47.

3. **DESIGN:**
   (i) R.B.D. (ii) (a) 39. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 12′x25′. (v) Nil; interspace of 2′ between plots. (vi) Yes.

4. **GENERAL:**
   (i) Normal. (ii) Folidol sprayed against stemborer. (iii) Grain yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. **RESULTS:**
   (i) 2063 lb./ac. (ii) 213 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>Mean</th>
<th>N1</th>
<th>N2</th>
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</table>

S.E. of marginal mean of S or N = 30.7 lb./ac.
S.E. of marginal mean of P = 35.5 lb./ac.
S.E. of body of N×P or S×P table = 61.4 lb./ac.
S.E. of body of N×S table = 53.3 lb./ac.
S.E. of extra treatment mean = 106.5 lb./ac.

Ref. K. §§(75) Type 'M'.

Object: — To compare the effects of different phosphatic manures along with G.L. and A/S on Paddy.

1. **BASAL CONDITIONS:**
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 23.4.1958/7.6.1958. (iv) (a) 6 ploughings and 3 levellings. (b) Transplanting in lines. (c) —. (d) 10′x6′. (e) 2. (v) 5000 lb./ac. G.L. at the time of puddling. (vi) PTB-2 (improved). (vii) Unirrigated. (viii) One weeding. (ix) 77.35′. (x) 13.10.1958.

2. **TREATMENTS:**
   Same as in exp. no. 71 on page 47.
3. DESIGN:
   (i) R.B.D. (ii) (a) 39. (b) 75' x 156'. (iii) 4. (iv) (a) N.A. (b) 12' x 25'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1956—contd. (b) Yes (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1485 lb./ac. (ii) 171 lb./ac. (iii) Interaction N x P is significant. N x S and N x S x P are highly significant and others are not significant. (iv) Av. yield of grain in lb./ac.

<table>
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<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
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<td>2761</td>
<td>2793</td>
</tr>
<tr>
<td>Mean</td>
<td>2793</td>
<td>2745</td>
<td>2734</td>
<td>2717</td>
<td>2747</td>
<td>2679</td>
<td>2774</td>
<td>2788</td>
</tr>
</tbody>
</table>

S.E. of marginal mean of S or N = 31 lb./ac.
S.E. of marginal means of P = 36 lb./ac.
S.E. of body of S x P or N x P table = 62 lb./ac.
S.E. of body of S x N table = 54 lb./ac.
S.E. of extra treatment mean = 107.5 lb./ac.

Crop: Paddy (2nd Crop).
Ref: K. 58(76)
Type: 'M'.

Object: To compare the effects of different phosphatic manures along with G.L. and A/S on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
   (iii) 17.9.1958/26.10.1958. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanted in lines. (c) 10' x 6'.

2. TREATMENTS:
   Same as in expl. no. 71 on page 47.

3. DESIGN:
   (i) R.B.D. (ii) (a) 39. (b) 75' x 156'. (iii) 4. (iv) (a) and (b) 12' x 25'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2716 lb./ac. (ii) 215 lb./ac. (iii) Main effect of N is significant and extra treatments vs. others is significant. All others are not significant. (iv) Av. yield of grain in lb./ac.

T1 = 2668 lb./ac., T2 = 2669 lb./ac. and T3 = 2401 lb./ac.
Object: To compare the effect of P\textsubscript{2}O\textsubscript{5} and K\textsubscript{2}O, when applied in nursery and in transplanted fields, in inducing resistance to pests and diseases.

1. BASAL CONDITIONS:
   (i) (a) No. (b) Paddy. (c) G.L. at 4000 lb./acre+100 lb./ac. of A/S as top dressing. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 17.6.1959. (iv) (a) 6 puddlings and 4 levelings. (b) to (e) N.A. (v) N.A. (vi) PTB-2 (medium). (vii) Unirrigated. (viii) N.A. (ix) 10.98. (x) 2.11.1959.

2. TREATMENTS:
   Main-plot treatments:
   All combinations of (1) and (2)
   (1) 2 levels of Super: P\textsubscript{2}O\textsubscript{5}=0 and P\textsubscript{2}O\textsubscript{5}=150 lb./ac.
   (2) 2 levels of Pot. Suf: K\textsubscript{2}O=0 and K\textsubscript{2}O=100 lb./ac.
   5000 lb./ac. of G.L. applied in all the plots.

3. DESIGN:
   (i) Split-plot. (j) (a) 2 main-plots/block and 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 20\times10'. (a) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Grain yield. (iv) (a) 1952—N.A. (b) Yes. (c) Nil. (v) (a) and (b) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1452 lb./acre. (ii) (a) 160.6 lb./ac. (b) 137.4 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.
<table>
<thead>
<tr>
<th></th>
<th>$K_0$</th>
<th>$K_1$</th>
<th>Mean</th>
<th>$P_0$</th>
<th>$P_1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_1$</td>
<td>1620</td>
<td>1399</td>
<td>1510</td>
<td>1486</td>
<td>1533</td>
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<td>1363</td>
<td>1422</td>
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<tr>
<td>Mean</td>
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<td>1514</td>
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<tr>
<td>$P_0$</td>
<td>1390</td>
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<td>1389</td>
<td>1434</td>
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</tr>
<tr>
<td>$P_1$</td>
<td>1593</td>
<td>1434</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. T marginal means
2. K or P marginal means
3. K or P means at the same level of T
4. T means at the same level of K or P

---

Crop: Paddy (2nd Crop).  
Ref: K 88(78).  
Type: 'M'.

Object: To compare the effect of $P_2O_5$ and $K_2O$, when applied in nursery and in transplanted field, in inducing resistance to pests and diseases.

1. BASAL CONDITIONS:
   (i) (a) No. (b) Paddy. (c) G.L. at 4000 lb./ac. and 100 lb./ac. of A/S as top dressing. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 30.9.1959. (iv) (a) Six puddlings and 4 levellings. (b) to (c) N.A. (v) N.A. (vi) FTB-20. (medium) (vii) Unirrigated. (viii) N.A. (ix) 3.56'. (x) 15.2.1960.

2. TREATMENTS:
Same as in exp. no. 77 on page 52.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/block; and 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 20'x10'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Weights of grain of individual plots. (iv) (a) 1959—N.A. (b) and (c) —. (v) (a) and (b) —. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1313 lb./ac. (ii) (a) 167.2 lb./ac. (b) 130.0 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>$K_0$</th>
<th>$K_1$</th>
<th>Mean</th>
<th>$P_0$</th>
<th>$P_1$</th>
</tr>
</thead>
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<td>$T_1$</td>
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<td>1384</td>
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<tr>
<td>$T_2$</td>
<td>1245</td>
<td>1237</td>
<td>1242</td>
<td>1208</td>
<td>1275</td>
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<td>1279</td>
<td>1362</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. T marginal means
2. K or P marginal means
3. K or P means at the same level of T
4. T means at the same level of K or P

-56.79 lb./ac.
48.58 lb./ac.
-68.70 lb./ac.
-74.72 lb./ac.
Crop : Paddy (1st crop).  
Ref : K. 54(97).  
Type : 'M'.

Object : To find out the effect of continuous application of A/S to Paddy crop.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) G.L. at 4000 lb./ac. + Super at 100 lb./ac. + A/S at 100 lb./ac. (i) (a) Laterite soils. (b) Refer soil analysis, Taliparamba. (ii) 12.5.1954/24.6.1954. (iv) (a) 4 ploughings. (b) Planting in lines. (c) 10’x4’. (e) 2. (v) Nil. (vi) PTB-9 (late). (vii) Unirrigated. (viii) 3 weedings. (ix) 151.63’. (x) 5.10.1954.

2. TREATMENTS :
   (1) No manure.  
   (2) 5000 lb./ac. of G.L.  
   (3) 5000 lb./ac. of G.L. + 150 lb./ac. of A/S.  
   G.L. applied at the time of puddling. A/S top dressed in two doses 3 weeks and 7 weeks after planting.

3. DESIGN :
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) and (b) 15’x24’. (v) Nil. (vi) No. Expt. appears to be defective.

4. GENERAL :
   (i) Satisfactory. (ii) Case-worm and paddy bug attack. Dusting with 10% B.H.C. (iii) Grain yield. (iv) (a) 1954-1957 (No second crop raised in these plots). (b) Yes. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :
   (i) 2319 lb./ac. (ii) 186.7 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2032</td>
<td>2303</td>
<td>2632</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>66.0 lb./ac.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop := Paddy.  
Ref := K. 55(80).  
Type := 'M'.

Object := To find out the effect of continuous application of A/S to Paddy crop.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Gravelly laterite. (b) Refer soil analysis, Taliparamba. (iii) 9.5.1955/11.6.1955. (iv) (a) 6 ploughings and levelling. (b) Transplanting in lines. (c) 10’x4’. (e) 2. (v) Nil. (vi) PTB-9 (medium, improved). (vii) Unirrigated. (viii) One 1 weeding a month after planting. (ix) 80’. (x) 5.10.1955.

2. TREATMENTS :
   (1) No manure.  
   (2) G.L. at 5000 lb./ac. as B.D.  
   (3) G.L. at 5000 lb./ac. as B.D. + A/S at 150 lb./ac.  
   A/S applied one month after planting.

3. DESIGN :
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 2. (iv) (a) and (b) N.A. (10 cents for the whole expt.). (v) Nil. (vi) Yes.

4. GENERAL :
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1954-1957 (no second crop raised). (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) Raw data N.A.
5. RESULTS:
   (i) 2750 lb./ac.  (ii) N.A.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2531</td>
<td>2550</td>
<td>3069</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>N.A.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop -> Paddy,
Object: To find out the effect of continuous application of A/S to Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite. (b) Refer soil analysis, Taliparamba. (iii) 4.5.1957/21.6.1957. (iv) (a) 3 to 4 ploughings. (b) Planting in lines. (c) — (d) 10' x 4'. (e) N.A. (v) 4000 lb./ac. of G.L. at ploughing. 115 lb./ac. of Super before planting and 100 lb./ac. of A/S top dressed in two doses, 3 weeks and 7 weeks after planting. (vi) PTB-9 (improved). (vii) Unirrigated. (viii) 2 weedings and 1 roughing. (ix) 128'.

2. TREATMENTS:
   1. No manure.
   2. 5000 lb./ac. of G.L. alone at the time of ploughing.
   3. 5000 lb./ac. of G.L. + 150 lb./ac. of A/S top dressed in two doses 3 weeks and 7 weeks after planting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3, (b) N.A. (iii) 2. (iv) (a) N.A. (b) 1/125 acre. (v) Nil. (vi) No.

4i GENERAL:
   (i) Better growth under treatment (3). (ii) Slight attack of leaf roller line winnowing was done to control.
   (iii) Grain yield. (iv) (a) 1954–1957 (no 2nd crop raised). (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2712 lb./ac.  (ii) N.A.  (iii) N.A.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2575</td>
<td>2700</td>
<td>2862</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>N.A.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop -> Paddy (1st crop).
Object: To find out the effect of potash on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. as B.D. + 112 lb./ac. A/S + 112 lb./ac. of Super top dressed one month after planting. (ii) (a) Laterite Gravelly. (b) Refer soil analysis, Taliparamba. (iii) 29.4.1959/6.6.1959. (iv) (a) 6 ploughings and levellings. (b) Transplanting in lines. (c) — (d) 10' x 4'. (e) 2. (v) 5000 lb./ac. of G.L. + 15 lb./ac. of A/S + 150 lb./ac. of Super. (vi) PTB-9 (improved). (vii) Unirrigated. (viii) One or two weedings at an interval of one month from planting. (ix) 100'.

2. TREATMENTS:
   6 levels of K₂O as Pot.Sul.: K₀=0, K₁=30, K₂=50, K₃=70, K₄=90 and K₅=110 lb./ac.
   Pot.Sul. applied at planting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6, (b) 25' x 50'. (iii) 6. (iv) (a) and (b) 25' x 7'. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) Rice bug attack. (iii) Grain and straw yield. (iv) 1959 — contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (v) and (vii) Nil.

5. RESULTS:
(i) 3115 lb./ac. (ii) 171 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>K₁</th>
<th>K₂</th>
<th>K₃</th>
<th>K₄</th>
<th>K₅</th>
<th>K₆</th>
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<tbody>
<tr>
<td>Av. yield</td>
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<td>3007</td>
<td>3174</td>
<td>3122</td>
<td>3225</td>
<td>3060</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=70 lb./ac.</td>
<td></td>
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<td></td>
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</tbody>
</table>

Object:—To study the effect of application of green and dry G.M. crops on Paddy crop.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) N.A. (b) Yes. (iii) 22.10.1959. (iv) (a) 6 ploughings and 2 diggings with mammatty. (c) —, (d) and (e) N.A. (vi) Supra at 2.5 lb./plot. Pot. Sul. at 0.8 lb./plot. and fully burnt lime at 25 lb./plot. on 25.10.1959, (vii) Irrigated, (viii) One weeding.

2. TREATMENTS:
All combinations of (1) and (2) + a control
(1) 3 sources of N as G.M. : S₁=Glycyrrhiza, S₂=Indigo fera and S₃=Bupatorium.
(2) 2 forms of G.M. : M₁=Green and M₂=Dry 1
The % of moisture in G.M. was found to be 75%. Hence the application of 25 lb./ac. of dried matter is equivalent to 100 lb./ac. of G.M.

3. DESIGN:
(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 16'x31'. (b) 15'x30'. (v) Two rows left on each side as border at the time of harvest. (vi) Yes.

4. GENERAL:
(i) No severe lodging excepts in S₃M₃ plot on 20.1.1960. (ii) At the time of transplanting, the seedlings were dipped in 1% D.D.T., 50% to kill all the larvae lodging on it. There were the egg masses of Paddy stem borer "Schindleria incertillis" on the leaves. These were hand picked and destroyed. Two sprayings of D.D.T. 50% were given in the "early stages of growth. No other pest attack was observed. There were stray cases of "Foot rot" of Paddy but not of any serious importance. (iii) : Grain yield. (iv) (a) and (b) (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) N.A.

5 RESULTS:
(i) 1638 lb./ac. (ii) 228.6 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Control</th>
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<tr>
<td>S₁</td>
<td>S₂</td>
</tr>
<tr>
<td>M₁</td>
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<tr>
<td>M₂</td>
<td>1512</td>
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<tr>
<td>Mean</td>
<td>1624</td>
</tr>
<tr>
<td>S.E. of S marginal mean</td>
<td>= 80.8 lb./ac.</td>
</tr>
<tr>
<td>S.E. of N marginal mean</td>
<td>= 66.0 lb./ac.</td>
</tr>
<tr>
<td>S.E. of body of table</td>
<td>= 114.3 lb./ac.</td>
</tr>
</tbody>
</table>
Crop : Paddy (1st crop).
Site : Agri. College and Res. Institute, Vellayani.
Object :- To study the relative efficiencies of Hyper Phos. and B.M. with and without N.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Clay loam. (b) N.A. (iii) 30.1.1958. (iv) (a) Land was spaded and weeds are moved. (b) Sprouted seed were broadcast and covered by hand. (c) 64 lb./ac. (d) and (e) Nil. (v) Kochuvitru (local, early). (vi) Irrigated. (vii) Weeding done before applying manure. (ix) 2.17. (x) 4.5.1957.

2. TREATMENTS :
   All combinations of (1), (2) and (3) + a control
   (1) 2 sources of P₂O₅ : P₁=Hyper Phos. and P₂=B.M.
   (2) 2 levels of P₂O₅ : L₁=30 and L₂=49 lb./ac.
   (3) 2 levels of N as A/S : N₀=0 and N₁=30 lb./ac.
   Manures applied as B.D. 3 to 4 days before sowing and mixed with the soil by spreading evenly one month after sowing.

3. DESIGN:
   (i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 84'x20'. (v) Nil ; 1.5' bund between plots. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. No lodging. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1957—contd. (b) Yes. (c) No. (v) (a) and (b) Nil. (vii) and (viii) Nil.

5. RESULTS:
   (i) 3052 lb./ac. (ii) 474 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

   Control : 3065 lb./ac.

   \[
   \begin{array}{cccc}
   & P₁ & P₂ & \text{Mean} & L₁ & L₂ \\
   N₀ & 3085 & 3099 & 3092 & 2968 & 3217 \\
   N₁ & 2942 & 3076 & 3099 & 2898 & 3119 \\
   \hline
   \text{Mean} & 3014 & 3087 & 3059 & 2933 & 3168 \\
   L₁ & 3047 & 2819 \\
   L₂ & 2581 & 3355 \\
   \end{array}
   \]

   S.E. of P, L or N marginal means = 106 lb./ac.
   S.E. of body of any table = 150 lb./ac.
3. DESIGN:
(i) R.B.D.  (ii) (a) 9. (b) Nil.  (iii) 5.  (iv) (a) 90'x24'. (b) 84'x20'. (v) 3' on either side of length and 2' on either side of width.  (vi) Yes.

4. GENERAL:
(i) Satisfactory.  (ii) Nil.  (iii) Grain and straw yield.  (iv) (a) and (b) No.  (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
(i) 2888 lb./ac.  (ii) 455 lb./ac.  (iii) None of the effects is significant.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>Mean</th>
<th>L1</th>
<th>L2</th>
</tr>
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<td>2919</td>
<td>2781</td>
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<td>2774</td>
<td>2928</td>
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<tr>
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<tr>
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<td>2832</td>
<td>3191</td>
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</tbody>
</table>

S.E. of of P, L or N marginal mean = 102 lb./ac.
S.E. of body of any table = 144 lb./ac.

Crop : Paddy (1st crop).
Site : Agri. College and Res. Institute, Vellayani.
Ref : K. 58(86).
Type : ‘M’.

Object : To study the relative efficiencies of Hyper Phos. and B.M. with and without N.

1. BASAL CONDITIONS:
(i) (a) Nil.  (b) Paddy.  (c) Nil.  (ii) Red loam, affected by waterlogging, acidic with blent black clay in bottom layers.  (b) N.A.  (iii) 2.3.1958.  (iv) (a) One ploughing. (b) Sown by broadcast.  (c) 96 lb./ac.  
(d) N.A.  (e) N.A.  (f) Nil.  (g) Kochuvittu (early, local).  (h) Irrigated.  (i) Nil.  (j) 1.86'.  (k) 20.6.1958.

2. TREATMENTS:
1. B.M. at 40 lb./ac. of P2O5
2. Hyper Phos. at 40 lb./ac. of P2O5+N as A/S as much as in treatment 1.
P2O5 as B.D. and N as top dressing one month after sowing.

3. DESIGN:
(i) Paired-plot.  (ii) (a) 2.  (b) N.A.  (iii) 5.  (iv) (a) and (b) 24'x18'.  (v) Nil.  (vi) No.

4. GENERAL:
(i) Healthy stand.  (ii) Nil.  (iii) Grain yield.  (iv) (a) 1957-1958.  (b) No.  (c) Nil.  (v) (a) No.  (b) Nil.  
(vi) and (vii) Nil.

5. RESULTS:
(i) 1784 lb./ac.  (ii) 241 lb./ac.  (iii) Treatment difference is not significant.  (iv) Av. yield of grain in lb./ac.
Treatment 1 2
Av. yield 1834 1735
S.E./mean = 108 lb./ac.
Crop :- Paddy (1st crop).
Site :- Agri. College and Res. Institute, Vellayani.
Object :- To study the effect of method of application of fertilizers.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Red loam, affected by water logging, acidic with blunt black clay in bottom layer. (b) N.A. (iii) 12.5.1958. (iv) (a) One ploughing. (b) Broadcast. (c) 80 to 100 lb./ac. (d) and (e) --. (v) Nil. (vi) Kochuvittu (local, early). (vii) Irrigated. (viii) Nil. (ix) 1.86'. (x) 20.6.1958.

2. TREATMENTS :
   Main-plot treatments:
   All combinations of (1), (2) and (3)
   (1) 2 levels of N as A/S : N$_1$ =20 and N$_2$ =40 lb./ac.
   (2) 2 levels of P$_2$O$_5$ as Super : P$_1$ =20 and P$_2$ =40 lb./ac.
   (3) 2 levels of K$_2$O Pot. as Sui. : K$_1$ =20 and K$_2$ =40 lb./ac.

   Sub-plot treatments:
   2 methods of application : M$_1$=Individual and M$_2$=Pre-mixed.

3. DESIGN :
   (i) Split-plot. (ii) (a) 8 main-plots/block; 2 sub-plots/main-plot. (b) 208''x33.5''. (iii) 4. (iv) (a) 33.5''x13'' (b) 31.5''x11''. (v) One foot of border plants on all sides discarded. (vi) Yes.

4. GENERAL :
   (i) Healthy stand. (ii) Nil. (iii) Grain and straw yield. (iv) (a) and (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) N.A.

5. RESULTS :
   (i) 2747 lb./ac. (ii) (a) 343 lb./ac. (b) 298 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>N$_1$</th>
<th>N$_2$</th>
<th>Mean</th>
<th>M$_1$</th>
<th>M$_2$</th>
<th>K$_1$</th>
<th>K$_2$</th>
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<td>2754</td>
<td>2740</td>
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<td>2754</td>
<td>2748</td>
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<td>2791</td>
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<tr>
<td>Mean</td>
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<td>2779</td>
<td>2747</td>
<td>2757</td>
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<td>K$_2$</td>
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<td>2702</td>
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<td>2819</td>
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<tr>
<td>M$_1$</td>
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<td></td>
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<tr>
<td>M$_2$</td>
<td>2'01</td>
<td>2774</td>
<td>2737</td>
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<td></td>
</tr>
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</table>

S.E. of difference of two
1. M, P or K marginal means = 85 lb./ac.
2. M marginal means = 74 lb./ac.
3. N, P or K means at the same level of M = 113 lb./ac.
4. M means at the same level of N, P or K = 106 lb./ac.

Crop :- Paddy (2nd crop).
Site :- Agri. College and Res. Institute, Vellayani.
Object :- To evolve a modified Japanese method of Paddy cultivation which can be easily adapted by the cultivators.

Crop :- Paddy (2nd crop).
Site :- Agri. College and Res. Institute, Vellayani.
1. **BASAL CONDITIONS**:
   (i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) and (b) N.A. (iii) 2.10.1958/28.10.1958. (iv) (a) 6 ploughings. (b) Planting in lines. (c) N.A. (d) 8" spacing for Japanese method. Not uniform for local method, but approximately same as in Japanese method. (e) 3 seedlings/hole. (f) Nil. (g) Kochivittu (early). (h) Irrigated.

2. **TREATMENTS**:
   1. Japanese method: Japanese nursery, 4 seedlings/hole. 5000 lb./ac. of G.L.+5 ton/ac. of compost+200 lb./ac. of Super+F.OO lb. of A/S.
   2. Local method: Japanese nursery, 40 ton of ash+5 ton of compost.
   3. Modified Japanese method I: Japanese nursery, G.L. at 2000 lb./ac.+5 ton of compost+50 lb./ac. of Super+50 lb./ac. of A/S.
   4. Modified Japanese method II: Japanese nursery. G.L. at 3000 lb./ac.+5 ton of compost+100 lb./ac. of Super+100 lb./ac. of A/S.
   5. Modified Japanese method III: Japanese nursery, G.L. at 4000 lb./ac.+5 ton of compost+150 lb./ac. of Super+150 lb./ac. of A/S.

Japanese nursery: 3 ploughings for preparing seed bed. Broadcast seed at 15 lb./ac. A/S at 22 lb./ac.+Super at 18 lb./ac.+Pot. Sul. at 6 lb./ac. top dressed one week after sowing. Half dose of N, P and K applied before planting. The other half applied 4 weeks after planting as top dressing.

3. **DESIGN**:
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 45'x24'. (b) Not uniform since the spacings are not uniform. (v) Two rows around the net plot. (vi) Yes.

4. **GENERAL**:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. **RESULTS**:
   (i) 2265 lb./ac. (ii) 189 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tr>
<td>Av. yield</td>
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<td>2169</td>
<td>2165</td>
<td>2312</td>
<td>2285</td>
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<td>S.E./mean</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Crop :- Paddy (1st crop).  
Site :- Agri. College and Res. Institute, Vellayani.  
Object :- To evolve a modified Japanese method of Paddy cultivation.

1. **BASAL CONDITIONS**:

2. **TREATMENTS**:
   5 methods of manuring:  
   \( M_1 = 5 \text{ tons of compost+}5000 \text{ lb. of G.L.+200 lb. of A/S+200 lb. of Super} \) (Japanese method).  
   \( M_2 = 5 \text{ tons of compost+}40 \text{ tons of ash (Local), } M_3 = 5 \text{ tons of compost+}2000 \text{ lb. of G.L.+50 lb. of A/S}+50 \text{ lb. of Super} \)  
   \( M_4 = 5 \text{ tons of compost+}3000 \text{ lb. of G.L.+100 lb. of A/S}+100 \text{ lb. of Super} \)  
   \( M_5 = 5 \text{ tons of compost+}4000 \text{ lb. of G.L.+150 lb. of A/S}+150 \text{ lb. of Super} \).

3. **DESIGN**:
   (i) R.B.D. (ii) (a) 5. (b) 45'x124'. (iii) 6. (iv) (a) 24'x45'. (b) 20'x8'x41'. (v) Two rows. (vi) Yes.

4. **GENERAL**:
   (i) Satisfactory. (ii) There was incidence of stem borer. Spraying with D.D.T. and Basudein. (iii) Grain yield. (iv) (a) 1959—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) Nil.

5. **RESULTS**:
   (i) 2140 lb./ac. (ii) 214.9 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.
Crop : Paddy (1st crop).
Site : Model Agronomic Exptl. Centre, Karamanai.
Ref : K.56 (90).
Type : 'M'.

Object : To study the most suitable time of application of N to Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 3 ton/ac of cowdung generally applied at the time of ploughing.
(ii) (a) Leterite. (b) N.A. (iii) 2.5.1956/22.6.1956. (iv) (a) 2 tractor ploughing in dry condition. One
digging with local spade after an irrigation. Another digging and puddling by trampling. (b) Transplanting
(c) (d) Rows 9" apart. (e) 4, (v) 5000 lb/ac. of compost and 20 lb/ac. of P<sub>2</sub>O<sub>5</sub> as super.

2. TREATMENTS:
All combinations of (1) and (2) + a control
(1) 2 sources of 40 lb/ac. of N: S<sub>1</sub> = Urea and S<sub>2</sub> = A/S.
(2) 7 times of application of N: T<sub>1</sub> = before planting (21.6.1956), T<sub>2</sub> = at planting (22.6.1956), T<sub>3</sub> = at
tillering (13.7.1956), T<sub>4</sub> = before planting and 1/2 at planting, T<sub>5</sub> = 1/2 at planting and 1/2 at
ploughing (13.7.1956), T<sub>6</sub> = before planting, T<sub>7</sub> = 1/2 at planting, 1/2 at ploughing and 1/4 at brushing (19.8.1956) and
T<sub>8</sub> = 1/2 at planting, 1/2 at ploughing and 1/4 at flowering.

3. DESIGN:
(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 3. (iv) (a) and (b) 45 × 22 links. (v) Nil. 1' bund between
plots. (vi) Vet.

4. GENERAL:
(i) Satisfactory. No lodging. (ii) Slight sporadic attack of stem borer and rice hispa. Dusting with
gammexane arranged. (iii) Grain and straw yield. (iv) (a) 1955 (2nd crop)—continued. (b) No. (c) N.A.
(v) (a) Chalvai and Chinnegonchal (A.P.), Barpalli and Kendrapara (Orissa), Kharaj (Maharashtra), Ral-
pur, Reurs, Bagwani (M.P.), Hirangali and Canning (W.B.), Aduthurai (Macras), Tinsukia (Assam),
Ponnampet and Shimoga (Mysore). (vi) Severe drought just after flowering in August. (vii) Experiment
conducted during 1955 failed.

5. RESULTS:
(i) 2369 lb/ac. (ii) 255 lb/ac. (iii) Control vs. other treatments and T effects are highly significant.
Others are not significant. (iv) Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
<th>Control =100 lb/ac.</th>
<th>T&lt;sub&gt;1&lt;/sub&gt;</th>
<th>T&lt;sub&gt;2&lt;/sub&gt;</th>
<th>T&lt;sub&gt;3&lt;/sub&gt;</th>
<th>T&lt;sub&gt;4&lt;/sub&gt;</th>
<th>T&lt;sub&gt;5&lt;/sub&gt;</th>
<th>T&lt;sub&gt;6&lt;/sub&gt;</th>
<th>T&lt;sub&gt;7&lt;/sub&gt;</th>
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<td>2583</td>
<td>2450</td>
<td>2333</td>
<td>2418</td>
</tr>
<tr>
<td>S&lt;sub&gt;2&lt;/sub&gt;</td>
<td>2067</td>
<td>2042</td>
<td>2750</td>
<td>2658</td>
<td>2433</td>
<td>2292</td>
<td>2567</td>
<td>2401</td>
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<tr>
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<td>2146</td>
<td>2588</td>
<td>2646</td>
<td>2508</td>
<td>2371</td>
<td>2450</td>
<td>2410</td>
</tr>
</tbody>
</table>

S.E. of marginal mean of T = 96 lb/ac.
S.E. of marginal mean of S = 51 lb/ac.
S.E. of body of table = 136 lb/ac.
Crop: Paddy (1st & 2nd crop).
Site: Model Agronomic Exptl. Centre, Karamanai.
Object: To study the most suitable time for the application of nitrogenous fertilizers to Paddy.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) Nil (d) (a) Laterite. (b) N.A. (iii) N.A. (iv) (a) 4 wet ploughings and one digging. (b) Transplanting. (c) - (d) 30x30 (e) 2 to 3. (v) 500 lb./ac. of P<sub>2</sub>O<sub>5</sub> as super. (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS and 3. DESIGN:
   Same as in ext. no. 90 on page 61.

4. GENERAL:
   (i) Satisfactory. (ii), (iii) N.A. (iv) (a) 1953 (2nd crop) - contd. (b) No. (c) N.A. (v) (a) Chinna nagal and Maruteru (A.P.), Tinsukia (Assam), Karij (Maharashtra), Raipur, Reura Farm (M.P.), Adathurai (Madras), Shimoga (Mysore), Barpali (Orissa), Nasipur (Punjab), Burdwan and Cannings (W.B.). (b) Nil. (vi) and (vii) N.A.

5. RESULTS:

   \( \text{Kharif} \)
   (i) 2658 lb./ac.  (ii) 310.0 lb./ac.  (iii) None of the effects is significant.  (iv) Av. yield of grain in lb./ac.
   \[
   \begin{array}{ccccccc}
   & T_1 & T_2 & T_3 & T_4 & T_5 & T_6 & T_7 & \text{Mean} \\
   S_1 & 2667 & 2667 & 2567 & 2923 & 2933 & 2890 & 2525 & 2748 \\
   S_2 & 2442 & 2942 & 2117 & 2738 & 2708 & 2400 & 2758 & 2589 \\
   \text{Mean} & 2554 & 2804 & 2312 & 2841 & 2820 & 2625 & 2691 & 2669 \\
   \end{array}
   \]
   S.E. of marginal mean of T =126.5 lb./ac.
   S.E. of marginal mean of S = 67.6 lb./ac.
   S.E. of body of table =179.0 lb./ac.

   \( \text{Rabi} \)
   (i) 743.1 lb./ac.  (ii) 140.4 lb./ac.  (iii) Only T effect is highly significant.  (iv) Av. yield of grain in lb./ac.
   \[
   \begin{array}{ccccccc}
   & T_1 & T_2 & T_3 & T_4 & T_5 & T_6 & T_7 & \text{Mean} \\
   S_1 & 542 & 608 & 892 & 758 & 800 & 792 & 821 & 745 \\
   S_2 & 617 & 642 & 800 & 883 & 758 & 658 & 867 & 746 \\
   \text{Mean} & 579 & 625 & 846 & 821 & 779 & 725 & 846 & 746 \\
   \end{array}
   \]
   S.E. of marginal mean of T =57.3 lb./ac.
   S.E. of marginal mean of S =30.6 lb./ac.
   S.E. of body of table =81.1 lb./ac.

Crop: Paddy (Kharif).
Site: Model Agronomic Exptl. Centre, Karamanai.
Object: To study the most suitable time for the application of nitrogenous fertilizers to Paddy.
1. BASAL CONDITIONS:


2. TREATMENTS and 3. DESIGN:

Same as in exp. no. 90 on page 61.

4. GENERAL:

(i) Generally satisfactory. (ii) No. (iii) Grain and straw yield. (iv) (a) 1958 (*Kharif*)—contd. (b) No. (c) Nil. (v) (a) Maruteru and Chinnagongul (A.P.), Tinsukia (Assam), Adoniagar (Madras), Saboor (Bihar), Raipur, Reura (M.P.), Karjat (Maharashtra), Namipur (Punjab), Bapatli (Uttar Pradesh), Shimoga (Mysore), Burdwan and Canning (W.B.). (vi) N.A. (vii) and (viii) Nil.

5. RESULTS:

*Kharif*

(i) 1907 lb/ac. (ii) 215.2 lb/ac. (iii) Control vs others effect is highly significant, T effect is significant while other effects are not significant. (iv) Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
<th></th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>T₆</th>
<th>T₇</th>
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<td>1783</td>
<td>1813</td>
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<td>1957</td>
<td>1770</td>
<td>1959</td>
<td>2030</td>
<td>1939</td>
</tr>
<tr>
<td>Mean</td>
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<td>1865</td>
<td>1783</td>
<td>1885</td>
<td>1930</td>
<td>1824</td>
<td>1960</td>
<td>1931</td>
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</table>

S.E. of marginal mean of T = 87.9 lb/ac.
S.E. of marginal mean of S = 47.0 lb/ac.
S.E. of body of table = 124.2 lb/ac.

*Rabi*

(i) 2033 lb/ac. (ii) 400.6 lb/ac. (iii) Only control vs others effect is significant. (iv) Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
<th></th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
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<td>2224</td>
<td>2300</td>
<td>2012</td>
<td>2033</td>
<td>2067</td>
</tr>
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</table>

S.E. of marginal mean of T = 163.1 lb/ac.
S.E. of marginal mean of S = 87.4 lb/ac.
S.E. of body of table = 231.3 lb/ac.

Crop: Paddy (*Kharif*).
Ref: K. 59(93).
Site: Model Agronomic Exptl. Centre, Karmanai. Type: 'M'.

Object: To study the most suitable time for the application of nitrogenous fertilisers to Paddy.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Laterite. (b) N.A. (iii) 22.5.1959/26.6.1959. (iv) (a) 4 wet ploughings and one digging. (b) Transplanting. (c) —. (d) 5'9" x 9'. (e) 2 to 3. (v) 5000 lb./ac. of F.Y.M. and 20 lb./ac. of P_2O_5 as Super applied by broadcasting before planting. (vi) PTB—9. (long duration). (vii) Irrigated. (viii) Two hand weedications one digging before planting. (ix) 51.6'. (x) 25.9.1959.

2. TREATMENTS and DESIGN:
   Same as in exp. no. 50 on page 61.

4. GENERAL:
   (i) Generally satisfactory. (ii) No. (iii) Grain and straw yield. (iv) (a) 1955 kharif—contd. (b) No. (c) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2234 lb./ac. (ii) 214.4 lb./ac. (iii) Only control vs others effect is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>S</th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
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<td>2225</td>
<td>2341</td>
<td>2131</td>
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</tr>
</tbody>
</table>

   S.E. of marginal mean of T = 87.5 lb./ac.
   S.E. of marginal mean of S = 46.8 lb./ac.
   S.E. of body of table = 123.8 lb./ac.


Object :- To determine the most suitable method of placement of fertilizers for Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Laterite. Rep. I to III are clayey in nature and Rep. IV sandy. (b) N.A. (iii) 10.5.1956/24, 25.6.1956. (iv) (a) Two tractor ploughings in dry condition (ploughing and cross ploughing). One digging with local spade after an irrigation. Another digging and puddling. (b) Transplanting in lines. (c) N.A. (d) 5'. (e) 4 seedlings/hole. (f) 5000 lb. of compost and 30 lb./ac. of N as A/S. (v) (Thulandhar medium, local). (vi) Partially irrigated. (vii) One weeding one month after planting. (ix) 28.8'. (a) 28.9.1956 and 29.9.1956.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 2 levels of P_2O_5: P_1 = 30 and P_2 = 40 lb./ac. of P_2O_5.
   (2) 3 sources of P_2O_5: S_1 = Super, S_2 = Ammon. Phos, and S_3 = Dicalcium phosphate.
   (3) 3 methods of application: M_1 = Broadcasting at puddling time, M_2 = Dipping seedlings in mud slush mixed with fertilizer, M_3 = Application of manure in the form of pellets.

All manures applied at the time of planting.
3. DESIGN:
(i) 3×2 Conf. fact. with SM, PSM partially confounded. (ii) (a) 7 plots/block; 3 blocks/replication. (b) N.A. (iii) 4. (iv) (a) and (b) 29.3 x 14.85; (v) Nil; one foot band between plots. (vi) Yes.

4. GENERAL:
(i) Satisfactory. No lodging. (ii) Slight sporadic attack of stem borer and Rice blast. Dusting with Gamme-xane. (iii) Yield of grain and straw. (iv) (a) 1955—N.A. (b) N.A. (c) Nil. (v) (e) Chalival (A.P.), Maduru (Madras), Rajpur (M.P.), Karjat (Maharashtra), Shimoga (Mysore), Barpalli and Kudrupara (Orissa), Burdwan and Canning (W.B.). (b) Nil. (vi) Expt. vitiated in 1955. Drought at flowering and setting time in August has adversely affected the crop yield. (vii) N.A.

5. RESULTS:
(i) 1738 lb./ac. (ii) 177.8 lb./ac. (iii) Only M effect is highly significant. (iv) Av. yield of grain in lb./ac.

Control mean = 1692 lb./ac.

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S.E. of marginal mean of M or S = 36.3 lb./ac.
S.E. of marginal mean of P = 29.6 lb./ac.
S.E. of body of M×S table = 67.8 lb./ac.
S.E. of body of S×P or P×M table = 51.2 lb./ac.
S.E. of control mean = 11.3 lb./ac.

Crop = Paddy (Kharif).
Site = Model Agronomic Expt. Centre, Karamanai.
Object: To study the best method of placement of fertilizers.

Ref = K. 57(95).
Type = 'M'.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Laterite. (b) N.A. (iii) N.A. (iv) (a) to (e) N.A. (v) N.A. (vi) N.A. (vii) Irrigated. (viii) (a) N.A.

2. TREATMENTS and 3. DESIGN:
Same as in exp. no. 94 on Page 64.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1955 (2nd crop)—contd. (b) No. (c) N.A. (v) (e) Maruteru, (A.P.), Tinsukia (Assam), Aduthurai (Madras), Rajpur (M.P.), Karjat (Maharashtra), Shimoga (Mysore), Burdwan (W.B.). (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
Kharif
(i) 2131 lb./ac. (ii) 2215 lb./ac. (iii) P effect is significant. Control vs other treatments effect is highly significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.
Crop = Paddy.
Site = Model Agronomic Exptl. Centre, Karamanai. 
Type = 'M'.

Object: — To study the best method of placement of fertilizers.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Laterite. (b) N.A. (iii) 7.5.1958/7.6.1958. (iv) (a) 4 wet ploughings and one digging. (b) Transplanting. (c) —. (d) 9"x9". (e) 2 to 3. (v) 5000 lb./ac. of F.Y.M. broadcast before planting. (vi) Kadukantrop (Local medium). (vii) Irrigated. (viii) Two hand weeding and one digging. (ix) 44.1". (x) 11.9.1958.

2. TREATMENTS and 3. DESIGN:
   Same as in expt. no. 94 on page 64.

4. GENERAL:
   (i) Generally satisfactory. (ii) No. (iii) Grain and straw yield. (iv) (a) 1955 (2nd crop) — contd.
   (b) No. (c) Nil. (v) Marureru (A.P.), Tinakia (Assam), Adshurul (Madras), Raipur (M.P.), Karjat (Maharashtra), Shimoga (Mysore), Barpalli (Orissa) and Burdwan (W.B.). (vi) Nil. (vii) Nil.

### Control—396 lb./ac.

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S.E. of M or S marginal mean = 45.3 lb./ac.
S.E. of P marginal mean = 37.0 lb./ac.
S.E. of body of M×S table = 38.9 lb./ac.
S.E. of body of P×M or S×P table = 64.1 lb./ac.
S.E. of control mean = 64.1 lb./ac.

(i) 363 lb./ac. (ii) 84.1 lb./ac. (iii) Only M×S interaction is significant. (iv) Av. yield of grain in lb./ac.

### Rabi

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S.E. of M or S marginal mean = 17.2 lb./ac.
S.E. of P marginal mean = 14.0 lb./ac.
S.E. of body of M×S table = 31.1 lb./ac.
S.E. of body of table P×M or S×P table = 24.3 lb./ac.
S.E. of control mean = 24.3 lb./ac.

Ref = K. 58(96).
5. GENERAL:

(i) 1567 lb./ac.  (ii) 280.3 lb./ac.  (iii) Only control vs other treatments is highly significant.  (iv) Av. yield of grain in lb./ac.

Control = 1415 lb./ac.

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S.E. of marginal mean of M or S = 57.2 lb./ac.
S.E. of marginal mean of P = 46.7 lb./ac.
S.E. of body of MxS table = 105.9 lb./ac.
S.E. of body of PxM or SxP table = 80.9 lb./ac.
S.E. of control mean = 140.2 lb./ac.

Crop: Paddy (Kharif).

Site: Model Agronomic Expt Centre, Karamanai.

Object: To study the best method of placement of fertilizers.

1. BASAL CONDITIONS:

(i) (a) Nil.  (c) Nil.  (d) Laterite.  (b) N.A.  (iii) 25.5.1959/30.6.1959.  (iv) (a) 4 wet ploughings and one digging.  (b) Transplanting.  (c) 9' x 9'.  (d) 5000 lb./ac. of F.Y.M. applied by broadcasting before planting.  (v) PTB-9 (long duration).  (vi) Irrigated.  (vii) Two weedings and one digging.  (ix) 51.6°.

2. TREATMENTS:

All combinations of (1), (2) and (3) and a control.

(1) 2 levels of P₂O₅: P₁ = 20 and P₂ = 45 lb./ac.
(2) 2 sources of P₂O₅: S₁ = Ammo. Phos. and S₂ = Super.
(3) 3 methods of application: M₁ = Broadcasting at puddling, M₂ = Dipping the seedlings in mud slush mixed with fertilizers before planting, and M₃ = Application of fertilizers in the form of pellets.

3. DESIGN:

(i) R.B.D.  (ii) 13.  (b) N.A.  (iii) 3.  (iv) (a) and (b) 29.7' x 14.85'.  (v) N.A.  (vi) Yes.

4. GENERAL:

(i) Generally satisfactory.  (ii) Free from major pests and diseases.  (iii) Grain and straw yield.  (iv) (a) 1959 (Kharif) — contd.  (b) N.A.  (c) Nil.  (v) (a) Maruteru (A.P.), Tinukia (Asstam), Aduthurai (Madras), Raipur and Bagwal (M.P.), Shimoga (Mysore), Barpalli (Orissa), Burdwan and Canning (W.B.).  (vi) and (vii) Nil.

5. RESULTS:

(i) 1940 lb./ac.  (ii) 226.3 lb./ac.  (iii) None of the effects is significant.  (iv) Av. yield of grain in lb./ac.
Crop: Paddy (*Rabi* and *Kharif*).  
Site: Model Agronomic Exptl. Centre, Karmanai.  
Object: To find out the direct, cumulative and residual effects of certain manurial combinations.

### 1. BASAL CONDITIONS:

(i) (a) Paddy-Paddy.  
(b) Paddy.  
(c) N.A.  
(ii) (a) Laterite.  
(b) N.A.  
(iii) *Kharif*: 1st-2nd week of May 1957/2nd week of June 1957.  
*Rabi*: Transplanting 2nd week of Nov. 1957.  
(iv) (a) 5 diggings or 5 ploughings.  
(b) Transplanting.  
(c) 2 to 3.  
(v) *N*.  
(vi) *K*: Local Thirunedi (145 days).  
(vii) Irrigated.  
(viii) N.A.  
(ix) 53°.  
*Rabi*: N.A.

### 2. TREATMENTS:

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

(a) 3 levels of N as A/S: N₀ = 0, N₁ = 30 and N₂ = 60 lb./ac.
(b) 3 levels of P as Super: P₀ = 0, P₁ = 30 and P₂ = 60 lb./ac.
(c) 3 levels of K as Muriate of Potash: K₀ = 0, K₁ = 30 and K₂ = 60 lb./ac.
(d) 3 levels of bulky manures as compost: M₀ = 0, M₁ = 5000 lb./ac., and M₂ = 10,000 lb./ac.

Each of the 81 plots were divided into 3 Sub-plots of R₁, R₂ and R₃.

Where R₁ = Manuring every season, R₂ = Manuring in alternative seasons starting from the 1st season and R₃ = Manuring in alternative seasons starting from the 2nd season.

### 3. DESIGN:

(i) 3' Fact. confd.  
(ii) 9 block/replication; 9 plots/block.  
(iii) Yes, Guard rows and bunds kept around.

### 4. GENERAL:

(i) Good.  
(ii) *Kharif*: slight attack of blast disease.  
*Rabi*: Heavy attack of stem-borer, leaf roller and caseworm.  
(iii) Grain and straw yield.  
(iv) (a) 1956-contd.  
(b) Yes; Phases altered in direct and residual effects.  
(c) N.A.  
(d) Chhugacakoli and Maruteru (A.P.), Karjat (Maharashtra), Bargar and Rainpur (M.P.), Aduthurai (Madra), Shimoga (Mysore), Barpalli and Kendrapara (Orissa) and Burdwan (W.B.).  
(v) Rabi crop affected by drought.  
(vi) Data analysed as split-plot design with manurial treatments in main-plots while phases in sub-plot treatments. Results for the experiment conducted during 1950 not included as it was the first year of the experiment.

### 5. RESULTS:

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S.E. of marginal mean of P or S = 5.3 lb./ac.  
S.E. of marginal mean of M = 6.5 lb./ac.  
S.E. of body of P×S table = 7.5 lb./ac.  
S.E. of body of P×M or S×M table = 9.2 lb./ac.  
S.E. of control mean = 130.7 lb./ac.

Ref: K. 57(98).  
Type: 'M'.
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S.E. of difference of two
1. N, P, K or M marginal means
2. R marginal means
3. R means at the same level of N, P, K or M means
4. N, P, K or M means at the same level of R

Kharif

(i) 1866 lb./ac.  (ii) (a) 514.8 lb./ac.  (b) 239.2 lb./ac.  (iii) Main effects of N, P and M are significant. Main effect of R, interactions RN and RM are highly significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.

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S.E. of the difference of two
1. N, P, K or M marginal means  10.9 lb./ac.
2. R marginal means  37.6 lb./ac.
3. R means at the same level of N, P, K or M means  65.1 lb./ac.
4. N, P, K or M means at the same level of R  96.8 lb./ac.

Crop : Paddy (Rabi).
Site : Model Agronomic Exptl. Centre, Karamnai.
Object : To find out the direct, cumulative and residual effects of certain manurial combinations.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Laterite. (b) N.A. (iii) 7.7.1958/2.9.1958. (iv) (a) Two diggings and two trappings. (b) Transplanting. (c) (d) 9"×9". (e) 2 to 3. (v) Nil. (vi) PTB—15 (late). (vii) Irrigated. (viii) Weeding twice. (ix) N.A.

2. TREATMENTS & 3. DESIGN :
Same as in exp. no. 98 on page 68.

4. GENERAL:
   (i) Lodging towards the harvest season. (ii) Slight attack of Stemborer during October. Plots with 60 lb./ac. of N heavily damaged. Sprayed foliolol E 605. (iii) Grain and straw weight. (iv) (a) 1956 Kharif — Contd. (b) Yes. Site changed from year 1958. (c) Nil. (v) (a) and (b) N.A. (vi) Nil. (vii) Data analysed separately for each effect i.e., cumulative, residual and direct effects.

5. RESULTS :
Cumulative effect
(i) 1618 lb./ac. (ii) 405.1 lb./ac. (iii) N and P effects are highly significant. Interaction P×M is significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.

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S.E. of any marginal mean  78.0 lb./ac.
S.E. of body of any table  135.0 lb./ac.

Residual effect
(i) 1599 lb./ac. (ii) 398.8 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.
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S.E. of any marginal mean = 76.7 lb./ac.
S.E. of body of any table = 152.9 lb./ac.

**Direct effect**

(i) 1140 lb./ac. (ii) 269.3 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain lb./ac.

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S.E. of any marginal mean = 51.8 lb./ac.
S.E. of body of any table = 89.8 lb./ac.

**Crop:** Paddy (Kharif and Rabi).
**Site:** Model Agronomic Exptl. centre, Karamanai.
**Ref:** K. 59(100).
**Type:** M'.

**Object:** To find out the direct, cumulative and residual effects of certain manurial combinations.

1. **BASAL CONDITIONS:**

2. **TREATMENTS & 3. DESIGN:**
   Same as in exp. no. 98 on Page 68.
4. GENERAL:
(i) Generally satisfactory. (ii) Kharif: Nil. Rab: Attack of stemborer, case worm and leaf roller. A washing spray of Folidol E 605 was given. (iii) Grain and straw weight. (iv) (a) 1955—contd. (b) Yes. Site changed from 1956. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) Data analysed separately for each effect i.e. cumulative, residual and direct.

5. RESULTS:

Cumulative (Kharif 59)

(i) 2208 lb./ac. (ii) 337.0 lb./ac. (iii) Main effects of N, P and M and interaction M x P are significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.

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S.E. of any marginal mean = 64.9 lb./ac.
S.E. of body of any table = 112.3 lb./ac.

Residual effect

(i) 1738 lb./ac. (ii) 253.6 lb./ac. (iii) Only P effect is significant. (iv) Av. yield of grain in lb./ac.

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S.E. of any marginal mean = 48.8 lb./ac.
S.E. of body of any table = 84.5 lb./ac.

Direct effect

(i) 2116 lb./ac. (ii) 366.8 lb./ac. (iii) Main effect of N and P are highly significant. Interaction M x P is significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.
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S.E. of any marginal mean = 70.6 lb./ac.
S.E. of body of any table = 122.3 lb./ac.

Residual effect

(i) 1276 lb./ac. (ii) 334.3 lb./ac. (iii) Only N effects is significant. (iv) Av. yield of grain in lb./ac.

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<th>P₂</th>
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S.E. of any marginal mean = 61.3 lb./ac.
S.E. of body of any table = 111.4 lb./ac.

Residual effect

(i) 1036 lb./ac. (ii) 281.1 lb./ac. (iii) Interaction N x K alone is significant. (iv) Av. yield of grain in lb./ac.

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<th>P₂</th>
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<th>K₀</th>
<th>K₁</th>
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</tbody>
</table>
Crop : Paddy (1st and 2nd crop).
Centre : Chalakudy (c.f.).

Object : To study the effect of type and levels of N.

1. BASAL CONDITIONS:

2. TREATMENTS:
O = control (no manure).
N₁ = 20 lb./ac. of N as A/S.
N₂ = 40 lb./ac. of N as A/S.
N₃₁ = 20 lb./ac. of N as Urea.
N₃₂ = 40 lb./ac. of N as Urea.

3. DESIGN:
(i) and (ii) Eleven community project centres, representing the entire paddy growing tract of the country, were selected. From each community project centre, one development block was selected. Villages were selected at random from the selected block and a list of cultivators growing paddy for each selected village was prepared. From this list, two cultivators were selected at random and one field each belonging to them was taken for trial. In each selected field an unreplicated trial was laid out. (iii) N.A. (iv) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1953 to 1955. (b) No. (c) N.A. (v) No. (vi) Nil. (vii) The exp. was conducted in cultivator's field.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>O</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃₁</th>
<th>N₃₂</th>
</tr>
</thead>
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<tr>
<td>Av. yield</td>
<td>1188</td>
<td>1461</td>
<td>1548</td>
<td>1437</td>
<td>1614</td>
</tr>
<tr>
<td>G.M.</td>
<td>1450 lb./ac.; S.E./mean = 41.14 lb./ac.; No. of experiments 19.</td>
<td></td>
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</tbody>
</table>
Crop :- Paddy (Mundakan).
Centre :- Chalakudy (c.f.).

Object :- To study the effect of types and levels of N.

1. BASAL CONDITIONS :
   (i) N.A. (ii) Laterite loam. pH 5.5. (iii) C.M. applied in most of the trials. (iv) N.A. (v) (a) N.A. (b) transplanted. (c) to (e) N.A. (vi) Sept.—Oct. (vii) Irrigated. (viii) and (ix) N.A. (e) January—February.

2. TREATMENTS :
   Same as in expt. no. 101 on page 74.

3. DESIGN :
   Same as in expt. no. 101 on page 74.

4. GENERAL :
   (i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1953 to 1955. (b) No. (c) N.A. (v) No. (vi) Nil. (vii) The exp. was conducted in cultivator’s field.

5. RESULTS :

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N_1</th>
<th>N_2</th>
<th>N_{1}'</th>
<th>N_{2}'</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1121</td>
<td>1307</td>
<td>1513</td>
<td>1299</td>
<td>1396</td>
</tr>
<tr>
<td>G.M. = 1327 lb./ac.;</td>
<td>S.E./mean = 49.37 lb./ac.;</td>
<td>No. of experiments = 11.</td>
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</tr>
</tbody>
</table>

---

Crop :- Paddy (1st and 2nd crop).
Centre :- Chalakudy (c.f.).

Object :- To study the effect of types and levels of N and P.

1. BASAL CONDITIONS :
   Same as in expt. no. 101 on page 74.

2. TREATMENTS :
   0 = Control.
   P_1 = 20 lb./ac. of P_2O_5 as Super.
   P_1N_1 = 20 lb./ac. of P_2O_5 as Super + 20 lb./ac. of N as A/S.
   P_1N_2 = 20 lb./ac. of P_2O_5 as Super + 40 lb./ac. of N as A/S.
   P_1N' = 20 lb./ac. of P_2O_5 as Super + 20 lb./ac. of N as Nitrochalk.
   P_1N_{1}' = 20 lb./ac. of P_2O_5 as Super + 40 lb./ac. of N as Nitrochalk.

3. DESIGN :
   Same as in expt. no. 101 on page 74.

4. GENERAL :
   (i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1953 to 1955. (b) No. (c) N.A. (v) No. (vi) Nil. (vii) The exp. was conducted in cultivator’s field.

5. RESULTS :

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>P_1</th>
<th>P_1N_1</th>
<th>P_1N_2</th>
<th>P_1N_{1}'</th>
<th>P_1N_{2}'</th>
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<td>Av. yield</td>
<td>1234</td>
<td>1506</td>
<td>1695</td>
<td>1868</td>
<td>1605</td>
<td>1819</td>
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<tr>
<td>G.M. = 1641 lb./ac.;</td>
<td>S.E./mean = 52.85 lb./ac.;</td>
<td>No. of experiments = 16.</td>
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</tbody>
</table>
Crop: Paddy (Mundakan).
Centre: Chalakudy (c.f.).

Object: To study the effect of types and levels of N and P.

1. BASAL CONDITIONS:
   Same as in expt. no. 102 on page 73.

2. TREATMENTS:
   0 = Control (no manure).
   P1 = 20 lb./ac. of P2O5 as Super.
   P1N1 = 20 lb./ac. of P2O5 as Super + 20 lb./ac. of N as A/S.
   P1N2 = 20 lb./ac. of P2O5 as Super + 40 lb./ac. of N as A/S.
   P1N'1 = 20 lb./ac. of P2O5 as Super + 20 lb./ac. of N as Urea.
   P1N'2 = 40 lb./ac. of P2O5 as Super + 40 lb./ac. of N as Urea.

3. DESIGN:
   Same as in expt. no. 101 on page 74.

4. GENERAL:
   Ref.: K. 55(106).
   Type: 'M'.

   (i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1953 to 1955. (b) No. (c) N.A. (v) No. (vi) Nil. (vii) The expt. was conducted in cultivator's field.

5. RESULTS:

   Treatment | 0 | P1 | N1P1 | N2P1 | N1P'1 | N2P'1 | N1P'2 | N2P'2 |
   Av. yield | 1568 | 1681 | 2001 | 2114 | 1744 | 1860 |

G.M.=1828 lb./ac.; S.E./mean=88.87 lb./ac.; No. of experiments 14.
5. RESULTS:

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<th>N₂P₁</th>
<th>N₂P₂</th>
<th>N₂P₃</th>
<th>N₂P₄</th>
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<td>1734</td>
<td>1945</td>
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<td>G.M.</td>
<td>1784 lb./ac.</td>
<td>S.E./mean=60.9 lb./ac.</td>
<td>No. of experiments 16.</td>
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</table>

Crop : Paddy (1st and 2nd crop).
Centre : Chalakudy (c.f.).
Object : To study the effect of types and levels of P and N.

1. BASAL CONDITIONS:
   Same as in exp. no. 101 on page 74.

2. TREATMENTS:
   0 = Control (no manure).
   N₁ = 20 lb./ac. of N as A/s.
   N₁P₁ = 20 lb./ac. of N as A/s + 20 lb./ac. of P₂O₅ as Super.
   N₁P₂ = 20 lb./ac. of N as A/S + 40 lb./ac. of P₂O₅ as Super.
   N₁P₃ = 20 lb./ac. of N as A/S + 40 lb./ac. of P₂O₅ as Dicalcium Phosphate.
   N₁P₅ = 20 lb./ac. of N as A/S + 40 lb./ac. of P₂O₅ as Dicalcium Phosphate.

3. DESIGN:
   Same as in exp. no. 101 on page 74.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1953 to 1955. (b) No. (c) N.A. (v) No. (vi) Nil. (vii) The exp. was conducted in cultivator's field.

5. RESULTS:

<table>
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<tr>
<th>Treatment</th>
<th>0</th>
<th>N₁</th>
<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₁P₃</th>
<th>N₁P₄</th>
<th>N₁P₅</th>
<th>N₁P₆</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1366</td>
<td>1547</td>
<td>1563</td>
<td>1736</td>
<td>1712</td>
<td>1901</td>
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<tr>
<td>G.M.</td>
<td>1638 lb./ac.</td>
<td>S.E./mean=41.14 lb./ac.</td>
<td>No. of experiments 19.</td>
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<table>
<thead>
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<th>N₁P₁</th>
<th>N₁P₂</th>
<th>N₁P₃</th>
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<th>N₁P₅</th>
<th>N₁P₆</th>
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<td>Av. yield</td>
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<td>1325</td>
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<td>1563</td>
<td>1761</td>
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<tr>
<td>G.M.</td>
<td>1495 lb./ac.</td>
<td>S.E./mean=24.69 lb./ac.</td>
<td>No. of experiments 9.</td>
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6. RESULTS:

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<td>Av. yield</td>
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<td>1547</td>
<td>1563</td>
<td>1736</td>
<td>1712</td>
<td>1901</td>
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</tr>
<tr>
<td>G.M.</td>
<td>1638 lb./ac.</td>
<td>S.E./mean=41.14 lb./ac.</td>
<td>No. of experiments 19.</td>
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<table>
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<th>N₁P₁</th>
<th>N₁P₂</th>
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<th>N₁P₄</th>
<th>N₁P₅</th>
<th>N₁P₆</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
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<td>1325</td>
<td>1531</td>
<td>1637</td>
<td>1563</td>
<td>1761</td>
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</tr>
<tr>
<td>G.M.</td>
<td>1495 lb./ac.</td>
<td>S.E./mean=24.69 lb./ac.</td>
<td>No. of experiments 9.</td>
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</tbody>
</table>
4. GENERAL:
(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1953 to 1955. (b) No. (c) N.A. (v) (a) No. (vi) Nil. (vii) The exp. was conducted in cultivator’s field.

5. RESULTS:

<table>
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<th>Treatment</th>
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<th>N&lt;sub&gt;P&lt;/sub&gt;&lt;sup&gt;1&lt;/sup&gt;</th>
<th>N&lt;sub&gt;P&lt;/sub&gt;&lt;sup&gt;2&lt;/sup&gt;</th>
<th>NP&lt;sub&gt;K&lt;/sub&gt;&lt;sup&gt;1&lt;/sup&gt;</th>
<th>NP&lt;sub&gt;K&lt;/sub&gt;&lt;sup&gt;2&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
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<td>1722</td>
<td>1901</td>
<td>2009</td>
<td>2001</td>
<td>2142</td>
</tr>
<tr>
<td>G.M.</td>
<td>1885 lb./ac.</td>
<td>S.E./mean=23.04 lb./ac.</td>
<td>No. of experiments 15.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy (Mundakan).  
Centre: Chalakudy (c.f.).

Object: To study the effect of types and levels of P and N.

1. BASAL CONDITIONS:
Same as in exp. no. 102 on page 75.

2. TREATMENTS:
0 =Control (no manure).  
N<sub>1</sub> =20 lb./ac. of N as A/S.  
N<sub>P</sub><sup>1</sup> =20 lb./ac. of N as A/S+20 lb./ac. of P<sub>2</sub>O<sub>5</sub> as Super.  
N<sub>P</sub><sup>2</sup> =20 lb./ac. of N as A/S+40 lb./ac. of P<sub>2</sub>O<sub>5</sub> as Super.  
NP<sub>K</sub><sup>1</sup> =20 lb./ac. of N as A/S+20 lb./ac. of P<sub>2</sub>O<sub>5</sub> as Super+20 lb./ac. of K<sub>2</sub>O as Pot. Sul.  
NP<sub>K</sub><sup>2</sup> =20 lb./ac. of N as A/S+20 lb./ac. of P<sub>2</sub>O<sub>5</sub> as Super+40 lb./ac. of K<sub>2</sub>O as Pot. Sul.

3. DESIGN:
Same as in exp. no. 101 on page 74.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1953 to 1955. (b) No. (c) N.A. (v) (a) No. (vi) Nil. (vii) The exp. was conducted in cultivator’s field.
5. RESULTS:

### 1st crop

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1358</td>
<td>1605</td>
<td>1761</td>
<td>1791</td>
<td>2000</td>
<td>2139</td>
</tr>
</tbody>
</table>

G.M. = 1776 lb./ac.; S.E./mean = 49.37 lb./ac.; No. of experiments 20.

### 2nd crop

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1160</td>
<td>1317</td>
<td>1547</td>
<td>1473</td>
<td>1819</td>
<td>1761</td>
</tr>
</tbody>
</table>

G.M. = 1513 lb./ac.; S.E./mean = 82.29 lb./ac.; No. of experiments 10.

### Object:
To study the effects of manures (N.P.K.).

### Design:
- **Basal conditions:**
  - Same as in expt. no. 102 on page 75.
- **Treatments:**
  - Same as in expt. no. 101 on page 74.
- **Design:**
  - Same as in expt. no. 101 on page 74.

### General:
(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1953 to 1955. (b) No. (c) N.A. (v) No. (vi) Nil. (vii) The expt. was conducted in cultivator's field.

### RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;P&lt;sub&gt;1&lt;/sub&gt;K&lt;sub&gt;4&lt;/sub&gt;</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1541</td>
<td>1899</td>
<td>2021</td>
<td>2041</td>
<td>2445</td>
<td>2235</td>
</tr>
</tbody>
</table>

G.M. = 2041 lb./ac.; S.E./mean = 161.28 lb./ac.; No. of experiments 15.

### Object:
To study the response of Paddy to levels of N, P and K applied individually and in combinations.

### Design:
- **Basal conditions:**
  - (i) to (c) N.A. (ii) Laterite. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.
- **Treatments:**
  - O=Control (no manure).
  - P=20 lb./ac. of P<sub>2</sub>O<sub>5</sub> as Super.
  - NP=20 lb./ac. of N as A/S and 20 lb./ac. of P<sub>2</sub>O<sub>5</sub> as Super.
  - K=20 lb./ac. of K as Mur. of Potash.
  - NP=20 lb./ac. of N as A/S+20 lb./ac. of K as Mur. of Potash.
  - PK=20 lb./ac. of P<sub>2</sub>O<sub>5</sub> as Super+20 lb./ac. of K as Mur. of Potash.
  - NPK=20 lb./ac. of N as A/S+20 lb./ac. of P<sub>2</sub>O<sub>5</sub> as Super+20 lb./ac. of K as Mur. of Potash.

### Object:
To study the response of Paddy to levels of N, P and K applied individually and in combinations.
3. DESIGN:
(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the Circle/Thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year 8 on a *kharif* cereal, 8 on a *rahi* cereal, 8 on a cash crop, 4 on a rice crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half are of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are being studied on type C trials in two out of the four zones in each district every year. The above experiments will be laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) Generally, 1/20 lb./ac. (b) 1/80 lb./ac. generally. (iv) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—cond. (b) Nil. (c) Nil. (v) (a) Palghat, Quilon and Trivandrum. (b) Nil. (vi) Nil. (vii) The exp. was conducted in cultivator's field.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. Yield</th>
<th>n</th>
<th>p</th>
<th>np</th>
<th>k</th>
<th>nk</th>
<th>pk</th>
<th>npk</th>
</tr>
</thead>
<tbody>
<tr>
<td>control</td>
<td>2115</td>
<td>2460</td>
<td>2460</td>
<td>2781</td>
<td>2312</td>
<td>2025</td>
<td>2576</td>
<td>3020</td>
</tr>
</tbody>
</table>

G.M. = 2544 lb./ac.; S.E./mean = 27.35 lb./ac.; No. of trials = 16.

Crop: Paddy (Rahi and *Kharif*). Ref: K. 59(112). Centre: Palghat (c.f.). Type: 'M'.

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

1. BASAL CONDITIONS to 4. GENERAL:
Same as in exp. no. 111 on page 79.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. Yield</th>
<th>n</th>
<th>p</th>
<th>np</th>
<th>k</th>
<th>nk</th>
<th>pk</th>
<th>npk</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Kharif</em></td>
<td>2041</td>
<td>2510</td>
<td>2370</td>
<td>2781</td>
<td>2203</td>
<td>2617</td>
<td>2485</td>
<td>3912</td>
</tr>
</tbody>
</table>

G.M. = 2510 lb./ac.; S.E./mean = 15.94 lb./ac.; No. of trials = 16.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. Yield</th>
<th>n</th>
<th>p</th>
<th>np</th>
<th>k</th>
<th>nk</th>
<th>pk</th>
<th>npk</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Rahi</em></td>
<td>2246</td>
<td>2732</td>
<td>2351</td>
<td>3045</td>
<td>2436</td>
<td>2831</td>
<td>2715</td>
<td>3423</td>
</tr>
</tbody>
</table>

G.M. = 2747 lb./ac.; S.E./mean = 26.04 lb./ac.; No. of trials = 16.

Crop: Paddy (*Kharif*). Ref: K. 58(113). Centre: Quilon (c.f.). Type: 'M'.

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

1. BASAL CONDITIONS to 4. GENERAL:
Same as in exp. no. 111 on page 79.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. Yield</th>
<th>n</th>
<th>p</th>
<th>np</th>
<th>k</th>
<th>nk</th>
<th>pk</th>
<th>npk</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1819</td>
<td>1991</td>
<td>2008</td>
<td>2353</td>
<td>1925</td>
<td>2230</td>
<td>2131</td>
<td>2518</td>
</tr>
</tbody>
</table>

G.M. = 2122 lb./ac.; S.E./mean = 28.51 lb./ac.; No. of trials = 16.
Crop: Paddy (Rabi and Kharif).
Centre: Quilon (c.f.).
Ref: K. 59(114).
Type: 'M'.

Object: To study the response of Paddy to levels of N, P and K applied individually and in combinations.

1. BASAL CONDITIONS to 4. GENERAL:
Same as in exp. no. 111 on page 79.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n</th>
<th>p</th>
<th>np</th>
<th>k</th>
<th>nk</th>
<th>pk</th>
<th>npk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1794</td>
<td>2205</td>
<td>1991</td>
<td>2337</td>
<td>1942</td>
<td>2288</td>
<td>2115</td>
<td>2584</td>
</tr>
<tr>
<td>G.M.</td>
<td>2157 lb./ac.; S.E./mean=15.98 lb./ac.; No. of trials =16.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy (Kharif).
Centre: Trivandrum (c.f.).
Ref: K. 58(115).
Type: 'M'.

Object: To study the response of Paddy to levels of N, P and K applied individually and in combinations.

1. BASAL CONDITIONS to 4. GENERAL:
Same as in exp. no. 111 on page 79.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n</th>
<th>p</th>
<th>np</th>
<th>k</th>
<th>nk</th>
<th>pk</th>
<th>npk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1584</td>
<td>2213</td>
<td>2131</td>
<td>2576</td>
<td>2082</td>
<td>2460</td>
<td>2312</td>
<td>2822</td>
</tr>
<tr>
<td>G.M.</td>
<td>2337 lb./ac.; S.E./mean=16.81 lb./ac.; No. of trials =16.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Crop: Paddy (Kharif).
Centre: Trivandrum (c.f.).
Ref: K. 59(116).
Type: 'M'.

Object: To study the response of Paddy to levels of N, P and K applied individually and in combinations.

1. BASAL CONDITIONS to 4. GENERAL:
Same as in exp. no. 111 on page 79.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n</th>
<th>p</th>
<th>np</th>
<th>k</th>
<th>nk</th>
<th>pk</th>
<th>npk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1605</td>
<td>1958</td>
<td>1863</td>
<td>2370</td>
<td>1810</td>
<td>2386</td>
<td>2172</td>
<td>2650</td>
</tr>
<tr>
<td>G.M.</td>
<td>2101 lb./ac.; S.E./mean=33.60 lb./ac.; No. of trials =16.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Crop: Paddy (Rabi and Kharif).
Centre: Trivandrum (c.f.).
Ref: K. 59(116).
Type: 'M'.

Object: To study the response of Paddy to levels of N, P and K applied individually and in combinations.

1. BASAL CONDITIONS to 4. GENERAL:
Same as in exp. no. 111 on page 79.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n</th>
<th>p</th>
<th>np</th>
<th>k</th>
<th>nk</th>
<th>pk</th>
<th>npk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1522</td>
<td>1893</td>
<td>1835</td>
<td>2107</td>
<td>1712</td>
<td>2008</td>
<td>1987</td>
<td>2403</td>
</tr>
<tr>
<td>G.M.</td>
<td>1931 lb./ac.; S.E./mean=43.73 lb./ac.; No. of trials =18.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Paddy.  
Centre: Quilon (c.f.).  

Object: To compare the productive values of different nitrogenous fertilizers.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  
   (ii) Laterite and forest.  
   (iii) to (vi) N.A.  
   (vii) Irrigated.  
   (viii) to (x) N.A.

2. TREATMENTS:
   0 =Control (no manure).  
   \( N_0 \) =20 lb./ac. of N as A/S/N.  
   \( N_0'P_1 \) =20 lb./ac. of N as A/S/N+20 lb./ac. of \( P_2O_5 \) as Super.  
   \( N_0'P_2 \) =20 lb./ac. of N as A/S/N+40 lb./ac. of \( P_2O_5 \) as Super.  
   \( N_0'P_3 \) =20 lb./ac. of N as A/S/N+20 lb./ac. of \( P_2O_5 \) as dicalcium phosphate.  
   \( N_0'P_4 \) =20 lb./ac. of N as A/S/N+40 lb./ac. of \( P_2O_5 \) as dicalcium phosphate.  
   \( N_0'P_5K_1 \) =20 lb./ac. of N as A/S/N+20 lb./ac. of \( P_2O_5 \) as Super +20 lb./ac. of \( K_2O \) as Pet. Sul.

3. DESIGN:
   Same as in expt. no. 111 on page 79.

4. GENERAL:
   (i) Satisfactory.  
   (ii) Nil.  
   (iii) Grain yield.  
   (iv) (a) No.  
   (b) and (c) Nil.  
   (v) (a) Quilon and Trivandrum.  
   (b) Nil.  
   (vi) Nil.  
   (vii) The expt. was conducted in cultivators' field.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>( N_0' )</th>
<th>( N_0'P_1 )</th>
<th>( N_0'P_2 )</th>
<th>( N_0'P_3 )</th>
<th>( N_0'P_4 )</th>
<th>( N_0'P_5K_1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2123</td>
<td>2312</td>
<td>2946</td>
<td>3143</td>
<td>3020</td>
<td>2831</td>
<td>3349</td>
</tr>
</tbody>
</table>
| G.M. | 2818 lb./ac. | S.E./mean =25.02 lb./ac. | No. of trials =9.

---

Crop: Paddy.  
Centre: Trivandrum. (c.f.).  

Object: To study the response of Potash in combination with N and P.

---

Crop: Paddy.  
Centre: Quilon. (c.f.).  

Object: To study the response of Potash in combination with N and P.

---
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Laterite and forest. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   0 = Control (no manure).
   \( N_1^* = 20 \text{ lb./ac. of } N \text{ as A/S/N.} \)
   \( N_2^* = 40 \text{ lb./ac. of } N \text{ as A/S/N.} \)
   \( P_1 = 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \)
   \( N_1^*P_1 = 20 \text{ lb./ac. of } N \text{ as A/S/N+20 lb./ac. of } P_2O_5 \text{ as Super.} \)
   \( N_2^*P_1 = 40 \text{ lb./ac. of } N \text{ as A/S/N+20 lb./ac. of } P_2O_5 \text{ as Super.} \)

3. DESIGN:
   Same as in exp. no. 111 on page 79.

4. GENERAL:
   (i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) N.A. (c) N.A. (v) (a) Quilon and Trivandrum. (b) N.A. (vi) Nil. (vii) The exp. was conducted in cultivator's field.

5. RESULTS:
   Treatment | Av. yield |
   0          | 2098      |
   \( N_1^*  \) | 2255      |
   \( N_2^*  \) | 2600      |
   \( P_1     \) | 2493      |
   \( N_1^*P_1 \) | 2123      |
   \( N_2^*P_1 \) | 3102      |

G.M. = 2445 lb./ac.; S.E./mean = 12.80 lb./ac.; No. of trials = 9.

---

Crop: Paddy. Centre: Trivandrum. (c.f.). Object: - To study the response of potash in combination with N and P.

Ref: K. 57(120). Type: 'M'.

---

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Laterite and coastal alluvial. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   Same as in exp. no. 117 on page 82.

3. DESIGN:
   Same as in exp. no. 111 on page 79.

4. GENERAL:
   Same as in exp. no. 117 on page 82.

5. RESULTS:
   Treatment | Av. yield |
   0          | 1744      |
   \( N_1^*  \) | 1967      |
   \( P_1     \) | 2082      |
   \( N_1^*P_1 \) | 2098      |
   \( P_1     \) | 2271      |

G.M. = 2010 lb./ac.; S.E./mean = 29.67 lb./ac.; No. of trials = 6.

---

Crop: Paddy (Kharif). Centre: Palghat. (c.f.). Object: - To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

Ref: K. 58(121). Type: 'M'.

---

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Laterite. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.
2. TREATMENTS:

0 = Control (no manure).
N1' = 20 lb./ac. of N as Urea.
N2' = 40 lb./ac. of N as Urea.
N1" = 20 lb./ac. of N as A/S/N.
N2" = 40 lb./ac. of N as C/A/N.

3. DESIGN:

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conducts the trials in one revenue circle or Thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on a kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are being studied on type C trials in two out of the four zones in each district every year. The above experiments will be laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment/village. (iii) (a) 1/20 ac. (b) 1/80 ac. (iv) Yes.

4. GENERAL:

(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) Yes 1957—contd. (b) No. (c) N.A. (v) (a) Palghat, Quilon and Trivandrum. (b) N.A. (vi) Nil. (vii) The expt. was conducted in cultivator’s field.

5. RESULTS:

Crop -> Paddy (Kharif).
Centre -> Palghat (c.f.).
Object: - To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>N1'</th>
<th>N1&quot;</th>
<th>N2'</th>
<th>N2&quot;</th>
<th>N1&quot;</th>
<th>N2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2238</td>
<td>2617</td>
<td>2789</td>
<td>2444</td>
<td>2658</td>
<td>2469</td>
<td>2691</td>
</tr>
<tr>
<td>G.M.</td>
<td>2558 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.E./mean</td>
<td>30.26 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of trials</td>
<td>16.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ref: K. 59(122).
Type: 'M'.

Crop -> Paddy (Kharif).
Centre -> Quilon (c.f.).
Object: - To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>N1'</th>
<th>N1&quot;</th>
<th>N2'</th>
<th>N2&quot;</th>
<th>N1&quot;</th>
<th>N2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2049</td>
<td>2501</td>
<td>2855</td>
<td>2501</td>
<td>2864</td>
<td>2370</td>
<td>2666</td>
</tr>
<tr>
<td>G.M.</td>
<td>2544 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.E./mean</td>
<td>27.34 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of trials</td>
<td>16.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ref: K. 58(123).
Type: 'M'.

Crop -> Paddy (Kharif).
Centre -> Palghat (c.f.).
Object: - To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>N1'</th>
<th>N1&quot;</th>
<th>N2'</th>
<th>N2&quot;</th>
<th>N1&quot;</th>
<th>N2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1728</td>
<td>2032</td>
<td>2288</td>
<td>2205</td>
<td>2008</td>
<td>2205</td>
<td>2008</td>
</tr>
<tr>
<td>G.M.</td>
<td>2068 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.E./mean</td>
<td>15.71 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of trials</td>
<td>16.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Paddy (Kharif).
Centre: Quilon (c.f.).

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

1. BASEL CONDITIONS: to 4. GENERAL:
   Same as in exp. no. 121 on page 83.

5. RESULTS:
   Treatment | N_1' | N_1'' | N_2' | N_1'' | N_1'' | N_1'' |
   Av. yield  | 1810 | 2082  | 2312 | 2049  | 2296  | 2057  | 2271  |
   G.M. = 2125 lb./ac.; S.E./mean = 17.46 lb./ac.; No. of trials = 16.

Crop: Paddy (Kharif).
Centre: Trivandrum (c.f.).

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

1. BASEL CONDITIONS: to 4. GENERAL:
   Same as in exp. no. 121 on page 83.

5. RESULTS:
   Treatment | 0   | N_1' | N_1'' | N_2' | N_1'' | N_1'' | N_1'' |
   Av. yield  | 1777 | 2090 | 2345  | 2074 | 2543  | 2032  | 2304  |
   G.M. = 2166 lb./ac.; S.E./mean = 44.80 lb./ac.; No. of trials = 15.

Crop: Paddy (Kharif).
Centre: Trivandrum.

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

1. BASEL CONDITIONS: to 4. GENERAL:
   Same as in exp. no. 121 on page 83.

5. RESULTS:
   Treatment | 0   | N_1' | N_1'' | N_2' | N_1'' | N_1'' | N_1'' |
   Av. yield  | 1695 | 2024 | 2301  | 1967 | 2320  | 1991  | 2370  |
   G.M. = 2124 lb./ac.; S.E./mean = 37.82 lb./ac.; No. of trials = 16.

Crop: Paddy.
Centre: Trivandrum (c.f.).

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

1. BASEL CONDITIONS:
   (i) N.A. (ii) Laterite. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x), N.A.

2. TREATMENTS:
   0 = Control.
   N_1 = 20 lb./ac. of N as A/S.
   N_2 = 40 lb./ac. of N as A/S.
   N_1' = 20 lb./ac. of N as A/S.
   N_1'' = 40 lb./ac. of N as A/S.
   N_2' = 20 lb./ac. of N as Urea.
   N_1'' = 40 lb./ac. of N as A/S.
   N_2'' = 40 lb./ac. of N as A/S/N.
3. DESIGN:
(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/althana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on a kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The trials on legumes are of type C. Residual effects of phosphate application are being studied on Type C trials in two out of the four zones in each district every year. The above experiments will be laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment/village. (iii) (a) 1/20 ac. (b) 1/30 ac. (iv) Yes.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) 1957—contd. (b) No. (c) N.A. (v) (a) Trivandrum, Quilon and Palghat. (b) N.A. (vi) Nil. (vii) The exp. was conducted in cultivator’s field.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N₁</th>
<th>N₂</th>
<th>N₁⁺</th>
<th>N₂⁺</th>
<th>N₁⁻</th>
<th>N₂⁻</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1728</td>
<td>1967</td>
<td>2098</td>
<td>1901</td>
<td>2074</td>
<td>1884</td>
<td>2041</td>
</tr>
</tbody>
</table>

G.M. = 1956 lb./ac.; S.E./mean = 30.26 lb./ac.; No. of trials = 6.

Crop: Paddy (Rabi)
Centre: Trivandrum (c.f).
Object: To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

BASAL CONDITIONS to 4. GENERAL:
Same as in exp. no. 127 on page 85.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N₁</th>
<th>N₂</th>
<th>N₁⁺</th>
<th>N₂⁺</th>
<th>N₁⁻</th>
<th>N₂⁻</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1876</td>
<td>2213</td>
<td>2493</td>
<td>2353</td>
<td>2584</td>
<td>2203</td>
<td>2485</td>
</tr>
</tbody>
</table>

G.M. = 2324 lb./ac.; S.E./mean = 62.26 lb./ac.; No. of trials = 18.

Crop: Paddy.
Centre: Quilon (c.f).
Object: To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

BASAL CONDITIONS to 4. GENERAL:
Same as in exp. no. 127 on page 85.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N₁</th>
<th>N₂</th>
<th>N₁⁺</th>
<th>N₂⁺</th>
<th>N₁⁻</th>
<th>N₂⁻</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2123</td>
<td>2255</td>
<td>2436</td>
<td>2238</td>
<td>2403</td>
<td>2263</td>
<td>2501</td>
</tr>
</tbody>
</table>

G.M. = 2317 lb./ac.; S.E./mean = 34.91 lb./ac.; No. of trials = 9.

Crop: Paddy (Rabi).
Centre: Quilon (c.f).
Object: To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

BASAL CONDITIONS to 4. GENERAL:
Same as in exp. no. 127 on page 85.
5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;</th>
<th>N&lt;sub&gt;6&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1925</td>
<td>2320</td>
<td>2559</td>
<td>2353</td>
<td>2559</td>
<td>2345</td>
<td>2567</td>
</tr>
</tbody>
</table>

G.M.—2375 lb./ac.; S.E./mean=17.46 lb./ac.; No. of trials=16.

Crop: Paddy (Rabi).
Centre: Palghat (c.f).
Object: To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

1. BASAL CONDITIONS: to 4. GENERAL:

Same as in exp. no. 127 on page 87.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
<th>N&lt;sub&gt;5&lt;/sub&gt;</th>
<th>N&lt;sub&gt;6&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2156</td>
<td>2576</td>
<td>2987</td>
<td>2600</td>
<td>3020</td>
<td>2600</td>
<td>3061</td>
</tr>
</tbody>
</table>

G.M.—2714 lb./ac.; S.E./mean=27.93 lb./ac.; No. of trials=16.

Crop: Paddy. (Kayalpuna)
Centre: Kottayam.
Object: To study the effect of K, N and P<sub>2</sub>O<sub>5</sub> on paddy.

1. BASAL CONDITIONS:

(i) (a) to (c) Nil. (ii) Alluvial soil of laterite origin. (iii) Oct.—Nov. (iv) Thirinjavel/ai (early, local). (v) (a) Ploughing immediately after the previous crop. (b) Seeds broadcast in one foot deep water. (c) N.A. (d) and (e) N.A. (vi) Irrigated. (vii) Nil. (viii) Nil. (ix) 24.17". (x) Jan.—Feb.

2. TREATMENTS:

(1) Cultivator's usual practice.
(2) 30 lb./ac. of N+45 lb./ac. of P<sub>2</sub>O<sub>5</sub>.
(3) 30 lb./ac. of N+45 lb./ac. of P<sub>2</sub>O<sub>5</sub>+40 lb./ac. of K.
10 lb. of N+40 lb. of P+20 lb. of K given as 1st top dressing 10 days after sowing. 10 lb. of N+20 lb. of K given as 2nd top dressing 25 days after sowing. 10 lb. of N given as 3rd top dressing 45 days after sowing.

3. DESIGN:

(i) and (ii) Fields selected without any randomisation. No. of trials=12. (iii) (a) 1/4 acre. (b) 32"X16'.
(iv) Yes.

4. GENERAL:

(iv) (a) to (c) No. (v) (a) and (b) No. (vi) Nil. (vii) The expt. was conducted in cultivators' field.

5. RESULTS:

(i) 2011 lb./ac. (ii) 264 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1768</td>
<td>1944</td>
<td>2321</td>
</tr>
</tbody>
</table>

S.E./mean =76 lb./ac.
Crop: Paddy (2nd crop).
Site: Karunagapally, Mavelikkara, Karthikapally (c.f.).
Object: To demonstrate and study the effect of K₂O in conjunction with N and P₂O₅.

1. BASAL CONDITIONS:
(i) (a) Varied from field to field. (b) and (c) Varied from field to field.
(ii) (a) N.A. (b) Sandy. (iii) Transplanted in August. (iv) (a) 4 to 6 ploughings. (b) Dibbled. (c) 60 lb./ac. (d) and (e) N.A. (v) Nil.

2. TREATMENTS:
1. Cultivator's usual practice.
2. 40 lb./ac. of N + 40 lb./ac. of P₂O₅.
3. 40 lb./ac. of N + 40 lb./ac. of P₂O₅ + 40 lb./ac. of K₂O.

The entire quantity of P₂O₅, 20 lb. K₂O and 10 lb. N/acre were applied before planting as B.D. 20 lb. N and 20 lb. K₂O were applied 4 weeks after planting as first top dressing and the remaining 10 lb. N as second top dressings seven weeks after planting.

3. DESIGN:
(i) Fields were selected without any randomisation. No. of trails=12. (ii) (a) and (b) 1/4 acre. (iii) 32' x 16'. (iv) Yes.

4. GENERAL:
(i) Normal. (ii) In few fields attack of stem-borer was noticed. This was more severe in the control and NP plots. (iii) Grain yield. (iv) (a) 1957 (1st crop)—1957 (2nd crop), (b) and (c) —. (v) (a) and (b) Nil. (vi) Nil. (vii) Nil. (viii) Nil. (ix) Kochuvittu (early, improved). (x) Yes.

5. RESULTS:
(i) 2615 lb./ac. (ii) 319 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2354</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2444</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3046</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E./mean =92 lb./ac.

Crop: Paddy (1st crop).
Site: Karunagapally, Mavelikkara and Karthikapally (c.f.).
Object: To study the effect of K₂O in conjunction with N and P₂O₅.

1. BASAL CONDITIONS:
(i) (a) to (c) Varied from field to field. (ii) (a) N.A. (b) Sandy. (iii) April. (iv) (a) 4 to 6 ploughings. (b) Dibbled. (c) 60 lb./ac. (d) and (e) N.A. (v) 4000 lb./ac. of F.Y.M. (vi) Kochuvittu (early, improved). (vii) Unirrigated. (viii) Nil. (ix) 45.34°. (x) July.

2. TREATMENTS:
1. Cultivator's usual practice.
2. 30 lb./ac. of N + 40 lb./ac. of P₂O₅.
3. 30 lb./ac. of N + 40 lb./ac. of P₂O₅ + 40 lb./ac. of K₂O.

(i) N, full P, and K were applied at the time of sowing. (ii) N and K three weeks after sowing and the remaining (i) N seven weeks after sowing.

3. DESIGN:
(i) and (ii) Fields were selected without strict randomisation. Total no. of trials=11. (iii) (a) 1/4 acre. (b) 32' x 16'. (vi) Yes.

4. GENERAL:
(i) Crop suffered due to drought at the time of sowing and due to heavy rains at the time of first top dressings. (ii) Nil. (iii) Grain yield. (iv) (a) 1957 (1st crop)—1957 (2nd crop), (b) and (c) Nil. (v) (a) and (b) Nil. (vii) Nil. (vii) Expt. was conducted on cultivators' fields.
5. RESULTS:
(i) 2204 lb./ac. (ii) 258 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1953</td>
<td>2195</td>
<td>2463</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=78 lb./ac.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (1st crop).
Site :- Karunagapally, Mavelikkara and Karthikapally (c.f.).
Object :- To study the effect of K₂O in conjunction with N and P₂O₅.

1. BASAL CONDITIONS:
(i) (a) to (c) Varied from field to field. (ii) Sandy. (iii) April. (iv) (a) 6 ploughings. (b) Line planting. (c) N.A. (d) 5"×6". (e) 3 to 4 seedlings/hole. (f) 3000 lb./ac. of F.Y.M. (vi) Kochuvittu (medium, improved). (vii) Unirrigated. (viii) Nil. (ix) 45.34%. (x) July.

2. TREATMENTS:
1. Cultivator's usual practice.
2. 20 lb./ac. of N+30 lb./ac. of P₂O₅.
3. 20 lb./ac. of N+JO lb./ac. of P₂O₅+30 lb./ac. of K₂O.
The entire quantity of P₂O₅, 20 lb. of K₂O and 10 lb. N/acre were applied a week before sowing. Remaining dose of N and K was applied one month later.

3. DESIGN:
(i) and (ii) Fields selected without any randomisation. Total no. of trials=18. (iii) 1/4 acre. (b) 16'×32'. (iv) Yes.

4. GENERAL:
(i) Heavy rains were recorded in the early stages of growth causing some delay in the development of the crop. (ii) Nil. (iii) Grain yield. (iv) (a) N.A. (b) and (c) →. (v) (a) and (b) →. (vi) Nil. (vii) Expt. was conducted on cultivators' fields.

5. RESULTS:
(i) 1699 lb./ac. (ii) 267 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1535</td>
<td>1575</td>
<td>1986</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=63 lb./ac.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (2nd crop).
Site :- Agastheswaram, Thorala, Nagercoil, Kalkulam, Chalakudy, Trinjalakuda, Mukundapuram and Thalapilly (c.f.).
Object :- To study the efficacy of complete and balanced NPK manuring.

1. BASAL CONDITIONS:
(i) (a) Paddy. (b) and (c) Varied from field to field. (ii) Loamy. (iii) September, October 1955. (iv) (a) N.A. (b) Transplanted. (c) to (e) N.A. (v) 2000 lb./ac. of jungle leaves applied only to control plots. (vi) Panmarvi, Vepshramandal, Athiyon' and Chittani, (local). (vii) Irrigated. (viii) Nil. (ix) N.A. (x) January, February 1956.
2. TREATMENTS:

1. Control: Usual practice of the cultivator to supply 16 lb./ac. of N+6 lb./ac. of P₂O₅+11 lb./ac. of K₂O.

2. NP mixture: 20 lb./ac. of N+40 lb./ac. of P₂O₅ applied before planting+20 lb./ac. of N as A/S/N applied after planting.

3. NPK mixture: 20 lb./ac. of N+40 lb./ac. of P₂O₅+40 lb./ac. of K₂O applied before planting+20 lb./ac. of N as A/S/N applied after planting.

All treatments top dressed.

3. DESIGN:

(i) and (ii) Twelve fields, representative of the tract, were selected without any randomisation. But two fields were dropped from analysis due to excessive damage by rats, leaf roller and stem-borer. (iii) (a) Approximately 0.25 acre and varied from plot to plot. (b) 512 sq. ft. 4 stratified random samples of size 8 x 16 each were taken from each plot with the help of rectangular wooden frames. (vii) Yes.

4. GENERAL:

(i) Normal. (ii) Attack by rats, stem-borer and leaf roller. (iii) Grain yield. (iv) (a) to (c) No. (v) (a) and (b) No. (vii) Irrigated. (viii) Nil. (xi) December 1954.

5. RESULTS:

(i) 2945 lb./ac. (ii) 1911 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2701</td>
<td>2996</td>
</tr>
<tr>
<td>2</td>
<td>3138</td>
<td>3616</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy (Mundakan).
Site: Kuttanad (Kottayam).
Ref.: K. 54(137).
Type: 'M'.

Object: To study the efficacy of complete and balanced NPK manuring.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy in almost all fields. (c) Varied from field to field. (ii) Loamy. (iii) September, 1954. (iv) (a) According to owners usual practice—details N.A. (b) Broadcasted. (c) to (e) N.A. (v) Nil. (vi) Thiruveli and T. 9 (early). (vii) Irrigated. (viii) Nil. (ix) N.A. (x) December 1954.

2. TREATMENTS:

1. Control: Usual practice of the cultivator to supply 20 lb./ac. of N+18 lb./ac. of P₂O₅+10 lb./ac. of K.

2. NPK mixture: 30 lb./ac. of N+70 lb./ac. of P₂O₅+30 lb./ac. of K. Two-third of NPK mixture was applied 10 days after sowing, one month later. All mixtures applied as top dressing, N applied as A/S, P₂O₅ as Super and K as K₂SO₄.

3. DESIGN:

(i) and (ii) Six fields, one field in each village, representative of the tract, were selected without any randomisation. As one field was harvested by the owner without any supervision it has been dropped from analysis. (iii) (a) Approximately 1/4 acre; varied from field to field. (b) 512 sq. ft. Six random samples of size 8 x 16 measured with wooden frames. (iv) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) No. (b) and (c) No. (v) (a) and (b) No. (vi) Nil. (vii) Experiment was conducted under 'Pot. scheme'.

5. RESULTS:

(i) 2652 lb./ac. (ii) 174 lb./ac. (iii) Treatment difference is highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2474</td>
<td>2831</td>
</tr>
</tbody>
</table>

S.E./mean = 78 lb./ac.
Crop: Paddy (Mundakan).
Site: Kottayam, Changannacherry (c.f.).

Object: To study the efficacy of complete and balanced NPK manuring.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) Varied from field to field. (ii) Nil. (vi) T. indicus (short, improved).
   (v) (a) Owners usual practice. Detailed information N.A. (b) Broadcast. (c) to (e) N.A. (vi) September, 1955.

2. TREATMENTS:
   1. Control: Usual practice of cultivator to supply 29 lb./ac. of N + 29 lb./ac. of P + 11 lb./ac. of K.
   2. NP mixture: 15 lb./ac. of N + 45 lb./ac. of P applied 15 days after sowing + 15 lb./ac. of N applied 45 days after sowing.
   3. NPK mixture: 15 lb./ac. of N + 45 lb./ac. of P + 45 lb./ac. of K applied 15 days after sowing + 45 lb./ac. of N applied 45 days after sowing.

   All fertilizers top-dressed.

3. DESIGN:
   (i) and (ii) 12 fields, one field in each village, representative of the tract, were selected without any randomisation.
   (iii) (a) 1 acre approximately; varied from plot to plot. (b) 512 sq. ft. 4 stratified random samples of size 8' x 16' each were taken from each plot with the help of wooden rectangular frames.
   (iv) Yes.

4. GENERAL:
   (i) Normal. (ii) Stem-borer attack—no control measures taken. (iii) Grain yield. (iv) (a) No. (b) and (c) —. (v) (a) and (b) —. (vi) Two fields in the villages Kumarakom and Karapuzha had to be dropped because the trials were affected by heavy rains immediately after the top dressings and by floods due to breaches in the bunds between the plots. (vii) Experiment conducted under 'Pot. scheme'.

5. RESULTS:
   (i) 2839 lb./ac. (ii) 202 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
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<th>Treatment</th>
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<th>3</th>
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<td>3012</td>
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<tr>
<td>S.E./mean</td>
<td>=4 lb./ac.</td>
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</table>

Crop: Paddy (2nd crop).

Object: To find out the best time of applying quick acting nitrogenous manures for different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy (c) 5000 lb./ac. of G.L as B.D. at puddling. Triple Super at 25 lb./ac. as basal before planting. A/S at 50 lb./ac. top dressed one month after planting. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 23.9.1957/20.10.1957. (iv) (a) Six ploughings and 3 diggings. (b) Transplanting. (c) —. (d) 10" x 6". (e) 3 to 4. (v) G.L. at 4000 lb./ac. at puddling. (vi) As per treatments. (vii) Unirrigated. (viii) One weeding before applying 2nd dose of A/S. (ix) 19.30'. (x) 11.2.1958.

2. TREATMENTS:
   Main-plot treatments:
   2 varieties: V₁ = PTB-12 (medium) and V₂ = PTB-20 (medium).
   Sub-plot treatments:
   4 applications of 30 lb./ac. of N as A/S: M₁ = Full dose top dressed, M₂ = 10 lb./ac. as basal + 20 lb./ac. as top dressing, M₃ = 20 lb./ac. as basal + 10 lb./ac. as top dressing and M₄ = Full dose as basal.

   Top dressing done one month after planting.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/block; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 15° x 15°. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) Dieldrin sprayed against stem-borer. (iii) Grain yield. (iv) (a) 1957 (2nd crop)—contd.,
(b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2386 lb./ac. (ii) (a) 321 lb./ac. (b) 167 lb./ac. (iii) M effect alone is highly significant. (iv) Av.
yield of grain in lb./ac.

<table>
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<tr>
<th></th>
<th>$M_1$</th>
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<td>$V_2$</td>
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<tr>
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<td>2372</td>
<td>2432</td>
<td>2251</td>
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S.E. of difference of two
1. V marginal means = 114 lb./ac.
2. M marginal means = 84 lb./ac.
3. M means at the same level of V = 118 lb./ac.
4. V means at the same level of M = 153 lb./ac.

Crop: Paddy (1st crop).
Ref.: K. 58(140).
Type: ‘MV’.

Object:—To find out the best time of application of A/S for different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
(iii) 16.4.1958/2.6.1958. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting. (c) ——. (d) 6’x6’.
(e) 2. (v) 4000 lb./ac. of G.L. before last puddling. (vi) As per treatments. (vii) Unirrigated. (viii) One
weeding one month after planting. (ix) 77.35°. (x) 11.10.1958.

2. TREATMENTS:
Main-plot treatments:
2 varieties: $V_1$=PTB-I (medium) and $V_2$=PTB-5 (medium).
Sub-plot treatments:
Same as in exp. no. 139 on page 91.

3. DESIGN:
(i) Split-plot. (ii) 2 main-plots/block; 4 sub-plots/main-plot. (iii) 4. (iv) (a) and (b) 15’X15’. (v)
Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1957 (2nd crop)—1958 (1st crop). (b) Yes.
(c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) N.A.

5. RESULTS:
(i) 1662 lb./ac. (ii) (a) 306 lb./ac. (b) 290 lb./ac. (iii) None of the effects is significant. (iv) Av.
yield of grain in lb./ac.

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<tr>
<th></th>
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Crop: Paddy (1st crop—single crop area). Ref: K. 57(141).
Site: Agri. Res. Stn., Pattambi. Type: 'MV'.

Object: To find out the effect of manuring on different PTB varieties of Paddy.

1. **Basal Conditions:**
   - (i) (a) Nil. (b) Paddy. (c) G.L. at 5000 lb./ac. as basal and A/S at 75 lb./ac. as top dressing. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 27.5.1957/4.7.1957. (iv) (a) Six ploughings and 3 diggings. (b) Transplanting. (c) —. (d) 10' × 6'. (e) 3 to 4. (f) Nil. (g) As per treatments. (h) Unirrigated. (viii) One weeding 3 weeks after planting. (ix) 70.90'. (x) PTB-10 on 11.9.1957 and others on 5-10.1957.

2. **Treatments:**
   - **Main-plot treatments:**
     - 3 doses of manures: M₁=G.L. at 6000 lb./ac.+C M at 4200 lb./ac.+A/S at 200 lb./ac., M₂=G.L. at 5000 lb./ac.+C M at 2100 lb./ac.+A/S at 100 lb./ac. and M₃=G.L. at 1000 lb./ac.+C M at 700 lb./ac.+A/S at 50 lb./ac.
   - **Sub-plot treatments:**
     - 4 varieties: V₁=PTB-7 (medium), V₀=PTB-10 (early), V₄=PTB-32 (medium). G.L. and C.M. applied at puddling and A/S top dressed one month after planting.

3. **Design:**
   - (i) Split-plot. (ii) (a) 3 main-plots/block; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 25' × 8'. (v) Nil. (vi) Yes.

4. **General:**
   - (i) Normal. (ii) BHC dusted against case worms. (iii) Grain yield. (iv) (a) 1957 (1st crop)—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) Yes. (vii) Nil.

5. **Results:**
   - (i) 2465 lb./ac. (ii) (a) 312 lb./ac. (b) 259 lb./ac. (iii) M effect is significant, V effect is highly significant. Interaction is not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>V₁</th>
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<th>V₃</th>
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<td>2960</td>
<td>2685</td>
<td>2465</td>
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</table>

S.E. of difference of two
- 1. M marginal means = 110 lb./ac.
- 3. V means at the same level of M = 183 lb./ac.
- 4. M means at the same level of V = 193 lb./ac.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 23.5.1958/21.6.1958. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting. (c) —. (d) 10" x 6". (e) 2. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) One weeding a month after planting. (ix) N.A. (a) 19.9.1958 to 3.10.1958.

2. TREATMENTS:
   Same as in exp. no. 141 on page 93.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/block; 4 sub-plots/main-plot. (b) 75' x 32'. (iii) 4. (iv) (a) and (b) 8' x 25'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) N.A.

5. RESULTS:
   (i) 2135 lb./ac. (ii) (a) 403 lb./ac. (b) 304 lb./ac. (iii) M and V effects are highly significant. Interaction is not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>V₁</th>
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<th>V₃</th>
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<td>1502</td>
<td>2272</td>
<td>2418</td>
<td>2135</td>
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</table>

S.E. of difference of two
1. M marginal means = 143 lb./ac.
2. V marginal means = 124 lb./ac.
3. V means at the same level of M = 215 lb./ac.
4. M means at the same level of V = 234 lb./ac.

Crop := Paddy (2nd crop—double crop area).  
Ref. := K, 57(143).  
Type := 'MV'.

Object := To find out the effect of manuring on different PTB varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite Loam. (b) Refer soil analysis, Pattambi. (iii) 26.9.1957/3.11.1957. (iv) (a) Four ploughings and 4 diggings. (b) Transplanting (c) —. (d) 10" x 6". (e) 3 to 4. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) One weeding 4 weeks after planting. (ix) 19.30". (a) 24.2.1958.

2. TREATMENTS:
   Main-plot treatments:
   Same as in exp. no. 141 on page 93.
   Sub-plot treatments:
   G.L. and C.M. applied as basal at the time of puddling. A/S top dressed one month after planting.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plot/block; 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 25' x 8'. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) Folidol sprayed against stem-borer. (iii) Grain yield. (iv) (a) 1957 (1st crop)—contd. (b) Yes. (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2364 lb/acre. (ii) (a) 560 lb/acre. (b) 304 lb/acre. (iii) M and V effects are highly significant. Interaction is not significant. (iv) Av. yield of grain in lb/acre.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
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S.E. of difference of two
1. M marginal means = 140 lb/acre.
3. V means at the same level of M = 215 lb/acre.
4. M means at the same level of V = 245 lb/acre.

Crop : Paddy (2nd crop).
Ref : K. 58(144).
Type : 'MV'.
Object : To find out the effect of manuring on different PTB varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 29.9.1958/4.11.1958. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting. (c) —. (d) 6'x6'. (e) 2 (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) One weeding one month after planting. (ix) N.A. (x) 19.2.1959.

2. TREATMENTS:
Same as in exp. no. 143 on page 94. A/S applied on 6.11.1958.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/block ; 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 8'x25'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Folidol sprayed as a precautionary measure. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) No. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1567 lb/acre. (ii) (a) 385 lb/acre. (b) 250 lb/acre. (iii) Main effect of V and interaction MxV are highly significant. M effect is not significant. (iv) Av. yield of grain in lb/acre.

<table>
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<tr>
<th></th>
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Crop: Paddy (2nd crop).  
Ref: K. 59(145).  
Type: 'MV'.

Object:—To find out the effect of manuring on different PTB varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) No. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.  
   (iii) 8.10.1959/12.11.1959. (iv) (a) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Unirrigated.  
   (viii) N.A. (ix) 3.5 lb./ac. (x) On different dates according to maturity.

2. TREATMENTS:
   Same as in exp. no. 143 on page 94.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/block; 8 sub-plots/main-plot. (b) N.A.  
   (iii) 4. (iv) (a) and (b) 25'x8'. (v) No. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) No.  
   (vi) and (vii) Nil.

5. RESULTS:
   (i) 2633 lb./ac. (ii) (a) 744.5 lb./ac. (b) 424.7 lb./ac. (iii) V effect alone is highly significant. (iv) Av.  
   yield of grain in lb./ac.

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S.E. of difference of two  
1. M marginal means = 186.1 lb./ac.  
2. V marginal means = 173.4 lb./ac.  
3. V means at the same level of M = 300.3 lb./ac.  
4. M means at the same level of V = 337.0 lb./ac.

Crop: Paddy (1st crop—double crop area).  
Ref: K. 57(146).  
Type: 'MV'.

Object:—To find out the effect of manuring on different PTB varieties of Paddy.

BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. as basal at puddling+250 lb./ac. super as basal before planting+203 lb./ac. as A/S top dressed one month after planting. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.  
   (iii) 27.5.1957/20.6.1957. (iv) (a) Five ploughings and 3 diggings. (b) Transplanting. (c) 10'x6'. (d) 3 to 4. (e) Nil. (vi) As per treatment. (vii) Unirrigated. (viii) One weeding (ix) 70.90°. (x) PTB 22 to 26 and 31 on 25.9.1957; PTB 1, 2, 5, 8 and 9 on 3.10.1957.
2. TREATMENTS:

Main-plot treatments:
Same as in expt. no. 141 on page 92.

Sub-plot treatments:
11 varieties: \( V_1 = \text{PTB-1}, V_2 = \text{PTB-2}, V_3 = \text{PTB-5}, V_4 = \text{PTB-8}, V_5 = \text{PTB-9}, V_6 = \text{PTB-22}, V_7 = \text{PTB-23}, V_8 = \text{PTB-24}, V_9 = \text{PTB-25}, V_{10} = \text{PTB-26} \) and \( V_{11} = \text{PTB-31} \).

G.L. and C.M. applied at puddling and A/S top dressed one month after planting.

3. DESIGN:

(i) Split-plot. (ii) 3 main-plots/block; 11 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 25'x8'. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) BHC dusted against case worms. (iii) Grain yield. (iv) (a) 1957 (1st crop)—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 2612 lb./ac. (ii) (a) 506 lb./ac. (b) 322 lb./ac. (iii) V effect alone is highly significant, M effect is significant while interaction is not significant. (iv) Av. yield of grain in lb./ac.

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<tr>
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<th>V_3</th>
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S.E. of difference of two
1. M marginal means = 108 lb./ac.
2. V marginal means = 132 lb./ac.
3. V means at the same level of M = 228 lb./ac.
4. M means at the same level of V = -243 lb./ac.

Crop : Paddy (1st crop).
Object :—To find out the effect of manuring on different PTB varieties of Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
(iii) 23.5.1958/30.6.1958. (iv) (a) Six puddings and 3 leavings. (b) Transplanting. (c) — (d) 6"x6".
(e) 2. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) One weeding one month after planting.
(iv) 25'. (a) PTB-22 to 25 and 31 on 7.10.1958 others on 25.10.1958.

2. TREATMENTS:

Same as in expt. no. 146 on page 96.

3. DESIGN:

(i) Split-plot. (ii) 3 main-plots/block; 11 sub-plots/main-plot. (b) 75'x88'. (iii) 4. (iv) (a) and (b) 25'x8'. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 2286 lb./ac. (ii) (a) 417 lb./ac. (b) 330 lb./ac. (iii) V effect alone is highly significant. (iv) Av. yield of grain in lb./ac.
Crop: Paddy (1st crop).  
Type: 'MV'.  

Object: To find out the effect of manuring on the different PTB varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) No. (b) Paddy. (c) As per treatments.  
   (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.  
   (iii) 17.6.1959/14.7.1959. (iv) (a) to (e) N.A. (v) N.A.  
   (vi) As per treatments. (vii) Unirrigated. (viii) N.A. (ix) 10.98. (x) On different dates according to maturity.

2. TREATMENTS:
   Same as in expt. no. 146 on page 96.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/block; 11 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 25' x 8'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Grain yield. (iv) 1957 (1st crop) — contd. (v) (a) and (b) Nil. (vi) and (vii) N.A.

5. RESULTS:
   (i) 1399 lb./ac.  
   (ii) (a) 560.1 lb./ac. (b) 291.9 lb./ac. (iii) V effect alone is highly significant. (iv) Av. yield of grain in lb./ac.

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<tr>
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<th>V_3</th>
<th>V_4</th>
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S.E of difference of two
1. M marginal means = 119.6 lb./ac.
2. V marginal means = 119.2 lb./ac.
3. V means at the same level of M = 206.4 lb./ac.
4. M means at the same level of V = 230.2 lb./ac.
Crop: Paddy (1st crop).

Object: To study the effect of N and P on different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) B.D. of 4000 lb./ac. of G.L. and top dressing with 150 lb./ac. of A/S. G.L. applied at the time of puddling and A/S one month after planting. (ii) (a) Lateritic. (b) Refer soil analysis, Pattambi. (iii) 9.6.1954/9.7.1954. (iv) (a) Six puddlings and 3 levellings. (b) Transplanted. (c) —. (d) N.A. (e) 2 to 3. (v) 4000 lb./ac. of G.L. at the time of puddling. (vi) As per treatments. (vii) Unirrigated. (viii) Two wecjings. (ix) 42.92%. (x) 16.10.1954.

2. TREATMENTS:
   Main-plot treatments:
   2 varieties: \( V_1 = \text{PTB-2} \) and \( V_2 = \text{PTB-9} \) (both medium).
   Sub-plot treatments:
   All combinations of (1) and (2)
   1. 4 levels of N as A/S: \( N_0 = 0, N_1 = 30, N_2 = 45 \) and \( N_3 = 60 \) lb./ac.
   2. 4 levels of P as super: \( P_0 = 0, P_1 = 30, P_2 = 45 \) and \( P_3 = 60 \) lb./ac.
   N top dressed one month after planting and \( P_3 \) applied as B.D. at the time of final ploughing and leveling.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/block and 16 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 10' x 20'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Uniform dusting with BHC against paddy stem-borer. (iii) Grain yield. (iv) 1954 (1st crop)—1956 (2nd crop). (b) Yes. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 3226 lb./ac. (ii) (a) 703 lb./ac. (b) 305 lb./ac. (iii) V effect is highly significant while effect of N is significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.

<table>
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<th>( N_2 )</th>
<th>( N_3 )</th>
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S.E. of difference of two
1. V marginal means = 124 lb./ac.
2. N or P marginal means = 76 lb./ac.
3. N or P means at the same level of V = 109 lb./ac.
4. V means at the same level of N or P = 155 lb./ac.
5. means in the body of N x P table = 152 lb./ac.

Crop: Paddy (2nd crop).

Object: To study the effect of N and P on different varieties of Paddy.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
   (iii) 21.5.1958 and 7.7.1955. (iv) (a) 2 ploughings, 2 matted digging and levelling. (b) Crop transplanted in bulk. (c) —. (d) 10' x 6'. (e) 3—4. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) 2 weeding. (ix) 28 and 29.10.1955.

2. TREATMENTS:
   Same as in exp. no. 149 on page 99.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/block; 16 sub-plots/main-plot. (b) 80' x 80'. (iii) (a) and (b) 10' x 20'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Dusting of BHC against stem-borer. (iii) Grain yield. (iv) (a) 1954 (1st crop)—1956 (2nd crop). (b) Yes. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2367 lb./ac. (ii) (a) 271 lb./ac. (b) 339 lb./ac. (iii) V and N effects are highly significant. P effect is significant while other effects are not significant. (iv) Av. yield of grain in lb./ac.

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<th>N₄</th>
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S.E. of difference of two:
1. V marginal means
2. N or P marginal means
3. N or P means at the same level of V
4. V means at the same levels of N or P
5. means in the body of N x P table

Crop := Paddy (1st crop).
Ref := K. 56(151).
Type := 'MV'.

Object := To study the effect of N and P on different varieties of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
   (iii) 4.6.1956 and 6.7.1956. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting. (c) —. (d) 10' x 6'. (e) 4. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) One weeding. (ix) 80'. (x) 3rd week of Oct. 1956.

2. TREATMENTS:
   Same as in exp. no. 149 on page 99.

3. DESIGN:
   (i) (a) Split-plot. (ii) (a) 2 main-plots/block; 16 sub-plots/main-plot. (b) 80' x 80' (iii) (a) and (b) 10' x 20'. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Satisfactory.  (ii) Nil.  (iii) Grain and straw yield.  (iv) (a) 1954 (1st crop)—1956 (2nd crop).  (b) Yes.  (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
(i) 167 lb./ac.  (ii) (a) 429 lb./ac.  (b) 246 lb./ac.  (iii) N effect is highly significant.  V effect is significant while other effects are not significant.  (iv) Av. yield of grain in lb./ac.

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Crop: Paddy (2nd crop).  
Object: To study the effect of N and P on different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil.  (b) Paddy.  (c) As per treatments.  (ii) (a) Laterite loam.  (b) Refer soil analysis, Pattambi.  (iii) 6.9.1954/28.10.1954.  (iv) (a) Six puddlings and 3 levellings.  (b) Transplanted.  (c) —.  (d) N.A.  (e) 2 to 3.  (v) 4000 lb./ac. of G.L. at the time of puddling.  (vi) As per treatments.  (vii) Unirrigated.  (viii) 2 weedings.  (ix) 15.69".  (x) 28.1.1955.

2. TREATMENTS:
Main-plot treatments: 2 varieties: V₁=PTB-18 V₂=PTB-20 (both medium).  
Sub-plot treatments: Same as in exp. no. 149 on page 99.

3. DESIGN:
(i) Split-plot.  (ii) (a) 2 main-plots/block ; 16 sub-plots/main-plot.  (b) 80"×80".  (iii) 4.  (iv) (a) and (b) 10"×20".  (v) Nil.  (vi) Yes.

4. GENERAL:
(i) Normal.  (ii) Uniform dusting with BHC against stem-borer.  (iii) Grain yield.  (iv) (a) 1954 (1st crop)—1956 (2nd crop).  (b) Yes.  (c) N.A.  (v) (a) and (b) N.A.  (vi) and (vii) Nil.

5. RESULTS:
(i) 2937 lb./ac.  (ii) (a) 2531b./ac.  (b) 2051b./ac.  (iii) Main effect N and interaction V X N are highly significant.  V effect is significant.  Other effects are not significant.  (iv) Av. yield of grain in lb./ac.

Ref. - K. 54(152).  
Type = 'MV'.
## Crop: Paddy (2nd crop).


**Object:** To study the effect of N and P on different varieties of Paddy.

**Type:** 'MV'.

### 1. BASAL CONDITIONS:

1. (a) Nil. (b) Paddy. (c) As per treatments.  
2. (a) Laterite loam. (b) Refer soil analysis, Pattambi.  
3. (a) N or P marginal means  
4. (a) V means at the same level of V  
5. (a) Mean in the body of N \times P table

### 2. TREATMENTS:

Same as in expt. no. 152 on page 101.

### 3. DESIGN:

(i) Split-plot.  
(ii) (a) 2 main-plots/block; 16 sub-plots/main-plot. (b) 80'X80'.  
(iii) 4. (iv) (a) and (b) 10'X2Y. (v) Nil. (vi) Yes.

### 4. GENERAL:

(iii) Grain yield.  
(iv) (a) 1954 (1st crop)—1956 (2nd crop). (b) Yes. (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

### 5. RESULTS:

(i) 1680 lb./ac. (ii) (a) 432 lb./ac. (b) 245 lb./ac. (iii) Effect of P is highly significant. N effect is significant. Other effects are not significant.  
(iv) Avg. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>N_0</th>
<th>N_1</th>
<th>N_2</th>
<th>N_3</th>
<th>N_4</th>
<th>Mean</th>
<th>P_0</th>
<th>P_1</th>
<th>P_2</th>
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<td>V_1</td>
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<td>2844</td>
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<td>V_2</td>
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<td>3008</td>
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<tr>
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<td>2937</td>
<td>2889</td>
<td>2972</td>
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</table>

S.E. of difference of two

1. V marginal means = 44 lb./ac.
2. N or P marginal means = 52 lb./ac.
3. N or P means at the same level of V = 72 lb./ac.
4. V means at the same level of N or P = 76 lb./ac.
5. means in the body of N \times P table = 102 lb./ac.
Site: Agri. Res. Stn., Pattambi.  Type: 'MV'.

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

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) Paddy.  (c) As per treatments.  (ii) (a) Laterite loam; (b) Refer soil analysis, Pattambi.
   (iii) 28.9.1956/11.11.1956.  (iv) (a) Six puddlings and 3 levellings.  (b) Transplanting.  (c) —.  (d) 10' x 6'.
   (e) 2.  (v) Nil.  (vi) As per treatments.  (vii) Unirrigated.  (viii) One weeding one month after planting.
   (ix) N.A.  (x) 7.2.1957.

2. TREATMENTS:
   Same as in expt. no. 152 on page 101.
   N applied one month after planting and P2O5 before planting.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 2 main-plots/block; 16 sub-plots/main-plot.  (b) 80' x 60'.  (iii) 4.  (iv) (a) and (b) 10' x 20'.
   (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  (ii) Nil.  (iii) Grain and straw yield.  (iv) (a) 1954 (1st crop)—1956 (2nd crop).  (b) Yes.
   (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 1587 lb./ac.  (ii) (a) 584 lb./ac.  (b) 216 lb./ac.  (iii) Effect of N alone is highly significant.  (iv) Av.
   yield of grain in lb./ac.

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<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
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<th>P0</th>
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<th>P2</th>
<th>P3</th>
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<td>V2</td>
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<td>1557</td>
<td>1742</td>
<td>1870</td>
<td>1580</td>
<td>1509</td>
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<tr>
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<tr>
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<td>1564</td>
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<tr>
<td>P2</td>
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<td>1557</td>
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<td>1902</td>
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</tbody>
</table>

S.E. of difference of two
   1. V marginal means = 103 lb./ac.
   2. N or P marginal means = 54 lb./ac.
   3. N or P means at the same level of V = 76 lb./ac.
   4. V means at the same level of N or P = 122 lb./ac.
   5. means in the body of N x P table = 109 lb./ac.
Crop : Paddy (1st crop).  
Object : To find out the comparative susceptibility of different cultures.

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) Paddy.  (c) 1000 lb. of G.L. and 100 lb. of Calcium, A/S and Muriate of Potash.  (ii) (a) N.A.  (b) Refer soil analysis, Ambalavayal. (iii) 23.5.1959.  (iv) (a) to (e) N.A.  (v) Nil.  (vi) *Neeralagoda* (late).  (vii) Irrigated.  (viii) One hand weeding.  (ix) 107.87.  (x) 9.12.1959.

2. TREATMENTS:
   4 cultures :—C1 = No. 190, C2 = No. 179, C3 = No. 54 and C4 = Local.

3. DESIGN:
   (i) R.B.O.  (ii) (a) 4.  (b) N.A.  (iii) 6.  (iv) (a) and (b) 20' x 5'.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) No lodging.  (ii) Nil.  (iii) Grain yield.  (iv) (a) and (b) No.  (c) Nil.  (v) (a) and (b) Nil.  (vi) Nil.  (vii) Nil.

5. RESULTS:
   (i) 316 lb./ac.  (ii) 217.5 lb./ac.  (iii) Treatment differences are significant.  (iv) Av. yield of grain in lb./ac.
   
<table>
<thead>
<tr>
<th>Treatment</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
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<td>Av. yield</td>
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<td>3467</td>
<td>3158</td>
<td>2777</td>
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<tr>
<td>S.E./mean</td>
<td>88.9 lb./ac.</td>
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</table>

Crop : Paddy (Mundakan).  
Site : Paddy Breeding Stn., Kayamkulam.  
Object : To find out the optimum age of seedlings for Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) Paddy.  (c) 2 cwt/ac. of B.M. broadcast and A/S/N ploughed in ½ cwt/ac. at the time of sowing and ½ cwt/ac. top dressed 45 days after sowing by broadcast. (ii) (a) Sandy loam.  (b) N.A.  (iii) 22.6.1956/10.8.1956.  (iv) (a) 4 ploughings with desi plough and one with iron plough.  (b) Transplanted.  (c) —.  (d) 6' x 6'.  (e) (v) B.M. at 2 cwt/ac. broadcast and A/S/N ploughed in at the time of planting at 1 cwt/acre. Top dressing with ½ cwt/ac. of Pot. Sul. 40 days after planting by broadcast.  (vi) U.R. 19, improved, late.  (vii) Unirrigated.  (viii) 2 weedings 15 and 35 days after planting.  (ix) 31.46.  (x) 10.1.1957.

2. TREATMENTS:
   4 ages of seedlings at transplanting :—C1 = 28, C2 = 35, C3 = 42 and C4 = 49 days.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 6.  (iv) (a) 9' x 7'.  (b) 8' x 6'.  (v) One row around each plot discarded.  (vi) Yes.

4. GENERAL:
   (i) Satisfactory, lodged, date of lodging N.A.  (ii) Paddy blight controlled by spraying with 1 lb. of Cupravit in 40 gallons of water per acre.  (iii) Height of tillers and grain yield.  (iv) (a) No.  (b) No.  (c) Nil.  (v) (a) and (b) Nil.  (vi) Nil.  (vii) Nil.

5. RESULTS:
   (i) 1805 lb./ac.  (ii) 150 lb./ac.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in lb./ac.

Object: To determine the best age of seedling for transplanting Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 1\(^\text{1}^\text{st}\) cwt/ac. of B.M. as B.D. before planting. (ii) (a) Sandy loam, slightly acidic. (b) N.A. (iii) 23.6.1957/27.8.1957. (iv) (a) 4 ploughings. (b) Transplanted in lines. (c) … (d) 15\(\times\)15'. (e) 2. (v) 45 cwt/ac. of C.M. at the time of ploughing+1\(^\text{1}^\text{st}\) cwt/ac. of B.M. applied by broadcast+35 lb./ac. of A/S a month after planting. (vi) U.R. 19 (late, improved). (vii) Unirrigated. (viii) 2 weedings at intervals of one month after planting. (ix) 13.1.1958.

2. TREATMENTS:
   4 ages of seedlings at transplanting :-C\(_1\)=30, C\(_2\)=45 and C\(_3\)=60 days.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) 20'x5'. (b) Nil. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good stand, no lodging. (ii) Attack of blast, controlled by spraying Cupravat two months after planting. (iii) Grain yield. (iv) (a) and (b) Nil. (v) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1599 lb./ac. (ii) 268 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

\[\begin{array}{cccc}
\text{Treatment} & C_1 & C_2 & C_3 \\
\text{Av. yield} & 1442 & 1748 & 1607 \\
\text{S.E./mean} & =109 lb./ac. \\
\end{array}\]


Object: To determine the best age of seedling for transplanting Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 1\(^\text{1}^\text{st}\) cwt/ac. of B.M. as B.D. before planting. (ii) (a) Sandy loam. (b) N.A. (iii) 21.6.1958/25.8.1958. (iv) (a) Puddled twice. (b) Transplanted in lines. (c) … (d) 15\(\times\)15'. (e) 2. (v) 4000 lb./ac. C.M. and 150 lb./ac. B.M. ploughed in before planting. Top dressed with 50 lb./ac. of A/S and 56 lb./ac. of Pot. Sul. one month after planting. (vi) U.R. 19 (late, improved). (vii) Unirrigated. (viii) 2 weedings. (ix) 19.30'. (x) 17.1.1959.

2. TREATMENTS:
   4 ages of seedlings at transplanting :-C\(_1\)=30, C\(_2\)=45 and C\(_3\)=60 days.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) and (b) 20'x5'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good stand, no lodging. (ii) Attack of blast, controlled by spraying Cupravat two months after planting. (iii) Grain yield. (iv) (a) and (b) Nil. (v) Nil. (vi) and (vii) Nil.
5. RESULTS:

(i) 252 lb./ac. (ii) 255 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
<th>C₄</th>
<th>Av. yield</th>
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<td>2688</td>
<td>2576</td>
<td>2321</td>
<td>2624</td>
<td></td>
</tr>
<tr>
<td>S.E./mean</td>
<td>231 lb./ac.</td>
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</table>

Crop: Paddy (Mundakan).
Site: Paddy Breeding Stn., Kayamkulam.
Ref: K. 56(159).
Type: 'C'.

Object: To find out whether inter cultivation with Japanese hoe is beneficial to Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) A/S/N at ½ cwt/ac. + B.M. at 2 cwt/ac. B.M. broadcast and ploughed in at the time of sowing. Top dressing with A/S/N 45 days after sowing. (ii) (a) Sandy loam. (b) N.A. (iii) 16.8.1956. (iv) (a) 4 ploughings with desi plough and 1 with iron plough. (b) Transplanting from nursery. (c) —. (d) 12" x 9". (e) 2. (v) B.M. at 2 cwt/ac. broadcasted and ploughed in at the time of planting. A/S/N at 1 cwt per acre broadcast soon after planting. Top dressing with ½ cwt/ac. Pot. Sul. 40 days after planting by broadcast. (vi) U.R. 19 (late, improved). (vii) Unirrigated. (viii) 2 weedings 15 and 35 days after planting. (ix) 31.46°. (x) 10.1.1957.

2. TREATMENTS:

1. No inter cultivation.
2. Inter cultivation 15 days after planting.
3. Inter cultivation 25 days after planting.
4. Inter cultivation 15 and 25 days after planting.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 9' x 7'. (b) 8' x 6'. (v) One row allround. (vi) Yes.

4. GENERAL:

(i) Satisfactory. Lodged. (ii) Paddy blight—controlled by spraying with Cupravit 1 lb in 40 gallons of water per acre. (iii) Height of tiller and grain yield. (iv) (a) 1956—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) Nil. (viii) Nil.

5. RESULTS:

(i) 252 lb./ac. (ii) 1521 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tr>
<td>S.E./mean</td>
<td>45 lb./ac.</td>
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</tbody>
</table>

Crop: Paddy.
Site: Paddy Breeding Stn., Kayamkulam.
Ref: K. 57(160).
Type: 'C'.

Object: To find out whether inter cultivation with Japanese hoe is beneficial to Paddy.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) 1½ cwt/ac. of B.M. as B.D. + 5 cwt/ac. of wood ash top dressed one month after planting. (ii) (a) Sandy loam, slightly acidic. (b) N.A. (iii) 28.6.1957/27.8.1957. (iv) (a) 4 ploughings. (b) Transplanting in lines. (c) —. (d) 9' x 9'. (e) 2. (v) C.M. at 45 cwt/ac. and B M. at ½ cwt/ac. applied at the time of ploughing. Top dressing with 35 lb./ac. of A/S one month after planting. (vi) U.R. 19 (improved, late). (vii) Unirrigated. (viii) 2 weedings at intervals of one month from planting. (ix) 34.82°. (x) 17.1.1958.
2. TREATMENTS:
Same as in expt. no. 159 on page 106.

3. DESIGN:
(i) R.B.D.  (ii) (a) 4. (b) N.A.  (iii) 6. (iv) (a) 14'x10'. (b) 13'x9'. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Good stand. No lodging. (ii) Sprayed with Shell Copper (1 lb in 35 gallons of water) as a protection against Paddy blast. (iii) Grain yield. (iv) (a) 1956—contd. (b) No. (c) No. (v) (a) and (b) Nil. (vi) Nil. (vii) Nil.

5. RESULTS:
(i) 184 lb./ac.  (ii) 231 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Av. yield</th>
<th>S.E./mean</th>
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<td>1782</td>
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</table>

Crop :- Paddy (2nd crop).  Ref :- K. 58(161).
Site :- Paddy Breeding Stn., Kayamkulam.  Type :- 'C'.

Object :- To find out whether inter cultivation with Japanese hoe is beneficial to Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 1½ cwt/ac. of B.M. as B.D. and 5 cwt/ac. of wood ash as top dressing. (ii) (a) Sandy loam. (b) N.A.  (iii) 21.6.1958/22.8.1958. (iv) (a) Puddled twice. (b) Transplanted in lines. (c) —.  (d) 6'x6'. (e) 2. (v) C.M. at 45 cwt/ac. and B.M. at 1½ cwt/ac. ploughed in before planting. Top dressing with 50 lb/ac. of A/S and 55 lb/ac. of Pot. Sui. one month after planting. (vi) U.B.-19 (improved) (vii) Unirrigated. (viii) 2 weedings one month after planting.  (ix) 19.30'.  (x) 17.1.1959.

2. TREATMENTS:
Same as in expt. no. 159 on page 106.

3. DESIGN:
(i) R.B.D.  (ii) (a) 4. (b) N.A.  (iii) 8. (iv) 20'x10'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Good stand, no lodging. (ii) Attack of blast: sprayed with Cupravit 2 times. (iii) Yield of grain and tiller count. (iv) (a) 1956—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 317 lb./ac.  (ii) 359 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Av. yield</th>
<th>S.E./mean</th>
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Crop :- Paddy (2nd crop).  Ref :- K. 58(162).
Site :- Paddy Breeding Stn., Kayamkulam.  Type :- 'C'.

Object :- To determine the optimum number of seedlings per hole for planting Paddy.
1. **BASAL CONDITIONS**:

(i) (a) Nil. (b) Paddy. (c) 11 cwt/ac. of B.M. as B.D. and 5 cwt/ac. wood ash as top dressing. (ii) (a) Sandy loam. (b) N.A. (iii) 21.6.1958/20.8.1958. (iv) (a) Puddled twice. (b) Planted in lines. (c) 9"x6'. (d) As per treatments. (v) 4000 lb/ac. of C.M. and 150 lb/ac. of B.M. ploughed in before planting; 50 lb/ac. of A/S and 50 lb/ac. of Pot. Sol. top dressed one month after planting. (vi) U.R. 19 (improved, late) (vii) Unirrigated. (viii) 2 weedings. (a) 19.30'. (a) 16.1.1959.

2. **TREATMENTS**:

1. Planting 1 seedling/hole.
2. Planting 2 seedlings/hole.
3. Planting 3 seedlings/hole.
4. Planting 4 seedlings/hole.

3. **DESIGN**:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) 12'x12'. (v) Nil. (vi) Yes.

4. **GENERAL**:

(i) Good stand. No lodging. (ii) Blast attack, sprayed twice with Cupravit two months after planting. (iv) (a) 1958. (b) and (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. **RESULTS**:

(i) 2561 lb/ac. (ii) 519 lb/ac. (iii) Treatments are not significantly different. (iv) Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2448</td>
<td>2548</td>
<td>2670</td>
<td>2379</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>183 lb/ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Crop :-** Paddy (*Mandakar*).  
**Site :-** Paddy Breeding Stn., Kayamkulam.  
**Type :-** 'C'.

Object:-To find out the best spacing and the optimum number of seedlings/hole for planting Paddy.

1. **BASAL CONDITIONS**:

(i) (a) Nil. (b) Paddy. (c) 2 cwt of B.M./ac. broadcast and ploughed in at the time of sowing. A/S/N at 1 cwt/ac. top dressed 45 days after sowing by broadcast. (ii) (a) Sandy loam. (b) N.A. (iii) 16.8.1956. (iv) (a) 4 ploughings with desi plough and 1 with iron plough. (b) Transplanting. (c) -. (d) and (e) As per treatments. (v) B.M. at 2 cwt/ac. broadcast and ploughed in at the time of planting. A/S/N at 1 cwt/ac. broadcast 'soon after planting. Top dressing with 1 cwt/ac. of Pot. Sol. 40 days after planting by broadcast. (vi) U.R. 19 (improved, late). (vii) Unirrigated. (viii) 2 weedings 15 and 35 days after planting. (ix) 31.46'. (x) 10.1.1957.

2. **TREATMENTS**:

All combinations of (1) and (2).

(1) 3 spacings: -C1=6", C2=9" and C3=12".

(2) No. of seedlings hole := S1=1, S2=2 and S3=4.

3. **DESIGN**:

(i) 3 x 3 Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 7'x7'. (b) 6'x6'. (v) One row alround. (vi) Yes.

4. **GENERAL**:

(i) Satisfactory. Crop lodged, but date N.A. (ii) Paddy blight controlled by spraying with Cupravit 1 lb. in 40 gallons of water/ac. (iii) Height of tillers and grain yield. (iv) (a) and (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. **RESULTS**:

(i) 2753 lb/ac. (ii) 229 lb/ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb/ac.
Object:—To find the optimum age of seedlings to be used for transplanted Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) Cowdung, 150 lb./ac. of ash, 1 cwt/ac of A/S and 1 1/2 cwt/ac of Super. (ii) (a) Sandy loam. (b) N.A. (iii) 5 dates of sowing beginning from 27.7.1955 at weekly intervals/14.9.1955. (iv) 6 ploughings. (b) Transplanted on hills. (c) —. (d) 9' x 9'. (e) 2. (v) Cowdung at 1875 lb./ac. applied as B.D.+ash at 150 lb./ac. applied after transplanting+A/S at 1 cwt/ac. and Super at 1 1/2 cwt/ac. in two equal doses first half one week after transplanting and other half about 40 days after transplanting. (vi) Cochin-1 (local, medium). (vii) Irrigated. (viii) One weeding. (ix) 36'. (x) 21.1.1956.

2. TREATMENTS:
   Age of seedlings at transplanting:—T1=21, T2=28, T3=35, T4=42 and T5=49 days.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 12'6' x 6'. (b) 12'1' x 6'. (v) One row all round. (vi) Yes.

4. GENERAL:
   (i) Fair. No lodging. (ii) Nil. (iii) Nil. (iv) (a) to (c) N.A (v) (a) and (b) Nil. (vi) Nil. (vii) Conducted by Eco. Bot. Sec.

5. RESULTS:
   (i) 3184 lb./ac. (ii) 389 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain In lb./ac.

   Treatment T1 T2 T3 T4 T5
   Av. yield 3566 3296 3056 3056
   S.E./mean = 159 lb./ac.
2. TREATMENTS:
1. Broadcasting sprouted seeds at 130 lb./ac. (local practice)
2. Transplanting 3 seedlings/hole at a spacing of 9" both ways.

3. DESIGN:
(i) Paired-plot. (ii) (a) 2. (b) N.A. (iii) 6. (iv) (a) 37' × 13'. (b) 35' × 13'. (v) 1' border around (vi) No.

4. GENERAL:
(i) Stand good, vigorous growth in transplanted plots, partial lodging on 2.1.1955. (ii) Nil. (iii) Grain yield. (iv) (a) 1953–1955. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1168 lb./ac. (ii) 73 lb./ac. (iii) Treatment difference is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1053</td>
</tr>
<tr>
<td>2</td>
<td>1284</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>= 30 lb./ac.</td>
</tr>
</tbody>
</table>

Crop :- Paddy.  
Site :- Rice Res. Stn., Monkompu.  
Ref. :- K. 55(166).  
Type :- 'C'.

Object :- To study the efficiency of transplanting over the local method of sowing Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) B.M. at 1 cwt/ac. + G.N.C. at 1 cwt/ac. + A/S at 1 cwt/ac. (ii) (a) Clayey soil. (b) N.A. (iii) 13.11.1955/4.12.1955. (iv) (a) 2 ploughings (dry and wet) and levelling. (b) to (e) As per treatments. (v) Nil. (vi) M₉₋₂ (early, improved). (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 11.2.1956.

2. TREATMENTS:
1. Broadcasting of sprouted seeds at the rate of 130 lb./ac.
2. Transplanting 3 seedlings/hole at a spacing of 9" both ways.

3. DESIGN:
(i) Paired-plot. (ii) (a) 2. (b) N.A. (iii) 6. (iv) (a) 37' × 13'. (b) 35' × 13'. (v) One foot border all round the plot. (vi) Yes.

4. GENERAL:
(i) Stand good, vigorous growth in transplanted plots, partial lodging on 3.1.1956. (ii) Leaf roller D.D.T. 50% sprayed. (iii) Grain yield. (iv) (a) 1953–1955. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1192 lb./ac. (ii) 188 lb./ac. (iii) Treatment difference is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1075</td>
</tr>
<tr>
<td>2</td>
<td>1308</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>= 77 lb./ac.</td>
</tr>
</tbody>
</table>

Crop :- Paddy (1st crop)  
Ref. :- K. 55(167).  
Type :- 'C'.

Object :- To assess the utility of working double row rice weeder over the local method of hand weeding.
1. **BASAL CONDITIONS**:
   (i) (a) Nil. (b) Paddy. (c) G.L. at 5000 lb./ac. as B.D. in Oct. 1954 followed by A/S at 75 lb./ac. one month after planting as top dressing.  
   (ii) (a) Sandy loam to loam. (b) Refer soil analysis, Pattambi.  
   (iii) 5.9.1955/2.11.1955.  
   (iv) (a) 7 ploughings and puddling. (b) to (e) As per treatments.  
   (v) 6000 lb. of G.L. +50 lb./ac. of A/S as B.D. one month after planting.  
   (vi) PTB-2 (medium, improved).  
   (vii) Unirrigated.  
   (viii) As per treatments.  
   (ix) 31.11’.  
   (x) 24.1.1956.

2. **TREATMENTS**:
   1. Planting in at 6’×6’ spacing, 1 seeding/hole and hand weeding — (control).  
   2. Planting in lines at 10’×6’ spacing, 4 seedlings/hole and hand weeding.  
   3. Planting in lines at 10’×10’ spacing, 4 seedlings/hole and double row rice weeder worked once in a fortnight i.e., 14, 28, 42 and 56 days after planting.

3. **DESIGN**:
   (i) R.B.D.  
   (ii) (a) 3. (b) N.A.  
   (iii) 8.  
   (iv) (a) N.A.  
   (v) 20’×22’.  
   (vi) Nil. About 2’ interspace between plots.  
   (vii) Yes.

4. **GENERAL**:
   (i) Normal.  
   (ii) Spraying with D.D.T. against stem-borer.  
   (iii) Grain yield.  
   (iv) (a) 1955—contd.  
   (b) N.O.  
   (c) Nil.  
   (d) Nil.  
   (e) Nil.  
   (f) Nil.  
   (g) Nil.

5. **RESULTS**:
   (i) 3235 lb./ac.  
   (ii) 3171 lb./ac.  
   (iii) Treatment differences are highly significant.  
   (iv) Av. yield of grain in lb./ac.  
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3208</td>
<td>3372</td>
</tr>
<tr>
<td>2</td>
<td>3215</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3152</td>
<td></td>
</tr>
</tbody>
</table>

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**Crop** := Paddy (2nd crop).  
**Ref.** := K. 55(168).  
**Type** := 'C'.

Object := To assess the utility of working double row rice weeder over the local method of hand weeding.

1. **BASAL CONDITIONS**:
   (i) (a) Nil. (b) Paddy. (c) 4000 lb./ac. of G.L. +50 lb./ac. of A/S as B.D. in June +50 lb./ac. of A/S as top dressing one month after planting.  
   (ii) (a) Laterite loam.  
   (b) Refer soil analysis, Pattambi.  
   (iii) 5.9.1955/2.11.1955.  
   (iv) (a) 7 puddlings and levelling. (b) to (e) As per treatments.  
   (v) 6000 lb. of G.L. +50 lb./ac. of A/S. G.L. applied one week before planting followed by a ploughing. Half of A/S applied on 1.11.1955 and the other half on 14.11.1955.  
   (vi) PTB-20 (medium, improved).  
   (vii) Unirrigated.  
   (viii) As per treatments.  
   (ix) 31.11’.  
   (x) 24.1.1956.

2. **TREATMENTS**:
   Same as in exp. no. 167 above.

3. **DESIGN**:
   (i) R.B.D.  
   (ii) (a) 3. (b) N.A.  
   (iii) 8.  
   (iv) (a) N.A.  
   (v) 20’×10’.  
   (vi) Nil. About 2’ interspace between plots.  
   (vii) Yes.

4. **GENERAL**:
   (i) Normal.  
   (ii) Spraying with D.D.T. against stem-borer.  
   (iii) Grain yield.  
   (iv) (a) 1955—contd.  
   (b) No.  
   (c) Nil.  
   (d) Nil.  
   (e) Nil.  
   (f) Nil.  
   (g) Nil.

5. **RESULTS**:
   (i) 1896 lb./ac.  
   (ii) 197 lb./ac.  
   (iii) Treatment differences are highly significant.  
   (iv) Av. yield of grain in lb./ac.  
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2411</td>
<td>1687</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>1592</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

S.E./mean := 70 lb./ac.
Crop: Paddy (1st crop)

Object: To assess the utility or working double row rice weeder over the local method of hand weeding.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L.+30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 19.5.1955/21.6.1956. (iv) (a) 6 puddlings and 3 levellings. (b) to (e) N.A. (v) 5000 lb./ac. of G.L. +30 lb./ac. of N as A/S. G.L. applied as B.D. and A/S as top dressing one month after planting. (vi) PB-2 (improved). (vii) Unirrigated. (viii) One weeding one month after planting. (ix) About 82°. (x) 16.10.1956.

2. TREATMENTS:
   Same as in exp. no. 167 on page 110.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) 60' x 10'. (iii) 3. (iv) (a) and (b) 10' x 20'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) 1955—1957. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2759 lb./ac. (ii) 141.7 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

   Treatment | 1 | 2 | 3
   --- | --- | --- | ---
   Av. yield | 2818 | 2764 | 2596
   S.E./mean = 50.1 lb./ac.

Crop: Paddy (2nd crop).

Object: To assess the utility of working double row rice weeder over the local method of hand weeding.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L.+30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 21.9.1956/31.10.1956. (iv) (a) 6 puddlings and 3 levellings. (b) to (e) N.A. (v) 5000 lb./ac. of G.L. at the time of puddling+30 lb./ac. of N as A/S one month after planting. (vi) PB-20 (improved). (vii) Unirrigated. (viii) One weeding. (ix) 2.62°. (x) 4.2.1957.

2. TREATMENTS:
   Same as in exp. no. 167 on page 110.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) 60' x 10'. (iii) 3. (iv) (a) N.A. (b) 10' x 20'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) 1955—1957. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2212 lb./ac. (ii) 192 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

   Treatment | 1 | 2 | 3
   --- | --- | --- | ---
   Av. yield | 2103 | 2265 | 2266
   S.E./mean = 68 lb./ac.
Crop: Paddy (1st crop).
Ref: K. 57(171).
Type: 'C'.

Object: To assess the utility of working double row rice weeder over the local method of hand weeding.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. + 30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 8.5.1957/7.6.1957. (iv) (a) 4 ploughings and 4 diggings. (b) to (c) As per treatments. (v) G.L. at 5000 lb./ac. at the time of puddling + 150 lb./ac. of Super before planting + A/S at 100 lb./ac. top dressed one month after planting. (vi) PTB-2 (improved). (vii) Unirrigated. (viii) As per treatments. (ix) 8.4.64'. (x) 12.10.1957.

2. TREATMENTS:
1. Planting in bulk and weeding, hand weeding one month after planting.
2. Planting in lines at 10"x 6" spacing, 4 seedlings/hole and hand weeding thrice 14, 28 and 42 days after planting.
3. Planting in lines at 10"x 6" spacing, 4 seedlings/hole and double row rice weeder worked at 14, 28 and 42 days after planting.

3. DESIGN:
(i) R.B.D.; (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) N.A. (b) 10"x 20". (v) Nil; 1½' interspace between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) BHC dusted against case-worm. (iii) Grain yield. (iv) (a) 1955-1957. (b) Yes. (c) N.A. (v) (a) and (b) Nil. (vi) Nil. (vii) Nil.

5. RESULTS:
(i) 3168 lb./ac. (ii) 137 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3333</td>
<td>3056</td>
<td>3105</td>
</tr>
</tbody>
</table>

S.E./mean = -49 lb./ac.

---

Crop: Paddy (1st crop).
Ref: K. 57(172).
Type: 'C'.

Object: To assess the utility of working double row rice weeder over the local practice of hand weeding.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. + 30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 9.9.1957/25.10.1957. (iv) (a) 4 ploughings and 4 diggings. (b) to (c) As per treatments. (v) G.L. at 5000 lb./ac. at the time of puddling + A/S 100 lb./ac., half as B.D. before planting and half top dressed one month after planting. (vi) PTB-20 (improved). (vii) Unirrigated. (viii) As per treatments. (ix) 19.49'. (x) 3.2.1958.

2. TREATMENTS:
Same as in exp. no. 171 above.

3. DESIGN:
(i) R.B.D.; (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) N.A. (b) 10"x 20". (v) Nil; 1½' interspace between plots. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Folidol sprayed against stem-borer. (iii) Grain yield. (iv) (a) 1955-1957. (b) Yes. (c) N.A. (v) (a) and (b) Nil. (vi) Nil. (vii) Nil.

5. RESULTS:
(i) 2133 lb./ac. (ii) 130 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.
Crop : Paddy.  
Ref : K. 58(173).  
Type : ‘C’.

Object : To study the effect of transplanting Paddy in lines against bulk planting.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 4000 lb./ac. of G.L.+50 lb./ac. of A/S+25 lb./ac. of triple Super as B.D. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 8.5.1958/2.7.1958. (iv) (ii) 6 puddlings and 3 levellings. (b) As per treatments. (c) N.A. (d) As per treatments. (e) N.A. (v) 5000 lb./ac. of G.L. as B.D.+30 lb./ac. of N as A/S one month after planting. (vi) PTB-26 (improved). (vii) Unirrigated.  
(viii) One hand weeding one month after planting. (ix) 8°. (x) 23.10.1958.

2. TREATMENTS:
1. Planting in bulk.  
2. Planting in lines 10" apart.  
3. Planting at 6’x6’ doubles.

3. DESIGN:
(i) R.B.D. (ii) (a) 3 (b) 24’x16’. (iii) 8. (iv) (a) N.A. (b) 8’x16’. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1958—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2820 lb./ac. (ii) 174 lb./ac. (iii) Treatment differences are significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2265</td>
<td>2093</td>
<td>2038</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>= 46 lb./ac.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop : Paddy.  
Ref : K. 58(174).  
Type : ‘C’.

Object : To study the effect of transplanting Paddy in lines against bulk planting.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L.+30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) Last week of Sept. 1958/1st week of Nov. 1958. (iv) (a) 6 puddlings and 3 levellings. (b) As per treatments. (c) N.A. (d) As per treatments. (e) N.A. (v) 5000 lb./ac. of G.L. (vi) PTB-15 (improved). (vii) Unirrigated. (viii) One hand weeding one month after planting. (ix) 15°.  
(x) 23.2.1959.

2. TREATMENTS:
Same as in expt. no. 173 above.

3. DESIGN:
(i) R.B.D. (ii) 3. (b) 24’x16’. (iii) 8. (iv) (a) N.A. (b) 8’x16’. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1958—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2898 lb./ac. (ii) 190 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2916</td>
<td>2922</td>
</tr>
<tr>
<td>2</td>
<td>2885</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2892</td>
<td></td>
</tr>
</tbody>
</table>

S.E./mean = 67 lb./ac.

Crop: Paddy (1st crop).

Object: To compare different methods of Paddy cultivation.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 500 lb./ac. of G.L. + 30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 31.5.1956/3.7.1956. (iv) (a) 6 puddlings and 3 levellings. (b) As per treatments. (c) —. (d) As per treatments. (e) N.A. (v) Super at 150 lb./ac. as B.D. (vi) PTB-2 (improved). (vii) Unirrigated. (viii) One weeding. (ix) About 80°. (x) 17.10.1956.

2. TREATMENTS:
1. Modified Japanese method of planting with 10' x 6' spacing and 2 seedlings/hole.
2. Local method of planting (Ryots' method adopted in the locality) with varying number of seedlings/hole.
3. Wave shaped method of planting with 1' x 6' x 4' spacing and 2 seedlings/hole.
4. Wave shaped method of planting 2' x 6' x 2' spacing with 2 seedlings/hole.
5. Wave shaped method of planting with 10' x 5' spacing and 4 seedlings/hole.
6. Japanese method with 10' x 5' spacing and 4 seedlings/hole.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) 45° x 40°. (iii) 6. (iv) (a) and (b) 7.5' x 40'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1956—1957. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 3214 lb./ac. (ii) 166.7 lb./ac. (iii) Treatment differences are significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3327</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3248</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3363</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2940</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3374</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E./mean = 68.0 lb./ac.

Crop: Paddy (2nd crop).

Object: To compare different methods of Paddy cultivation.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) G.L. at 8000 lb./ac. + A/S at 50 lb./ac. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 3.6.1957/6.7.1957. (iv) (a) 4 ploughings. (b) As per treatments. (c) —. (d) As per treatments. (e) N.A. (v) G.L. at 5000 lb./ac. + Super at 150 lb./ac. + A/S at 100 lb./ac. G.L. applied as B.D. at puddling, Super as B.D. before planting and A/S top dressed one month after planting. (vi) PTB-2 (improved). (vii) Unirrigated. (viii) Weeding and hoeing. (ix) 77.06°. (x) 1.11.1957.
2. TREATMENTS:

Same as in expt. no. 175 on page 115.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 7½'x35'. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) BHC dusted against case-worm. (iii) Grain yield. (iv) (a) 1956—condstd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 2705 lb./ac. (ii) 114 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2725</td>
<td>2883</td>
<td>2536</td>
<td>2489</td>
<td>2767</td>
<td>2831</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>—57 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy.  
Ref: K. 58(177).  
Type: 'C'.

Object: To compare wave shaped method of paddy cultivation with modified Japanese method and local method of cultivation.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) G.L. at 5030 lb./ac. + A/S 100 lb./ac. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 27.5.1958/4.7.1958. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanting according to treatments. (c) —. (d) and (e) N.A. (v) 5000 lb./ac. of G.L. + Super 150 lb./ac. as B.D. A/S at 100 lb./ac. top dressing one month after planting. (vi) PTB-2 (improved). (vii) Rainfed. (viii) one weeding. (ix) About 90°. (x) 27.10.1958.

2. TREATMENTS:

Same as in expt. no. 175 on page 115.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) 45'x35'. (iii) 6. (iv) (a) N.A. (b) 7½'x35'. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Grain and straw weight. (iv) (a) 1956—condstd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 2098 lb./ac. (ii) 191 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2008</td>
<td>2387</td>
<td>2038</td>
<td>1863</td>
<td>2109</td>
<td>2164</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>—78 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy.  
Ref: K. 54(178).  
Type: 'CV'.

Object: To determine the best spacing and optimum number of seedlings per hole for different varieties of Paddy.
1. **BASAL CONDITIONS**

   (i) (a) Nil. (b) Paddy. (c) 2 cwt/ac. of B.M. 1 cwt/ac. of G.N.C. and 40 tins/ac. of ash. (ii) (a) Sandy loam. (b) N.A. (iii) 19.6.1954/26.8.1954. (iv) (a) 2 ploughings with iron plough and 3 with desi plough. One levelling and breaking of clots. (b) Transplanting in lines. (c) 60 lb/ac. (d) 6' x 6'. (e) As per treatments. (v) 1 cwt/ac. of A/S and 35 tins/ac. of ash as top dressing. (vi) As per treatments. (vii) Unirrigated. (viii) 2 weedings 21 and 36 days after planting. (ix) 12°. (x) 8.1.1955.

2. **TREATMENTS**

   **Main-plot treatments**:

   **Sub-plot treatments**:
   - 3 spacings: S1 = 6', S2 = 9', and S3 = 12'.

   **Sub-sub-plot treatments**:
   - No. of seedlings/hole: C1 = 1, C2 = 2, and C3 = 4.

3. **DESIGN**

   (i) Split-plot in L. Sq. (ii) 3 main-plots, 3 sub-plots/main-plot, and 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a) 12' x 9'. (b) 9' x 6'. (v) 14' border row between plots. No guard rows kept. (vi) Yes.

4. **GENERAL**

   (i) Good, no lodging. (ii) Nil. (iii) Grain yield. (iv) (a) 1954—1955. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. **RESULTS**

   (i) 2707 lb/ac. (ii) (a) 834 lb/ac. (b) 472 lb/ac. (c) 332 lb/ac. (iii) None of the effects is significant.

   (iv) Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>2335</td>
<td>2790</td>
<td>2935</td>
<td>2983</td>
</tr>
<tr>
<td>2593</td>
<td>2493</td>
<td>3092</td>
<td>2726</td>
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<tr>
<td>2868</td>
<td>2425</td>
<td>2846</td>
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<td>2595</td>
<td>2569</td>
<td>2958</td>
<td>2707</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
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<tbody>
<tr>
<td>2487</td>
<td>2330</td>
<td>2930</td>
<td>2666</td>
</tr>
<tr>
<td>2666</td>
<td>2622</td>
<td>3008</td>
<td>2633</td>
</tr>
</tbody>
</table>

   S.E. of difference of two
   1. V marginal means = 226.9 lb/ac.
   2. S marginal means = 128.1 lb/ac.
   3. C marginal means = 50.0 lb/ac.
   4. S means at the same level of V = 222.9 lb/ac.
   5. V means at the same level of S = 290.9 lb/ac.

   6. C means at the same level of V = 156 lb/ac.
   7. V means at the same level of C = 260 lb/ac.
   8. C means at the same level of S = 156 lb/ac.
   9. S means at the same level of C = 181 lb/ac.

---

**Crop**: Paddy.  
**Ref**: K. 55(179).  
**Site**: Paddy Breeding Stn., Kayamkulam.  
**Type**: 'CV'.  
**Object**:—To determine the best spacing and optimum number of seedlings per hole for different varieties of Paddy.

1. **BASAL CONDITIONS**

   (i) (a) Nil. (b) Paddy. (c) 2 cwt/ac. of B.M. 1 cwt/ac. of G.N.C. and 40 tins/ac. of ash. (ii) (a) Sandy loam. (b) N.A. (iii) 18.6.1955/25.8.1955. (iv) (a) 2 ploughings with iron plough and 3 with desi plough. One levelling and breaking of clots. (b) Transplanting. (c) 60 lb/ac. (d) 6' x 6'. (e) As per treatments. (v) 1 cwt/ac. of A/S and 35 tins/ac. of ash as top dressing. (vi) As per treatments. (vii) Unirrigated. (viii) 2 weedings 21 and 36 days after planting. (ix) 12°. (x) 10.1.1956.
2. TREATMENTS:
Same as in exp. no. 178 on page 116.

3. DESIGN:
(i) Split-plot in L. Sq. (ii) (a) 3 main-plots/block; 3 sub-plots/main-plot and 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a) 12'×9'. (b) 9'×6'. (v) 14' border row between plots. No guard row discarded. (vi) Yes.

4. GENERAL:
(i) Good. (iii) Nil. (iii) Grain yield. (iv) (a) 1954-1955. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2446 lb./ac. (ii) (a) 2791 lb./ac. (b) 33 lb./ac. (c) 255 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>Mean</th>
<th>C₁</th>
<th>C₂</th>
<th>C₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>2314</td>
<td>2252</td>
<td>2650</td>
<td>2405</td>
<td>2258</td>
<td>2476</td>
<td>2482</td>
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<tr>
<td>S₂</td>
<td>2274</td>
<td>2336</td>
<td>2487</td>
<td>2366</td>
<td>2356</td>
<td>2409</td>
<td>2353</td>
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<tr>
<td>S₃</td>
<td>2279</td>
<td>2560</td>
<td>2640</td>
<td>2566</td>
<td>2598</td>
<td>2431</td>
<td>2678</td>
</tr>
<tr>
<td>Mean</td>
<td>2295</td>
<td>2383</td>
<td>2659</td>
<td>2446</td>
<td>2394</td>
<td>2439</td>
<td>2504</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. V marginal means = 75.5 lb./ac. 6. C means at the same level of V = 120.2 lb./ac.
2. S marginal means = 89.7 lb./ac. 7. V means at the same level of C = 124.0 lb./ac.
3. C marginal means = 69.3 lb./ac. 8. C means at the same level of S = 120.2 lb./ac.
4. S means at the same level of V = 155.5 lb./ac. 9. S means at the same level of C = 132.9 lb./ac.
5. V means at the same level of S = 147.9 lb./ac.

Site : Agri. Res. Sta., Mannuthy.  Type : 'CV'.
Object : To test the performance of Sahasralingam variety against two normal Viruppu and Mundakan crops.

1. BASAL CONDITIONS:
(a) (b) Paddy. (c) 5000 lb./ac. of G.L. + 100 lb./ac. of A/S. (ii) (a) Sandy loam. (b) N.A. (iii) 4.6.1958/5.7.1958. (iv) (a) 6 to 8 ploughings and 2 diggings. (b) Transplanted. (c) N.A. (d) 6'×6". (e) 2. (v) 5000 lb./ac. of G.L. + 200 lb./ac. of A/S. G.L. as B.D. and A/S a month after planting for each of the varieties. (vi) As per treatments. (vii) Unirrigated. (viii) 2 weedings one month and two months after planting. (ix) 117.77'. (x) 26.9.1958, 22.12.1958, 2.1.1959.

2. TREATMENTS:
1. Normal Viruppu (1st crop) of PTB-7 followed by PTB-20 during Mundakan.
3. Normal 1st crop of PTB-7 followed by Sahasralingam variety in September.
Sahasralingam variety grown in Sahasralingam farm with its profuse tillering is claimed to be as good as the two crops of normal Viruppu and Mundakan.
3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) 40' x 25'. (iii) 8. (iv) (a) 10' x 25'. (b) 9' x 24'. (v) One row all round. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—condt. (b) Yes. (c) Nil. (v) (a) Mannuthy. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 3063 lb./ac. (ii) 508 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. yield</td>
<td>2894</td>
<td>2223</td>
<td>3458</td>
<td>3677</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=180 lb./ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Object: To test the performance of Sahasralingam variety against two normal Viruppu and Mundakan crops.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. + 30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) As per treatments. (iv) (a) 6 puddings and 3 levellings. (b) to (e) As per treatments. (v) B.D. of 5000 lb. ac. of G.L. before last ploughing. Also see treatments. (vi) As per treatments. (vii) Unirrigated. (viii) One weeding. (ix) 106.98°. (x) 24.2.1959.

2. TREATMENTS:
1. Normal Viruppu (1st crop) of PTB-7 followed by PTB-20 during Mundakan—Sown 3 lb./cent and planted 6" x 6". 1st crop sown in April, May and 2nd crop in early Sept.
2. Sahasralingam variety sown May-June, planted in Aug.-Sept. with 10" x 10" and 1 seedling/hole and harvested in Jan.-Feb.
3. Normal 1st crop of PTB-7 followed by Sahasralingam variety planted in September. With seed rate and spacing as in treatment 1.
4. Mixed seedlings of PTB-7 and Sahasralingam in 3:1 ratio planted in June-July, PTB-7 harvested in Sept. while Sahasralingam variety in Jan.-Feb. Seed rate and spacing as in treatment 1 and PTB-7 harvested without injuring the other crop. 150 lb. ac. of N as A/S applied a month after planting of each crop in treatments 1 to 3. 300 lb. ac. of N as A/S applied in two equal doses a month after planting and during November for treatment 4.

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) 40' x 30'. (b) 8. (iv) (a) N.A. (b) 10' x 30'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—condt. (b) Yes. (c) Nil. (v) (a) Mannuthy. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 3063 lb./ac. (ii) 508 lb./ac. (iii) Treatments differ highly significantly. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. yield</td>
<td>4381</td>
<td>4295</td>
<td>5633</td>
<td>5968</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=202 lb./ac.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Crop : Paddy (2nd crop).

Object : To find out the best age of planting seedlings.

1. BASAL CONDITIONS:
   - (i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L.+100 lb./ac. of A/S.
   - (iv) (a) 6 to 8 ploughings and 2 diggings. (b) Transplanting. (c) ---. (d) 6"x6".
   - (e) 2. (v) 5000 lb./ac. of G.L. at ploughing+100 lb./ac. of A/S one month after planting.
   - (vi) Local chitrine (medium). (vii) Unirrigated. (viii) One weeding one month after planting.
   - (ix) 17.69". (x) 3.2.1959.

2 TREATMENTS:
Main-plot treatments:
   - 2 levels of manuring to nursery : M₃=0 and M₄= 10 C.L./ac. of C.M. + 100 lb./ac. 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/block and 3 sub-plots/main-plot. (b) 30'x20'. (iii) 4.
   - (iv) (a) 5'x20'. (b) 4'x19'. (v) 6" along the border. (vi) Yes.

4. GENERAL:
   - (i) Normal. Lodged in middle of January. (ii) Case-worm attack—BHC dusted at 10%. (iii) Grain and straw yield, tiller counts and length measurements. (iv) (a) 1958 (2nd crop) contd. (b) No. (c) Nil.
   - (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   - (i) 1055 lb./ac. (ii) (a) 573 lb./ac. (b) 269 lb./ac. (iii) Only S effect is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>Mean</th>
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<td>M₄</td>
<td>752</td>
<td>1272</td>
<td>1173</td>
<td>1066</td>
</tr>
<tr>
<td>Mean</td>
<td>784</td>
<td>1214</td>
<td>1168</td>
<td>1055</td>
</tr>
</tbody>
</table>

S.E. of difference of two
   - 1. M marginal means =-233.9 lb./ac.
   - 2. S marginal means =-134.5 lb./ac.
   - 3. S means at the same level of M =-190.2 lb./ac.
   - 4. M means at the same level of S =-280.7 lb./ac.

Crop : Paddy (1st crop).

Object : To compare the Chinese method with modified Japanese method and Farm method of paddy cultivation.

1. BASAL CONDITIONS:
   - (i) (a) No. (b) Paddy. (c) 5000 lb./ac. of G.L.+100 lb./ac. of A/S as top dressing. (ii) (a) N.A. (b)
   - Refer soil analysis, Pattambi. (iii) 17.6.1959/16.7.1959. (iv) (a) Six puddlings and 4 levelling. (b) to (c)

2. TREATMENTS:
   - 3 doses of basal manuring : B₁ (Farm method)=G.L. at 5000 lb./ac.+Super at 150 lb./ac., B₂ (Japanese method)=G.L. at 6000 lb./ac.+C.M. at 3 ton/ac. and B₃ (Chinese method)=20 ton/ac. of C.M. +200 lb./ac. of A/S+250 lb./ac. of Super.
3. DESIGN:
(i) R.B.D. (ii) 3. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 30' x 30'. (v) Two rows as border were left all round the plot. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Grain yield. (iv) (a) No. (b) —. (c) Nill. (v) (a) and (b) Nill. (vi) Nil. (vii) Information is not available about the cultural practices for different methods.

5. RESULTS:
(i) 1144 lb./ac. (ii) 340.6 lb./ac. (iii) Treatment differences are significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>B₁</th>
<th>B₂</th>
<th>B₃</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1442</td>
<td>778</td>
<td>1212</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>= 139.0 lb./ac.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (2nd crop).
Object :- To find out the effect of different doses of manure and methods of interculture on Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 500 lb./ac. of G.L. in 1st week of June, 1953 followed by ploughings +50 lb./ac. of A/S on 15.6.1955 along the last plough furrows as B.D. 50 lb./ac. of A/S as top dressing one month after planting on 21.7.1955. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 5.9.1955. (iv) (a) 2 ploughings and 2 mummatty diggings. (b) Transplanted in lines. (c) —. (d) 6' x 4'.
(e) 3 to 4. (v) Nit. (vi) PTB~20 (medium). (vii) Unirrigated. (viii) As per treatments. (ix) 34.28. (x) 30 1.1956.

2. TREATMENTS:
At combinations of (1) and (2)
(1) 2 methods of manuring : M₁ = Japanese method — G.L. at 6000 lb./ac. + C.M. at 5 C.L./ac. applied a week before planting. Super and A/S, each at 100 lb./ac., broadcast at planting and an equal amount of A/S and Super top dressed a month before planting and M₂ = Local method — G.L. at 5000 lb./ac. applied a week before planting. Super at 150 lb./ac. broadcast at transplanting and A/S at 150 lb./ac. top-dressed a month after planting.
(2) 5 intercultures : W₀ = No weeding, W₁ = 2 weedings 15 and 30 days after planting, W₂ = 2 weedings and intercultures with intercultivator 15 and 30 days after planting, W₃ = intercultures with hand rake 15, 30 and 45 days after planting and W₄ = intercultures with rotatory weeder 15, 30 and 45 days after planting.

3. DESIGN:
(i) 2 x 5 F. in R.B.D. (ii) 10. (iii) 4. (iv) (a) and (b) 15' x 35'. (v) Nill. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Spraying with D.D.T. against stem-borer. (iii) Grain yield. (iv) (a) 1955 — (2nd crop) contd. (b) No. (c) Nill. (vi) and (vii) Nill.

5. RESULTS:
(i) 689 lb./ac. (ii) 31 lb./ac. (iii) M and W effects are highly significant. Interaction is not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>W₀</th>
<th>W₁</th>
<th>W₂</th>
<th>W₃</th>
<th>W₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>710</td>
<td>821</td>
<td>671</td>
<td>716</td>
<td>647</td>
<td>713</td>
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<tr>
<td>M₂</td>
<td>640</td>
<td>776</td>
<td>658</td>
<td>671</td>
<td>601</td>
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<tr>
<td>Mean</td>
<td>675</td>
<td>798</td>
<td>654</td>
<td>693</td>
<td>624</td>
<td>689</td>
</tr>
</tbody>
</table>
Crop :- Paddy (1st crop).

Ref :- K. 56(185).
Type :- 'CM'.

Object :- To find out the effect of different doses of manures and methods of interculture on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb/acre of G.L. + 30 lb/acre of N as A/S. (b) Refer soil analysis, Pattambi. (iii) 5.5.1956/14 and 15.6.1956. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting. (c) —. (d) 6" × 10" and 10" × 10". (e) 2 to 4. (x) Nil. (vi) PTB-2 (medium). (vii) Unirrigated. (viii) As per treatments. (ix) About 10'. (x) 9.10.1956.

2. TREATMENTS:
   Same as in exp. no. 184 on page 121.

3. DESIGN:
   (i) 2 × 5 Fact. in R.B.D. (ii) (a) 10. (b) 15'. (c) 20'. (iii) 4. (iv) (a) and (b) 15' × 40'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1955 (2nd crop)—1954 (1st crop). (b) No. (c) Nil. (vi) (a) and (b) Nil. (vi) (a) and (b) Nil. (vii) Nil.

5. RESULTS:
   (i) 2714 lb/acre. (ii) 222.0 lb/acre. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb/acre.

<table>
<thead>
<tr>
<th>M1</th>
<th>W6</th>
<th>W1</th>
<th>W4</th>
<th>W2</th>
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<tr>
<td>2819</td>
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<td>2496</td>
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<td>2696</td>
<td>2623</td>
<td>2605</td>
<td>2561</td>
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</tr>
<tr>
<td>Mean</td>
<td>2678</td>
<td>2723</td>
<td>2891</td>
<td>2750</td>
<td>2632</td>
<td>2715</td>
</tr>
</tbody>
</table>

S.E. of W marginal mean = 78.5 lb/acre.
S.E. of M marginal mean = 49.6 lb/acre.
S E. of body of table = 111.0 lb/acre.

---

Crop :- Paddy (2nd crop).

Ref :- K. 56(186).
Type :- 'CM'.

Object :- To find out the effect of different doses of manures and methods of interculture on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 5000 lb/acre of G.L. + 30 lb/acre of N as A/S. (ii) (b) Refer soil analysis, Pattambi. (iii) 21.9.1956/4.11.1956. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting. (c) —. (d) 10" × 4". (e) 2. (x) Nil. (vi) PTB-20 (medium). (vii) Unirrigated. (viii) As per treatments. (ix) 2.62'. (x) 12.2.1957.

2. TREATMENTS:
   Same as in exp. no. 184 on page 121.

3. DESIGN:
   (i) 2 × 5 Fact. in R.B.D. (ii) (a) 10. (b) 100' × 40'. (iii) 4. (iv) (a) and (b) 40' × 10'. (v) Nil. (vi) Yes.
4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1955 (2nd crop)—1958 (1st crop). (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1610 lb./ac. (ii) 103 lb./ac. (iii) Interaction M x W alone is highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>W₁₀</th>
<th>W₁</th>
<th>W₂</th>
<th>W₃</th>
<th>W₄</th>
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</tr>
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<tbody>
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<td>1688</td>
<td>1613</td>
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<td>1640</td>
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<tr>
<td>M₂</td>
<td>1586</td>
<td>1552</td>
<td>1504</td>
<td>1640</td>
<td>1613</td>
<td>1579</td>
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<tr>
<td>Mean</td>
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<td>1616</td>
<td>1596</td>
<td>1626</td>
<td>1600</td>
<td>1610</td>
</tr>
</tbody>
</table>

S.E. of W marginal mean = 36.4 lb./ac.
S.E. of M marginal mean = 23.0 lb./ac.
S.E. of body of table = 51.5 lb./ac.

Crop: Paddy (1st crop).
Ref: K. 57(187).
Type: 'M'.

Object: To find out the effect of different doses of manures and methods of interculture on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 8.5.1957/23.6.1957. (iv) (a) Four ploughings and 4 diggings. (b) Transplanting. (c) —. (d) 10' x 6'. (e) 3 to 4. (v) Nil. (vi) PFB—2 (improved). (vii) Unirrigated. (viii) As per treatments. (ix) 85.79°. (x) 16.10.1957.

2. TREATMENTS:
   Same as in exp. no. 184 on page 121.

3. DESIGN:
   (i) 2 x 5 Rct. in R.B.D. (ii) (a) No. (b) N.A. (iii) 4. (iv) (a) and (b) 10' x 35'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) BHC dusted against case-worm. (iii) Grain yield. (iv) (a) 1955 (2nd crop)—1958 (1st crop). (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 3654 lb./ac. (ii) 200 lb./ac. (iii) M effect alone is highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>W₁₀</th>
<th>W₁</th>
<th>W₂</th>
<th>W₃</th>
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<td>3271</td>
<td>3183</td>
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<td>3251</td>
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<td>3095</td>
<td>3044</td>
<td>3079</td>
<td>3002</td>
<td>3052</td>
<td>3054</td>
</tr>
</tbody>
</table>

S.E. of W marginal mean = 70.7 lb./ac.
S.E. of M marginal mean = 44.7 lb./ac.
S.E. of body of table = 100.0 lb./ac.
Crop: Paddy (2nd crop).

Ref: K. 57(188).
Type: 'CM'.

Object:—To find out the effect of different doses of manures and methods of interculture on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
   (iii) 5.9.1957/30.10.1957. (iv) (a) Four ploughings and 4 diggings. (b) Transplanting. (c) —. (d) 10'x6'.
   (e) 3 to 4. (v) Nil. (vi) PTB-20 (medium). (vii) Unirrigated. (viii) As per treatments. (ix) 19.97'.
   (x) 21.2.1957.

2. TREATMENTS:
   Same as in expt. no. 184 on page 121.

3. DESIGN:
   (i) 2x5 Pact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) and (b) 10'x35'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Folidol sprayed against stem-borer. (iii) Grain yield. (iv) (a) 1955 (2nd crop)—1958
   (1st crop). (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1804 lb./ac. (ii) 174 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>W₀</th>
<th>W₁</th>
<th>W₂</th>
<th>W₃</th>
<th>W₄</th>
<th>Mean</th>
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<tr>
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<td>1867</td>
<td>1863</td>
<td>1694</td>
<td>1993</td>
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<td>1826</td>
<td>1824</td>
<td>1750</td>
<td>1775</td>
<td>1759</td>
</tr>
<tr>
<td>Mean</td>
<td>1726</td>
<td>1816</td>
<td>1844</td>
<td>1722</td>
<td>1884</td>
<td>1804</td>
</tr>
</tbody>
</table>

S.E. of W marginal means = 61.5 lb./ac.
S.E. of M marginal means = 38.9 lb./ac.
S.E. of body of table = 87.0 lb./ac.

Crop: Paddy (1st crop).

Ref: K. 58(189).
Type: 'CM'.

Object:—To find out the effect of different doses of manures and methods of interculture on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
   (iii) 5.5.1958/26.6.1958. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting. (c) —. (d) 10'x6'.
   (e) 2. (v) Nil. (vi) PTB-2 (medium). (vii) Unirrigated. (viii) As per treatments. (ix) About 90'.
   (x) 26.10.1958.

2. TREATMENTS:
   Same as in expt. no. 184 on page 121.

3. DESIGN:
   (i) 2x5 Pact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) and (b) 10'x40'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1955 (2nd crop)—contd. (b) Yes. (c) Nil. (v) (a)
   and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2405 lb./ac. (ii) 165 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.
Crop : Paddy (2nd crop).

Object : To find out whether application of Pot. Sul. to thick and thin nursery, will induce pest resistance in the transplanted Paddy crop.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L.+30 lb./ac. of N as A/S. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 22.9.1958/11.11.1958. (iv) (a) Six puddlings and 3 levellings. (b) Transplanting. (c) —. (d) 6'x10'. (e) N.A. (v) 4000 lb./ac. of G.L. (vi) PTB-20 (medium). (vii) Unirrigated. (viii) One weeding one month after transplanting. (ix) 15°. (a) 25.2.1959.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 seed rates: S₁=3 and S₂=6 lb./cent.
(2) 2 manures: M₁=G.L. at 5000 lb./ac. and M₂=Pot. Sul. at 200 lb./ac.

3. DESIGN:
(i) 2x2 Fact. in R.B.D. (ii) (a) 4. (b) 69'x20'. (iii) 2. (iv) (a) N.A. (b) 20'x15'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a). 1958—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1775 lb./ac. (ii) 156 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>M₁</th>
<th>M₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1952</td>
<td>1744</td>
</tr>
<tr>
<td>S₂</td>
<td>1754</td>
<td>1650</td>
</tr>
<tr>
<td>Mean</td>
<td>1853</td>
<td>1697</td>
</tr>
</tbody>
</table>

S.E. of S or M marginal mean = 78 lb./ac.
S.E. of body of table = 110 lb./ac.

---

Crop : Paddy (1st crop).

Object : To compare the Japanese method of Paddy cultivation with Farm method.

Ref : K. 58(180).
Type : 'CM'.

Ref : K. 54(181).
Type : 'CMV'.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
(iii) 22.5.1954/25.6.1954. (iv) (a) Six puddlings and 3 levellings. (b) to (d) As per treatments. (e) 2 to 3, (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) Weedings as and when required. (ix) 42.9'.
(x) 9.10.1954.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 methods of cultivation: \( M_1 = \) Japanese method and \( M_2 = \) Farm method.

Japanese method: Long and narrow nursery beds manured with C.M. at 40 C.L./ac. + Wood ash at 2000 lb./ac. + Compost at 2000 lb./ac. and mixture of A/S and Super at 2 lb./ac. per lb. of seed. Seeds, treated with salt solution. sown at 15 lb./ac. Second dose of manure mixture applied 15 days after sowing. Seedlings transplanted at 10'x 10' spacing and intercultivation done with rotary weeder. Then 20 C.L./ac. of F.Y.M. +30 lb./ac. of N as A/S+30 lb./ac. of P\(_2\)O\(_5\) given as B.D. to field before transplanting. 15 lb./ac of N+15 lb./ac. of P\(_2\)O\(_5\) given one month after transplanting and an equal dose given two months after transplanting.

Farm method: Wet seed beds manured with 10000 lb./ac. of C.M. at the time of puddling. Seeds sown in nursery at 3 lb./ac. B.D. of 5000 lb./ac. of G.L. and 30 lb./ac. of P\(_2\)O\(_5\) as Super given at the time of last ploughing. Seedlings transplanted at 6"x6' spacing in block. 30 lb./ac. of N as A/S applied 3 to 4 weeks after planting. Hand weeding.

3. DESIGN:
(i) R.B.D. (ii) 4. (b) N.A. (iii) 8. (iv) (a) and (b) 23'x30'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Uniform dusting with BHC against the stem-borer. (iii) Grain and straw yield. (iv) (a) 1951-1955. (b) Nil (v) (a) and (b) Nil. (vi) Nil. (vii) Cultural practices given are not available in detail.

5. RESULTS:
(i) 2359 lb./ac. (ii) 2305 lb./ac. (iii) All effects are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>( V_1 )</th>
<th>( V_2 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( M_1 )</td>
<td>3031</td>
<td>1951</td>
<td>2491</td>
</tr>
<tr>
<td>( M_2 )</td>
<td>2515</td>
<td>1940</td>
<td>2223</td>
</tr>
<tr>
<td>Mean</td>
<td>2773</td>
<td>1946</td>
<td>2359</td>
</tr>
</tbody>
</table>

S.E. of M or V marginal mean = 51.5 lb./ac,
S.E. of body of table = 72.8 lb./ac.

Crop: Paddy (2nd crop).
Ref: K. 54(192).
Type: 'CMV'.

Object: To compare the Japanese method of Paddy cultivation with Farm method.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
(iii) 8.9.1954/16.10.1954. (iv) (a) Puddling 8 to 10 times, levelling 6 to 8 times. (b) to (d) As per treatments. (e) 2 to 3. (v) and (vi) As per treatments. (vii) Unirrigated. (viii) One or two weedin's at intervals of one month from planting according to need. (ix) 15.69'. (x) 21.1.1955.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 methods of cultivation: \( M_1 = \) Japanese and \( M_2 = \) Farm method.
(2) 2 varieties: \( V_1 = \) PTB-18 and \( V_2 = \) PTB-20.
Refer exp. no. 191 above for details.
3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) N.A. (b) 25' x 30'. (v) Nil; an inter space of 1' left between plots. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Uniform dusting with BHC against stem-borer. (iii) Grain and straw yield. (iv) (a) 1951-1955. (b) Yes. (c) Nil. (v) (a) and (b) N.A. (vi) Nil. (vii) Cultural practices not available in detail.

5. RESULTS:
   (i) 2070 lb./ac. (ii) 110 lb./ac. (iii) M and V effects are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>Mean</th>
</tr>
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</tr>
<tr>
<td>M2</td>
<td>2301</td>
<td>2737</td>
<td>2520</td>
</tr>
<tr>
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</tr>
</tbody>
</table>
   Mean 2446 2893 2670

S.E. of M or V marginal mean = 27.5 lb./ac.
S.E. of body of table = 38.9 lb./ac.

Crop: Paddy (1st crop).
Ref. => K. 55(183).
Type: ‘CMV’.

Object: To compare Japanese method of Paddy cultivation with Farm method.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi.
   (iii) 28.5.1955/29.6.1955. (iv) (a) 2 nummerry diggings and levelling. (b) to (d) As per treatments.
   (e) Japanese method—4 and Farm method—2. (v) Nil. (vi) As per treatments. (vii) Unirrigated.
   (viii) 2 weedings. (ix) 68.93'. (x) 15.10.1955.

2. TREATMENTS:
   Same as in exp. no. 192 on page 126.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) (a) and (b) 15' x 20'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Preventive dusting with BHC. (iii) Grain weight. (iv) (a) 1951 (1st crop) — 1955 (2nd crop).
   (b) Yes. (c) Nil. (v) (a) and (b) N.A. (vi) Nil. (vii) Cultural practices not available in detail.

5. RESULTS:
   (i) 2471 lb./ac. (ii) 189 lb./ac. (iii) M and V effects are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
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<td>2303</td>
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<td></td>
</tr>
</tbody>
</table>
   Mean 2620 2321 2471

S.E. of M or V marginal mean = 47.2 lb./ac.
S.E. of body of table = 66.8 lb./ac.
Crop: Paddy (2nd crop).

Object:—To compare the efficiency of Endrex as an insecticide with Folidol.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. + 30 lb./ac. of N as A/S one month after planting. (ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 24.9.1958/9.11.1958. (iv) (a) 6 puddings and 3 levellings. (b) Transplanting in lines. (c) 10' X 6'. (e) 2. (v) 5000 lb./ac. of G.L. + 30 lb./ac. of N as A/S one month after planting. (vi) PTB-20 (improved). (vii) Unirrigated. (viii) Nil.

2. TREATMENTS:
(1) Control.
(2) Endrex 20 E.C. at 12 oz./ac. one week after planting + 16 oz./ac. 2 weeks after planting + 16 oz./ac. 5 weeks after planting.
(3) Folidol applied in the same manner as Endrex.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) 15' X 50'. (iii) 8. (iv) (a) N.A. (b) 5' X 50'. (v) 2 rows left as guard rows. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.
5. RESULTS:
(i) 1378 lb./ac.  (ii) 129 lb./ac.  (iii) Treatment differences are significant.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1250</td>
<td>1437</td>
<td>1728</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>66 lb./ac.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy (1st crop).

Object: To compare the efficiency of Endrex as an insecticide with Folidol.

1. BASAL CONDITIONS:
(i) (a) No.  (b) Paddy.  (c) 5000 lb./ac. of G.L. + 30 lb./ac. of N as A/S.  (ii) (a) N.A.  (b) Refer soil analysis, Pattambi.  (iii) 2.5.1959/22.6.1959.  (iv) (a) 6 puddlings and 4 levellings.  (b) to (c) N.A.  (v) G.L. at 5000 lb./ac.  (vi) PTB-20 (medium).  (vii) Unirrigated.  (viii) N.A.  (ix) 110'.  (x) 10.10.1959.

2. TREATMENTS:
Same as in exp. no. 195 on page 128.

3. DESIGN:
(i) R.B.D.  (ii) (a) 3.  (b) N.A.  (iii) 8.  (iv) (a) and (b) 50'x5'.  (v) N.A.  (vi) Yes.

GENERAL:
(i) Normal.  (ii) As per treatments.  (iii) Grain yield and pest count.  (iv) (a) 1958—contd.  (b) No.  (c) Nil.  (v) (a) and (b) No.  (vi) and (vii) Nil.

4. RESULTS:
(i) 2815 lb./ac.  (ii) 241.9 lb./ac.  (iii) Non on the effects is signiticant.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2655</td>
<td>2953</td>
<td>2838</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>85.5 lb./ac.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Paddy (2nd crop).

Object: To compare the efficiency of Endrex as an insecticide with Folidol.

1. BASAL CONDITIONS:
(i) (a) No.  (b) Paddy.  (c) 5000 lb./ac. of G.L.  (ii) (a) N.A.  (b) Refer soil analysis, Pattambi.  (iii) 24.9.1959/24.10.1959.  (iv) (a) 6 puddlings and 4 levellings.  (b) to (c) N.A.  (v) G.L. at 5000 lb./ac.  (vi) PTB-20 (medium).  (vii) Unirrigated.  (viii) N.A.  (ix) 36'.  (x) 10.2.1960.

2. TREATMENTS:
Same as in exp. no. 195 on page 128.

3. DESIGN:
(i) R.B.D.  (ii) (a) 3.  (b) N.A.  (iii) 8.  (iv) (a) and (b) 50'x5'.  (v) N.A.  (vi) Yes.

GENERAL:
(i) Normal.  (ii) As per treatments.  (iii) Pest count and grain yield.  (iv) (a) 1958—contd.  (b) No.  (c) Nil.  (v) (a) and (b) No.  (vi) and (vii) Nil.

5. RESULTS:
(i) 1920 lb./ac.  (ii) 127.9 lb./ac.  (iii) Treatment differences are not significant.  (iv) Av. yield of grain in lb./ac.
Crop: Paddy (1st crop).
Object: To study the effect of spraying different insecticides as a pest control measure.

1. BASAL CONDITIONS:
   (i) (a) No. (b) Paddy. (c) G.L. at 4000 lb./ac. + A/S at 100 lb./ac. (ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 3-5.1959/22.6.1959. (iv) (a) 6 puddlings and 4 levellings. (b) to (e) N.A. (v) G.L. at 4000 lb./ac. as B.D.+A/S at 100 lb./ac. one month after planting. (vi) PTB-2, PTB-9, PTB-26 (medium). (vii) Unirrigated. (viii) N.A. (ix) 110'. (x) 26.8.1959.

2. TREATMENTS:
   1. Endrine at 1 oz. in 61 gallons of water.
   2. Folidol at 1 oz. in 12! gallons of water.
   3. o.o.T. 550 at 1 lb. in 25 gallons of water.
   4. Control.
   35-45 gallons/ac. of the mixture sprayed. Shoot portions of seedlings dipped in the solution for one hour before planting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) and (b) 50' X 5'. (v) An inter space of 1' is left between plots. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) As per treatments. (iii) Pest count and grain yield. (iv) (a) 1959—contd. (b) No. (c) Nil. (v) (a) No. (b) No. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2152 lb./ac. (ii) 217.0 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2067</td>
<td>2163</td>
<td>2127</td>
<td>2250</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>8.6 lb./ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. GENERAL:
(i) Normal. (ii) As per treatments. (iii) Pest count and grain yield. (iv) (a) 1959—contd. (b) No. (c) Nil. (v) (a) and (b) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 1246 lb./ac. (ii) 95.51 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1444</td>
<td>1231</td>
<td>1198</td>
<td>1113</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>38.58 lb./ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop ➔ Paddy (2nd crop).
Object ➔ To compare the insecticidal value of Aldrex with BHC 10%.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5000 lb./ac. of G.L. + 30 lb./ac. of N as A/S.
(ii) (a) Laterite loam. (b) Refer soil analysis, Pattambi. (iii) 24.9.1958/7.11.1958. (iv) (a) 6 puddlings and 3 levellings. (b) Transplanting in lines. (c) —. (d) 6' x 6'. (e) 2. (f) 5000 lb./ac. of G.L. as B.D. + 30 lb./ac. of N as A/S one month after planting. (vi) PTB-20 (improved). (vii) Unirrigated. (viii) One weeding. (ix) 15'. (x) 18th Feb. 1959.

2. TREATMENTS:
1. Control.
2. Aldrex 5%.
3. BHC 10%.

Dusting one, two and three weeks after planting at 15 lb./ac. each time.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) 15' x 50'. (iii) 8. (iv) (a) N.A. (b) 5' x 50'. (v) 4 rows at a spacing of 10' on either side of the plot left as guard rows. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) As per treatments. (iii) Grain yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (d) Nil. (e) Nil. (f) Nil. (g) Nil. (h) Nil.

5. RESULTS:
(i) 1474 lb./ac. (ii) 102 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>2</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1595</td>
<td>1392</td>
<td>1435</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>36 lb./ac.</td>
<td></td>
<td></td>
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</tbody>
</table>

Crop ➔ Paddy (1st crop).
Object ➔ To compare the insecticidal value of Aldrex with BHC.

1. BASAL CONDITIONS:
(i) (a) No. (b) Paddy. (c) 5003 lb./ac. of G.L. + 30 lb./ac. of N as A/S.
(ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 3.5.1959/20.6.1959. (iv) (a) 6 puddlings and 4 levellings. (b) to (e) N.A. (f) G.L. at 5000 lb./ac. (vi) PTB-20 (medium). (vii) Unirrigated. (viii) N.A. (ix) 110'. (x) 12.10.1959.

2. TREATMENTS:
Same as in exp. no. 200 above.
3. DESIGN:
(i) R.B.D. (ii) a. 3. (b) N.A. (iii) k. (iv) (a) and (b) 50' x 5'. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) As per treatments. (iii) Pest count and grain yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (a) and (b) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 3190 lb./ac. (ii) 164.6 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3079</td>
<td>3268</td>
<td>3224</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>38.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop:—Paddy (2nd crop).  
Ref:—K. 59(262).  
Type:—'D'.

Object:—To compare the insecticidal value of Aldrex with BHC.

1. BASAL CONDITIONS:
(i) (a) No. (b) Paddy. (c) 5000 lb./ac. of G.L. (ii) (a) N.A. (b) Refer soil analysis, Pattambi. (iii) 10.9.1959/23.10.1959. (iv) (a) 6 puddlings and 4 levellings. (b) to (e) N.A. (v) G.L. at 5000 lb./ac. (vi) PTB-20 (medium). (vii) Unirrigated. (viii) N.A. (ix) 9.2.1960.

2. TREATMENTS:
Same as in expt. no. 230 on page 131.

3. DESIGN:
(i) R.B.D. (ii) a. 3. (b) N.A. (iii) k. (iv) (a) and (b) 50' x 5'. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) As per treatments. (iii) Pest count and grain yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (a) and (b) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 2103 lb./ac. (ii) 164 lb./ac. (iii) Treatment differences are not significant (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2093</td>
<td>2104</td>
<td>2112</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>43.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop:—Paddy.  
Site:—Agri. College and Res. Institute, Vellayani.  
Ref:—K. 57(293).  
Type:—'D'.

Object:—To find out the best insecticide for controlling stem-borer.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) Nil. (ii) Alluvial soil. (b) Refer soil analysis, Vellayani. (iii) 26.1.1957. (iv) (a) Digging. (b) Broadcast. (c) 80 to 100 lb./ac. (d) and (e) — (v) Nil. (vi) Kochuritu (early, local). (vii) Irrigated. (viii) One weeding. (ix) N.A. (x) 29.4.1957.
2. TREATMENTS:
1. Polidol at 0.04%
2. Polidol at 0.05%
3. Dieldrin at 0.18%
4. Dieldrin at 0.10%
5. Endrin at 0.05%
6. Ekatox at 0.01%
7. Dieldrin at 0.06%
8. Dieldrin at 0.12%
9. D.D.T at 0.1%
10. D.D.T at 0.2%
11. D.D.T at 0.6%
12. Control (3 plots).

Insecticide sprayed 15 and 40 days after sowing.

3. DESIGN:
(i) R.B.D. (ii) (a) 15. (b) 60'X108'. (iii) 5. (iv) (a) N.A. (b) 36'X12'. (v) Border left. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Stem-borer; As per treatments. (iii) No. of dead ear heads. (iv) (a) and (b) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 8.48 earheads/plot. (ii) 2.63 earheads/plot. (iii) Control vs others and levels of insecticides are highly significant while sources are not significant. (iv) Av. no. of dead earheads/plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>8.60</td>
<td>6.40</td>
<td>7.80</td>
<td>8.40</td>
<td>8.20</td>
<td>6.00</td>
<td>15.60</td>
</tr>
<tr>
<td>Treatment</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Av. yield</td>
<td>6.80</td>
<td>6.80</td>
<td>10.80</td>
<td>7.00</td>
<td>8.00</td>
<td>9.60</td>
<td></td>
</tr>
</tbody>
</table>

S.E./mean = 1.18 earheads/plot.

Crop => Paddy. Ref => K. 58(284).
Site => Agri. College and Res. Institute, Vellayani. Type => 'D'.

Object => To find out the best insecticide for controlling the rice stem-borer.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) Nil. (ii) Red loam. (b) Refer soil analysis, Vellayani. (iii) 18.3.1958. (iv) (a) One ploughing. (b) Broadcast. (c) 200 lb./ac. (d) and (e) N.A. (v) Nil. (vi) Kochuvittu (local). (vii) Irrigated. (viii) One weeding. (ix) 1.86. (x) 5.6.1958.

2. TREATMENTS:
1. D.D.T. at 0.2%
2. Endrin at 0.1%
3. Basudin (E-20) at 0.15%
4. Polidol at 0.1%
5. Ekatox at 0.1%
6. Control.
Two sprayings 15 and 41 days after sowing at 25 gallons/ac.

3. DESIGN:
(i) R.B.D. (ii) 6. (b) 162'X12'. (iii) 4. (iv) (a) 27'X12'. (b) 24'X9'. (v) 1½ feet border around the net plot. (vi) Yes.

4. GENERAL:
(i) Average. (ii) Stem-borer; As per treatments. (iii) No. of dead ear heads, weight of equal no. of good earheads. (iv) (a) and (b) N.A. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 220 earheads/plot. (ii) 79 earheads/plot. (iii) Treatments are not significantly different. (iv) Av. no. of dead earheads/plot.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>224</td>
<td>160</td>
<td>187</td>
<td>248</td>
<td>266</td>
<td>234</td>
</tr>
</tbody>
</table>

S.E./mean = 39 earheads/plot.
Crop : Bhindi.  
Site : Agri. College and Res. Institute, Vellayani.  
Type : 'D'.

Object: To study the effect of insecticides as a post control measure on the yield of Bhindi.

1. BASAL CONDITIONS:
   (i) (a) No. (b) Blendi. (c) Cow dung at 5 lb./plant. (ii) (a) Red soil. (b) Refer soil analysis, Vellayani.  
   (iii) 13.6.1959.  
   (iv) (a) to (c) N.A. (v) Cow dung at 5 lb./plant. (vi) Local. (vii) Irrigated. (viii) Two weedings. (ix) N.A.  
   (x) 31.7.1959 to 8.9.1959.

2. TREATMENTS:
   2. Endrin at 0.05%.  
   3. Dieldrin at 0.05%.  
   4. Ekatin (dose N.A.)  
   5. Lindane at 1% dust.  
   6. Mechanical aid.  
   7. Control (no treatment).

3. DESIGN:
   (i) R.B.D.  
   (ii) (a) 7. (b) 55'x12.5'. (iii) 5. (v) (a) 12.5'x7.5' (b) 7.5'x5'. (v) N.A.  
   (vi) Yes.

4. GENERAL:
   (i) Average.  
   (ii) Slight attack.  
   (iii) Pest count and Bhindi yield.  
   (iv) (a) to (c) No. (v) (a) and (b) No.  
   (vi) and (vii) Nil.

5. RESULTS:
   (i) 2884 lb./ac. (ii) 749.9 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

   Treatment  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | S.E./mean | 33.4 lb./ac.
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Av. yield  | 3100 | 3267 | 2621 | 3267 | 3060 | 2240 | 2425 | = | 33.4 lb./ac.

-------

Crop : Sweet Potato.  
Site : Tapioca and Sweet Potato Res. Stn., Mannuthy.  
Type : 'M'.

Object: To determine the optimum requirements of N, P and K for Sweet potato crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sweet potato. (c) As per treatments. (ii) (a) Loamy. (b) N.A.  
   (iii) 20.7.1954. (iv) (a) Two ploughings. (b) Vines are cut with 3 nodes and planted at a depth of 3' on ridges. (c) N.A.  
   (d) 0'. (e) One cutting/groove. (v) 5 C.L./ac. of cow dung broadcast before ploughing and 50 tin/ac. of ash after ploughing. (vi) Local (medium). (vii) Unirrigated. (viii) Two weedings and two intercultures. (ix) 12'. (x) 18.11.1954.

2. TREATMENTS:
   Main-plot treatments: All combinations of (1) and (2)
   (1) 3 levels of N as A/S: N_A = 0, N_1 = 50 and N_2 = 100 lb./ac.
   (2) 3 levels of K_2O as Pot. Sul.: K_A = 0, K_1 = 80 and K_2 = 160 lb./ac.

   Sub-plot treatments: 2 levels of P_2O_5 as Super: P_2 = 0 and P_3 = 80 lb./ac.

3. DESIGN:
   (i) Split-plot. (ii) (a) 9 main-plots/block ; 2 sub-plots/main-plot. (b) N.A.  
   (iii) 6. (iv) (a) 24'x12', (b) 22'x6'. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1952—contd. (b) Yes. (c) No. (v) (a) and (b) Nil.  
   (vi) and (vii) Nil.
5. RESULTS:

(i) 10214 lb./ac. (ii) (a) 2488 lb./ac. (b) 1261 lb./ac. (iii) Main effects of N, P and K are highly significant. Interaction NP is significant. (iv) Av. yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>N_0</th>
<th>N_1</th>
<th>N_2</th>
<th>Mean</th>
<th>P_0</th>
<th>P_1</th>
</tr>
</thead>
<tbody>
<tr>
<td>K_0</td>
<td>8052</td>
<td>10441</td>
<td>9075</td>
<td>9207</td>
<td>8250</td>
<td>10164</td>
</tr>
<tr>
<td>K_1</td>
<td>7821</td>
<td>11748</td>
<td>10890</td>
<td>10164</td>
<td>8712</td>
<td>11161</td>
</tr>
<tr>
<td>K_2</td>
<td>8877</td>
<td>13563</td>
<td>12012</td>
<td>11184</td>
<td>9867</td>
<td>13134</td>
</tr>
<tr>
<td>Mean</td>
<td>8250</td>
<td>11913</td>
<td>10659</td>
<td>10296</td>
<td>6943</td>
<td>11161</td>
</tr>
</tbody>
</table>

S.E. of difference of two:
1. N or K marginal means = 587 lb./ac.
2. P marginal means = 244 lb./ac.
3. P means at the same level of N or K = 419 lb./ac.
4. N or K means at the same level of P = 657 lb./ac.
S.E. of body of N x K table = 719 lb./ac.

Site: Tapioca and Sweet Potato Res. Stn., Mannuthy. Type := 'M'.
Object := To determine the optimum requirements of N, P and K for Sweet potato crop.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sweet potato. (c) As per treatments. (ii) (a) Loamy. (b) N.A. (iii) 10.7.1955. (iv) (a) Two ploughings. (b) Vines cut with 3 nodes and planted at a depth of 3'. (c) N.A. (d) 1'. (e) One cutting/groove. (v) 5 C.L./ac. of cow dung applied before ploughing; 50 tin/ac. of ash applied at the time of planting. (vi) Local white (medium). (vii) Unirrigated. (viii) Two weedings and two intercultures. (ix) 32'. (x) 5.12.1955.

2. TREATMENTS:
Same as in exp. no. 1 on page 134 on Sweet potato.

3. DESIGN:
(i) Split-plot. (ii) (a) 9 main-plots/block 4 sub-plots/main-plot. (iii) N/A. (vi) (a) 24' x 12' (b) 22' x 6'. (v) One row around the plot. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1952—cond. (b) Yes. (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 8415 lb./ac. (ii) (a) 2586 lb./ac. (b) 2314 lb./ac. (iii) Main effects of P and K alone are highly significant. (iv) Av. yield of tuber in lb./ac.

<table>
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<th>N_2</th>
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<td>P_1</td>
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</table>
S.E. of difference of two
1. N or K marginal means = 634 lb/ac.
2. P marginal means = 426 lb/ac.
3. P means at the same level of N or K = 739 lb/ac.
4. N or K means at the same level of P = 822 lb/ac.
S.E. of body of N x K table = 776 lb/ac.

Crop : Sweet Potato.
Ref : K. 56(3).

Site : Tapioca and Sweet Potato Res. Stn., Mannuthy. Type : 'M'.

Object : To determine the optimum requirements of N, P and K for Sweet potato crop.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Sweet potato. (c) As per treatments. (ii) (a) Laterite and gravelly soil. (b) N.A. (iii) 8.7.1956. (iv) (a) Two ploughings. (b) Planting along ridges, erect planting. (c) —. (d) Y between ridges. (e) Single cutting/hole, 4 nodes per cutting (v) 50 t/m. of compost was applied before making the ridges. (vi) Local white (medium). (vii) Unirrigated. (viii) Two weedings one month and two months after planting. (ix) N.A. (x) 6.12.1955.

2. TREATMENTS :
   Same as in exp. no. 1 on page 134 on Sweet potato.

3. DESIGN :
   (i) Split-plot. (ii) (a) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) 2' x 12', (b) 2' x 6'. (v) One row around the plot discarded. (vi) Yes.

4. GENERAL :
   (i) Good. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1952—cond. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS :
   (i) 5478 lb/ac. (ii) (a) 2072 lb/ac. (b) 1152 lb/ac. (iii) Main effects of P and K are highly significant. Others are not significant. (iv) Av. yield of tuber in lb/ac.

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S.E. of difference of two
1. N or K marginal means = 488 lb/ac.
2. P marginal means = 221 lb/ac.
3. P means at the same level of N or K = 383 lb/ac.
4. N or K mean at the same level of P = 558 lb/ac.
S.E. of body of N x K table = 661 lb/ac.

Crop : Sweet Potato.
Ref : K. 57(4).

Site : Tapioca and Sweet Potato Res. Stn., Mannuthy. Type : 'M'.

Object : To determine the optimum requirements of N, P and K for Sweet potato crop.
1. **BASAL CONDITIONS**:

   (i) Nil. (b) Sweet potato. (c) As per treatments. (ii) (a) Laterite gravelly soil. (b) N.A. (iii) 22.7.1957.
   (iv) (a) Two ploughings. (b) Planting. (c) —. (d) N.A. (e) Single cutting. (v) Nil. (vi) Local (medium).

2. **TREATMENTS**:

   **Main-plot treatments**:
   All combinations of (1) and (2)
   (1) 3 levels of K₂O as Pot. Sul. : K₀ = 0, K₁ = 80 and K² = 165 lb./ac.
   (2) 3 levels of P₂O₅ as Super : P₀ = 0, P₁ = 50 and P₂ = 100 lb./ac.

   **Sub-plot treatments**:
   2 levels of N as A/S : N₀ = 0 and N₁ = 50 lb./ac.

   P₂O₅ applied at planting and N and K₂O about one month after planting.

3. **DESIGN**:

   (i) Split-plot. (ii) (a) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) N.A.
   (b) 22'x6'. (v) Border rows around the plots discarded. (vi) Yes.

4. **GENERAL**:

   (i) Satisfactory. (ii) Nil. (iii) Tuber yield. (iv) (a) 1957—contd. (b) No. (c) No. (v) (a) and (b) Nil.
   (vi) and (vii) Nil.

5. **RESULTS**:

   (i) 2010 lb./ac. (ii) (a) 934 lb./ac. (b) 475 lb./ac. (iii) Main effect of K and interaction NPK are highly significant. Other effects are not significant. (iv) Av. yield of tuber in lb./ac.

<table>
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<tr>
<th></th>
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<th>P₂</th>
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S.E. of difference of two
1. K or P marginal means = 218 lb./ac.
2. N marginal means = 92 lb./ac.
3. N means the same level of K or P = 158 lb./ac.
4. K or P means at the same level of N = 248 lb./ac.
S.E. of body of P×K table = 270 lb./ac.

**Crop** : Sweet Potato. **Ref** : K. 58(5).

**Site** : Tapioca and Sweet Potato Res. Stn., Mannuthy. **Type** : 'M'.

**Object** : To determine the optimum requirements of N, P and K for Sweet potato crop.

1. **BASAL CONDITIONS**:

   (i) (a) Nil. (b) Sweet potato. (c) As per treatments. (ii) (a) Laterite and gravelly soil. (b) N.A. (iii)
   (iv) (a) 16.7.1958. (iv) (a) Two ploughings and weeding. (b) Planting cuttings of 9" length on ridges.
   (c) —. (d) 1' between plants and 3' between rows. (e) Single cutting/hole. (v) 3 C.L./ac. of cow dung
   before ploughing and 25 tin/ac. of ash before making ridges. (vi) Local white (medium). (vii) Unirrigated.
2. TREATMENTS:

Main-plot treatments:
All combinations of (1) and (2)
(1) 3 levels of P₂O₅ as Super: P₀=0, P₁=30 and P₁=100 lb/ac.
(2) 3 levels of K₂O as Pot. Sol.: K₀=0, K₁=80 and K₁=160 lb/ac.

Sub-plot treatments:
2 levels of N as A/S: N₀=0 and N₁=80 lb/ac.

3. DESIGN:
(i) Split-plot. (ii) 9 main-plots/block; 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) 24' × 12', (b) 22' × 6'. (v) 1' along length and 3' along width. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Tuber weight. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) N.A. (vii) No reason given for low yield.

5. RESULTS:
(i) 1243 lb/ac. (ii) (a) 1008 lb/ac. (b) 425.6 lb/ac. (iii) Main effects of N and K are highly significant. Interaction N × K is significant. Other effects are not significant. (iv) Av. yield of tuber in lb/ac.

<table>
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<tr>
<th></th>
<th>P₀</th>
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<th>P₂</th>
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S.E. of difference of two
1. K or P marginal means =168.0 lb/ac.
2. N marginal means = 57.9 lb/ac.
3. N means at the same level of P or K =100.3 lb/ac.
4. K or P means at the same level of N =182.3 lb/ac.
S.E. of body of P × K table =291.0 lb/ac.

Crop :— Sweet Potato (Kharif).
Site :— Tapioca and Sweet Potato Res. Stn., Mannuthy.
Type :— 'M'.

Object :— To determine optimum requirements of N, P and K for Sweet potato crop.

1. BASAL CONDITIONS:
(i) Nil. (b) Sweet potato. (c) 5 C.L./ac. of cow dung and 40 tins/ac. of ash. (ii) (a) Laterite and gravelly red soil. (b) N.A. (iii) 6.7.1959. (iv) (a) 2 ploughings, removing of weeds and forming ridges. (b) Planting on ridges. (c) N.A. (d) 1' plant to plant. (e) Single cutting/hole. (f) 5 C.L. of cow dung and 40 tins of ash applied as B.D. before planting. (vi) Local. (vii) Unirrigated. (viii) Weeding and hand picking during the 2nd month. (a) N.A. (b) 5.12.1959.

2. TREATMENTS:
Same as in exp. no. 5 on page 137.

3. DESIGN:
(i) Split-plot. (ii) 9 main-plots/block; 2 sub-plots/main-plot. (b) 24' × 324'. (iii) 6. (iv) (a) 18' × 22', (b) 22' × 12'. (v) Border rows discarded. (vi) Yes.
4. GENERAL:
(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) No. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 6678 lb./ac. (ii) (a) 3247 lb./ac. (b) 1675 lb./ac. (iii) Effects of K and interaction NK are significant. (iv) Av. yield in lb./ac.

<table>
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S.E. of difference of two
1. P or K marginal means
2. N marginal means
3. N means at the same level of P or K
4. P or K means at the same level of N
S.E. of body of P × K table

Crop :- Sweet Potato. 
Site :- Tapioca and Sweet Potato Res. Stn., Mannuthy. Type :- 'C'.

Object :- To determine the best spacing and best methods of planting for Sweet potato.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sweet potato. (c) As per treatments. (ii) (a) Loamy. (b) N.A. (iii) 21.7.1954. (iv) (a) Two ploughings before making ridges. (b) Vines are cut with 3 nodes and planted at a depth of 3" on ridges or flat beds. (c) Only one cutting per groove. (d) As per treatments. (v) 5 C.F./ac. of cow dung and 100 tins/ac. of ash. Cow dung broadcast before planting and ash at the time of planting. (vi) Local (medium). (vii) Unirrigated. (viii) Two weedicings and one interculture. (ix) 12.6'. (x) 19.11.1954.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 methods of planting: M₁=On ridges and M₂=On flat beds.
(2) 4 spacings: S₁=1', S₂=2', S₃=3' and S₄=4'.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) 12'×24'. (b) 12'×24'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1952—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 3255 lb./ac. (ii) 568 lb./ac. (iii) All the effects are highly significant. (iv) Av. yield of tuber in lb./ac.

<table>
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<th>S₃</th>
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Crop: Sweet Potato.  
Site: Tapioca and Sweet Potato Res. Stn., Mannuthy.  
Type: 'C'.

Object: To determine the best spacing and best method of planting for Sweet potato.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sweet potato. (c) Nil. (ii) (a) Laterite and gravelly soil. (b) N.A. (iii) 16.7.1955. (iv) (a) Two ploughings before planting. (b) Vines cut with 3 nodes and planted at a depth of 3" on ridges or flat beds. (c) —. (d) As per treatments. (e) Only one cutting/groove. (v) 5 C.L./ac. of cow dung applied before ploughing. 100 tins/ac. of ash applied at the time of planting. (vi) Local white (medium). (vii) Unirrigated. (viii) Two weedings. (ix) 32'. (x) 5.12.1955.

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 = 1', S2 = 2' and S3 = 3'.

3. DESIGN:
   (i) 2x3 Fact. in R.B.D. (ii) (a) N.A. (iii) 14'x26'; 16'x28'; 18'x30'. (b) 12'x24'. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) N.A. (iii) Tuber yield. (iv) (a) 1952—contd. (b) No. (c) Yes. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 5955 lb./ac. (ii) 2747 lb./ac. (iii) Interaction M x S is highly significant. (iv) Avg yield of tuber in lb./ac.

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S.E. of S marginal mean = 793 lb./ac.
S.E. of M marginal mean = 648 lb./ac.
S.E. of body of table = 1120 lb./ac.

Crop: Sweet Potato.  
Site: Tapioca and Sweet Potato Res. Stn., Mannuthy.  
Type: 'C'.

Object: To determine the best spacing and best method of planting for Sweet potato.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sweet potato. (c) 5 C.L./ac. of cow dung+100 tins/ac. of ash. (ii) (a) Laterite and gravelly soil. (b) N.A. (iii) 13.7.1956. (iv) (a) Two ploughings and removing weeds. (b) to (d) N.A. (e) Single cutting/hole with 4 nodes. (v) 5 C.L./ac. of compost applied after ploughing and 50 tins/ac. of ash before planting. (vi) Local white (medium). (vii) Unirrigated. (viii) Two weedings one month and two months after planting. (ix) N.A. (x) 7.12.1956.
2. TREATMENTS:
Same as in expt. no. 8 on page 140.

3. DESIGN:
(i) 3 x 1 Fact. R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 14' x 26'; 16' x 28'; 18' x 30'. (b) 12' x 24'.
(v) One row all round. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1952—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2334 lb./ac. (ii) 562 lb./ac. (iii) All the effects are highly significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of marginal mean of $S$ = 163 lb./ac.
S.E. of marginal mean of $M$ = 133 lb./ac.
S.E. of body of table = 23 lb./ac.

---

Crop : Sweet Potato.  
Ref. : K. §§(10).  
Site : Tapioca and Sweet Potato Res. Stn., Mannuthy. Type : ‘C’.

Object : To determine the best spacing and best method of planting of Sweet potato.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sweet potato. (c) 3 C.L./ac. of compost and 30 tin/ac. of ash. (ii) (a) Laterite and gravelly soil. (b) N.A. (iii) 22.7.1958. (iv) (a) Two ploughings. (b) to (d) N.A. (e) Single cutting 9' long planted erect. (v) 3 C.L./ac. of cow dung and 50 tin/ac. of ash applied before planting. (vi) Local white (medium). (vii) Unirrigated. (viii) One weeding one month after planting. (ix) N.A. (x) 5.12.1958.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 methods of planting : $M_1$ = On ridges and $M_2$ = On flat beds.
(2) 3 spacings : $S_1$ = 1' x 2', $S_2$ = 1' x 2' and $S_3$ = 1' x 2'.

3. DESIGN:
(i) 2 x 3 Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 13' x 28'; 14' x 28' and 15' x 28'. (b) 12' x 24'.
(v) One row all round. (vi) Yes.

4. GENERAL:
(i) Moderately good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1957—contd. (b) No. (c) Yes. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 4129 lb./ac. (ii) 1568 lb./ac. (iii) Main effect of $S$ alone is significant. (iv) Av. yield of tuber in lb./ac.

<table>
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Crop: Sweet Potato (Kharif).

Site: Tapioca and Sweet Potato Res. Stn., Mannuthy. Type: 'C'.

Object: To determine the best spacing and method of planting for Sweet potato.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sweet potato. (c) 3 C.L./ac. cow dung and 50 tins of ash.
   (ii) (a) Laterite and gravelly soil. (b) N.A. (iii) 27.7.1954. (iv) Two ploughings, removing weeds and preparing seed beds and ridges. (b) As per treatments. (c) N.A. (d) As per treatments. (e) Single cutting 6' long. (v) 3 C.L. cow dung and 50 tins of ash mixed in soil before planting. (vi) Local white (medium). (vii) Irrigated. (viii) One weeding one month after planting. (ix) N.A. (x) 5-12-1954.

2. TREATMENTS:
   Same as in exp. no. 10 on page 141.

3. DESIGN:
   (i) R.B.D. (ii) 6. (b) N.A. (iii) 6. (iv) (a) 15'x28' (S3), 14'x28' (S2) and 15'x28' (S1) (b) 12'x24' for all. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1952—contd. (treatments changed in 1957). (b) N.A. (c) Nil. (v) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2735 lb./ac. (ii) 777.0 lb./ac. (iii) Effects of S and interaction M x S are highly significant while M is not significant. (iv) Av. yield of tuber in lbs./ac.

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S.E. of S marginal mean = 343.3 lb./ac.
S.E. of M marginal mean = 183.2 lb./ac.
S.E. of body of table = 317.2 lb./ac.

Crop: Tapioca.

Site: Tapioca and Sweet Potato Res. Stn., Mannuthy. Type: 'M'.

Object: To determine the optimum dose of N, P and K manures for Tapioca to give the best yield.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite gravelly soil. (b) N.A. (iii) 28.4.1954. (iv) (a) Two rounds of ploughing and removal of weeds before planting. (b) Planting erect on mounds. (c) and (d) N.A. (e) Single cutting of 6' length per hole. (v) NIL (vi) No. 97 (local, medium). (vii) Irrigated. (viii) Weeding and intercultivations one month and two months after planting. Next weeding 4 months after planting. (ix) N.A. (x) 2.4.1955.
2. TREATMENTS:

**Main-plot treatments:**
All combinations of (1) and (2).

1. 3 levels of N: \( N_0 = 0, N_1 = 50 \) and \( N_2 = 100 \) lb./ac.
2. 3 levels of K: \( K_0 = 0, K_1 = 80 \) and \( K_2 = 160 \) lb./ac.

**Sub-plot treatments:**
2 levels of P: \( P_0 = 0 \) and \( P_1 = 80 \) lb./ac.

3. DESIGN:
(i) Split-plot. (ii) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) \( 57' \times 24' \) (main-plot); \( 51' \times 18' \) (sub-plot). (b) \( 57' \times 32' \) (main-plot); \( 51' \times 6' \) (sub-plot). (v) Border row discarded. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1952—contd. (b) Yes. (c) N.A. (v) (a) Trivandrum and Tiruvalla. (vi) and (vii) Nil.

5. RESULTS:
(i) 9022 lb./ac. (ii) (a) 2769 lb./ac. (b) 1676 lb./ac. (iii) Main effect of N is highly significant. Main effect of P and K are significant. Interactions N×P, N×K and P×K are significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of difference of two
1. N or K marginal means
2. P marginal means
3. P means at the same level of N or K
4. N or K means at the same level of P
S.E. of body of N×K table

Crop: Tapioca.
Site: Tapioca and Sweet Potato Res. Stn., Mannuthy.
Type: 'M'.

Object:—To determine the optimum requirements of N, P and K for Tapioca to give the best yield.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Gravelly and laterite soil. (b) N.A. (iii) 4.5.1955. (iv) (a) Two rounds of ploughing. After removing weeds, mounds were made. (b) Straight planting. (c) —. (d) 4' by 4'. (e) Single cuttings. (v) 5 C.L./acre of cow dung broadcasted before ploughing. (vi) Loca (late). (vii) Unirrigated. (viii) Weeding and intercultivation during 2nd and 4th month after planting, weeding again at the 6th month. (ix) N.A. (x) 27.2.1956.

2. TREATMENTS:
Same as in expn. no. 1 above.

3. DESIGN:
(i) Split-plot. (ii) 9 main-plots/block; 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) \( 57' \times 24' \) (main-plot); \( 51' \times 18' \) (sub-plot). (b) \( 57' \times 32' \) (main-plot); \( 51' \times 6' \) (sub-plot). (v) Border discarded. (vi) Yes.
4. GENERAL:
(i) Good. (ii) Slight attack of scale insects in some plants. Completely controlled by spraying 1% Folidol. (iii) Tuber yield. (iv) (a) 1952—contd. (b) Yes. (c) N.A. (v) (a) and (b) Trivandrum and Tiruvalla. (vi) and (vii) Nil.

5. RESULTS:
(i) 11359 lb./ac. (ii) (a) 3622 lb./ac. (b) 1769 lb./ac. (iii) Main effects of $N$ and $K$ are highly significant. Others are not significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of difference of two
1. $N$ or $K$ marginal means = 852.6 lb./ac.
2. $P$ marginal means = 340.4 lb./ac.
3. $P$ means at the same level of $N$ or $K$ = 589.7 lb./ac.
4. $N$ or $K$ means at the same level of $P$ = 950.0 lb./ac.
S.E. of body of $N \times K$ table = 1045.0 lb./ac.

Crop:— Tapioca.
Site:— Tapioca and Sweet Potato Res. Stn., Mannuthy.
Type:— 'M'.

Object:— To determine the optimum requirements of $N$, $P$ and $K$ manures for Tapioca to give the best yield.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Gravelly and laterite. (b) N.A. (iii) 20.5.1956. (iv) (a) 2 ploughings. (b) Planing in mounds cuttings of 6"—8" length. (c) — . (d) Along mounds Y × Y. (e) Single cutting/hole. (vi) C.M. at 5 C.L./ac, applied before ploughing. Applying 50 ties of ash. (vii) No. 97 (medium). (viii) Irrigated. (vii) Four withdrawals. (ix) N.A. (a) 2.3.1957.

2. TREATMENTS:
Same as in expl. no. 1 on page 142.

3. DESIGN:
(i) Split-plot. (ii) (a) 9 main-plots/block; 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 5' × 24' (main-plot). (b) 5' × 6' (sub-plot). (v) One row all round each sub-plot discarded. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Tuber weight. (iv) (a) 1952—contd. (b) Yes. (c) N.A. (v) (a) Trivandrum, Tiruvalla. (b) N.A. (vii) and (vii) Nil.

5. RESULTS:
(i) 12252 lb./ac. (ii) (a) 2162 lb./ac. (b) 1183 lb./ac. (iii) Main effect of $N$ is highly significant and main effect of $P$ is significant. Others are not significant. (iv) Av. yield of tuber in lb./ac.
### Table

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S.E. of difference of two
1. N or K marginal means = 509.6 lb./ac.
2. P marginal means = 227.1 lb./ac.
3. P means at the same level of N or K = 393.1 lb./ac.
4. N or K means at the same level of P = 580.5 lb./ac.
S.E. of body of N x K table = 624.1 lb./ac.

### Crop: Tapioca.

### Site: Tapioca and Sweet Potato Res. Stn., Mannuthy.

### Type: 'M'.

**Object:** To determine the optimum requirements of N, P and K manures for Tapioca to give the best yield.

1. **BASAL CONDITIONS:**
   (i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite and gravelly soil. (b) N.A. (iii) 27.5.1957.
   (iv) (a) Two rounds of ploughing. (b) Planting cuttings of about 10 inches length on mounds. (c) —. (d) 3' x 3'.
   (e) Single cutting/hole. (f) 5 C.L. of cow dung/ac. broadcast before ploughing. (vi) Local 97 (early). (vii) Irrigated. (viii) 1st weeding and digging one month after planting and 2nd weeding during the 4th month after planting. (ix) N.A. (x) 22.3.1958.
2. **TREATMENTS:**
   Same as in exp. no. 1 on page 142.
   P applied one month after planting. N as A/S applied 15 days after the application of P and K applied one month after the application of P.
3. **DESIGN:**
   (i) Split-plot. (ii) (a) 9 main-plots/block : 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 57' x 24' (main-plot), 57' x 12' (sub-plot). (v) 51' x 6'. (vi) One row all round each net sub-plot discarded. (vii) Yes.
4. **GENERAL:**
   (i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1952—contd. (b) Yes. (c) N.A. (v) (a) Trivandrum and Tiruvalla. (b) Nil. (vi) and (vii) Nil.
5. **RESULTS:**
   (i) 10914 lb./ac. (ii) (a) 3453 lb./ac. (b) 1526 lb./ac. (iii) Main effect of N is highly significant and of P is significant. Effect of K and two factor interactions are not significant. (iv) Av. yield of tuber in lb./ac.

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Crop : Tapioca.  Ref : 54(5).
Site: Tapioca Res. Str., Tiruvalla. Type : 'M'.

Object : To determine the optimum requirements of N, P and K manures for Tapioca to give the best yield.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla. (iii) 10.4.1954. (iv) (a) Ploughed two rounds before transplanting. (b) Erect planting of fresh cuttings of uniform length (7") on small mounds in lines. (c) --. (d) 3'x3'. (e) One cutting per hole. (v) 3240 lbs. of F.Y M. applied to the whole experimental area. (vi) Ariyan (medium—local). (vii) Unirrigated. (viii) Interculturing three times at two months interval; weeding was done along with intercultures. (ix) 80'. (x) 15.2.1955.

2. TREATMENTS:
Same as in exp. no. 1 on page 142.

3. DESIGN:
(i) Split-plot. (ii) (a) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 30' x 18' (main-plot); 30' x 9' (sub-plot). (b) 24' x 12' (main-plot); 24' x 3' (sub-plot). (v) One row around each sub-plot and main-plot. (vi) Yes.

4. GENERAL:
(i) Growth very good in N,P plots and poor in control plot. (ii) Nil. (iii) Height of plants and number of sprouts. (iv) (a) 1953—contd. (b) Yes. (c) N.A. (v), (v) (a) Mannuthy and Trivandrum. (b) Nil. (vii) Nil.

5. RESULTS:
(i) 1669 lb./ac. (ii) (a) 3061 lb./ac. (b) 3086 lb./ac. (iii) Main effects of N and K are highly significant. Other effects are not significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of difference of two
1. N or K marginal means = 721 lb./ac.
2. P marginal means = 594 lb./ac.
3. P means at the same level of N or K = 1024 lb./ac.
4. N or K means at the same level of P = 884 lb./ac.
Crop: Tapioca.
Site: Tapioca Res. Stn., Tiruvalla.

Object: To determine the optimum dose of N, P, and K manures for Tapioca to give the best yield.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) Cow dung at the rate of 5000 lb./ac. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla.
   (iii) 20.4.1955. (iv) (a) Ploughed two rounds before planting. (b) Erect planting of fresh cuttings of uniform length 7" on small mounds. (c) —. (d) 3' both ways. (e) Single cutting per hole. (v) 3240 lb. of F.Y.M. applied to the whole experimental area. (vi) Arthrurus (medium—local).
   (vii) Unirrigated. (viii) Interculturing three times at two months interval, weeding was done along with intercultivation. (ix) 89°. (x) 20.2.1956.

2. TREATMENTS:
   Same as in expt. no. 1 on page 142.
   A/S, Super and Pot. Sul. are generally applied about one month after planting and raked into the soil. Sometimes Super applied as basal dressing before planting.

3. DESIGN:
   (i) Split-plot. (ii) (a) 9 main-plots/block; 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 30'x18' (main plot); 30'x9' (sub-plot). (b) 24'x3' (sub-plot). (v) One guard row around the sub-plot. (vi) Yes.

4. GENERAL:
   (i) Growth very good in N and P plots and poor in control and K plots. (ii) Nil. (iii) Tubber yield. Height of plants and number of sprouts. (iv) (a) 1953—contd. (b) Yes. (c) N.A. (v) (a) Mannathy and Trivandrum. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 23777 lb./ac. (ii) (a) 5499 lb./ac. (b) 3775 lb./ac. (iii) Main effect of N alone is highly significant. Other effects are not significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of difference of two

1. N or K marginal means = 1296 lb./ac.
2. P marginal means = 727 lb./ac.
3. P means at a level of N or K = 1258 lb./ac.
4. N or K means at a level of P = 1573 lb./ac.
5. S.E. of body of N x K table = 1387 lb./ac.

Crop: Tapioca.
Site: Tapioca Res. Stn., Tiruvalla.

Object: To determine the optimum dose of N, P, and K manures for Tapioca to give the best yield.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla. (iii) 12.4.1956. (iv) (a) Ploughing twice for initial preparation of land. (b) Fresh cuttings of uniform length planted erect on mounds. (c) —. (d) 3' both ways. (e) Single cutting per hole. (v) 3240 lb./ac. of cow dung applied to the whole experimental area. (vi) Neudammigudan, (local, late). (vii) Unirrigated. (viii) Weeding was done along with intercultivation thrice. (ix) 89°. (x) 28.1.1957.
2. TREATMENTS:
Same as in expt. no. 1 on page 142.
A/S, Super and Pot. Sul. applied about one month after planting and raked into the soil.

3. DESIGN:
(i) Split-plot. (ii) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 30' x 18' (main-plot) ; 30' x 9' (sub-plot). (b) 24' x 3' (sub-plot). (v) One row all round each sub-plot. (vi) Yes.

4. GENERAL:
(i) Uniform stand and uneven growth in plots under different treatments. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1953—contd. (b) Yes. (c) N.A. (v) (a) Mannathy, Trivandrum. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 18256 lb./ac. (ii) (a) 5046 lb./ac. (b) 3025 lb./ac. (iii) Main effect of N is highly significant. Main effect of K and P are significant, while interactions are not significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of difference of two:
1. N or K marginal means = 1180 lb./ac.
2. P marginal means = 582 lb./ac.
3. P means at the same level of N or K = 1008 lb./ac.
4. N or K means at the same level of P = 1386 lb./ac.
S.E. of body of N x K table = 1457 lb./ac.

Object : To determine the optimum dose of N, P and K manures for Tapioca to give the best yield.

1. BASAL CONDITIONS:
(i) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla. (iii) 15.4.1957. (iv) (a) Ploughing two rounds. (b) Erect planting of cuttings of uniform length 7' on mounds. (c) Pl. (d) 3' x 3' (e) One cutting/hole. (v) 2700 lb./ac. of cow dung. (vi) Y. 37. (late local). (vii) Weeding was done with intercultivation three times. (ix) 80'. (x) 11.2.1958.

2. TREATMENTS:
Same as in expt. no. 1 on page 142.
Manures applied on 23.7.1957 in shallow pits around each plant.

3. DESIGN:
(i) Split-plot. (ii) (a) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 24' x 6' (main-plot) ; 30' x 9' sub-plot. (b) 24' x 3'. (v) One row all round each sub-plot. (vi) Yes.

4. GENERAL:
(i) Satisfactory. Growth good in N and K plots and poor in P plots. (ii) Nil. (iii) Tuber yield. (iv) (a) 1953—1957. (b) Yes. (c) N.A. (v) (a) Mannathy, Trivandrum. (b) Nil. (vi) and (vii) Nil.
5. RESULTS:

(i) 15441 lb./ac.  
(ii) (a) 5360 lb./ac. (b) 3092 lb./ac.  
(iii) Main effect of P is highly significant. Main effects of N and K are significant. Two factor interactions are not significant.  
(iv) Av. yield of tuber in lb./ac.

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S.E. of difference of two
1. N or K marginal means = 1263 lb./ac.
2. P marginal means = 595 lb./ac.
3. P means at the same level of N or K = 1031 lb./ac.
4. N or K means at the same level of P = 1458 lb./ac.
S.E. of body of N x K table = 1547 lb./ac.

Crop := Tapioca.  
Site := Tapioca Res. Stn., Trivandrum.  
Ref := K. §4(9).  
Type := 'M'.

Objective := To determine the optimum dose of N, P and K manures for Tapioca to give the best yield.

1. BASAL CONDITIONS:
(i) (a) Nil.  (b) Tapioca.  (c) As per treatments.  
(ii) (a) Laterite soil.  
(iii) Soil analysis, Trivandrum.  
(iv) 2.4.1954.  
(v) Soil well tilled and levelled.  
(vi) Erect planting of cutting of length 8' in shallows pits.  
(vii) Single cutting per hole.  
(viii) Night soil compost applied before tilling the plots by broadcasting uniformly at a rate of 3 ton/ac.  
(ix) Partially irrigated—hand watering once a week for the first three months after planting when there is no rain.  
(x) Intercultivated before and after applying manures.  
(xi) 67.5°.  
(xii) 9.3.1955.

2. TREATMENTS:
Same as in exp. no. 1 on page 142.  
P was applied on 8.5.1954, N was applied on 12.5.1954, K was applied on 25.5.1954 (all after intercultivation).

3. DESIGN:
(i) Split-plot.  
(ii) (a) 9 main-plots/block ; 2 sub-plots/main-plot.  
(b) N.A.  (iii) 6.  
(iv) (a) 27' x 18' (main-plot); 27' x 9' (sub-plot).  
(b) 21' x 12' (main-plot); 21' x 3' (sub-plot).  
(v) One row in the net plot.  
(vi) Yes.

4. GENERAL:
(i) Stand good.  
(ii) Vigorous vegetative growth was noticed in plots which received maximum dose of N.  
(iii) Yield of tubers and weight of vegetative products.  
(iv) 1952—1955.  
(v) (a) Tiruvalla, Mannuthy.  
(vi) Nil.  
(vii) Nil.

5. RESULTS:
(i) 25426 lb./ac.  
(ii) 5542 lb./ac.  
(iii) Main effect of N is highly significant and of P is significant. Other effects and interactions are not significant.  
(iv) Av. yield of tuber.
Crop := Tapioca.
Site := Tapioca Res. Stn., Trivandrum.

Ref := K. 55(10).
Type := 'M'.

Object := To determine the optimum dose of N, P and K manures for Tapioca to give the best yield.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite soil. (b) Refer soil analysis, Trivandrum.
(iii) 28.6.1955. (iv) (a) After tilling, shallow pits at 3' spacing are made. (b) Erect planting. (c) —
(d) 3' both ways (e) One fresh cutting each of 8' length planted per hole. (v) Night soil compost at the rate of 3 ton/ac. by broadcasting uniformly before tilling. (vi) Malayarn no. 4 (late). (vii) Partially irrigated; hand watering twice a week till the start of monsoon. (viii) Intercultivated on 11.8.1955 and weeding. (ix) 67.5'. (x) 15.3.1956.

2. TREATMENTS:
Same as in expt. no. 1 on page 142. A/S and Super were applied on 18.8.1955 and raked into the soil. Pot. Sul. was applied on 6.9.1955 and raked with the soil.

3. DESIGN:
(i) Split-plot. (ii) (a) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 27'x18' (main-plot); 27'x9' (sub-plot). (b) 21'x12' (main-plot); 21'x3' (sub-plot). (v) One row all round the net sub-plot. (vi) Yes.

4. GENERAL:
(i) Growth of plants more vigorous in treated plots than in control plots. (ii) Nil. (iii) Yield of tuber.
(iv) (a) 1952—1955. (b) Yes. (c) N.A. (v) (a) Mannuthy, Tiruvalla. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1976 lb./ac. (ii) (a) 3020 lb./ac. (b) 1603 lb./ac. (iii) Main effects of N, P and K are highly significant. None of the interactions is significant. (iv) Av. yield of tuber in lb./ac.
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S.E. of difference of two
1. N or K marginal means
2. P marginal means
3. P means at the same level of N or K
4. N or K means at the same level of P
S.E. of body of N×K table
= 71.7 lb./ac.
= 308.5 lb./ac.
= 534.3 lb./ac.
= 805.7 lb./ac.
= 871.8 lb./ac.

Crop: Tapioca.
Site: Tapioca Res. Stn., Trivandrum.
Object: To determine the optimum dose of N, P and K manures for Tapioca and give the best yield.

1. BASAL CONDITIONS:
(i) (a) No. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite soil. (b) Refer soil analysis, Trivandrum.
(iii) 19.6.1956. (iv) (a) Soil tilled to a depth of 18". Shallow pits were made. (b) Cuttings of 8' length planted. (c) — (d) 3' both ways. (e) Single cutting per hole. (v) Cow dung at the rate of 5 ton/ac. applied before tilling by broadcast. (vi) Malayan no. 4. (late, improved). (vii) Partially irrigated—hand watering twice a week till the starting of monsoon. (viii) Weeding and intercultivation on 20.7.1956. (ix) 67.5". (x) 11.3.1957.

2. TREATMENTS:
Same as in exp. no. 1 on page 142.
A/S, Pol. Sul. and Super applied on 20.7.1956 and raked into the soil.

3. DESIGN:
(i) (a) Split-plot. (ii) (a) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 27'×18' (main-plot); 27'×9' (sub-plot). (b) 21'×3'. (v) One row around the net sub-plot. (vi) Yes.

4. GENERAL:
(i) Growth in treated plots more vigorous than in control plots. (ii) Nil. (iii) Yield of tubers. (iv) (a) 1952–1956. (b) Yes. (c) N.A. (v) (a) Mannuthy and Tiruvalla. (b) Nil. (vi) and (vii) Nil. in lb./ac.

5. RESULTS:
(i) 17023 lb./ac. (ii) a) 2849 lb./ac. (b) 1894 lb./ac. (iii) Main effect of N is highly significant. Main effect of K and interaction N×K are significant. Others are not significant. (iv) Av. yield of tuber.

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Ref: K. 58(11).
Type: 'M'.
S.E. of difference of two

1. N or K marginal means = 671.5 lb./ac.
2. P marginal means = 364.5 lb./ac.
3. P means at the same level of N or K = 631.3 lb./ac.
4. N or K means at the same level of P = 806.4 lb./ac.
S.E. of body of N x K table = 822.4 lb./ac.

---

**Crop:** Tapioca.
**Site:** Tapioca Res. Stn., Trivandrum.

**Object:** To determine the optimum dose of N, P and K manures for Tapioca to give the best yield.

1. **BASAL CONDITIONS:**
   (i) (a) No. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite soil. (b) Refer soil analysis, Trivandrum. (iii) 29.5.1957. (iv) (a) The soil tilled to a depth of 18", shallow pits at 3' spacings were made. (b) Cuttings of 8' length planted. (c) —. (d) 3'. (e) One cutting/hole. (v) Cow dung at the rate of 5 tons/ac. applied before tilling. (vi) Malayalam no. 4, (late). (vii) Partially irrigated. (viii) One weeding before the application of manures. Another weeding one or two months afterwards. (ix) 67.5°. (x) 18.3.1958.

2. **TREATMENTS:**
   Same as in expt. no. 1 on page 142.
   Applied on 19.7.1957, after thorough weeding and intercultivation.

3. **DESIGN:**
   (i) Split-plot. (i) (a) 9 main-plots/block : 2 sub-plots/main-plot. (b) N.A. (ii) 6. (iv) (a) 27' x 9' (sub-plot), (b) 21' x 6' (main-plot); 21' x 3' (sub-plot). (v) One row all round the net plot. (vi) Yes.

4. **GENERAL:**
   (i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1952—1957. (b) Yes. (c) Nil. (v) (a) Tiruvalla and Mannuthy. (b) Nil. (vi) and (vii) Nil.

5. **RESULTS:**
   (i) 18950 lb./ac. (ii) (a) 2289 lb./ac. (b) 938 lb./ac. (iii) Main effect of N and K are highly significant. Interaction N x K is highly significant. Other effects are not significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of difference of two

1. N or K marginal means = 539.5 lb./ac.
2. P marginal means = 180.4 lb./ac.
3. P means at the same level of N or K = 312.2 lb./ac.
4. N or K means at the same level of P = 583.0 lb./ac.
S.E. of body of N x K table = 860.8 lb./ac.

---

**Ref:** K. 57(12).
**Type:** 'M'.
Crop: Tapioca.
Site: Agri. College and Res. Institute, Vellayani.

Object: To compare the manurial effects of compost and ash.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) Nil. (ii) (a) Red soil. (b) Refer soil analysis, Vellayani. (iii) 16.6.1958.
   (iv) (a) One digging. (b) Planting in lines on heaps. (c) —. (d) 3'x3'. (e) One cutting of 8’ length. (v)
   Nil. (vi) Kall kalan, (local, medium.) (vii) Rainfed. (viii) One weeding and intercultivation two months
   after planting. (ix) 69.5°. (x) 28.4.1959.

2. TREATMENTS:
   1. Compost.
   2. Ash.
   3. Control.

   Equal quantities of dry leaves were taken for preparing compost and ash. Quantity N.A. Applied before
   planting.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) 45’x24’. (iii) 6. (iv) (a) 24’x15’. (b) 18’x9’. (v) One row all round the net
   plot. (vi) Yes.

4. GENERAL:
   (i) Healthy growth. (ii) —. (iii) Tuber Weight. (iv) (a) 1957—contd. (b) No. (c) Nil. (v) (a) No. (b) Nil.
   (vi) and (vii) Nil.

5. RESULTS:
   (i) 12305 lb./ac. (ii) 3551 lb./ac. (iii) The treatments are not significantly different. (iv) Av. yield of tuber
   in lb./ac.

   Treatment 1 2 3
   Av. yield 11738 13552 11626
   S.E./mean =1491.0 lb./ac.

Crop: Tapioca.
Site: Agri. College and Res. Institute, Vellayani.

Object: To compare the manurial effects of compost and ash.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Red soil. (b) Refer soil analysis, Vellayani.

2. TREATMENTS:
   Same as in exp. no. 13 above.
   Other details N.A.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) 47’x24’. (iii) 6. (iv) (a) and (b) 24’x15’. (v) —. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) N.A. (iii) N.A. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi)
   and (vii) Nil.

5. RESULTS:
   (i) 5542 lb./ac. (ii) 1651 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of tuber.
Object:—To study the efficiency of complete and balanced manuring of N, P and K fertilizers.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca in most of the cases. (c) N.A. (ii) (a) Laterite. (b) N.A. (iii) In some of the fields, F.Y.M. or G.L. were uniformly applied. (iv) Nedumangadan or Ariyan. (v) (a) Digging and piling up of mounds. (b) Erect planting of cuttings of length about 10" on the mounds. (c) to (e) N.A. (vi) Varied from field to field—March-April 1956. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) Varied from field to field. Dec. 1956 to Jan. 1957.

2. TREATMENTS:
   1. Control.
   2. 80 N+80 P,
   3. 80 N+80 P+160 K.
   Manures applied as mixtures.
   A uniform treatment, that is, usual practice of the cultivators in the tract was given to the control plots. This treatment was 2000 lb./ac. of ash at the time of planting and 2000 lb./ac. ash+3000 lb./ac. of F.Y.M. three months after planting. In NP and NPK plots, half of the total dose was applied before planting and the remaining half three months after planting.

3. DESIGN:
   (i) No randomisation was adopted but care was taken to select a field which could be considered as representing local tract conditions. Within a field, the treatments were allotted at random. (ii) There were in all 21 experimental fields. (iii) (a) 0.25 ac. (b) 1176 sq.ft. (iv) Yes.

4. GENERAL:
   (i) Normal. (ii) Nil. (iii) Yield of tapioca tubers. (iv) (a) No. (b) Nil. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Expt. was conducted on cultivators' fields.

5. RESULTS:
   (i) 20389 lb./ac. (ii) 3354 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of green tapioca tubers in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>14939</td>
<td>18772</td>
<td>27456</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>-732 lb./ac.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop := Tapioca.
Centre := Tiruvalla (c.f.).
Object := To find out the effect of NP and NPK mixtures on the yield of Tapioca in the presence and absence of lime.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) N.A. (ii) Laterite loam. (iii) 1 ton/ac. of F.Y.M. as B.D. before planting. (iv) Nedumangadan (local). (v) (a) Digging, levelling. (b) Planting cuttings of 9' length after rain on heaps. (c) —. (d) 3' spacing. (e) Single cutting per hole. (vi) 18.4.1956. (vii) Rainfed. (viii) Nil. (ix) 103.74'. (x) 1.1.1957.
2. TREATMENTS:
All combinations of (1) and (2).
(1) 2 mixtures of NPK manures: M₁=NP and M₂=NPK.
(2) 2 levels of lime: L₀=0 and L₁=1 ton/ac.
N, P and K are applied at 80 lb./ac. of N, 80 lb./ac. of P₂O₅ and 160 lb./ac. of K₂O as Parry's mixture.
Manures applied as B.Đ before planting. Lime applied after digging and levelling.

3. DESIGN:
(i) 3 cultivator's fields located at different places were selected. (ii) One cultivator had 3 fields under experiment. (iii) (a) and (b) Varied from cultivator to cultivator. (iv) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Tuber yield. (iv) (a) to (c) No. (v) Yes. (vi) and (vii) Expt. was conducted in cultivator's fields.

5. RESULTS:
(i) 20412 lb./ac. (ii) 1680 lb./ac. (iii) Only main effect of M is significant. (iv) Av. yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>M₁</th>
<th>M₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₀</td>
<td>19466</td>
<td>21347</td>
<td>20407</td>
</tr>
<tr>
<td>L₁</td>
<td>19466</td>
<td>21369</td>
<td>20418</td>
</tr>
<tr>
<td>Mean</td>
<td>19466</td>
<td>21358</td>
<td>20412</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 686 lb./ac.
S.E. of body of table = 970 lb./ac.

Crop ^= Tapioca.
Centre ^= Tiruvalla (c.f.).
Ref ^= K. 58(17). Type ^= 'M'.

Object ^= To find out the optimum dose of N, P and K manures required by Tapioca tubers.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Tapioca. (c) F.Y.M. 100 tons (2400 lb./ac.) as B.D. (ii) Gravelly loam with less percentage of gravel. (iii) F.Y.M. 2400 lb./ac. Half the quantity of manures given under treatment at planting.
(iv) Nedumangadan (local, medium). (v) (a) 2 diggings during 1st and last weeks of March 1958. (b) Planting cuttings of length about 10" along mounds. (c) -. (d) 3½' x 3½'. (e) Single cutting per hole.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N as A/S: N₀=0, N₁=40 and N₂=80 lb./ac.
(2) 3 levels of P₂O₅ as Rock Phos.: P₀=0, P₁=40 and P₂=80 lb./ac.
(3) 3 levels of K₂O as Pot. Sul.: K₀=0, K₁=40 and K₂=80 lb./ac.

3. DESIGN:
(i) Garden of one cultivator in the Tiruvalla taluk which was a typical tapioca growing tract was selected. (ii) Experiment laid in a 3º confounded design with 2 replications in blocks of 9 plots. (iii) (a) 35' x 17½', (b) 28' x 10½'. (iv) Yes.

4. GENERAL:
(i) Good. (ii) Rat attack in some plots. (iii) Yield of tubers. (iv) (a) No. (v) No. (vi) Yes. (vii) Expt. was conducted in cultivator's field.

5. RESULTS:
(i) 15708 lb./ac. (ii) 2325 lb./ac. (iii) Main effects of N, P and K are highly significant. Interactions are not significant. (iv) Av. yield of tuber in lb./ac.
Crop : Tapioca.
Centre : Neyyatthin Kara, Kunnathunad (c.f.).

Ref : K. 54(18).
Type : ‘M’.

Object : To demonstrate the usefulness of complete and balanced N, P and K fertilizers.

1. BASAL CONDITIONS :
   (i) (a) In most of the cases tapioca. (b) and (c) N.A. (ii) Laterite. (iii) F.Y.M. or G.L. (quantity N.A.).
   (iv) Arjum or Nedumangadan. (v) (a) Preparing the land by digging the field with a spade to a depth of about 1" or ploughing twice or thrice to obtain proper tilth. (b) Forming small heaps or mounds at three to four feet distance or making ridges and furrows. (c) to (e) N.A. (vi) March 1954. (vii) Irrigated. (viii) Inter cultivation and weeding thrice or four times depending upon weed growth and rainfall. (ix) N.A. (x) January, 1955.

2. TREATMENTS :
   1. Control.
   2. 80N-135P+150 K.
      In the control plots the owners applied their own manures mostly ash, but some of them also used chemical fertilizers. In the NPK plots, the mixture was given before planting & at the time of 1st intercultivation and the balance at the time of 2nd intercultivation. N as A/S, P$_2$O$_5$ as Super and K as K$_2$SO$_4$.

3. DESIGN :
   (i) No randomisation was adopted but care was taken to select a field which could be considered representing local tract conditions. (ii) 12. (iii) (a) 80’ x 120’. (b) 102 sq. ft. (iv) Ven.

4. GENERAL :
   (i) Normal. (ii) Nil. (iii) Yield of tapioca tubers (iv) (a) to (c) No. (v) Nil. (vi) Nil. (vii) Demonstration under ‘Pot. scheme’.

5. RESULTS :
   (i) 24349 lb./ac. (ii) 4588 lb./ac. (iii) Treatment difference is highly significant. (iv) Av. yield of tube in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>N$_0$</th>
<th>N$_1$</th>
<th>N$_2$</th>
<th>Mean</th>
<th>K$_0$</th>
<th>K$_1$</th>
<th>K$_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>P$_0$</td>
<td>10297</td>
<td>15928</td>
<td>16125</td>
<td>14117</td>
<td>10174</td>
<td>16471</td>
<td>15705</td>
</tr>
<tr>
<td>P$_1$</td>
<td>11705</td>
<td>17582</td>
<td>18323</td>
<td>15870</td>
<td>11186</td>
<td>18051</td>
<td>18372</td>
</tr>
<tr>
<td>P$_2$</td>
<td>13483</td>
<td>17731</td>
<td>20199</td>
<td>17138</td>
<td>11631</td>
<td>19187</td>
<td>20595</td>
</tr>
<tr>
<td>Mean</td>
<td>11828</td>
<td>17080</td>
<td>18216</td>
<td>15708</td>
<td>10997</td>
<td>17903</td>
<td>18224</td>
</tr>
<tr>
<td>K$_0$</td>
<td>8100</td>
<td>12816</td>
<td>12975</td>
<td>N.A</td>
<td>N.A</td>
<td>N.A</td>
<td>N.A</td>
</tr>
<tr>
<td>K$_1$</td>
<td>14050</td>
<td>18842</td>
<td>20817</td>
<td>N.A</td>
<td>N.A</td>
<td>N.A</td>
<td>N.A</td>
</tr>
<tr>
<td>K$_2$</td>
<td>13335</td>
<td>19583</td>
<td>21355</td>
<td>N.A</td>
<td>N.A</td>
<td>N.A</td>
<td>N.A</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 548.0 lb./ac.
S.E. of body of any table = 949.1 lb./ac.

Av. yield | 21027 | 27671
S.E./mean = 1324 lb./ac.
Crop: Tapioca.
Centre: Trivandrum (c.f.).

Object: To demonstrate the usefulness of complete and balanced N, P and K fertilizers.

1. BASAL CONDITIONS:

(i) (a) Tapioca in most of the cases. (b) and (c) N.A. (ii) Laterite. (iii) F.Y.M. or green leaves (quantity N.A.) (iv) Aroyan or (Kalikalan, Kannum or white Aroyan). (v) (a) Preparing the land by digging the field with spade to a depth of about a foot and a half or ploughing twice or thrice to obtain proper soil. (b) Forming small heaps or mounds at three to four feet distances or making ridge and furrows for planting sets. (c) to (e) N.A. (vi) March to August 1955. (vii) Irrigated. (viii) Inter cultivation and weeding thrice or four times depending upon weed growth and rainfall. (ix) N.A. (x) Dec. 1955 to April 1956.

2. TREATMENTS:

1. Control.
2. 80 N + 60 P + 120 K.
3. 80 N + 80 P + 160 K.

In the control plots, the owners applied their own manures, mostly ash but some of them used chemical fertilizers also. In the NPK plots, 1 dose was applied before planting and the remaining 1 dose 3 months after planting. N as A/S, P as super and K as K₂O.

3. DESIGN:

(i) No randomisation was adopted but care was take to select a field which could be considered representing local tract conditions. (ii) Nine fields, one in each village. (iii) (a) About 0.25 acres (80' x 120'). (b) 1176 sq ft. (iv) Yes.

4. GENERAL:

(i) Normal. (ii) Nil. (iii) Yield of tapioca tuber. (iv) (a) to (c) No. (v) Nil. (vi) Nil. (vii) Demonstration trial under 'Pot. scheme'.

5. RESULTS:

(f) 16912 lb./ac. (ii) 3255 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>11336</td>
<td>17659</td>
<td>21741</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1085 lb./ac.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Tapioca.
Centre: Trivandrum (c.f.).

Object: To study the response of Tapioca to levels of N, P and K applied individually and in combinations.

1. BASAL CONDITIONS to 3. DESIGN:

Same as in exp. no. 111 on page 79 on paddy crop.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Tubber yield. (iv) (a) 1959—contd. (b) No. (c) Nil. (v) (a) Palghat. Quilon and Trivandrum. (vi) and (vii) Exp. was conducted on cultivator's field.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>6369</td>
<td>7941</td>
<td>7439</td>
<td>8418</td>
<td>7537</td>
<td>8541</td>
<td>8122</td>
</tr>
<tr>
<td>G.M. = 800</td>
<td>S.E./mean = 129.7 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of trials = 16.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Tapioca.
Centre: Palghat (c.f.).

Object: To study the response of Tapioca to levels of N, P and K applied individually and in combinations.

1. BASAL CONDITIONS to 3. DESIGN:
Same as in expt. no. 111 on page 79 on paddy crop.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Tuber yield. (iv) (a) and (b) No. (c) Nil. (v) (a) Palghat, Quilon and Trivandrum. (vi) and (vii) Expt. was conducted on cultivator’s field.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6920</td>
</tr>
<tr>
<td>N</td>
<td>8459</td>
</tr>
<tr>
<td>P</td>
<td>8278</td>
</tr>
<tr>
<td>np</td>
<td>11429</td>
</tr>
<tr>
<td>k</td>
<td>8928</td>
</tr>
<tr>
<td>nk</td>
<td>12014</td>
</tr>
<tr>
<td>pk</td>
<td>11216</td>
</tr>
<tr>
<td>npk</td>
<td>12902</td>
</tr>
</tbody>
</table>

G.M. = 10018 lb./ac.; S.E./mean = 190.7 lb./ac.; No. of trials = 12.

Crop: Tapioca.
Centre: Palghat.

Object: To study the response of Tapioca to levels of N, P and K applied individually and in combinations.

1. BASAL CONDITIONS to 3. DESIGN:
Same as in expt. no. 111 on page 79 on paddy crop.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Tuber yield. (iv) (a) and (b) No. (c) Nil. (v) (a) Palghat, Quilon and Trivandrum. (vi) and (vii) Expt. was conducted on cultivator’s field.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7101</td>
</tr>
<tr>
<td>N</td>
<td>9183</td>
</tr>
<tr>
<td>N</td>
<td>1150</td>
</tr>
<tr>
<td>N</td>
<td>9455</td>
</tr>
<tr>
<td>N</td>
<td>12896</td>
</tr>
<tr>
<td>N</td>
<td>9068</td>
</tr>
<tr>
<td>N</td>
<td>11701</td>
</tr>
</tbody>
</table>

G.M. = 9965 lb./ac.; S.E./mean = 243.8 lb./ac.; No. of trials = 12.

Crop: Tapioca.
Centre: Quilon (c.f.).

Object: To study the response of Tapioca to levels of N, P and K applied individually and in combinations.

1. BASAL CONDITIONS to 3. DESIGN:
Same as in expt. no. 111 on page 79 on paddy crop.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Tuber yield. (iv) (a) and (b) No. (c) Nil. (v) (a) Palghat, Quilon and Trivandrum. (vi) and (vii) Expt. was conducted on cultivator’s field.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7694</td>
</tr>
<tr>
<td>N</td>
<td>8640</td>
</tr>
<tr>
<td>P</td>
<td>8722</td>
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<tr>
<td>np</td>
<td>9381</td>
</tr>
<tr>
<td>k</td>
<td>8986</td>
</tr>
<tr>
<td>nk</td>
<td>9660</td>
</tr>
<tr>
<td>pk</td>
<td>9381</td>
</tr>
<tr>
<td>npk</td>
<td>10426</td>
</tr>
</tbody>
</table>

G.M. = 9111 lb./ac.; S.E./mean = 64.4 lb./ac.; No. of trials = 15.
Crop: Tapioca. Centre: Quilon (c.f.). Object: To investigate the relative efficiency of nitrogenous fertilizers at different levels.

1. BASAL CONDITIONS to 3. DESIGN:
   Same as in expt. no. 121 on page 83, 84 on paddy crop.

4. GENERAL:
   Same as in expt. no. 20 on page 157.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N₁'</th>
<th>N₂'</th>
<th>N₃'</th>
<th>N₄'</th>
<th>N₅'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>7850</td>
<td>8870</td>
<td>9496</td>
<td>9086</td>
<td>9570</td>
<td>9060</td>
</tr>
</tbody>
</table>

G.M. = 9053 lb./ac.; S.E./mean=48.88 lb./ac.; No. of trials=16.

Crop: Tapioca. Centre: Trivandrum. Object: To investigate the relative efficiency of different nitrogenous fertilizers at different levels.

1. BASAL CONDITIONS to 3. DESIGN:
   Same as in expt. no. 121 on page 83, 84 on paddy crop.

4. GENERAL:
   Same as in expt. no. 20 on page 157.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N₁'</th>
<th>N₂'</th>
<th>N₃'</th>
<th>N₄'</th>
<th>N₅'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>6566</td>
<td>8393</td>
<td>9413</td>
<td>8048</td>
<td>8837</td>
<td>7768</td>
</tr>
</tbody>
</table>

G.M. = 8371 lb./ac.; S.E./mean=151.3 lb./ac.; No. of trials=16.


1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) Cow dung at the rate of 5000 lb./ac. (ii) (a) Laterite soil. (b) Refer soil analysis, Tiruvalla. (iii) 27.4.1955. (iv) (a) Two ploughings. (b) Erect planting of fresh cuttings of 7" length on small mounds. (c) —. (d) Between plants 3', between rows 4'. (e) Single cutting per hole (v) Applied 900 lb. of F.Y.M. as cow dung procured from different cattle sheds. (vi) As per treatments (medium duration). (vii) Unirrigated. (viii) Interculturing 3 times at two months interval, weeding along with interculturing. (ix) 23.2.1956.

2. TREATMENTS:

   Main-plot treatments:
   3 levels of N as A/S: N₀=0, N₁=50 and N₂=160 lb./ac.

   Sub-plot treatments:

3. DESIGN:

   (i) Spt-p-plot. (ii) (a) 3 main-plots/block and 10 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) main-plot 40' X 10'. (b) Sub-plot 4' X 10'. (v) 4' spacing between main-plots and 3' spacing between plants. Each row consists of 3 plants. (vi) Yes.
4. GENERAL:

(i) Response in growth was different for different varieties. (ii) Nil. (iii) Tuber yield. (iv) (a) 1955—contd. (b) Yes. (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 13258 lb./ac. (ii) (a) 5411 lb./ac. (b) 3291 lb./ac. (iii) Main effect of N is significant and of V is highly significant. Interaction is not significant. (iv) Ave. yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
<th>V7</th>
<th>V8</th>
<th>V9</th>
<th>V10</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>5393</td>
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<td>5497</td>
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<td>16179</td>
<td>4563</td>
<td>6638</td>
<td>11469</td>
<td>7727</td>
<td>14935</td>
<td>9267</td>
</tr>
<tr>
<td>9438</td>
<td>19706</td>
<td>8297</td>
<td>21737</td>
<td>19913</td>
<td>6223</td>
<td>9334</td>
<td>17528</td>
<td>12394</td>
<td>20587</td>
<td>14499</td>
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<td>32031</td>
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<td>7312</td>
<td>17165</td>
<td>17994</td>
<td>10579</td>
<td>10112</td>
<td>12394</td>
<td>20587</td>
<td>14499</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. N marginal means
2. V marginal means
3. V means at the same level of N
4. N means at the same level of V

Object:—To study the differential response of Tapioca varieties to intensive nitrogenous manuring.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla. (iii) 23.4.1956. (iv) (a) Two ploughings. (b) Erect planting of single cutting uniformly per hole in mounds. (c) —. (d) 4' x 3'. (e) Single cutting/hole. (f) 90 lb. of cow dung equally distributed in the plots. (vi) As per treatments (improved, medium). (vii) Unirrigated. (viii) Three weedings and 3 intercultivations. (ix) 22.1.1957.

2. TREATMENTS:

Main-plot treatments: 3 levels of N as A/S: N0=0, N1=80 and N2=160 lb./ac.

3. DESIGN:

(i) Split-plot (ii) (a) 3 main-plots/block 10 sub-plots/main-plot. (b) N.A. (iii) S. (iv) (a) 40' x 10' (main-plot) : 10' x 4' (sub-plot). (b) 1/1037.14. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Uniform stand but uneven growth in different plots. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1955—contd. (b) Yes. (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 14679 lb./ac. (ii) (a) 466 lb./ac. (b) 2925 lb./ac. (iii) Main effects of N and V and interaction N x V are significant. (iv) Ave. yield of tuber in lb./ac.

<table>
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<tr>
<th>V1</th>
<th>V2</th>
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<th>V4</th>
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Crop : Tapioca.
Site : Tapioca Res. Stn., Tiruvalla.

Object : To study the differential response of Tapioca varieties to intensive nitrogenous manuring.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla.
   (iii) 23.4.1957. (iv) (a) Two ploughings. (b) Planting single cuttings of length 7' on mounds. (c) —.
   (d) 3' between plants and 4' between rows. (e) Single cutting/hole. (f) 900 lb./ac. cow dung dried powdered and applied uniformly in small pits over which mounds were formed. (g) As per treatments. (h) Un-irrigated. (i) Weeding done along with intercultivation. (j) 80'. (k) 7.3.1958.

2. TREATMENTS:
   Main-plot treatments:
   3 levels of N as A/S: No=0, N1=80 and N2=160 lb./ac.
   Sub-plot treatments:
   All are of medium duration except T-37 which is a late variety.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/block; 10 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 40'x10' (main-plot) ; 4'x10' (sub-plot). (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Tuber yield. (iv) (a) 1955—1957. (b) Yes. (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 12940 lb./ac. (ii) (a) 3713 lb./ac. (b) 3060 lb./ac. (iii) Main effects of N and V and interaction N x V are highly significant. (iv) Av. yield of tuber in lb./ac.

<table>
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<tr>
<th>V1</th>
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Mean 10821 14953 15038 17839 11166 13510 10060 12134 8954 15592 12940

S.E. of difference of two
1. N marginal means = 743 lb./ac.
2. V marginal means = 1117 lb./ac.
3. V means at the same level of N = 1935 lb./ac.
4. N means at the same level of V = 1981 lb./ac.

Crop : Tapioca.

Ref : K. 54(29).
Type : 'C'.

Object : To determine the best spacing and best method of cultivation for Tapioca.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per basal manuring. (ii) (a) Laterite and gravelly. (b) N.A. (iii) 20.6.1954. (iv) (a) Two ploughings before planting. (b) As per treatments. (c) —. (d) As per treatments. (e) Single cutting of 6' length/hole. (v) 5 C.L. of cow dung/ac. was applied before ploughing and 50 tins of ash/ac. before planting. 50 tins of ash/ac. two months after planting at the time of intercultivation. (vi) No. 97 (local, medium). (vii) Unirrigated. (viii) First weeding and intercultivation two months after planting. Next weeding 4 months after planting. (ix) N.A. (x) 30.3.1955.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 methods of planting: M1 = On ridges and M2 = On mounds.
   (2) 3 spacings: S1 = 2', S2 = 4' and S3 = 6' both ways.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 16'x30' (S1), 20'x30' (S2) and 24'x30' (S3). (b) 12'x34'. (v) One row circular. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1952—contd. (b) Yes. (c) Yes. (v) (a) Trivandrum and Tiruvalla. (b) —. (vii) and (vii) Nil.

5. RESULTS:
   (i) 10476 lb./ac. (ii) 1691 lb./ac. (iii) Main effects of M and S an1 interaction M x S are not significant. (iv) Av. yield of tuber in lb./ac.

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<td>S.E. of body of table</td>
<td>690.3 lb./ac.</td>
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Site : Tapioca and Sweet Potato Res. Stn., Mannuthy. Type : 'C'.
Object : To determine the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per basal manuring. (ii) (a) Gravelly and laterite. (b) N.A. (iii) 12.5.1955. (iv) (a) Digging the entire area to a depth of about 9". (b) As per treatments. (c) —. (d) As per treatments. (e) Single cutting per hole planted erect. (v) 5 C.L. of cow dung was broadcast before digging. 100 tins of ash/ac. was added at the time of planting. (vi) Local (late). (vii) Unirrigated. (viii) Weeding and intercultivation during the 2nd and 3rd months after planting. During the 6th month also weeding was carried out. (ix) N.A. (x) 26.2.1956.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 methods of planting: M1 = On ridges and M2 = On mounds.
   (2) 3 spacings: S1 = 2', S2 = 3' and S3 = 4' both ways.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 16'x28' (S1), 18'x30' (S2) and 20'x32' (S3) (b) 12'x24'. (v) One row circular. (vi) Yes.
4. GENERAL:
(i) Very good. (ii) Slight attack of scale insects was noticed on the stems. Completely controlled by spraying 1% Folidol. (iii) Yield of tuber. (iv) (a) 1952—contd. (b) and (c) Yes. (v) (a) Trivandrum and Tiruvalla. (b) —. (vi) and (vii) Nil.

5. RESULTS:
(i) 15085 lb./ac. (ii) 2268 lb./ac. (iii) Main effect of S is highly significant and main effect of M is significant. (iv) Av. yield of tuber in lb./ac.

<table>
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<tr>
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S.E. of marginal means of $S$ = 654.7 lb./ac.
S.E. of marginal means of $M$ = 534.5 lb./ac.
S.E. of body of table = 926.0 lb./ac.

Site : Tapioca and Sweet Potato Res. Stn., Mannuthy. Type : 'C'.

Object : To determine the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Tapioca. (c) As per basal manuring. (ii) (a) Gravelly and laterite. (b) N.A. (iii) 16.5.1956.
(iv) (a) 2 rounds of ploughing. (b) As per treatments. (c) —. (d) As per treatments. (e) Single cutting of 6" to 8" length per hole. (v) 5 C.L./ac. of cattle manure + 50 tins of ash. Cattle manure applied before ploughing and ash applied along ridges. (vi) No. 97 (local, medium). (vii) Rainfed. (viii) 3 weedings 1st before the application of ash, 2nd one month after planting and 3rd during the 3rd month. (ix) N.A. (x) 8.3.1957.

2. TREATMENTS:
Same as in expct. no. 30 on page 162.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) $16' \times 20' (S_1), 18' \times 30' (S_2)$ and $20' \times 32' (S_3)$. (b) $12' \times 24'$. (v) One row all round the plot. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Tuber yield. (iv) (a) 1952—contd. (b) and (c) Yes. (v) (a) Trivandrum and Tiruvalla. (b) —. (vi) and (vii) Nil.

5. RESULTS:
(i) 12558 lb./ac. (ii) 359 lb./ac. (iii) Main effect of $S$ alone is significant. (iv) Av. yield of tuber in lb./ac.

<table>
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S.E. of marginal mean of $S$ = 1022 lb./ac.
S.E. of marginal mean of $M$ = 834 lb./ac.
S.E. of body of table = 1445 lb./ac.
Crop: Tapioca.  
Site: Tapioca and Sweet Potato Res. Stn., Mannuthy. Type: 'C'.

Object:—To determine the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per basal manuring.  
   (ii) (a) Laterite and gravelly soil. (b) N.A. 
   (iii) 5.6.1957. (iv) (a) Two rounds of ploughing before planting. (b) As per treatments. (c) —. (d) As per treatments.  
   (e) Single cutting of length 10" per hole.  
   (v) 5 C.L.ac. of cow dung before ploughing and 50 tins of ash at the time of planting.  
   (vi) No. 97 (local, early).  
   (vii) Rained.  

2. TREATMENTS:
   Same as in expt. no. 30 on page 162.

3. DESIGN:
   (i) Fix in R.B.D.  
   (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 16'x28' (S1), 18'x30' (S2) and 20'x32' (S3). (b) 12'x24'. (v) One row all round. (vi) Yes.

4. GENERAL:
   (i) Good.  
   (ii) Nil. (iii) Tuber yield.  
   (iv) (a) 1952—contd. (b) Yes. (c) —.  
   (v) (a) Trivandrum and Tiruvalla. (b) —. (vi) and (vii) Nil.

5. RESULTS:
   (i) 12965 lb./ac. (ii) 3349 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of marginal mean of S = 966.8 lb./ac.
S.E. of marginal mean of M = 789.4 lb./ac.
S.E. body of table = 1367 lb./ac.

Crop: Tapioca.  
Site: Tapioca Res. Stn., Tiruvalla.  
Ref.: K. 54(33). Type: ‘C’.

Object:—To determine the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per basal manuring. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla. (iii) 3.4.1954. (iv) (a) Ploughed two rounds before planting. (b) As per treatments. (c) —. (d) Between rows 3' and between plants as per treatments. (e) One cutting of 7' length per hole.  
   (v) Applied 2880 lbs cow dung equally distributed in the different plots one month before planting. Cow dung procured from different sheds was dried, powdered and applied uniformly. (vi) Ariyan (local, medium). (vii) Unirrigated. (viii) Interculturring three times at two months interval. Weeding done along with interculture. (ix) 80'. (a) 31.1.1955.

2. TREATMENTS:
   Same as in expt. no. 29 on page 161.

3. DESIGN:
   (i) Fixt. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 24'x12'. (b) 24'x12'. (v) Nil. (vi) Yes.
4. GENERAL:
   (i) Growth poor in S plots.  (ii) Nil.  (iii) Height of plants, number of sprouts and yield. (iv) (a) 1952—contd. (b) Yes. (c) —.  (v) (a) Trivandrum and Mannuthy.  (b) —.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 11713 lb./ac.  (ii) 947 lb./ac.  (iii) Main effect of $S$ and interaction $S \times M$ are highly significant. Main effect of $M$ is not significant.  (iv) Av. yield of tuber in lb./ac.

<table>
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<td>12269</td>
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<td>11713</td>
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S.E. of marginal mean of $S$ = 273.3 lb./ac.
S.E. of marginal mean of $M$ = 223.2 lb./ac.
S.E. of body of table = 386.6 lb./ac.

Crop :- Tapioca.
Site :- Tapioca Res. Stn., Tiruvalla.

Object :-To determine the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS :
   (i) (a) Nil.  (b) Tapioca.  (c) Cow dung at the rate of 5000 lb./ac.  (ii) (a) Laterite.  (b) Refer soil analysis, Tiruvalla.  (iii) 21.4.1955.  (iv) (a) Two ploughings.  (b) As per treatments.  (c) —.  (d) 3’ spacing between rows and as per treatments between plants.  (e) Single cutting of 7’ length/bole.  (v) 2880 lb./ac. of cow dung procured from different cattle sheds. Dried and powdered cow dung measured out and applied in shallow pits over which mounds and ridges are prepared.  (vi) Type 37 Nedurnangadan (local, late).  (vii) Unirrigated.  (viii) Interculturing three times at two months interval. Weeding along with interculturing.  (x) 80’.  (ix) 27.2.1956.

2. TREATMENTS :
   Same as in expt. no. 29 on, page 161.

3. DESIGN :
   (i) Factor in R.B.D.  (ii) (a) 6.  (b) N.A.  (iii) 6.  (iv) (a) 24’x12’.  (b) 24’x12’.  (v) Nil.  (vi) Yes.

4. GENERAL :
   (i) Growth poor in $S_2$ plots.  (ii) Nil.  (iii) Yield of tuber, height of plants and number of sprouts (iv) (a) 1952—contd. (b) Yes. (c) —.  (v) (a) Trivandrum and Mannuthy.  (b) —.  (vi) and (vii) Nil

5. RESULTS :
   (i) 26075 lb./ac.  (ii) 4451 lb./ac.  (iii) Main effects and interaction are not significant.  (iv) Av. yield of tuber in lb./ac.

<table>
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<tr>
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S.E. of marginal mean of $S$ = 1285 lb./ac.
S.E. of marginal mean of $M$ = 1049 lb./ac.
S.E. of body of table = 1817 lb./ac.
Crop: Tapioca.
Site: Tapioca Res. Stn., Tiruvalla.

Object: To find out the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) Cow dung at 5000 lb./ac. and fertilizers to give 50 lb./ac. of N, 40 lb./ac. of P and 80 lb./ac. of K. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla. (iii) 11, 12.4.1956. (iv) (a) Two ploughings. (b) As per treatments. (c) —. (d) As per treatments. (e) Single cuttings of uniform length 7” per hole. (v) 1800 lb. of cow dung equally distributed in the plots—applied uniformly in shallow pits at prescribed spacings over which mounds and ridges were made before planting. (vi) Ariyan (local, medium). (vii) Unirrigated. (viii) Weeding was done along with intercultivation thrice. (ix) 80°. (x) 17, 18.1.1957.

2. TREATMENTS:
   Same as in exp. no. 30 on page 162.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 16’X28’ (S1), 18’X30’ (S2) and 20’X32’ (S3). (b) 12’X24’. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Uniform stand and healthy growth except in the S1 plots where plants looked weak and stunted. (ii) Nil. (iii) Yield of tuber, (iv) (a) 1952—contd. (b) Yes. (c) —. (v) (a) Trivandrum and Mannuthy. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 21698 lb./ac. (ii) 3172 lb./ac. (iii) None of the effects and interaction is significant. (iv) Av. yield of tuber in lb./ac.

   |   | S1   | S2   | S3   | Mean |
---|------|------|------|------|
M1 | 22008| 18120| 22310| 20813|
M2 | 22551| 22562| 22336| 22583|
Mean| 22430| 20341| 22323| 21698|

S.E. of marginal mean of S = 916 lb./ac.
S.E. of marginal mean of M = 747 lb./ac.
S.E. of body of table = 1295 lb./ac.

Crop: Tapioca.
Site: Tapioca Res. Stn., Tiruvalla.

Object: To find out the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per basal manuring. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla. (iii) 5.4.1957. (iv) (a) Ploughed twice. (b) As per treatments. (c) —. (d) As per treatments. (e) Single cuttings of uniform length 7”. (v) 1800 lb./ac. of cow dung equally distributed in shallow pits over which the mounds and ridges were formed. (vi) Ariyan (medium, local). (vii) Rainfed. (viii) Weeding was done along with intercultivation thrice. (ix) 80°. (x) 5.2.1958.

2. TREATMENTS:
   Same as in exp. no. 30 on page 162.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 16’X28’ (S1), 18’X30’ (S2) and 20’X32’ (S3). (b) 12’X24’. (v) One row around. (vi) Yes.
4. GENERAL:

(i) Uniform stand and healthy growth except in S1 plots where the plants looked weak and stunted. (ii) Nil. (iii) Tuber yield. (iv) (a) 1952—contd. (b) Yes. (c) —. (v) (a) Trivandrum and Mannuthy. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 18159 lb./ac. (ii) 2470 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of tuber in lb./ac.

<table>
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S.E. of marginal mean of S = 713 lb./ac.
S.E. of marginal mean of M = 582 lb./ac.
S.E. of body of table = 1009 lb./ac.

Crop:— Tapioca.
Site:— Tapioca Res. Stn., Tiruvalla.
Object:— To find out the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Tapioca. (c) As per basal manuring. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla. (iii) 28.4.1958. (iv) (a) Two ploughings. (b) As per treatments. (c) —. (d) As per treatments. (e) Single cutting per hole. (v) 1800 lb./ac. row dung equally distributed among plots in shallow pits. (vi) Aravun (medium local). (vii) Rainfed. (viii) Intercultivation and weeding done twice. (ix) 80'.

2. TREATMENTS :

Same as in exp. no. 30 on page 162.

3. DESIGN:

(i) Fact. in R.B.D. (ii) 6. (b) N.A. (iii) 6. (iv) (a) 16'×28' (S1), 18'×30' (S2) and 20'×32' (S3). (b) 12'×24'. (v) One row alround. (vi) Yes.

4. GENERAL:

(i) Uniform stand and healthy growth except in S1 plots where the plants looked stunted and weak. (ii) Nil. (iii) Tuber yield. (iv) (a) 1952—1958. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 15172 lb./ac. (ii) 2914 lb./ac. (iii) None of the effects and interactions is significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of marginal mean of S = 847 lb./ac.
S.E. of marginal mean of M = 692 lb./ac.
S.E. of body of table = 1198 lb./ac.
Crop: Tapioca.  
Site: Tapioca Res. Stn., Trivandrum.  

Ref: K. 54(38).  
Type: 'C'.

Object: To find out the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per basal manuring. (ii) (a) Laterite. (b) Refer soil analysis, Trivandrum. (iii) 7.4.1954. (iv) (a) Well tilled. (b) As per treatments. (c) —. (d) As per treatments. (e) Single cutting of 8' length taking only the tender top portion. (v) 3 ton/ac. of night soil compost broadcast uniformly before tilling. (vi) No. 97 (kalikalan, medium). (vii) Partially irrigated—hand watering before rains. (viii) Weeding twice before harvest. (ix) 67.5°. (x) 2.5.1955.

2. TREATMENTS:
   Same as in expt. no. 29 on page 161.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) (a) 6. (b) 31 sq. yds. (iii) 6. (iv) (a) 27' x 16' (S₁), 27' x 20' (S₂) and 27' x 24' (S₃). (b) 21' x 12'. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Stand good. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1952–1954. (b) Yes. (c) —. (v) (a) Tiruvalla and Mannuthy. (b) —. (vi) and (vii) Nil.

5. RESULTS:
   (i) 23413 lb./ac. (ii) 5849 lb./ac. (iii) Main effect of S is highly significant. Interaction M x S is significant. Effect of M is not significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of marginal mean of S = 1689 lb./ac.
S.E. of marginal mean of M = 1379 lb./ac.
S.E. of body of table = 2388 lb./ac.

Crop: Tapioca.  
Site: Tapioca Res. Stn., Trivandrum.  

Ref: K. 35(83).  
Type: 'C'.

Object: To find out the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per basal manuring. (ii) (a) Laterite. (b) Refer soil analysis, Trivandrum. (iii) 7.4.1954. (iv) (a) Well tilled. (b) As per treatments. (c) —. (d) As per treatments. (e) Single cutting of 8' length taking only the tender top portion. (v) Compost at 3 ton/ac. broadcast uniformly before tilling the field. Ash at 1/2 ton/ac. top dressed. (vi) No. 97 (medium, local). (vii) Partially irrigated—watered twice a week till monsoon. (viii) Intercultured on 27.6.1955 after giving ash. Weeding twice before harvest. (ix) 67.5°. (x) 14.3.1956.

2. TREATMENTS:
   Same as in expt. no. 29 on page 161.
3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 6, (b) 581 sq. yds. (iii) 6. (iv) (a) 16'x28' (S₁), 18'x30' (S₂) and 20'x32' (S₃) (b) 12'x24'. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Growth uniform. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1952—1955 (spacing between plants was modified in 1955 experiment). (b) Yes. (c) →. (v) (a) Tiruvalla, Mannuthy. (b) →. (vi) and (vii) Nil.

5. RESULTS:
(i) 1725 lb./ac. (ii) 2754 lb./ac. (iii) Main effect of S is highly significant. Other effects are not significant. (iv) Av. yield of tuber in lb./ac.

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S.E. of marginal mean of M = 743 lb./ac.
S.E. of marginal mean of S = 607 lb./ac.
S.E. of body of table = 1051 lb./ac.

Crop :- Tapioca.
Site :- Tapioca Res. Stn., Trivandrum.
Ref :- K. 56(40).
Type :- 'C'.

Object :- To find out the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Tapioca. (c) As per basal manuring. (ii) (a) Laterite. (b) Refer analysis, Trivandrum. (iii) 3.5.1956. (iv) (a) The soil tilled to a depth of 18" and mounds and ridges were made. (b) As per treatments. (c) →. (d) As per treatments. (e) Single cutting of 8" length per hole. (f) Cow dung at the rate of 5 ton per acre applied at the time of tilling and ash at the rate of 1.5 tons per acre applied during intercultivation as top dressing. (vi) No. 97 (local, medium). (vii) Partially irrigated. Hand watering twice a week till sprouting. (viii) Intercultivation done after 14 month of growth. Applying ash at the rate of 1.5 ton per acre. Twice weeding was done before harvest. (ix) 67.5°. (x) 11.2.1955.

2. TREATMENTS:
Same as in exp. no. 30 on page 162.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 16'x28' (S₁), 18'x30' (S₂) and 20'x32' (S₃). (b) 12'x24'. (v) One row all round the net plot. (vi) Yes.

4. GENERAL:
(i) Growth good. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1952—1956. (b) Yes. (c) →. (v) (a) Tiruvalla and Mannuthy. (b) →. (vi) and (vii) Nil.

5. RESULTS:
(i) 1928 lb./ac. (ii) 2801 lb./ac. (iii) Main effect of S is highly significant and of M is significant. Interaction M x S is not significant. (iv) Av. yield of tuber in lb./ac.
Crop: Tapioca.  
Site: Tapioca Res. Stn., Trivandrum.  
Ref: K. 57(41).  
Type: ‘C’.  

Object: To find out the best spacing and best method of planting for Tapioca.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Tapioca. (c) As per basal manuring.  
(ii) (a) Laterite. (b) Refer soil analysis, Trivandrum.  
(iii) 2.4.1957.  
(iv) (a) Soil tilled to a depth of 18” in shallow pits. (b) As per treatments. (c) (d) As per treatments.  
(e) Single cutting of 8” length per hole. (v) Cow dung at the rate of 5 ton per acre applied before tilling.  
(vi) No. 97 (local, medium).  
(vii) Partially irrigated. Hand watering twice a week till sprouting.  
(viii) Intercultivation done after 1½ months growth; applying ash at the rate of 1.5 ton/ac.; two weeding before harvest.  
(ix) 67.5°. (x) 3.3.1958.

2. TREATMENTS:
Same as in expt. no. 30 on page 162.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 16’×28’, 18’×30’ and 20’×32’, for 2, 3 and 4 feet spacings respectively. (b) 12’×24’. (v) One row around.

4. GENERAL:
(i) Growth of plants was good.  
(ii) Nil.  
(iii) Tuber yield.  
(iv) (a) 1952–1957. (b) Yes. (c) —. (v) (a) Tiruvalla and Mannuthy. (b) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 23285 lb./ac.  
(ii) 1124 lb./ac.  
(iii) Main effect of S is highly significant. Other effects are not significant.  
(iv) Av. yield of tuber in lb./ac.

<table>
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<tr>
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S.E. of marginal mean of $S$ = 809 lb./ac.  
S.E. of marginal mean of $M$ = 660 lb./ac.  
S.E. of body of table = 1143 lb./ac.
Crop: Tapioca.  
Site: Tapioca Res. Stn., Trivandrum.  
Object: To find out the effect of curing Tapioca stems before planting.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) Compost used for basal dressing at the rate of 3 ton/ac. by broad casting uniformly. Ash for top dressing at the rate of one ton/ac. (ii) (a) Laterite. (b) Refer soil analysis, Trivandrum. (iii) 25.5.1954. (iv) (a) Soil well tilled and levelled. (b) Erect planting of cuttings of 8" length in shallow pits. (c) 3' between plants. (d) Single cutting per hole. (v) Compost at the rate of 3 ton/ac. applied before tilling by broadcasting uniformly. (vi) Malayan 4 (late). (vii) Partially irrigated. (viii) Inter-cultivated after one and a half month growth with ash at the rate of 1 ton/ac. Weeded twice before harvest. (ix) 67 5'. (x) 14.5.1955.

2. TREATMENTS:
   1. Stems cured in smoke for 4 weeks.
   2. Stems cured in smoke for 3 weeks.
   3. Stems cured in smoke for 2 weeks.
   4. Stems cured in smoke for 1 week.
   5. Fresh stems cut at the time of planting.
   6. Stems stored in shade (usual practice) for 4 weeks (control).

3. DESIGN:
   (i) R.B.D. (ii) 6. (b) Nil. (iii) 4. (iv) (a) N.A. (b) 9'x5'. (v) Nil; one row between replications discarded. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Yield of tuber. (iv) (a) No. (b) and (c) Yes. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 23087 lb./ac. (ii) 3340 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of tuber in lb./ac.

<table>
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<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>S.E./mean</th>
</tr>
</thead>
</table>
| Av. yield | 24200 | 25562 | 21393 | 22748 | 22070 | 22748 | 1520 lb./ac.

---

Crop: Tapioca.  
Site: Agri. College and Res. Institute, Vellayani.  
Object: To study the effect of mixed cropping of Tapioca with Cowpeas.

1. BASAL CONDITIONS:
   (i) (a) Mixed cropping with cowpeas. (b) and (c) N.A. (ii) (a) Loamy. (b) Refer soil analysis, Vellayani. (iii) 9.6.1959. (iv) (a) to (e) N.A. (v) Cow dung at 20 lb./plot as basal dressing. (vi) Kali kalan (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 methods of planting: M1=Level, M2=Mound and M3=Ridge planting.
   (2) 2 crops: C1=Tapioca alone and C2=Tapioca and cowpeas.
   Cowpeas broadcast in the plots.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) 6. (b) 97'x24'. (iii) 6. (iv) (a) and (b) 24'x15'. (v) N.A. (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Yield of tuber. (iv) (a) 1958—N.A. (b) Yes. (c) N.A. (x) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 3651 lb./ac. (ii) 1791 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of tuber in lb./ac.

<table>
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<tr>
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S.E. of $M$ marginal mean = 517.0 lb./ac.
S.E. of $C$ marginal mean = 422.2 lb./ac.
S.E. of body of table = 731.2 lb./ac.

Crop: Tapioca. Ref.: K. 58(44).
Site: Tapioca and Sweet Potato Res. Stn., Mannuthy. Type: 'CM'.

Object: To determine the best dose of N, P, K and to find the best spacing to give the highest yield in the cultivation of Tapioca.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Tapioca. (c) 5 C.L. of cow dung and 50 tins of ash were applied per acre for the previous crop. (ii) (a) Laterite and gravelly soil. (b) N.A. (iii) 14.6.1958. (iv) (a) Grass weeds were first removed using mummatty, two rounds of ploughing and weeding. (b) Planted on mounds. (c) —. (d) N.A. (e) Single cutting of about 10" length. (v) Nil. (vi) No. 97 (local, medium). (vii) Rainfed. (viii) Weeding and 1st interculture one month after planting. Another weeding during the 2nd month. Weeding and earthing up during 3rd month. (ix) N.A. (x) 2.3.1959.

2. TREATMENTS:
All combinations of (1), (2), (3) and (4)
(1) 3 levels of $N$ as A/S: $N_1=50$, $N_2=100$ and $N_3=150$ lb./ac.
(2) 3 levels of $P_2O_5$ as Super: $P_0=0$, $P_1=60$ and $P_2=120$ lb./ac.
(3) 3 levels of $K_2O$ as Mar. of Potash: $K_1=80$, $K_3=120$ and $K_3=160$ lb./ac.
(4) 3 spacings: $S_1=2'$, $S_2=3'$ and $S_3=4'$.
$P_2O_5$ was applied immediately after planting. $N$ was applied one month and $K$ was applied 3 months after planting.

3. DESIGN:
(i) 3 Confd. Fact. NPK, NPS, NKS and PKK confounded. (ii) (a) 9 plots/block and 9 blocks/repetition. (b) (iii) 1. (iv) (a) $18'\times28'$, $18'\times30'$ and $20'\times32'$ for 2', 3' and 4' spacings respectively. (b) $12'\times24'$. (v) Outer rows of each net plot discarded. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1958—contd. (b) and (c) Nil. (v) (a) Trivandrum. (b) —. (vi) and (vii) Nil.

5. RESULTS:
(i) 12908 lb./ac. (ii) 2554 lb./ac. (iii) Main effect of $N$ alone is highly significant. (iv) Av. yield of tuber in lb./ac.
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<td>S₃</td>
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S.E. of any marginal mean = 491.5 lb./ac.
S.E. of body of table = 851.3 lb./ac.

Crop:– Tapioca.
Site:– Topioca and Sweet Potato Res. Stn., Mannuthy. Type:– ‘CM’.

Object:– To determine the best dose of N, P, K and to find the best spacing to give the highest yield in the cultivation of Tapioca.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Tapioca. (c) N.A. (ii) (a) Laterite and gravelly soil. (b) N.A. (iii) 13.4.1959. (iv) (a) The plot was tilled to a depth of 9' and weeds were removed along with the application of cow dung. (b) Mounds were taken after the application of definite quantity of ash and planting done on mounds. (c) –. (d) N.A. (e) Single cutting of length 9’. (v) 5 C.L./ac. of cowdung and 50 lbs. of ash per acre applied before planting. Specific dose of fertilizers were applied. (vi) H. 105. (vii) Unirrigated. (viii) 1st weeding one month after planting, 2nd weeding and intercultivation during the 2nd month after planting. (ix) N.A. (x) 26.2.1960.

2. TREATMENTS:
Same as in expl. no. 44 on page 172.

3. DESIGN:
(i) 3². Fact Confounded. (ii) (a) 9 plots/block and 9 blocks/replication. (b) 54’x90’. (iii) I. (iv) (a) 18’x30’. (b) 12’x24’. (v) Border rows discarded. (vi) Yes.

4. GENERAL:
(i) Good (ii) Nil. (iii) Yield of tuber. (iv) (a) 1958—contd. (b) Yes. (c) Nil. (v) (a) Trivandrum and Tiruvalla. (b) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 13964 lb./ac. (ii) 2284 lb./ac. (iii) Only the interaction K×P is significant. (iv) Av. yield of tuber in lb./ac.
Crop: Tapioca.

Site: Tapioca Res. Stn., Tiruvalla.

Type: 'CM'.

Object: To determine the best dose of N, P, K and to find the best spacing to give the highest yield in the cultivation of Tapioca.

### 1. BASAL CONDITIONS:

(i) (a) Nil. (b) Tapioca. (c) 200 lb. of cow dung/acre as basal dressing and fertilizers to give 50 lb. N, 40 lb. P₂O₅ and 80 lb. K/acre. (ii) (a) Laterite. (b) Refer soil analysis, Tiruvalla. (iii) 16.4.1959. (iv) (a) Ploughing twice, applying basal dressing and making mounds over it. (b) N.A. (c) Nil. (d) As per treatments. (e) One cutting of 7'' length/cane. (f) 3340 lb. of dried and powdered cow dung applied at 40 lb./plot in shallow pits at specified spacing and mounds made over it. (vi) No. 37 Nedumangadan (local, latz). (vii) Unirrigated. (viii) 3 intercultivations and 2 weeding. (ix) 83°. (x) 22.2.1960.

### 2. TREATMENTS:

Same as in exp. no. 44 on page 172. Fertilizers applied on 22, 23.7.1959.

### 3. DESIGN:

(i) 34 confounded. (ii) (a) 9 plots/block and 9 blocks/replication. (b) 90°x34'. (iii) 1. (iv) 30°x18'. (b) 24' x 12'. (v) One row allowed each plot. (vi) Yes.

### 4. GENERAL:

(i) Uniform growth in plots of 2' spacing. (ii) Nil. (iii) Yield of tuber. (iv) (a) No. (b) No. (c) Nil. (v) (a) Trivandrum and Mammuthy. (b) Nil. (vi) Nil. and (vii) Nil.

### 5. RESULTS:

(i) 13513 lb./ac. (ii) 2330 lb./ac. (iii) Only main effect of S is significant. (iv) Avg. yield of tuber in lb./ac.
<table>
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<tr>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>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>
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S.E. of any marginal mean = 448.3 lb./ac.
S.E. of body of table = 776.6 lb./ac.

Crop: Tapioca.
Site: Tapioca Res. Strn., Trivandrum.

Object: To determine the best dose of N, P, K and to find the best spacing to give the highest yield in the cultivation of Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) Cowdung at the rate of 5 ton/ac. applied before the 1st tilling as basal dressing
   (ii) (a) Laterite soil. (b) Refer soil analysis, Trivandrum. (iii) 9.6.1958.
   (iv) (a) Soil tilled to a depth of 18" and shallow pits were taken at desired spacing. (b) Erect planting in lines. (c) (d) As under treatments.
   (e) Single cutting of 10' length. (v) Cow dung at the rate of 5 ton/ac. applied at the time of tilling.
   (vi) (a) 4 (improved late). (b) Unirrigated. (c) Weeding and intercultivation before the application of manures. (d) 67.5°. (e) 13.3.1959.

2. TREATMENTS:  
Same as in exp. no. 44 on page 172.

3. DESIGN:
   (i) 3<sup>rd</sup> Confd. fact. (ii) (a) 9 plots/block and 9 blocks/repllication. (b) 32"x162" (approximately). (iii) 1.
   (iv) (a) 16"x28" (S<sub>1</sub>), 18"x30" (S<sub>2</sub>), and 20"x32" (S<sub>3</sub>). (b) 12′x24′. (v) One row alround the net plot.
   (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1958—contd. (b) No; site was changed in 1959. (c) Nil.
   (v) (a) Mannuthy and Tiruvalla. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 15302 lb./ac. (ii) 1472 lb./ac. (iii) Main effect of S and interaction NPS are highly significant. Main effects of N and P are significant. Other effects are not significant. (iv) Av. yield of tuber in lb./ac.
Object:—To determine the best dose of N, P, K and to find the best spacing to give the highest yield in the cultivation of Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (b) Cowdung at the rate of 5 ton/ac. applied before the 1st tilling as basal dressing. (ii) (a) Laterite soil. (b) Refer soil analysis, Trivandrum. (iii) 18.4.1959. (iv) (a) Soil tilled to a depth of 18" and shallow pits were taken at the desired spacings. (b) N.A. (c) -. (d) As per treatments. (e) N.A. (v) Cow dung at the rate of 5 ton/ac. applied at the time of tilling. (vi) M—4 (late). (vii) Partially irrigated—hand watering twice a week till sprouting. (viii) Thorough weeding and intercultivation. (x) 67.5°. (x) 4.3.1960.

2. TREATMENTS:
   Same as in exp. no. 44 on page 172. A/S applied on 8.7.1959 Mur. of Potash and Super applied on 9.7.1959.

3. DESIGN:
   (i) 34 confounded fact. (ii) (a) 9. (b) 90°x54°. (iii) 1. (iv) (a) 28'x16' (S1), 30'x18' (S2) and 32'x20' (S3). (b) 24'x12'. (v) One row around the net plot. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Yield of tuber. (iv) (a) 1958—1961. (b) Yes. (c) Nil. (v) (a) Mannuthy and Tiruvalla. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 23999 lb./ac. (b) 1249 lb./ac, (iii) Main effects of N and K are significant. Other effects and interactions are not significant. (iv) Av. yield of tuber in lb./ac.
Object : To study the effect of varying doses of potash on the starch content of Tapioca.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Tapioca. (c) Compost at the rate of 3 ton/ac., as B.D. and ash at 1 ton/ac., for top dressing.
   (ii) (a) Laterite soil. (b) Refer soil analysis, Trivandrum. (iii) 27.8.1954.
   (iv) (a) Soil well tilled and levelled. (b) Erect planting of cuttings of length 5 in shallow pits. (c) - .
   (e) Single cutting per hole. (v) Compost at 3 ton/ac. applied before tilling and super at 1 cwt./ac. used before planting.
   (vi) No. 302 (late). (vii) Hand watering twice a week for the first two months of growth when there is no rain.
   (viii) Intercultivated after one and a half months of growth. Weeded twice before harvest. (ix) 67.5°.
   (x) Sample tubers were collected from all the plots every month as under treatments.

2. TREATMENTS:
   Main-plot treatments:
   4 levels of K2O as Muriate of Potash: K0=0, K1=50, K2=100 and K3=150 lb./ac.
   Sub-plot treatments:
   5 stages of sample harvest: H1=?, H2=8, H3=9, H4=10 and H5=11 months after planting.

3. DESIGN:
   (i) Split-plot (main-plots in latin square). (ii) (a) 4 main-plots/row or column and 5 sub-plots/main-plot.
   (b) N.A. (iii) 4. (iv) (a) 12'x12'. (b) 9'x9'. (v) 1' wide border around the net plot of 9'x9' size.
   (vi) Yes.

4. GENERAL:
   (i) General stand was good. (ii) Nil. (iii) Yield of tuber for study of starch content. (iv) (a) 1954-1955.
   (b) Yes. (c) N.A. (v) (a) and (b) N/A. (vi) Nil. (vii) Each plot contains 9 plants. One plant at random
   will be selected from each plot during the 7th, 8th, 9th, 10th and 11th months (from the date of planting)
   and the % starch content of each sample estimated chemically.

5. RESULTS:
   (i) 76.13%. (ii) (a) 1.53%. (b) 1.70%. (iii) Main effects of P, H and interaction P×H are highly significant.
   (iv) % starch content of tuber.
<table>
<thead>
<tr>
<th></th>
<th>K₁</th>
<th>K₂</th>
<th>K₃</th>
<th>K₄</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
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<td>77.63</td>
<td>80.26</td>
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<td>79.38</td>
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<td>78.19</td>
<td>79.00</td>
<td>80.54</td>
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<td>80.22</td>
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<tr>
<td>H₄</td>
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<td>75.28</td>
<td>71.33</td>
<td>72.65</td>
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<tr>
<td>H₆</td>
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<td>71.58</td>
<td>71.86</td>
<td>76.36</td>
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<td>H₈</td>
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<td>78.90</td>
<td>75.71</td>
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<tr>
<td>Mean</td>
<td>74.58</td>
<td>74.66</td>
<td>76.95</td>
<td>78.34</td>
<td>76.13</td>
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</table>

S.E. of difference of two
1. P marginal means = -0.48%.
2. H marginal means = -0.60%.
3. H means at the same level of P = -1.21%.
4. P means at the same level of H = -1.18%.

Crop : Tapioca.
Site : Tapioca Res. Stn., Trivandrum.
Ref : K. 57(50).
Type : 'CM'.

Object : To study the combined effect of N and K on the starch content of Tapioca tubers.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Tapioca. (c) Compost at 3 ton/ac. as B.D.
   (ii) (a) Laterite soil. (b) Refer soil analysis, Trivandrum.
   (iii) 16.9.1957.
   (iv) (a) The soil was tilled well. (b) Cuttings planted. (c) N.A. (d) 24".
   (e) N.A. (f) Cow dung at 3 ton/ac. prior to planting. (g) No. 97 (Kalikalan, local).
   (vii) Irrigated.
   (viii) Intercultivated after 1½ months of growth, weeded twice during the course of the experiment 1½ months and 3 months after planting. (ix) N.A. (x) As per treatments.

2. TREATMENTS :
   Main-plot treatments :
   - 4 levels of K : K₀ = 0, K₁ = 50, K₃ = 100 and K₄ = 150 lb/ac.
   Sub-plot treatments :
   - 3 levels of N : N₀ = 0, N₁ = 50 and N₂ = 100 lb/ac.
   Sub-sub-plot treatments :
   - 4 stages of harvest : H₁ = 6, H₂ = 7, H₃ = 10 and H₄ = 12 months after planting.
   N applied as A/S and K as muriate of potash one month after planting.

3. DESIGN :
   (i) Split-plot. (ii) (a) 4 main-plots/block and 3 sub-plots/main-plot and 4 sub-sub-plots/sub-plot. (b) 15' x 90'. (iii) 4. (iv) (a) 15' x 22 ½' (main-plot). 15' x 7 ½' (sub-plot). (b) 10' x 24' (sub-sub-plot). (v) One row around. (vi) Yes.

4. GENERAL :
   (i) Good. (ii) Nil. (iii) Tuber yield for estimating starch content. (iv) (a) 1957—contd. (b) Yes. (c) Nil.
   (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS :
   (i) 79.90%. (ii) (a) 3.74%. (b) 2.34%. (c) 2.47%. (iii) Main effects of N and H and interaction N x H are highly significant. Interaction K x H is significant. Others are not significant. (iv) % starch content in tuber.
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S.E. of difference of two
1. K marginal means = 0.76 %
2. N marginal means = 0.41 %
3. H marginal means = 0.50 %
4. N means at the same level of $K$ = 0.83 %
5. $K$ means at the same level of $N$ = 1.02 %
6. $H$ means at the same level of $N$ = 0.87 %
7. $N$ means at the same level of $H$ = 0.86 %
8. $H$ means at the same level of $K$ = 1.01 %
9. $K$ means at the same level of $H$ = 1.16 %

---

Crop := Tapioca.
Site := Tapioca Res. Stn., Trivandrum.
Ref := K. 58(51).
Type := 'CM'.

Object := To study the combined effect of N and K on the starch content of Tapioca tubers.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Laterite. (b) Refer soil analysis, Trivandrum.
   (iii) 13.10.1958. (iv) (a) Soil tilled well before planting. (b) Cuttings of length 10" planted erect.
   (c) —. (d) 2'. (e) Single cutting per hole. (v) Cow dung at 3 ton/acre before planting. (vi) Malaysian No. 4 imported. (vii) Irrigated. (viii) Intercultivated 1½ months after planting along with a weeding. Another weeding 3 months after planting. (ix) N.A., (x) 14.4.1959, 18.8.1959, and 16.10.1959.

2. TREATMENTS:
   Main-plot and sub-plot treatments:
   Same as in expt. no. 50 on page 178.
   Sub-sub-plot treatments:
   3 stages of harvest: $H_1$ = 6, $H_2$ = 10 and $H_3$ = 12 months after planting.
   N as A/S, K as Mur. of Potash applied one month after planting.

3. DESIGN:
   (i) Split-plot (main-plot treatments in Latin sq.). (ii) (a) 4 main-plots/block, 3 sub-plots/main-plot and 3 sub-sub-plots/sub-plot. (b) 15" x 90". (iii) 4. (iv) (a) N.A. (b) 10" x 7½" (main-plot); 10" x 2½" (sub-plot). (v) One plant/sub-sub-plot. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Yield of tuber for estimating starch content. (iv) (a) 1957—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) Being a chemical experiment, the starch content is the important character investigated. Yield data is N.A.

5. RESULTS:
   (i) 83.59 %. (ii) (a) 1.95 %. (b) 1.27 %. (c) 1.23 %. (iii) Main effects of $N$ and $H$ are highly significant. Other effects and interactions are not significant. (iv) % starch content of tubers.
<table>
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<th>K₂</th>
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S.E. of difference of two
1. K marginal means =-0.46 %.
2. N marginal means =-0.26 %.
3. H marginal means =-0.25 %.
4. N means at the same level of K =-0.52 %.
5. K means at the same level of N =-0.62 %.
6. H means at the same level of N =-0.44 %.
7. N means at the same level of H =-0.44 %.
8. H means at the same level of K =-0.59 %.
9. K means at the same level of H =-0.62 %.

Crop :- Horse-gram.
Centre :- Palghat (c.f.).
Ref :- K. 59(1).
Type :-'M'.

Object :- To study the effect of P on the yield of Horse-gram.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Laterite. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   3 levels of P₂O₅ as Super : P₀=0, P₁=30 and P₂=60 lb./ac.

3. DESIGN:
   (i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conducts the trials in one revenue circle or Thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on a kharif cereal, 8 on a rice cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a legume crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are being studied on type C trials in two out of the four zones in each district every year. The above experiments will be laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/20 ac. (b) 1/80 ac. (iv) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1959—contd. (b) No. (c) N.A. (v) Palghat and Quilon. (vi) and (vii) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>485</td>
<td>773</td>
<td>946</td>
</tr>
</tbody>
</table>

G.M. = 735 lb./ac ; S.E./mean=29.67 lb./ac. ; No. of trials=3.
Crop: Horse-gram.  
Centre: Quilon (c.f.).  
Object: To study the effect of P on the yield of Horse-gram.

1. BASAL CONDITIONS to 4 GENERAL:
Same as in exp. no. 1 on page 180.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>P₁</th>
<th>P₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>922</td>
<td>1325</td>
<td>1440</td>
</tr>
</tbody>
</table>

G.M. = 1229 lb./ac.; S.E./mean = N.A.; No. of trials = 2.

Crop: Horse-gram.  
Centre: Quilon (c.f.).  
Object: To study the effect of P on the yield of Horse-gram.

1. BASAL CONDITIONS:
Ref: K. 59(2).  
Type: 'M'.

2. TREATMENTS:
0 = Control
P₁ = 30 lb./ac. of P₂O₅ as Super.
P₂ = 60 lb./ac. of P₂O₅ as Super.
P₁' = 30 lb./ac. of P₂O₅ as Dicalcium phosphate.
P₂' = 60 lb./ac. of P₂O₅ as Dicalcium phosphate.

3. DESIGN:
Same as in exp. no. 1 on page 180.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Grain yield. (iv) (a) 1959—contd. (b) No. (c) N.A. (v) (a) Quilon and Trivandrum. (b) N.A. (vi) and (vii) Expt. was conducted on cultivator's field.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>P₁</th>
<th>P₂</th>
<th>P₁'</th>
<th>P₂'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>453</td>
<td>634</td>
<td>773</td>
<td>584</td>
<td>716</td>
</tr>
</tbody>
</table>

G.M. = 632 lb./ac.; S.E./mean = 6.40 lb./ac.; No. of trials = 9.

Crop: Horse-gram.  
Centre: Trivandrum (c.f.).  
Object: To study the effect of P on the yield of Horse-gram.

1. BASAL CONDITIONS to 4 GENERAL:
Same as in exp. no. 3 above.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>P₁</th>
<th>P₂</th>
<th>P₁'</th>
<th>P₂'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>370</td>
<td>494</td>
<td>592</td>
<td>518</td>
<td>634</td>
</tr>
</tbody>
</table>

G.M. = 522 lb./ac.; S.E./mean = 28.51 lb./ac.; No. of trials = 12.
Object: To study the effect of P on the yield of Black gram.

1. BASAL CONDITIONS to 3. DESIGN:
   Same as in exp. no. 1 on page 180. on Horse-gram.

4. GENERAL:
   (i) Satisfactory.  (ii) N.A.  (iii) Grain yield.  (iv) (a) 1959—contd.  (b) No.  (c) N.A.  (v) (a) and (b) No.  (vi) and (vii) Nil.

5. RESULTS:

   Treatment  
<table>
<thead>
<tr>
<th></th>
<th>p1</th>
<th>p2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>494</td>
<td>823</td>
</tr>
</tbody>
</table>

   G.M. = 812 lb./ac.; S.E./mean = 30.84 lb./ac.; No. of trials = 3.

Crop: Sugarcane.  Ref: K. 57(1).

Site: Pampa River Factory Res. Stn., Tiruvalla.  Type: 'M'.

Object: To study the effect of N, P and K fertilizers on the yield and quality of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) Sugarcane.  (c) 50 lb./ac. of N+40 lb./ac. of P₂O₅+100 lb./ac. of K₂O as Ferry's alluvial mixture.  (ii) (a) Alluvial.  (b) Refer soil analysis.  Tiruvalla.  (iii) 10.12.1956 to 5.1.1957.  (iv) (a) Digging and removing stubbles.  (b) Planting cane sets end to end in furrows.  (c) 12300 sets/ac.  (d) 3 in rows.  (e) ---.  (f) Nil.  (g) CO. 449 (improved).  (h) Irrigated.  (i) Earthing up and propping.  (k) N.A.  (z) 13.12.1957.

2. TREATMENTS:
   Main-plot treatments
   All combinations of (1) and (2)
   (1) 3 levels of P₂O₅ as Rock Phos.: P₀ = 0, P₁ = 50 and P₂ = 100 lb./ac.
   (2) 2 levels of N as A/S: N₁ = 100 and N₂ = 150 lb./ac.

   Sub-plot treatments:
   3 levels of K₂O as Pot. Sul.: K₀ = 0, K₁ = 100 and K₂ = 200 lb./ac.
   Half of the manure applied from 28.2.1957 to 4.3.1957 and the other half from 30.3.1957 to 4.4.1957.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 6 main-plots/block; 3 sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) and (b) 31'x43'.  (z) Nil.  (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  (ii) Nil.  (iii) Cane yield, brix, pol and purity.  (iv) (a) No.  (b) No.  (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 32.34 ton/ac.  (ii) (a) 19 ton/ac.  (b) 2.97 ton/ac.  (iii) Only K effect is significant.  (iv) Av. yield of sugarcane in ton/ac.
Crop: Sugarcane.  
Site: Pampa River Factory Res., Stn., Tiruvalla. Type: 'M'.

Object: To determine the optimum dose of P and K manures for Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sugarcane.  
   (c) 3 cwt./ac. of G.N.C. + 14 cwt./ac. of A/S by broadcasting.  
   (ii) (a) Loam. (b) Refer soil analysis, Tiruvalla.  
   (iii) 5.1.1958. (iv) (a) Digging and removing stubbles. (b) Planting cane cuttings end to end in furrows.  
   (c) 13000 setts/ac.  
   (d) and (e) N.A. (v) Replication I and III treated with 1 ton lime/ac. and 100 lb./ac. of N as A/S applied to all plots.  
   (vi) CO. 449 (Improved).  
   (vii) Unirrigated. (viii) One hoeing and 2 weedings.  
   (ix) 111.7°. (x) 10.1.1959.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of $P_0$: $P_0=0$, $P_1=50$ and $P_2=100$ lb./ac.
   (2) 3 levels of $K_0$: $K_0=0$, $K_1=50$ and $K_2=100$ lb./ac.
   P and K applied in two equal doses on 5.3.1958 and 28.4.1958. 25 lb./ac. of N applied as B.D. while the rest is applied along with P and K as Parry's mixture.

3. DESIGN:
   (i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) and (b) 51'X43'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Cane yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (a) and (b) NIL (vi) and (vii) Nil.

5. RESULTS:
   (i) 24.01 ton/ac. (ii) 2.12 ton/ac. (iii) K effect is highly significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th>$P_0$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$K_0$</td>
<td>21.53</td>
<td>20.14</td>
<td>19.74</td>
</tr>
<tr>
<td>$K_1$</td>
<td>26.58</td>
<td>24.48</td>
<td>25.84</td>
</tr>
<tr>
<td>$K_2$</td>
<td>26.07</td>
<td>26.53</td>
<td>25.15</td>
</tr>
</tbody>
</table>

| Mean | 24.73 | 23.72 | 23.58 | 24.01 |
Crop: Sugarcane.  
Site: Pampa River Factory Res. Stn., Tiruvalla.  
Object: To find out the effect of application of lime on the yield of Sugarcane.

### BASAL CONDITIONS:

(i) (a) Nil. (b) Sugarcan. (II) (a) Alluvial. (b) Refer soil analysis, Tiruvalla. (iii) 3.2.1956. (iv) (a) Digging and uprooting stubbles. (b) Planting cane sets end to end in furrows. (c) About 13000 setts/ac. (d) and (e) N.A. (v) NIL (vi) CO. 349 (medium, improved). (vii) Irrigated. (viii) One slight hoeing, 2 weedings and one earthing. (ix) 103.74'. (x) 8.2.1957.

### TREATMENTS:

1. 4 cwt./ac. of Alluvial mixture + 1 cwt./ac. of A/S one month after planting.
2. 4 cwt./ac. of Alluvial mixture + 1 ton/ac. of lime top dressed on 28.2.1956.
3. 50 lb./ac. of N as A/S one month after planting + 1 ton/ac. of lime top dressed on 28.2.1956.
4. 4 cwt./ac. of Alluvial mixture.

### DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 2. (iv) (a) and (b) Varied from replication to replication. Dimensions—N.A. (v) NIL (vi) Yes.

### GENERAL:

(i) Satisfactory; propping done to prevent lodging. (ii) NIL. (iii) Cane yield. (iv) (a) to (c)'No. (v) (a) and (b) NIL. (vi) and (vii) NIL.

### RESULTS:

(i) 26.51 ton/ac. (ii) 5.45 ton/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in ton/ac. 

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Average yield</th>
<th>S.E./mean</th>
<th>3.85 ton/ac.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>1.02</td>
<td>2.40</td>
<td>3.38</td>
<td>2.73</td>
<td>2.33</td>
<td>3.85</td>
<td></td>
</tr>
</tbody>
</table>

### RESULTS:

Crop: Sugarcane.  
Site: Pampa River Factory Res. Stn., Tiruvalla.  
Object: To find the best time of application of manure to Sugarcane.

### BASAL CONDITIONS:

(i) (a) Nil. (b) Sugarcane. (II) (a) Alluvial. (b) Refer soil analysis, Tiruvalla. (iii) 13.12.1956. (iv) (a) Digging and removing stubbles. (b) Planting cane sets end to end in furrows. (c) 12000 setts/ac. (d) 3' row to row. (e) N.A. (v) As per treatments. (vi) CO. 349 (Improved). (vii) Irrigated. (viii) Earthing up 3 months after planting, propping, in May—June to prevent lodging. (ix) 120'. (x) 13.12.1957.

### TREATMENTS:

1. T1 = 1st dose at planting, 2nd 6 weeks after planting and 3rd 12 weeks after planting.
2. T2 = 1st dose 4 weeks, 2nd 10 weeks and 3rd 16 weeks after planting. 
3. T3 = 1st dose 4 weeks, 2nd 10 weeks after planting and 3rd in May. 
4. 1st dose = A/S at 1 cwt./ac., 2nd dose = 2 cwt./ac. of Parry's alluvial mixture (i.e., 50 lb. of N + 40 lb. of P₂O₅ and 100 lb. of K₂O.) and 3rd dose = 2 cwt./ac. of Parry's alluvial mixture.
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3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) and (b) 51'×43'. (v) H.B. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Cane yield. (iv) (a) 1957—1958. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 28.10 ton/ac. (ii) 3.61 ton/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in ton/ac.
Treatment  T1  T2  T3
Av. yield  26.57  28.75  29.92
S.E./mean = 1.82 ton/ac.

Crop :- Sugarcane.  Ref :—K. 57(5).
Site :- Pampa River Factory Res. Stn., Tiruvalla.  Type :- 'M'.
Object :- To find the best time of application of manure.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sugarcane. (c) 50 lb. of N+40 lb. of P+100 lb. of K as Parry's mixture. (ii) (a) Alluvial. (b) Refer soil analysis, Tiruvalla. (iii) 6.2.1957. (iv) (a) Digging and removing stubbles. (b) Planting cane setts end to end in furrows. (c) 12000 setts/ac. (d) 3' between rows. (e) —. (f) As per treatments. (i) CO. 349 (improved). (vii) Irrigated. (viii) Earthing up 3 months after planting, propping May—June to prevent lodging. (ix) N.A. (x) 2.2.1958 to 4.2.1958

2. TREATMENTS:
Same as in exp. no. 4 on page 184.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) and (b) 51'×43'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Cane yield. (iv) (a) 1957—1958. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 18.64 ton/ac. (ii) 4.01 ton/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in ton/ac.
Treatment  T1  T2  T3
Av. yield  22.20  17.35  16.36
S.E./mean = 2.00 ton/ac.

Crop :- Sugarcane.  Ref :- K. 54(6).
Site :- Pampa River Factory Res. Stn., Tiruvalla.  Type :- 'M'.
Object :- To verify whether filter press mud, a by-product of sugar industry, can be used as manure to Sugarcane.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sugarcane. (c) N.A. (ii) (a) N.A. (b) Refer soil analysis, Tiruvalla. (iii) End of Jan., 1954. (iv) (a) Digging the soil and up-rooting stubbles. (b) Planting cane setts end to end in furrows. (c) About 7500 setts/ac. (d) and (e) N.A. (v) Nil. (vi) CO. 349 (improved, medium). (vii) Irrigated. (viii) Light hoeing, 2 weedings and one earthing up. (ix) 108.41'. (x) 20 to 30.12.1954.
2. TREATMENTS:

5 manural treatments: M₁ = Control, M₂ = 20 ton/ac. of filter press mud, M₃ = 2 ton/ac. of lime, M₄ = 4 ton/ac. of lime and M₅ = 100 lb./ac. of P₂O₅ as Super.

Manures applied as B.D. at planting. Sets dipped in 1% Agro.3an solution before planting.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) and (b) 1/50 ac. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory; proping done to prevent lodging. (ii) Nil. (iii) Cane yield. (iv) (a) No. (b) No. (c) Nil (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 53.64 ton/ac. (ii) 5.42 ton/ac. (iii) Treatment differences are significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>45.04</td>
<td>58.42</td>
<td>55.24</td>
<td>55.13</td>
<td>54.33</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>2.71 ton/ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: - Sugarcane.  
Ref: - K. 55(7).  
Site: - Pampa River Factory Res. Sta., Tiruvalla.  
Type: - 'M'.

Object: - To determine the effect of molasses and sodium molybdate against burying trash on the yield and juice quality of Sugarcane.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Sugarcane. (c) 75 lb./ac. of N+100 lb./ac. of K₂O (ii) (a) Alluvial. (b) Refer soil analysis, Tiruvalla. (iii) 27.12.1955. (iv) (a) Digging thru soil and up-rooting stubbles. (b) Planting cane sets end to end in furrows. (c) about 11000 setts/ac. (d) and (e) N.A. (v) Nil. (vi) CO. 449 (medium, improved). (vii) Irrigated. (viii) Light hoeing, 2 weedings and earthing up. (ix) 120°. (x) 27.12.1956.

2. TREATMENTS:

5 manural treatments: M₁ = Periodical burying of trash bi-monthly starting from 15th May, M₂ = Digging up soil between rows without disturbing earthed portion immediately after each flood, M₃ = Applying 10 ton/ac. of molasses between rows after flowering and about 1 month before planting and M₄ = Applying 2 oz/ac. of sodium molybdate with 1st manuring and stirring of soil.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 2. (iv) (a) and (b) 35'×54'. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Good. No lodging. (ii) Nil. (iii) Population count, flowering details and cane yield. (iv) (a) Nil. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 37.88 ton/ac. (ii) 3.68 ton/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in ton/ac.

<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>36.52</td>
<td>35.23</td>
<td>41.78</td>
<td>35.35</td>
<td>40.55</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>2.69 ton/ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Sugarcane.  
Centre: Tiruvalla (c.f.).  
Ref: K. 54(8).  
Type: 'M'.

Object: To determine the optimum dose of N and the best ratio of A/S and G.N.C.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sugarcane. (c) Parry's mixture (50 N:40 P:160 K) applied in two doses by placement 1 month and 2 months after planting. (ii) Alluvial. (iii) Nil. (iv) CO. 349 (medium). (v) (a) Digging, removing stubbles. (b) Planting cane sets end to end along furrows. (c) About 12000 sets/ac. (d) N.A. (e) —. (vi) 5 to 8.2.1954. (vii) Irrigated. (viii) Earthed up 3 months after planting. (ix) 10.41'. (x) 17 to 21.12.1954.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 2 levels of N: N₁ = 100 lb/ac. and N₂ = 150 lb/ac.
   (2) 3 ratios of A/S to G.N.C: R₁ = 1:1, R₂ = 1:2 and R₃ = 2:1.
   N applied one month after planting.

3. DESIGN:
   (i) R.B.D. One cultivator's field was selected. (ii) 6 plots/block with 4 replications. (iii) (a) N.A. (b) 1.9 cents (iv) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Cane yield. (iv) (a) Nil. (b) and (c) No. (v) (a) and (b) No. (vi) Nil. (vii) Exp. was conducted on cultivator's field.

5. RESULTS:
   (i) 35.17 ton/ac. (ii) 2.98 ton/ac. (iii) Treatment differences are not significant. (iv) Av. yield of cane in ton/ac.

<table>
<thead>
<tr>
<th>R₁</th>
<th>R₂</th>
<th>R₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₁</td>
<td>36.35</td>
<td>31.58</td>
<td>34.70</td>
</tr>
<tr>
<td>N₂</td>
<td>34.87</td>
<td>36.18</td>
<td>37.34</td>
</tr>
<tr>
<td>Mean</td>
<td>35.62</td>
<td>33.88</td>
<td>36.02</td>
</tr>
</tbody>
</table>

S.E. of N marginal mean = 0.86 ton/ac.
S.E. of R marginal mean = 1.06 ton/ac.
S.E. of body of table = 1.49 ton/ac.

Crop: Sugarcane.  
Centre: Tiruvalla (c.f.).  
Ref: K. 54(9).  
Type: 'M'.

Object: To find out the optimum dose of N required for Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sugarcane. (c) 50 lb/ac. of N+40 lb/ac. of P₂O₅+100 lb/ac. of K₂O as Parry's alluvial mixture. (ii) (a) Alluvial; N : 0.183, P₂O₅ : 0.199, K₂O : 0.193, Available K₂O : 12.2 mgm/100 gm, Humus : 1.67, CaO : 0.25 and pH : 6.1. (iii) Nil. (iv) CO. 449 (medium, improved), except in 4 plots of rep. IV where only 8% of this variety was used. (v) (a) Digging the soil; up-rooting stubbles; preparation of furrows. (b) Planting cane sets end to end in furrows. (c) About 13000 sets/ac. (d) 3' between furrows. (e) —. (vi) 15 and 29.12.1954. (vii) Irrigated. (viii) Nil. (ix) 120.37'. (a) Middle of December, 1955.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 levels of N as A/S and G.N.C in 2:1 ratio: N₁ = 75, N₂ = 100 and N₃ = 150 lb/ac.
   (2) 2 levels of manures: M₁ = Ash at 5 ton/ac and M₂ = 100 lb/ac. of P₂O₅+100 lb/ac. of K₂O. N applied on 5.2.1955 and 23.3.1955, P₂O₅ as Rock Phos. and K₂O as Pot. Sub. on 8.2.1955.
3. DESIGN:
(i) A field by the side of Pampa River factory was selected for the experiment. (ii) R.B.D. with 6 plots/block and 4 replications. (iii) (a) and (b) 7.5' x 45'. (iv) Yes.

4. GENERAL:
(i) Good. Trash twist propping done to prevent lodging. (ii) Nil. (iii) Population count, flowering details, cane yield and quality of juice by estimating brix, pot and purity. (iv) (a) No. (b) --. (c) --. (v) (a) and (b) Nil. (vi) Nil. (vii) The experiment was conducted on cultivator's field.

5. RESULTS:

Yield of cane

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>37.58</td>
<td>36.42</td>
<td>37.26</td>
<td>37.09</td>
</tr>
<tr>
<td>M2</td>
<td>39.33</td>
<td>37.29</td>
<td>39.11</td>
<td>38.48</td>
</tr>
<tr>
<td>Mean</td>
<td>38.45</td>
<td>36.86</td>
<td>38.19</td>
<td>37.83</td>
</tr>
</tbody>
</table>

S.E. of marginal mean of N = 0.92 ton/ac.
S.E. of marginal mean of M = 0.76 ton/ac.
S.E. of body of table = 1.31 ton/ac.

Brix Percentage

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>18.28</td>
<td>18.42</td>
<td>18.08</td>
<td>18.25</td>
</tr>
<tr>
<td>M2</td>
<td>18.02</td>
<td>18.42</td>
<td>18.22</td>
<td>18.22</td>
</tr>
<tr>
<td>Mean</td>
<td>18.15</td>
<td>18.42</td>
<td>18.15</td>
<td>18.24</td>
</tr>
</tbody>
</table>

S.E. of marginal mean of N = 0.28%,
S.E. of marginal mean of M = 0.22%,
S.E. of body of table = 0.40%.

BASAL CONDITIONS:
(i) (a) N.A. (b) Sugarcane. (c) Parry's alluvial mixture (50 N + 40 P + 100 K) applied in two doses by placement 1 month and 2 months after planting. (ii) Alluvial. (iii) Nil. (iv) CO. 349 (improved, medium). (v) (a) Digging and removing stubbles. (b) Planting cane sets end to end along furrows. (c) About 13001 l/m. (d) and (e) N.A. (vi) 19.2.1954. (vii) Irrigated. (viii) Earthing up 3 months after planting. (ix) 10.8.41. (x) 27.9.1954.

TREATMENTS:
All combinations of (1), (2) and (3)
(1) 6 NP mixtures: M1 = 100 lb./ac. of N + 50 lb./ac. of P, M2 = 100 lb./ac. of N + 100 lb./ac. of P, M3 = 150 lb./ac. of N + 75 lb./ac. of P, M4 = 150 lb./ac. of N + 150 lb./ac. of P, M5 = 200 lb./ac. of N + 100 lb./ac. of P, M6 = 200 lb./ac. of N + 200 lb./ac. of P.
(2) 3 sources of P2O5: S1 = Super, S2 = Rock Phos. and S3 = B.M.
(3) 2 levels of K2O as Pot. Sul.: K0 = 0 and K1 = 100 lb./ac.

Crop: Sugarcane. Centre: Tiruvalla (c.f.). Object: To determine the optimum nitrogen requirement in the presence of single and double dose of P2O5, the best form of P2O5 and the effect of K2O on Paddy.

3. DESIGN:
(i) R.B.D. (ii) 36 plots/block with 3 replications. (iii) (a) N.A. (b) 24'x36'. (iv) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Cane yield, brix %, pol and purity. (iv) (a) to (c) No. (v) (a) and (b) Nil. (vi) Nil. (vii) Expt. was conducted on cultivator's field.

5. RESULTS:
(i) 38.42 ton/ac. (ii) 5.90 ton/ac. (iii) K effect is highly significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th></th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>Mean</th>
<th>K0</th>
<th>K1</th>
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<tr>
<td>S1</td>
<td>34.71</td>
<td>38.80</td>
<td>36.03</td>
<td>39.68</td>
<td>33.00</td>
<td>39.14</td>
<td>36.89</td>
<td>34.10</td>
<td>39.68</td>
</tr>
<tr>
<td>S2</td>
<td>38.13</td>
<td>37.41</td>
<td>38.65</td>
<td>39.41</td>
<td>39.70</td>
<td>42.97</td>
<td>39.39</td>
<td>35.79</td>
<td>42.99</td>
</tr>
<tr>
<td>S3</td>
<td>39.03</td>
<td>29.18</td>
<td>35.81</td>
<td>40.76</td>
<td>39.52</td>
<td>39.59</td>
<td>38.98</td>
<td>37.00</td>
<td>40.96</td>
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<tr>
<td>Mean</td>
<td>37.30</td>
<td>38.46</td>
<td>36.82</td>
<td>39.95</td>
<td>37.41</td>
<td>40.56</td>
<td>38.42</td>
<td>35.63</td>
<td>41.21</td>
</tr>
<tr>
<td>K0</td>
<td>34.39</td>
<td>35.74</td>
<td>33.99</td>
<td>37.52</td>
<td>35.67</td>
<td>36.46</td>
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<td>K1</td>
<td>40.20</td>
<td>41.19</td>
<td>39.66</td>
<td>42.38</td>
<td>39.14</td>
<td>44.68</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of M marginal mean = 1.39 ton/ac.
S.E. of K marginal mean = 0.80 ton/ac.
S.E. of S marginal mean = 0.98 ton/ac.
S.E. of body of M x S table = 1.39 ton/ac.
S.E. of body of M x K table = 1.97 ton/ac.
S.E. of body of K x S table = 2.41 ton/ac.

Crop: Sugarcane.
Centre: Tiruvalla (c.f).
Ref: K. 55(11).
Type: 'M'.

Object: To find out the manurial requirements of Sugarcane in different types of soils in Pampa river factory zone.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Sugarcane. (c) 50 lb./ac. of N+40 lb./ac. of P2O5+100 lb./ac. of K2O as Parry's alluvial mixture. (ii) Alluvial: N: 0.183, P2O5: 0.199, K2O: 0.193, Available K2O: 12.2 mgm./100 gm., Humus: 1.67, CaO: 0.25 and pH: 6.1. (iii) Nil. (iv) CO. 349 and CO. 449 (medium, improved). (v) (a) Digging the soil once. (b) Planting cane setts in pits. (c) and (d) N.A. (e) 2 setts/pit. (vi) 1st week of Jan., 1955. (vii) Irrigated. (viii) Two hoeings, weeding and propping up. (ix) 120.37'. (x) 1st week of Jan., 1956.

2. TREATMENTS:
(1) 40 lb./ac. of N.
(2) 40 lb./ac. of N+40 lb./ac. of K.
N applied as A/S and G.N.C. in 2:1 ratio, in two doses 11 months and 24 months after planting, K2O along with 1st manuring as Pot. Sal. Manures applied at plant base.

3. DESIGN:
(i) and (ii) 32 demonstration fields from different cultivators were selected. No specific method was adopted in the selection. (iii) (e) and (b) 10 cents. Dimensions—N.A. (iv) Randomisation defective.

4. GENERAL:
(i) Early floods in the month of May which had an adverse effect on the growth of the crop. (ii) Nil. (iii) Cane yield, juice quality by estimating brix, pol and purity. (iv) (a), (b) and (c) N.A. (v) (a) and (b) No. (vi) Nil. (vii) Expt. was conducted on cultivator's field.
5. RESULTS:
(i) 28.66 ton/ac. (ii) 4.05 ton/ac. (iii) Treatment difference is not significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>27.70</td>
<td>29.62</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>~0.72 ton/ac.</td>
<td></td>
</tr>
</tbody>
</table>

Crop: Sugarcane.  
Centre: Tiruvalla (c.f.).  
Object: To find out the *ma*trual requirements of Sugarcane in the different types of soils in the Pampa river factory zone.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Sugarcane. (c) 100 lb./ac. of N, 40 lb./ac. of P_{2}O_{5} and 100 lb./ac. of K_{2}O as Parry's loam mixture. (ii) Loam: N: 0.126, P_{2}O_{5}: 0.163, K_{2}O: 0.163, Available K_{2}O: 13.3 mgm/100 gms, Humus: 0.38, 
CaO: 0.42 and pH: 6.4. (iii) F.Y.Y. at 2 ton/ac. (iv) C.O. 349 and C.O. 449 (improved, medium). (v) (a) Digging the soil once. (b) Planting cane sets in pits. (c) and (d) N.A. (e) 2 sets/pit. (vi) 1st week of Jan., 1955. (vii) Irrigated. (viii) Two hoeings, weeding and propping up. (ix) 120.37°. (x) 1st week of January, 1956.

2. TREATMENTS:
1. 100 lb./ac. of N.  
2. 100 lb./ac. of N+100 lb./ac. of K.  
N applied as ANS and G.N.C. in 2:1 ratio in two equal doses, two doses, on 1st and 6th months and other 2:1 months after planting, K_{2}O along with 1st manuring as Pot. Std. Manures applied by dibbling. (v) (a) Digging the soil once. (b) Planting cane sets end to end in furrows. (c) About 13000 setts/ac. (d) 3' between furrows. (e) N.A. (f) 21.12.1954. (g) Nil. (h) 120.37°. (i) 14.12.1955.
2. TREATMENTS:

2 levels of lime: \( L_0 \) = Control (no lime) and \( L_1 \) = 1 ton/ac. of lime applied by dibbling.

3. DESIGN:

(i) One cultivator's field by the side of the Parma river was selected for the experiment. (ii) R.B.D. with two replications and 2 plots/block. (iii) (a) and (b) 1/20 ac. (iv) Yes.

4. GENERAL:

(i) Good. Not propped well and hence crop lodged. (ii) Nil. (iii) Regulation count, flowering details, cane yield, disease observation and juice analysis to get brix, pol and purity. (iv) (a) Nil. (b) and (c) —. (v) (a) and (b) —. (vi) Nil. (vii) Expt. was conducted on cultivator's field.

5. RESULTS:

(i) 38.18 ton/ac. (ii) 4.76 ton/ac. (iii) Treatment difference is not significant. (iv) Av. yield of cane in ton/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( L_0 )</th>
<th>( L_1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>37.21</td>
<td>39.15</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>3.36</td>
<td></td>
</tr>
</tbody>
</table>

Object: — To find out the effect of application of lime on the yield of Sugarcane.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Sugarcane. (c) 50 lb/ac. of N+40 lb/ac. of KCl, 4-100 lb/ac. of KO applied as Parry's mixture. (ii) Alluvial soil; N : 0.183, P : 0.199, K : 0.192, available \( K_2 O \) : 12.2 mgm./100 gm. Humus : 1.67, CaO : 0.25 and pH : 6.1. (iii) N.A. (iv) CO. 349 medium, improved. (v) (a) Digging and up-rooting stubbles. (b) Planting cane setts end to end in furrows. (c) Cut at 1500 actae. (d) and (e) N.A. (vi) January, 1956. (vii) Irrigated. (viii) Nil. (ix) 103.74'. (x) January, 1957.

2. TREATMENTS:

Two levels of lime: \( L_0 \) = Control (no lime) and \( L_1 \) = Lime at 1 ton/ac.

Lime applied one month after planting as top dressing.

3. DESIGN:

(i) and (ii) 13 fields were selected from different cultivators. (iii) (a) and (f) Varied from cultivator to cultivator. (iv) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Cane yield. (iv) (a) No. (b) and (c) No. (v) (a) and (b) Nil. (vi) Nil. (vii) Expt. was conducted on cultivators' fields.

5. RESULTS:

(i) 31.31 ton/ac. (ii) 5.22 ton/ac. (iii) Treatment difference is not significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( L_0 )</th>
<th>( L_1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>31.90</td>
<td>30.71</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1.45</td>
<td></td>
</tr>
</tbody>
</table>

Object: — To find out the effect of application of lime on the yield of Sugarcane.
1. BASAL CONDITIONS:
(i) (a) N.A. (b) Sugarcane. (c) 100 lb/ac. of N+40 lb/ac. of P₂O₅+100 lb/ac. of K₂O as Parry's loam mixture. (ii) Loam; N: 0.126, P₂O₅: 0.163, K₂O: 0.163, available K₂O: 13.3 mgm/100 gm. Humus: 0.38, CaO: 0.42 and pH: 6.4. (iii) N.A. (iv) CO. 349 (medium, improved). (v) (a) Digging and removing stubbles. (b) Planting cane sets end to end along furrows. (c) 13000 sets/ac. (d) and (e) N.A. (vi) January, 1956. (vii) Irrigated. (viii) Earthing up 2 to 3 months after planting. (ix) 103.74°. (x) January, 1957.

2. TREATMENTS:
Two levels of lime: L₀=Control (no lime) and L₁=Lime 1 ton/ac. Lime applied one month after planting as top dressing.

3. DESIGN:
(i) and (ii) 14 fields were selected from different cultivators. (iii) (a) and (b) Varied from cultivator to cultivator. (iv) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Cane yield. (iv) (a) No. (b) and (c) No. (v) (a) and (b) No. (vi) Nil. (vii) Expt. was conducted on cultivator's fields.

5. RESULTS:
(i) 27.93 ton/ac. (ii) 4.61 ton/ac. (iii) Treatment difference is not significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>26.89</td>
<td>28.97</td>
</tr>
</tbody>
</table>

S.E./mean=1.23 ton/ac.

Crop := Sugarcane.
Centre := Tiruvalla (c.f.).
Object := To find out the best period of application of manures.

Ref := K. 54(16).
Type := 'M'.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Sugarcane. (c) Parry's alluvial mixture (53 N+40 P+102 K). (iii) As per treatments. (iv) CO. 349 (improved, medium). (v) (a) Digging, removing stubbles. (b) Planting cane sets end to end along furrows. (c) 13000 sets/ac. (d) and (e) N.A. (vi) 22.2.1954. (vii) Irrigated. (viii) Earthing up three months after planting. (ix) 108.41°. (x) 14 to 16.12.1954.

2. TREATMENTS:
(1) 1st dose at planting + 2nd a month after planting.
(2) 1st dose 3 weeks after planting + 2nd a month after planting.
(3) 1st dose a month after planting + 2nd 3 months after planting.
1st dose=75 N+80 P+80 K as Parry's mixture, 2nd dose=75 N as a mixture containing A/S and G.N.C. in 1:1 ratio.

3. DESIGN:
(i) R.B.D. (ii) 3 plots/block with 4 replications. (iii) (a) N.A. (b) 2 cents. Dimensions—N.A. (iv) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Cane yield. (iv) (a), (b) and (c) Nil. (v) (a) and (b) No. (vi) Nil. (vii) Expt. was conducted on cultivator's field.

5. RESULTS:
(i) 37.32 ton/ac. (ii) 2.81 ton/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in ton/ac.
Crop :- Sugarcane.  
Centre :- Tiruvalla (c.f.).  
Object :- To verify whether addition of loam mixture as extra manure has any effect on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Sugarcane. (c) 100 N+40 P+100 K as Parry’s loam mixture.  
   (ii) Loam.  
   (iii) As per treatments.  
   (iv) CO. 349 (improved, medium).  
   (v) (a) Digging and removing stubbles.  
   (b) Planting cane setts end to end along furrows.  
   (c) About 13000 setts/ac.  
   (d) and (e) N.A.  
   (vii) Irrigated.  
   (viii) Earthing up about 3 months after planting.  
   (ix) 108.4”.  
   (x) December, 1954.

2. TREATMENTS:
   (i) Extra dose of 2 cwt/ac. of Parry’s loam mixture over and above the normal dose.
   (2) Normal loam mixture: 100 N+40 P+100 K.  
   50% of N applied one month after planting. Rest applied in split doses two months and 3 months after planting.

3. DESIGN:
   (i) and (ii) 31 cultivators’ fields in the Pampa river area were selected.  
   (iii) (a) and (b) Varied from cultivator to cultivator.  
   (iv) Yes.

4. GENERAL:
   (i) Satisfactory.  
   (ii) Nil.  
   (iii) Cultivar quality of cane by estimating brix, pol and purity.  
   (iv) (a) No. (b) and (c) No.  
   (v) No.  
   (vi) (vii) Expt. was conducted on cultivators’ fields.

5. RESULTS:
   (i) 25.76 ton/ac.  
   (ii) 6.09 ton/ac.  
   (iii) Treatment difference is not significant.  
   (iv) Av. yield of sugarcane in ton/ac.

### Crop :- Sugarcane.  
Centre :- Tiruvalla (c.f.).  
Object :- To find out the manurial value of trace elements for Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Sugarcane. (c) 100 N+40 P+100 K applied as Parry’s loam mixture.  
   (ii) Loam soil; P<sub>2</sub>O<sub>5</sub> : 0.199, K<sub>2</sub>O : 0.193, Humus : 1.67, CaO : 0.25 and pH : 6.3.  
   (iii) Nil.  
   (iv) CO. 349 (improved, medium).  
   (v) (a) Digging; up-rooting stubbles.  
   (b) Planting cane setts end to end in furrows.  
   (c) 13000 setts/ac.  
   (d) and (e) N.A.  
   (v) Nil.  
   (vi) 3.1.1954.  
   (vii) Irrigated.  
   (viii) Earthing up 3 months after planting.  
   (ix) 108.4”.  
   (x) 19.11.1954.

2. TREATMENTS:
   M<sub>1</sub> = Copper sulphate at 10 lb/ac.  
   M<sub>2</sub> = Copper sulphate at 20 lb/ac.  
   M<sub>3</sub> = Borax at 5 lb/ac.  
   M<sub>4</sub> = Borax at 10 lb/ac.  
   M<sub>5</sub> = Manganese at 10 lb/ac.  
   M<sub>6</sub> = Zinc sulphate at 10 lb/ac.  
   M<sub>7</sub> = Zinc sulphate at 20 lb/ac.  
   M<sub>8</sub> = Zinc sulphate at 20 lb/ac.  
   M<sub>9</sub> = Bordeaux mixture at 10 lb/ac.  
   M<sub>10</sub> = Bordeaux mixture at 20 lb/ac.  
   M<sub>11</sub> = Perenox treated setts and M<sub>12</sub> = Control.
3. DESIGN:
(i) R.B.D. One cultivator's field was selected; method of selection—N.A. (ii) 12 plots/block. with 3 replications. (iii) (a) N.A. (b) 2.6 cents. (iv) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Cane yield. (iv) (a) Nil. (b) No. (c) Nil. (v) Nil. (vi) Nil. (vii) Expt. was conducted on cultivator's field.

5. RESULTS:
(i) 3.25 ton/acre. (ii) 3.95 ton/acre. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in ton/acre.

<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>
<th>M9</th>
<th>M10</th>
<th>M11</th>
<th>M12</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>33.20</td>
<td>32.58</td>
<td>31.03</td>
<td>32.89</td>
<td>32.22</td>
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<td>30.40</td>
<td>31.32</td>
<td>31.16</td>
<td>37.41</td>
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</tr>
<tr>
<td>S.E./mean</td>
<td>2.28 ton/acre</td>
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</table>

Crop :- Sugarcane.
Centre :- Tiruvalla (c.f.).
Ref :- K. 54 [19].
Type :- 'M'.

Object :- To investigate whether molasses, a by-product of sugar industry, has any effect in the yield and other characters of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Sugarcane. (c) 50 lb./ac. of N+40 lb./ac. of P₂O₅+100 lb./ac. of K₂O as Parry's alluvial mixture. (ii) Alluvial : N : 0.183, P₂O₅ : 0.199, K₂O : 0.193, Available K₂O : 12.2 mgm/100 gm, Humus : 1.67, CaO : 0.25 and pH : 6.1. (iii) Nil. (iv) CO. 349 (medium, improved). (v) (a) Digging the soil, up-rooting stubbles. (b) Planting cane setts end to end in furrows. (c) About 13000 setts/ac. (d) N.A. (e) —. (vi) December, 1954. (vii) Irrigated. (viii) Nil. (ix) 120.37”. (x) December, 1955.

2. TREATMENTS:
T₀—Control (untreated), T₁—5 ton of molasses/ac. applied in the 2nd and third week of October, 1955 along the furrows.

3. DESIGN:
(i) and (ii) 4 cultivators on the side of the Pampa river selected for the experiment. (iii) (a) and (b) One cultivator's plot of 40 cents and others each of 10 cents. Dimensions N.A. (iv) Yes.

4. GENERAL:
(i) Good. No lodging. (ii) Nil. (iii) Population count, flowering details, cane yield and juice analysis to obtain brix, pol and purity. (iv) (a) Nil. (b) and (c) N.A. (v) No. (vi) Nil. (vii) Yield data N.A. Expt. was Conducted on on cultivator's fields.

5. RESULTS:

I. Brix %
(i) 15.19 %. (ii) 1.22 %. (iii) Treatment difference is not significant. (iv) % soluble salts in the juice.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>15.03</td>
<td>15.36</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.61 %</td>
<td></td>
</tr>
</tbody>
</table>

II. Pol %
(i) 12.08 %. (ii) 1.75 %. (iii) Treatment difference is not significant. (iv) % sugar in juice.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>11.72</td>
<td>12.15</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.88 %</td>
<td></td>
</tr>
</tbody>
</table>
III. Purity%  
(i) 79.45 %.  
(ii) 5.14 %.  
(iii) Treatment difference is not significant.  
(iv) % purity of the juice.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T₀</th>
<th>T₁</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>77.93</td>
<td>80.98</td>
<td></td>
<td>-2.57 %</td>
</tr>
</tbody>
</table>

Crop → Sugarcane.  
Centre: Tiruvalla (c.f.).  
Object: To find out whether molasses, a by-product of sugar industry, has any effect on the yield and other characters of Sugarcane.

1. BASAL CONDITIONS:  
(i) (a) N.A. (b) Sugarcane. (c) 50 N+43 P+103 K as Parry's alluvial mixture. (ii) Alluvial. (iii) Nil (iv) CO.349 (improved, medium). (v) (a) Digging and removing stubbles. (b) Planting cane sets end to end along furrows. (c) About 1000 sets/ac. (d) and (e) N.A. (vi) January 1956. (vii) Irrigated. (viii) Earthing up about 2 months after planting. (ix) 103.74°. (x) December 1957.

2. TREATMENTS:  
M₀ = Control (untreated).  
M₁ = 5 ton/ac. of molasses.  
Applied in between rows after digging up of soil on 31.7.1956.

3. DESIGN:  
(i) and (ii) 7 cultivators field were selected in the Pampa river factory area.  
(iii) (a) and (b) Varied from cultivator to cultivator. (iv) Yes.

4. GENERAL:  
(i) Satisfactory. (ii) Nil. (iii) Cane weight, estimating brix, pol and purity. (iv) (a) 1954—1956 (not conducted in 1955). (b) and (c) No. (v) No. (vi) Nil. (vii) Experiment was conducted on cultivators' fields.

5. RESULTS:  
(i) 33.33 ton/ac. (ii) 9.22 ton/ac. (iii) Treatment difference is not significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>34.52</td>
<td>32.14</td>
<td></td>
<td>3.48 ton/ac.</td>
</tr>
</tbody>
</table>

Crop → Sugarcane.  
Site → Pampa River Factory Res. Stn., Tiruvalla.  
Object: To find out the best varieties of Sugarcane and its optimum manurial requirements.

1. BASAL CONDITIONS:  
(i) (a) N.A. (b) Sugarcane. (c) 50 lb./ac. of N+40 lb./ac. of P₂O₅+100 lb./ac. of K₂O as Parry's alluvial mixture (ii) (a) Alluvial. (b) Refer soil analysis, Tiruvalla. (iii) 2.12.1954 to 4.12.1954 (iv) (a) Digging the soil; up-rooting stubbles and preparation of furrows. (b) Planting cane sets end to end in furrows. (c) 1300 sets/ac. (d) Furrows 3 spars. (e) — (v) 100 lb./ac. of K₂O as Pot. Sul. (vi) As per treatments. (vii) Irrigated. (viii) 2 hostings, 2 weeding, 1 earthing and 3 proppings. (ix) 120.37°. (x) 29.11.1955 to 4.12.1955.
2. TREATMENTS:

Main-plot treatments:
2 levels of N as A/S and G.N.C. in 2:1 ratio: N₁ = 25 and N₂ = 50 lb./ac.

Sub-plot treatments:
8 varieties: V₁ = CO. 927 (early), V₂ = CO. 349 (medium) V₃ = CO. 449 (medium), V₄ = CO. 876 (late), V₅ = CO. 949 (late), V₆ = CO. 959 (late), V₇ = CO. 969 (late) and V₈ = CO. 898.
Manures applied by dibbling.

3. DESIGN:
(i) Split-plot. (ii) 2 main-plots/block and 8 sub-plots/main-plot. (b) 31' x 240'. (iii) 2. (iv) (a) N.A. (b) 31' x 15' for 1st and 36' x 15' for 2nd replications. (v) Nil. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Nil. (iii) Population count, flowering details, cane yield, disease observation, chemical analysis of cane to determine juice quality by estimating brix, pol and purity. (iv) (a) to (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 16.32 ton/ac. (ii) (a) 2.01 ton/ac. (b) 1.31 ton/ac. (iii) Only V effect is highly significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
<th>V₅</th>
<th>V₆</th>
<th>V₇</th>
<th>V₈</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>N₁</td>
<td>15.36</td>
<td>14.18</td>
<td>18.46</td>
<td>17.36</td>
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<td>N₂</td>
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<td>16.06</td>
<td>17.76</td>
<td>18.31</td>
<td>13.70</td>
<td>16.61</td>
<td>18.06</td>
<td>15.84</td>
</tr>
<tr>
<td>Mean</td>
<td>15.52</td>
<td>15.12</td>
<td>18.11</td>
<td>17.84</td>
<td>14.05</td>
<td>16.11</td>
<td>17.91</td>
<td>15.90</td>
</tr>
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</table>

S.E. of difference of two
1. N marginal means = 0.74 ton/ac.
2. V marginal means = 0.93 ton/ac.
3. V means at the same level of N = 1.31 ton/ac.
4. N means at the same level of V = 1.43 ton/ac.

Crop :- Sugarcane.
Site :- Pampa River Factory Res. Stn., Tiruvalla.
Object :- To find out the best variety of Sugarcane and its optimum manural requirements.

Ref.:- K. 55(22).
Type :- 'MV'.

1. BASAL CONDITIONS :-
(i) (a) Nil. (b) Sugarcane. (c) 50 lb./ac. of N + 40 lb./ac. of P₂O₅ + 100 lb./ac. of K₂O as Parry's alluvial mixture. (ii) (a) Alluvial. (b) Refer soil analysis, Tiruvalla. (iii) 7-3-1955. (iv) (a) Digging the soil, up-rooting stubbles and preparation of furrows. (b) Planting cane setts end to end in furrows. (c) 13000 setts/ac. (d) 3' between furrows. (e) N.A. (v) 100 lb./ac. of K₂O as Pot. Sul. and 100 lb./ac. of P₂O₅ as Rock Phos. dibbled on 4.4.1955. (vi) As per treatments. (vii) Irrigated. (viii) 1 light hoeing, 2 weedings, 1 earthing and trash twist propping. (ix) 120.37'. (x) 20.1.1956.

2. TREATMENTS:
Main-plot treatments:
2 levels of N as A/S and G.N.C. in 2:1 ratio: N₁ = 25 and N₂ = 50 lb./ac.

Sub-plot treatments:
5 varieties: V₁ = CO. 349, V₂ = CO. 449, V₃ = CO. 785, V₄ = CO. 810 (medium) and V₅ = CO. 950 (late).
Manures applied by dibbling on 4.4.1955.

3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/block and 5 sub-plots/main-plot. (b) 50' x 75'. (iii) 2. (iv) (a) and (b) 25' x 15'. (v) Nil. The blocks are generally not compact. (vi) Yes.
4. GENERAL:
(i) Good. (ii) Nil. (iii) Population count, flowering times, cane yield, disease observations, chemical analysis of cane to determine juice quality by estimating brix, pol and purity. (iv) (a), (b) and (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 25.41 ton/ac. (ii) (a) 5.27 ton/ac. (b) 4.67 ton/ac. (iii) Only V effect is significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th></th>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
<th>V₅</th>
<th>Mean</th>
</tr>
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<td>23.57</td>
<td>27.72</td>
<td>26.97</td>
<td>31.99</td>
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</tr>
<tr>
<td>N₂</td>
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<td>25.10</td>
<td>29.38</td>
<td>24.88</td>
<td>25.05</td>
<td>23.80</td>
</tr>
<tr>
<td>Mean</td>
<td>18.22</td>
<td>24.33</td>
<td>28.54</td>
<td>25.92</td>
<td>30.02</td>
<td>25.41</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. N marginal means = 2.36 ton/ac.
3. V means at the same level of N = 4.67 ton/ac.
4. N means at the same level of V = 4.80 ton/ac.


Object: To find out the effect of N applied at different times, in two ratios of A/S and G.N.C., on three varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sugarcane. (c) 50 lb./ac. of N+40 lb./ac. of P₂O₅+100 lb./ac. of K₂O as Parry’s alluvial mixture. (ii) Alluvial; N₁ = 0.183%, P₂O₅ = 0.199%, K₂O = 0.191%. Available K₂O: 12.2 mgm/100 gm., Humus: 1.67%, CaO: 0.25% and H: 6.1. (iii) Nil. (iv) As per treatments. (v) (a) Digging the soil, up-rooting stubbles and preparation of furrows. (b) Planting sugarcane setts end to end in furrows. (c) About 13000 setts/ac. (d) Between furrows 3'. (e) ---. (vi) 1st week of January, 1955. (vii) Irrigated. (viii) Nil. (ix) 120.37. (x) 1st week of January, 1956.

2. TREATMENTS:
All combinations of (1, 2), (3) and (4).
(1) 3 varieties: V₁ = CO, 349, V₂ = CO, 449 and V₃ = CO, 785.
(2) 2 levels of N: N₁ = 50 and N₂ = 75 lb/ac.
(3) 2 times of application: T₁ = At planting and in March. T₂ = 6 weeks after planting and in May.
Matures dibbled at 40 lb/ac. of P₂O₅ and 100 lb/ac. of K₂O applied, as Parry’s alluvial mixture, to all plots.

3. DESIGN:
(i) and (ii) One cultivator’s field by the side of the Pampa river was taken for the experiments. (iii) (a) and (b) R.B.D. with 24 plots/block of size 5 cents and three replications. Dimensions—N.A. (vi) Yes.

4. GENERAL:
(i) Good; crop lodged. (ii) Nil. (iii) Population count, flowering times, sugarcane yield, disease observations and juice analysis to get brix, pol and purity. (iv) (a) Nil. (b) and (c) No. (v) (a) and (b) No. (vi) Nil. (vii) Expt. was conducted in cultivator’s field.

5. RESULTS:
(i) 35.38 ton/ac. (ii) 5.15 ton/ac. (iii) None of the effects is significant. (iv) Av. yield of sugarcane in ton/ac.
Object: - To find out the best time of planting for different Sugarcane varieties.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sugarcane. (c) 100 lb./ac. of N + +0 lb./ac. of P2O5 + 100 lb./ac. of K2O as Perky's loam mixture. (ii) (a) Loam. (b) Refer soil analysis, Tiruvalla. (iii) As per treatments. (iv) (a) Digging and up-rooting stubbles. (b) Planting cane setts end to end in furrows. (c) About 13000 setts/ac. (d) N.A. (e) - (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) Light hoeing after 2 months, 2 weedings, earthing-up and propping. (ix) 108.41". (x) December.

2. TREATMENTS:
   All combinations of (1) and (2).
   (2) 3 dates of planting: D1 = 31.12.1953, D2 = 15.1.1954 and D3 = 15.2.1954.

3. DESIGN:
   (i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 4. (iv) (a) and (b) 1/50 ac. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Population count, growth observations, cane yield and quality of cane by estimating brix, pol and purity. (iv) (a) to (c) No. (v) (a) and (b) Nil. (vi) Nil. (vii) Raw data N.A.

5. RESULTS:
   (i) 27.62 ton/ac. (ii) N.A. (iii) N.A. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>Mean</th>
<th>R1</th>
<th>R2</th>
<th>T1</th>
<th>T2</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>32.44</td>
<td>34.20</td>
<td>31.32</td>
<td>33.28</td>
<td>33.57</td>
<td>35.71</td>
<td>30.93</td>
</tr>
<tr>
<td>V2</td>
<td>37.55</td>
<td>36.19</td>
<td>36.87</td>
<td>36.95</td>
<td>36.78</td>
<td>38.04</td>
<td>35.70</td>
</tr>
<tr>
<td>V3</td>
<td>34.57</td>
<td>36.93</td>
<td>35.95</td>
<td>36.83</td>
<td>35.07</td>
<td>35.86</td>
<td>36.04</td>
</tr>
<tr>
<td>Mean</td>
<td>34.99</td>
<td>35.77</td>
<td>35.38</td>
<td>35.69</td>
<td>35.07</td>
<td></td>
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</tr>
<tr>
<td>T1</td>
<td>35.73</td>
<td>37.34</td>
<td>36.54</td>
<td>37.48</td>
<td>35.60</td>
<td></td>
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<tr>
<td>T2</td>
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<td>34.20</td>
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<td>35.98</td>
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</tr>
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<td>35.98</td>
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<td>34.58</td>
<td>35.57</td>
<td></td>
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</tr>
</tbody>
</table>

S.E. of V marginal mean = 1.05 ton/ac.
S.E. of N, R or T marginal mean = 0.86 ton/ac.
S.E. of body of NxR, RXT or NxT table = 1.21 ton/ac.
S.E. of body of VxN, VxR or VxT table = 1.48 ton/ac.

Crop: - Sugarcane.
Site: - Pampa River Factory Res. Stn., Tiruvalla.
Type: - 'CV'.
Ref: - K. 54(24).
Crop: Sugarcane.
Site: Pampa River Factory Res. Stn., Tiruvalla.  
Object: To find out the best time of planting for different Sugarcane varieties.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sugarcane. (c) 100 lb/ac. of N+40 lb/ac. of P₂O₅+100 lb/ac. of K₂O as Parry's loam mixture. (ii) (a) Loan. (b) Refer soil analysis, Tiruvalla. (iii) 21.11.1955. (iv) (a) Once digging the soil and up-rooting stubbles. (b) Planting cane sets end to end in furrows. (c) 8 cwt/ac. of Parry's loam mixture+1 cwt/ac. of A/S applied thrice. (v) As per treatments. (vi) Light hoeing, 2 weedings, earthing and propping. (ix) 120°. (x) 15 to 24.11.1956.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 varieties: V₁=CO. 319, V₂=CO. 449 and V₃=CO. 785 (all of medium duration).
   (2) 2 methods of planting: M₁=Royoengan and M₂=Normal planting.

3. DESIGN:
   (i) 3 x 2 Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 3. (iv) (a) and (b) 1/25 ac. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. No lodging. (ii) Nil. (iii) Population count, flowering details, juice quality by determining brix, pol and purity and cane yield. (iv) (a) to (c) No. (v) (a) and (b) Nil. (vi) (vii) Nil.

5. RESULTS:
   (i) 26.93 ton/ac. (ii) 5.62 ton/ac. (iii) None of the effects is significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th></th>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
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<td>28.64</td>
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<td>M₂</td>
<td>23.93</td>
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<td>27.20</td>
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<tr>
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<td>22.20</td>
<td>28.73</td>
<td>29.86</td>
<td>26.93</td>
</tr>
</tbody>
</table>

S.E. of V marginal mean = 2.29 ton/ac.
S.E. of N marginal mean = 1.87 ton/ac.
S.E. of body of table = 3.24 ton/ac.

Crop: Sugarcane.
Site: Pampa River Factory Res. Stn., Tiruvalla.  
Object: To find out the optimum spacing, the effect of earthing up and the optimum N requirement for Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sugarcane. (c) 10 lb/ac. of N + 40 lb/ac. of P₂O₅ + 100 lb/ac. of K₂O as Parry's loam mixture. (ii) (a) Loan. (b) Refer soil analysis, Tiruvalla. (iii) 21.11.1954. (iv) (a) Digging the soil and up-rooting stubbles. (b) Planting cane sets end to end in furrows. (c) About 13000 sets/ac. (d) and (e) =, (v) Nil. (vi) CO. 349. (improved, medium). (vii) Irrigated. (viii) Light hoeing, 2 weedings and earthing up in last week of May. (ix) 108.41°. (x) 25.11.1954 to 3.12.1954.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 4 spacings between rows: S₁=2', S₂=3', S₃=3½' and S₄=4'.
   (2) 2 cultural operations: E₀=No earthing and E₁=Earthing up in last week of May.
   (3) 2 levels of N: N₁=100 and N₂=150 lb/ac. of N.

N applied as A/S and G.N.C. in 1 : 1 ratio in two doses, at planting and one month after planting as top dressing.
3. DESIGN:
(i) Factor in R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) and (b) 36'×26'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Juice quality by determining brix, pol and purity and cane yield. (iv) (a) to (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 27.07 ton/ac. (ii) 3.00 ton/ac. (iii) Only N effect is highly significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th></th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
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<tr>
<td>E_1</td>
<td>35.12</td>
<td>29.15</td>
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<td>36.19</td>
<td>35.20</td>
<td>27.51</td>
<td>29.13</td>
</tr>
<tr>
<td>E_2</td>
<td>32.14</td>
<td>26.17</td>
<td>37.89</td>
<td>36.29</td>
<td>35.20</td>
<td>27.51</td>
<td>29.13</td>
</tr>
</tbody>
</table>

S.E. of S marginal mean = 0.75 ton/ac.
S.E. of N or E marginal mean = 0.53 ton/ac.
S.E. of body of N×E table = 0.75 ton/ac.
S.E. of body of E×S or N×S table = 1.06 ton/ac.

Crop :- Sugarcane.
Site :- Pampa River Factory Res. Stn., Tiruvalla

Object:-To find out the effect of irrigation on the yield of sugarcane.

1. BASAL CONDITIONS :
(i) (a) Nil. (b) Sugarcane. (c) 100 lb./ac. of N+40 lb./ac. of P_2O_5+100 lb./ac. of K_2O as Parry's loam mixture. (ii) (a) Loam. (b) Refer soil analysis, Tiruvalla. (iii) 11.1.1956. (iv) (a) Digging and up-rooting stubbles. (b) Planting cane setts end to end in furrows. (c) About 13000 setts/ac. (d) and (e) N.A. (v) Nil. (vi) CO. 449 (medium, improved). (vii) As per treatments. (viii) Slight hoeing, 2 weedings, 1 earthing-up and propping. (ix) 103.74'. (x) 12 months after planting.

2. TREATMENTS:
I_0 =Control (No irrigation).
I_1 =Irrigating once in March.
I_2 =Irrigating twice in Feb. and March.
I_3 =Irrigating thrice in Feb., March and April.
I_4 =Irrigating every fortnight up to monsoon.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 2. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Cane yield and quality of cane by estimating brix, pol and purity. (iv) (a) Nil. (b) and (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 29.23 ton/ac. (ii) 3.51 ton/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in ton/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>I_0</th>
<th>I_1</th>
<th>I_2</th>
<th>I_3</th>
<th>I_4</th>
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<tr>
<td>Av. yield</td>
<td>26.50</td>
<td>29.78</td>
<td>22.96</td>
<td>22.61</td>
<td>35.28</td>
</tr>
</tbody>
</table>
S.E./mean = 2.48 ton/ac.
Crop: Sugar cane.
Centre: Tiruvalla (c.f).

Object: To find out the effect of soil application of 2, 4-D on the quality and yield of Sugar cane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sugar cane. (c) 50 lb./ac. of N + 40 lb./ac. of P₂O₅ + 100 lb./ac. of K₂O applied as Parry's alluvial mixture. (ii) Alluvial soil; N: 0.183, P: 0.199, K: 0.193, available K₂O: 12.2 mg/mg/100 gm. Humus: 1.67, CaO: 0.25 and pH: 6.1. (iii) N.A. (iv) CO. 349 (improved, medium). (v) (a) Digging and up-rooting stubble. (b) Planting cane setts and to end in furrows. (c) 13000 setts/ac. (d) and (e) N.A. (vi) 2.2.1956 to 10.2.1956. (vii) Irrigated. (viii) Nil. (ix) 103.74'. (x) 7.2.1957 to 8.2.1957.

2. TREATMENTS:
   M₀ = Control (untreated) and M₁ = 2, 4-D applied to the soil at the rate of 3 lb./ac. (fernoxone) mixed with water on 5.1J.l956.

3. DESIGN:
   (i) and (ii) 4 cultivators' fields in Pampa river factory area were selected for this experiment. (iii) (a) and (b) Varied from cultivator to cultivator. (iv) Yes.

4. GENERAL:
   (i) Satisfactory, lodging prevented by propping. (ii) Nil. (iii) Cane yield, estimating juice quality by brix, pol and purity. (iv) (a), (b) and (c) No. (v) (a) and (b) Nil. (vi) Nil. (vii) Expt. was conducted in cultivators' fields.

5. RESULTS:
   (i) 34.68 ton/ac. (ii) 4.06 ton/ac. (iii) Treatment difference is not significant. (iv) Av. yield of sugar cane in ton/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M₀</th>
<th>M₁</th>
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<tr>
<td>Av. yield</td>
<td>36.79</td>
<td>32.56</td>
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<tr>
<td>S.E./mean</td>
<td>2.03 ton/ac.</td>
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Crop: Cotton.

Object: To study the effect of A/S and C/N singly and with a basal dose on Cotton.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 3 ton/ac. of C.M. and 20 lb./ac. of N as A/S. (ii) (a) Laterite soil. (b) Refer soil analysis, Pattambi. (iii) 21.6.1954. (iv) (a) Ploughing four times and forming ridges. (b) N.A. (c) 15 lb./ac. (d) 2'x1'. (e) N.A. (v) Nil. (vi) Sealed mound terr (late). (vii) Unirrigated. (viii) Weeding twice and earthing-up with spade. (ix) 63.39'. (x) 24.11.1954 to 29.1.1955.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 5 doses of N as top dressing: N₀=0, N₁=40 lb./ac. of N as A/S, N₂=60 lb./ac. of N as A/S, N₃=40 lb./ac. of N as C/N and N₄=60 lb./ac. of N as C/N.
   (2) 2 levels of B.D.: M₀=No B.D. and M₁=1 ton/ac. of C.M. + 30 lb./ac. of P₂O₅ as Super - 50 lb./ac. of K₂O as Pot. Sul. + 500 lb./ac. of lime.

3. DESIGN:
   (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) and (b) 20'x10'. (v) Nil. (vi) Yes.

4. GENERAL:
   (a) Stand uneven due to heavy rains in the initial stages of crop. (ii) Heavy incidence of secondary infection of black-arm. (iii) Yield of kapas and fibre. (iv) (a) 1952–1954. (b) No. (c) N.A. (d) (a) and (b) Nil. (v) Nil. (vi) Nil. (vii) The season was not favourable for cotton. Conducted by cotton breeding section.

5. RESULTS:
   (i) 103.3 lb./ac. (ii) 89.6 lb./ac. (iii) Effect of N is significant and M is highly significant. Interaction is not significant. (iv) Av. yield of Super in lb./ac.
Crop: Cotton.  
Centre: Palghat (c.f.).  
Object: To study the response of Cotton to levels of N, P and K applied individually and in combinations.

1. BASAL CONDITIONS to 3. DESIGN:
   Same as in expt. no. 111 on page 79 on paddy crop.

4. GENERAL:
   (i) Satisfactory.  (ii) NIL.  (iii) Cotton yield.  (iv) (a) to (c) NIL.  (v) (a) and (b) NIL.  (vi) NIL.  (vii) The Expt. was conducted on cultivator’s field.

5. RESULTS:
   Treatment | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Mean
   Av. yield | 411 | 404 | 453 | 543 | 428 | 543 | 569 | 625
   G.M. = 507 lb./ac.; S.E./mean = 13.06 lb./ac.; No. of trials = 6.

Crop: Cotton.  
Centre: Palghat (c.f.).  
Object: To investigate the relative efficiency of different nitrogenous fertilizers at different levels.

1. BASAL CONDITIONS to 3. DESIGN:
   Same as in expt. no. 121 on page 83, 84 on paddy crop.

4. GENERAL:
   (i) Satisfactory.  (ii) NIL.  (iii) Cotton yield.  (iv) (a) to (c) NIL.  (v) (a) and (b) NIL.  (vi) and (vii) NIL.

5. RESULTS:
   Treatment | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Mean
   Av. yield | 90.5 | 123.4 | 104.6 | 148.1 | 156.3 | 123.4 | 181.0
   G.M. = 141. lb./ac.; S.E./mean = 12.22 lb./ac.; No. of trials = 4.

Crop: Cotton.  
Object: To study the effect of spacing on the yield of Cotton.
1. **BASEL CONDITIONS:**

   (i) (a) Paddy and Cotton. (b) Paddy. (c) 3 ton/ac. of C.M. and 20 lb/ac. of N as A/S. (ii) (a) Laterite. (b) Refer soil analysis, Pattambi. (iii) 16.61954. (iv) (a) 4 ploughings. (b) N.A. (c) N.A. (d) As per treatments. (e) N.A. (v) 1 ton/ac. of C.M., 30 lb/ac. of P2O5 as Super and 50 lb/ac. of K2O as Pot. Sul. and top dressing with 60 lb/ac. of N as A/S. (vi) Sea island, montserrat (late). (vii) Unirrigated. (viii) Weeding twice and earthing up with spade. (ix) 65.39". (x) 21.11.1954 to 29.1.1955.

2. **TREATMENTS:**

   **Main-plot treatments:**

   - 3 row to row spacings: C1 = 11', C2 = 2' and C3 = 21'.

   **Sub-plot treatments:**

   - 3 plant to plant spacings: S1 = 6', S2 = 9' and S3 = 12'.

3. **DESIGN:**

   (i) Split-plot. (ii) (a) 3 main-plots/block ; 3 sub-plots/main-plot. (b) N.A. (iii) S. (iv) (a) Main-plot: 0.86 cent., Sub-plot: 0.43 cent. Dimensions N.A. (b) Main-plot: 15'X36', Sub-plot: 15'X12'. (v) Two rows on either side. (vi) Yes.

4. **GENERAL:**


5. **RESULTS:**

   (i) 155.2 lb/ac. (ii) (a) 124.6 lb/ac. (b) 63.2 lb/ac. (iii) None of the effects is significant. (iv) Av. yield of kapas in lb/ac.

<table>
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<th>C3</th>
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<td>119.2</td>
<td>184.8</td>
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<tr>
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<td>159.7</td>
<td>123.4</td>
<td>198.4</td>
<td>160.5</td>
</tr>
<tr>
<td>S3</td>
<td>222.4</td>
<td>111.0</td>
<td>129.8</td>
<td>147.8</td>
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<tr>
<td>Mean</td>
<td>176.6</td>
<td>117.9</td>
<td>171.0</td>
<td>155.2</td>
</tr>
</tbody>
</table>

S.E. of difference of two

1. C marginal means = 45.5 lb/ac.
2. S marginal means = 23.1 lb/ac.
3. S means at the same level of C = 40.1 lb/ac.
4. C means at the same level of S = 56.1 lb/ac.

---

**Crop:** Tobacco.

**Site:** Tobacco Res. Stn., Kanhangad.

**Object:** To study the effect of organic and inorganic manures and fertilizers on yield and quality of Tobacco.

1. **BASEL CONDITIONS:**

   (i) (a) Tobacco—Paddy. (b) Paddy. (c) 200 lb/ac. of wood ash. (ii) (a) Sandy (coastal) with varying admixture of clay. (b) N.A. (iii) End of Aug. 1958/3rd and 4th December, 1958. (iv) (a) Three ploughings with desi plough. Fureows dug 9" deep and 3' apart with spade. (b) Transplanting in line. (c) —. (d) 2' apart. (e) One seedling/hole. (v) 10 ton/ac. of F.Y.M. before planting. 5 ton/ac. of F.Y.M. one month after transplanting applied for mulching purpose. (vi) Fuman (local). (vii) Irrigated. (viii) 2 hoeings, 2 weedings and 2 earthings. (ix) Nil. (x) 4.3.1959.

2. **TREATMENTS:**

   All combinations of (1) and (2) + one extra treatment

   (I) 10 manurial combinations: M1 = Fish manure at 210 lb/ac. of N, M2 = G.M. at 210 lb/ac. of N, M3 = C.M. at 210 lb/ac. of N, M4 = A/S at 210 lb/ac. of N, M5 = M1 + M2 + M3 + M4, M6 = M1 + M2 + M3 + M4, M7 = M1 + M2 + M4, M8 = M1 + M2 + M3 + M4, M9 = M1 + M2 + M3 + M4, M10 = M1 + M2 + M3 + M4.
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(2) 2 levels of \( P_0 \) as Super: \( P_0 = 0 \) and \( P_0 = 50 \) lb./ac.

Extra treatment: \( T = \) Fish manure at 210 lb./ac. of N at A/S at 40 lb./ac. of N.

Fish manure top dressed in 3 equal doses 15, 45 and 75 days after planting. G.M. and C.M. applied in furrows just before transplanting. A/S applied in 5 equal doses 15, 30, 45, 60 and 75 days after planting. Super applied as B.D. before planting.

3. DESIGN:
(i) R.B.D. (ii) (a) 21. (b) N.A. (iii) 4. (iv) (a) and (b) 21\'x15\'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Healthy. (ii) Grass-hopper attack in the seedling stage, crop sprayed with 0.01% of Folidol by means of a pneumatic sprayer twice at interval of 15 days. (iii) Yield of cured leaf. (iv) (a) 1958—contd. (b) Nil. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1604 lb./ac. (ii) 236 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of cured leaf in lb./ac.

\[
\begin{array}{cccccccccc}
M_1 & M_2 & M_3 & M_4 & M_5 & M_6 & M_7 & M_8 & M_9 & M_{10} & \text{Mean} \\
\hline
P_0 & 1490 & 1749 & 1798 & 1448 & 1542 & 1493 & 1611 & 1656 & 1594 & 1646 & 1603 \\
P_1 & 1867 & 1621 & 1611 & 1514 & 1556 & 1570 & 1570 & 1563 & 1528 & 1690 & 1609 \\
\hline
\text{Mean} & 1678 & 1685 & 1704 & 1481 & 1549 & 1532 & 1590 & 1609 & 1561 & 1668 & 1606 \\
\end{array}
\]

S.E. of marginal mean of \( M \) = 83 lb./ac.
S.E. of marginal mean of \( P \) = 37 lb./ac.
S.E. of body of table = 118 lb./ac.

Crop : Tobacco.
Site : Tobacco Res. Stn., Kanhangad.

Object : To study the effect of split application of nitrogen as fish manure at different levels.

1. BASAL CONDITIONS:
(i) (a) Tobacco—Paddy. (b) Paddy. (c) 200 lb./ac. of wood ash. (ii) (a) Coastal sandy with varying admixture of clay. (b) N.A. (iii) End of Aug. 1958/23 and 24.12.1958. (iv) (a) 3 ploughings with deep plough. Furrows dug 9" deep, 8" wide and 3' apart. (b) Transplanted in lines. (c)—. (d) 2' plant to plant. (e) One seedling/hole. (f) 10 tons of F.Y.M. before planting +5 tons of F.Y.M. one month after planting as a mulch. (vi) Passion (local). (vii) Irrigated. (viii) 2 hoeings, 3 weedicings and 2 earthings. (ix) Nil. (x) 4.3.1959.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 levels of \( N \) as fish manure: \( N_1 = 180 \), \( N_4 = 210 \) and \( N_8 = 240 \) lb./ac.
(2) 3 applications of \( N \) : \( T_1 \) = Full dose at the time of planting, \( T_2 \) = Half at planting + half 15 days after planting and \( T_3 \) = 3 equal doses at planting, 15 days and 30 days after planting.

3. DESIGN:
(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 21\'x15\'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Healthy. (ii) Grass-hopper attack in the seedling stage, crop sprayed with 0.01% Folidol by means of a pneumatic sprayer twice at interval of 15 days. (iii) Weight of cured leaf, height, no. of leaves and leaf area. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1897 lb./ac. (ii) 144 lb./ac. (iii) \( N \) is highly significant, \( T \) is significant while interaction is not significant. (iv) Av. yield of cured leaf in lb./ac.
Crop:- Tobacco (Rah).  
Site:- Tobacco Res. Stn., Kanhangad.  
Ref:- K. §3(3).  
Type:- 'M'.

Object:- To study the effect of different doses and times of application of fish manure on the yield of chewing Tobacco.

1. BASAL CONDITIONS:
   (i) (a) Paddy—tobacco—paddy.  
      (b) Faddy.  
      (c) 50 lb./ac. of wood ash.  
      (ii) (a) Iltirol sand.  
      (b) Refer soil analysis, Kanhangad.  
      (iii) 12.11.1959.  
      (iv) (a) Digging, levelling, farrow and ridge making.  
      (b) Transplanting.  
      (c) 42 plants/plot.  
      (d) 15 C.L.(ac. of loose box C.M. filled in furrows 15 days before transplanting up to 6" and 2" layer of soil spread over it; 3 C.L./ac. loose box C.M. applied as much 15 days after transplanting.  
      (vi) Penman (local).  
      (vii) Irrigated.  
      (viii) 3 hoeings—weeding, 2 earthings, topping and suckering once in a week.  
      (ix) Nil.  
      (x) 19.2.1960.

2. TREATMENTS:
   Main-plot treatments:  
   3 levels of fish manure:  
   L₁=4000, L₂=6000 and L₃=8000 lb./ac.  
   Sub-plot treatments:  
   3 times of application:  
   T₁=3 equal doses 15, 45 and 75 days after transplanting.  
   T₂=4 equal doses 15, 45, 60 and 75 days after transplanting and  
   T₃=5 equal doses 15, 30, 45, 60 and 75 days after transplanting.

3. DESIGN:
   (i) Split-plot.  
   (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot.  
   (b) N.A.  
   (iii) 6.  
   (iv) (a) 23'×17'  
   (b) N.A.  
   (v) N.A.  
   (vi) Yes.

4. GENERAL:
   (i) Good.  
   (ii) Light incidence of grass hopper, spraying Folidol of 0.01 strength.  
   (iii) Relative growth of G.L., yield of 1st grade and 2nd grade cured chewing tobacco.  
   (b) Nil.  
   (c) Nil.  
   (d) N.A.  
   (e) Nil.  
   (f) Nil.  
   (vii) Nil.

5. RESULTS:
   (i) 2090 lb./ac.  
   (ii) 208.8 lb./ac.  
   (b) 239.2 lb./ac.  
   (iii) None of the effects is significant.  
   (iv) Ave. yield of G.L. in lb./ac.

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<table>
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Mean: 2012 2039 2170 2090
S.E. of difference of two
1. L marginal means = 49.2 lb./ac.
2. T marginal means = 56.4 lb./ac.
3. T means at the same level of L = 138.0 lb./ac.
4. L means at the same level of T = 132.4 lb./ac.

Crop: Tobacco (Rabi).
Site: Tobacco Res. Stn., Kanhangad.
Ref: K. 59(4).
Type: ‘M’.

Object: To find out the effect of different doses of N, P and K for Tobacco crop.

1. BASAL CONDITIONS:
   (i) (a) Paddy after tobacco, (c) Nil, (ii) (a) Littoral and, (b) N.A. (iii) 12.11.1959. (iv) (a) Digging, levelling and making furrows and ridges. (b) Transplanting. (c) (d) 2.5’x3’. (e) 1. (v) 15 C.L./ac. of loose box, C.M. applied 15 days before transplanting up to 6” and 2” layer of soil spread over it. 5 C.L./ac. of loose box C.M. applied as mulch 30 days after transplanting; 4000 lb./ac. of fish and 1 cwt. of A/S applied in three equal doses 15, 30 and 45 days after transplanting. (vi) Pasam (local). (vii) Irrigated. (viii) 3 hoings, 3 weedings, 2 earthings and suckering once in a week. (ix) Nil. (x) 15.2.1960.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N as A/S: N₀ =0, N₁ =40 and N₂ =80 lb./ac.
   (2) 3 levels of P₂O₅ as Supri: P₀ =0, P₁ =40 and P₂ =80 lb./ac.
   (3) 3 levels of K₂O as Pot. Sul.: K₀ =0, K₁ =40 and K₂ =80 lb./ac.
   A/S applied in four equal doses, P₂O₅ 15 days before transplanting and K₂O in two equal doses 15 and 30 days after transplanting.

3. DESIGN:
   (i) 3² Confounded. (ii) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 23’x17’. (b) 21’x15’. (c) N.A. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Light attack of grass-hoppers. Spraying Folidol of 0.01 strength. (iii) Height, no. of leaves, leaf area, 1st grade and 2nd grade cured leaves and green leaf yield. (iv) (a) 1959—1963. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1008 lb./ac. (ii) 79.63 lb./ac. (iii) Main effect of N and interaction NP are highly significant. Effect of P is significant. (iv) Av. yield of G.L. in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
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S.E. of any marginal mean = 32.69 lb./ac.
S.E. of body of any table = 56.31 lb./ac.
Crop: Tobacco.  
Site: Tobacco Res. Stn., Kanhangad.  
Ref: K. 58(5).  
Type: 'C'.

Object: To study the effect of spacing and topping on the yield of Tobacco.

1. BASAL CONDITIONS:
   (i) (a) Tobacco—Paddy. (b) Paddy. (c) 200 lb./ac. of wood ash. (ii) (a) Coastal sandy with varying admixture of clay. (b) N.A. (iii) End of Aug. 1958/28th and 6th December. (iv) (a) Three ploughings with deep plough and furrows dug at 9' deep 8' wide and three feet apart with space. (b) Transplanted. (c) — (d) As per treatments. (e) N.A. (v) 10 ton of F.Y.M. before planting and 5 tons of F.Y.M. one month after transplanting as mulch. (vi) Panun (local). (vii) Irrigated. (viii) 2 hoeings, 3 weedings and 2 earthings. (ix) Nil. (x) 10.3.1959.

2. TREATMENTS:
   All combinations of (1) and (2)
   (1) 3 spacings: S1=18'x3', S2=22'x3' and S3=30'x3'.
   (2) 3 levels of topping: L1=11, L2=13 and L3=15 leaves.

3. DESIGN:
   (i) R.B.D. (ii) (a) 9. (b) N.A. (iii) (a) 4. (b) N.A. (iv) 21'x3'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Healthy. (ii) Grass-hopper attack in the seedling stage crop sprayed with 0.01% of Feldol by means of a pneumatic sprayer twice at interval of 15 days. (iii) Weight, no. of leaves and leaf yield. (iv) 1958—contd. (b) No. (c) Nil. (v) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 20.90 lb./ac. (ii) 250 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of cured leaf in lb./ac.

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S.E. of any marginal mean = 72 lb./ac.
S.E. of body of table = 125 lb./ac.
3. DESIGN:
(i) Split-plot. (ii) (a) 9. (b) N.A. (iii) 6. (iv) (a) 32'×14'. (b) 30'×12'. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Light grasshopper attack. Foliar spray of 0.01% strength sprayed. (iii) Cured leaf yield. (iv) (a) No. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 219.6 lb/ac. (ii) (a) 31.7 lb/ac. (b) 219.6 lb/ac. (iii) None of the effects is significant. (iv) Av. yield of cured leaves in lb/ac.

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S.E. of difference of two
1. S marginal means =73.5 lb/ac.
2. L marginal means =61.2 lb/ac.
3. L means at the same level of S =149.9 lb/ac.
4. S means at the same level of L =160.5 lb/ac.

---

Crop :- Ginger.  
Site :- Agri Res. Stn., Ambalavayal.  
Type :- 'M'.

Object :- To determine the optimum dose of N and P for getting higher yield of Ginger.

1. BASAL CONDITIONS:
(i) (a), (b) and (c) Nil. (ii) (a) Brown to red clayey soil. (b) Refer soil analysis, Ambalavayal. (iii) 17.5.1955. (iv) (a) Three ploughings and forming seed beds. (b) Sown in pits and covered with soil. (c) N.A. (d) 9'×9'. (e) N.A. (v) 20 lbs/ac. of powdered C.M. broadcast at planting. (vi) Local. (vii) Unirrigated. (viii) Three weeding and earthing up twice. (ix) 82°F. (x) 17.1.1955.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 levels of N as A/S : N₀=0, N₁=50 and N₂=100 lb/ac.
(2) 3 levels of P₂O₅ as Super : P₀=0, P₁=15 and P₂=30 lb/ac.
N applied one month after planting as top dressing and P₂O₅ applied one month before planting as B.D.

3. DESIGN:
(i) R.B.D. (ii) (a) and (b) N.A. (iii) 4. (iv) (a) 2'×16'. (b) 19.5'×12'. (v) N.A. (vi) Yes.

4. GENERAL:
(ii) N.A. (ii) Attack of leaf spot. 1.0% Bordeaux mixture was sprayed. (iii) Yield of the rhizome was recorded at the time of harvest. (iv) (a) and (b) as 1. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 17449 lb/ac. (ii) 1857 lb/ac. (iii) None of the effects is significant. (iv) Av. yield of tuber in lb/ac.
Object:—To determine the optimum dose of N and P for getting higher yield of Ginger.

1. BASEL CONDITIONS
   (i) (a), (b) and (c) Nil.  (ii) (a) Brown to red clayey soil.  (b) Refer soil analysis, Ambalavayal.
   (iii) 4.5.1956.  (iv) (a) Ploughing thrice and forming beds.  (b) Sown in pits.  (c) N.A.  (d) 9"x9".
   (e) N.A.  (v) 10 tons/ac. of powdered G.M. applied as B.D. at the time of planting.  (vi) Local.  (vii) Un-
   irrigated.  (viii) Three weeding at an interval of 45 days each followed by a mulching with G.L. at
   2000 lb/ac. and earthing up.  (ix) 84.00°.  (x) 24.1.1957.

2. TREATMENTS :
   All combinations of (1) and (2)
   (1) 4 levels of N as A/S: N₀=0, N₁=50, N₂=100 and N₃=150 lb/ac.
   (2) 3 levels of P₀ as Super: P₀=0, P₁=45 and P₂=90 lb/ac.
   N top dressed one month after planting and P₀ as B.D. one month before planting.

3. DESIGN :
   (i) Fact in R.B.D.  (ii) 12 3
   (ii) 9 3
   (iv) (a) and (b) 12'x19.5'.  (v) Nil.  (vi) Yes.

4. GENERAL :
   (i) N.A.  (ii) Light attack of leaf spot—1% Bordeaux mixture sprayed.  (iii) Yield of rhizomes.  (iv) (a)
   1955—N.A.  (b) No.  (c) N.A.  (v) (a) and (b) N.A.  (vi) and (vii) Nil.

5. RESULTS :
   (i) 23808 lb/ac.  (ii) 2678 lb/ac.  (iii) Effect of N alone is significant.  (iv) Av. yield of rhizomes in lb/ac.

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S.E. of N marginal mean = 773 lb/ac.
S.E. of P marginal mean = 670 lb/ac.
S.E. of body of table = 1350 lb/ac.

Object:—To determine the optimum dose of N and P for getting higher yield of Ginger.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) Nil. (ii) (a) Loamy to red clayey soil. (b) Refer soil analysis, Ambalavayal. (iii) 18.4.1957. (iv) (a) Three ploughings and making beds. (b) Planting in pits. (c) 1200 lb./ac. (d) 9' x 9'. (e) N.A. (v) Crop mulched with green leaf at 20,000 lb./ac. 10 ton/ac. of powdered C.M. applied at planting. (vi) Local. (vii) Unirrigated. (viii) Weeding and earthing up. Mulching with G.L. at 20000 lb./ac. (ix) 95.10'. (x) 16.1.1958.

2. TREATMENTS:
Same as in expt no. 56(2) on page 209.

3. DESIGN:
(i) 4x3 Factor. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 12' x 19.5'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Light incidence of leaf spot—1% Bordeaux mixture sprayed. (iii) Yield of rhizomes. (iv) (a) N.A. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 13407 lb./ac. (ii) 2018 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of rhizomes in lb./ac.

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S.E. of N marginal mean = 583 lb./ac.
S.E. of F marginal mean = 504 lb./ac.
S.E. of body of table = 1009 lb./ac.

Crop := Ginger.
Ref := 58(4).
Type := ‘M’.

Object := To determine the optimum dose of N and P for getting higher yield of Ginger.
BASAL CONDITIONS:

(i) (a) to (c) Nil. (ii) (a) Brown to red clayey soil. (b) Refer soil analysis, Ambalavayal. (iii) 2.5.1955. (iv) (a) Ploughing thrice and making beds. (b) Sown in pits and covered with soil. (c) 1200 lb./ac. (d) 9"x9". (e) N.A. (v) 20 ton of powdered C.M. applied at the time of planting. (vi) Local. (vii) Unirrigated. (viii) Three weedings and 2 earthing. (ix) 82.50'. (x) 16.1.1956.

TREATMENTS:

All combinations of (1) and (2)

(1) 3 times of mulching: T1=At planting, T2=At planting±30 days after planting and T3=At planting+60 days after planting.

(2) 2 sources of mulch: S1=G.L. and S2=straw each at 5000 lb./ac.

DESIGN:

(i) 3x2 fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 8"x22'. (b) 6"x19.5'. (v) Nil. (vi) Yes.

GENERAL:

(i) N.A. (ii) Medium infection of leaf spot—1% Bordeaux mixture sprayed. (iii) Yield of rhizomes. (iv) (a) 1955—N.A. (b)—. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

RESULTS:

(i) 18864 lb./ac. (ii) 1797 lb./ac. (iii) T effect alone is highly significant. (iv) Av. yield in lb./ac.

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S.E. of T marginal mean = 635 lb./ac.
S.E. of S marginal mean = 519 lb./ac.
S.E. of body of table = 900 lb./ac.
Crop: Ginger.  

Object: To find out the optimum manurial requirement of Ginger crop.

1. BASAL CONDITIONS:
   (i) (a) Nil (b) and (c) Nil. (ii) (a) Brown to red clayey soil. (b) Refer soil analysis, Ambalavayal.  
   (iii) 28.4.1959. (iv) (a) Ploughing. (b) to (e) N.A. (v) 5 ton/ac. of C.M. applied at the time of planting.  
   (ix) About 80". (x) 5.1.1960.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N as A/S: N₀ = 0, N₁ = 50 and N₂ = 100 lb./ac.
   (2) 3 levels of P₂O₅ as Super: P₀ = 0, P₁ = 45 and P₂ = 90 lb./ac.
   (3) 3 levels of K₂O as Pot. Sulf: K₀ = 0, K₁ = 60 and K₂ = 120 lb./ac.  
   Super applied one month before planting while A/S and Pot. Sul. applied one and a half months after planting.

3. DESIGN:
   (i) 3² partially confounding NPK interaction. (ii) (a) 9. (b) 66'x72' (iii) 2. (iv) (a) 22'x8'. (b) 29'x6'. (v) One foot all round the plot. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Yield and tiller count. (iv) (a) 1959—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) N.A. (ii) 1958 lb./ac. (iii) Interaction N x P and N x P x K are significant. Other effects are not significant. (iv) % increase in yield over the control

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Details N.A.

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Crop: Ginger.  
Site: Ginger Res. Stn., Thodupuzha.

Object: To find out the optimum manurial requirement of Ginger.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil (ii) (a) Laterite soil. (b) Refer soil analysis, Thodupuzha. (iii) 4.7.1959. (iv) Digging, levelling, preparing beds and then digging gits. (b) Dibbling. (c) 1000 lb./ac. (d) 9\" x 9\". (e) N.A. (v) 10 C.L./ac. of C.M. and 3000 lb./ac. of G.L. given as B.D. Five C.L. of C.M. given at planting and the other five 45 days after planting. Mulching with G.L. in two doses, one at planting and the second 45 days after planting. (vi) Local (medium). (vii) Unirrigated. (viii) Weeding 3 times after planting. Earthing up after 45 days of planting. (ix) 167.2". (x) 29.1.1960.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N as A/S: N₀ = 0, N₁ = 50 and N₂ = 100 lb./ac.
   (2) 3 levels of P₂O₅ as Super: P₀ = 0, P₁ = 45 and P₂ = 60 lb./ac.
   (3) 3 levels of K₂O as Pot. Sul.: K₀ = 0, K₁ = 60 and K₂ = 120 lb./ac.  
   Super applied one month before planting. Half the quantity of A/S applied at planting and the other half along with full dose of Pot. Sul. applied 45 days after planting.
3. DESIGN:
(i) 3' confld. (ii) (a) 9 plots/block ; 3 blocks/repllication. (b) N.A. (iii) 1. (iv) (a) 14'x26'. (b) 12'x24' (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Slight attack of leaf spot and shoot borer—D.D.T. and Cupravit sprayed. (iii) No. of tillers/plant, no. of modes, length of shoot, length of leaves and rhizomes yield. (iv) (a) 1959—N.A. (b) No. (c) Nil. (v) (a) (ii) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 3515 lb./ac. (ii) 1165 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of rhizomes in lb./ac.

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S.E. of any marginal mean = 388.3 lb./ac.
S.E. of body of any table = 672.6 lb./ac.

Cop := Ginger.
Site := Ginger Res. Stn., Thodupuzha.
Object := To find out the effect of different forms of N on Ginger crop.

Ref :- K. 59(8).
Type := 'M'.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) Nil. (ii) (a) Laterite soil. (b) Refer soil analysis, Thodupuzha. (iii) 19.6, 1959.
(iv) (a) Digging, levelling, preparing beds and then digging. (b) Dibbling. (c) 1000 lb./ac. (d) 9'x9'.
(a) —. (v) 5 C.L. of G.M. and 5000 lb./ac. of G.L. were applied in two equal doses, at the time of planting and the remaining 45 days after planting. Manures were given according to treatments over the basal dose. (vi) Local variety (medium). (vii) Unirrigated. (viii) Three weeding. (ix) 167.2'.

2. TREATMENTS:
All combinations of (1) and (2)+2 controls
(1) 2 doses of N : N<sub>1</sub>=100 and N<sub>2</sub>=120 lb./ac.
(2) 6 sources of N : S<sub>1</sub>=G.L., S<sub>2</sub>=Cow dung, S<sub>3</sub>=A/S, S<sub>4</sub>=G.L.+A/S, S<sub>5</sub>=G.L.+cow dung and S<sub>6</sub>=Cow dung+A/S.
In treatments S<sub>1</sub>, S<sub>2</sub> and S<sub>3</sub>N has been applied in 1:1 proportion. Manures were applied in two equal doses, half at planting and the other half 45 days after planting.

3. DESIGN:
(i) R.B.D. (ii) (a) 14. (b) 52'x98'. (iii) 4. (iv) (a) 14'x26'. (b) 12'x24'. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal growth. (ii) Attack of shoot borer—D.D.T. sprayed. (iii) Mean no. of tillers per plant, mean no. of modes, length of shoot and yield of rhizomes. (iv) (a) N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.
5. RESULTS:
(i) 7857 lb/ac. (ii) 1058 lb/ac. (iii) None of the effects and interaction is significant. (iv) Av. yield of rhizomes in lb/ac.

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<td>7165</td>
<td>8555</td>
<td>7742</td>
<td>7307</td>
<td>7849</td>
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<tr>
<td>N2</td>
<td>7874</td>
<td>8338</td>
<td>7288</td>
<td>7988</td>
<td>8886</td>
<td>7156</td>
<td>7922</td>
</tr>
<tr>
<td>Mean</td>
<td>8087</td>
<td>8182</td>
<td>7227</td>
<td>8272</td>
<td>8314</td>
<td>7232</td>
<td>7886</td>
</tr>
</tbody>
</table>

S.E. of S marginal mean = 374.1 lb/ac.
S.E. of N marginal mean = 215.9 lb/ac.
S.E. of control mean = 374.1 lb/ac.
S.E. of control vs other means = 402.0 lb/ac.
S.E. of body of N x S table = 529.0 lb/ac.

Crop: Ginger.
Site: Ginger Res. Stn., Thodupuzha.

Object: To find out the effect of different combinations of manures on the growth of the plant, tillering and development of rhizomes of Ginger.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Nil. (c) Nil. (ii) (a) Loamy soil. (b) Refer soil analysis, Thodupuzha. (iii) 15.5.1958.
(iv) (a) One digging, preparing seed beds of size 6' X 12' X 9'. (b) Planting seed bits in lines. (c) 1000 lb/ac
(d) 9' X 9'. (e) N.A. (v) C.M. at 10 C.L./ac. at the planting of rhizomes in pits. (vi) Local (medium).

2. TREATMENTS:
All combinations of (1) and (2) + a control (no manure)
(1) 2 doses of N: N1 = 80 and N2 = 100 lb/ac.
(2) 6 sources of N: S1 = G.L., S2 = A/S, S3 = Cow dung, S4 = A/S + G.L., S5 = G.L. + cow dung and S6 = A/S + cow dung.
Organic and inorganic manures will be added in two equal doses at planting and one month after planting. At planting manure will be applied in small pits where rhizomes are planted.

3. DESIGN:
(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) 11' X 24'. (b) 10.5' X 22.5'. (v) One row around the net plot. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Attack of shoot borer - 50%, D.D.T. was sprayed. (iii) Weight of rhizomes. (iv) a 1955—condt. (b) No. (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1107 lb/ac. (ii) 470 lb/ac. (iii) None of the effects is significant. (iv) Av. yield of rhizomes in lb/ac.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
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<tr>
<td>N1</td>
<td>773</td>
<td>1003</td>
<td>911</td>
<td>1210</td>
<td>1221</td>
<td>1439</td>
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<td>992</td>
<td>1337</td>
<td>749</td>
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<td>1106</td>
<td>1118</td>
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<tr>
<td>Mean</td>
<td>934</td>
<td>998</td>
<td>1124</td>
<td>979</td>
<td>1325</td>
<td>1268</td>
<td>1105</td>
</tr>
</tbody>
</table>
CROP: Ginger.
Site: Ginger Res.Stn., Thodupuzha.

Ref.: K. 59(10)
Type: 'M'.

Object: To find out the best time of application of manure to get maximum yield of Ginger.

1. BASAL CONDITIONS:
   (i) (a) and (b) N.A. (a) N.A. (ii) (a) Laterite soil. (b) Refer soil analysis, Thodupuzha. (iii) 29.6.1959.
   (iv) (a) One digging, levelling and preparing beds of 12' x 6' x 6' size. (b) Planting in lines. (c) 1000 lb./ac.
   (d) 9" x 9". (e) N.A. (v) 5 C.L. of C.M. and 500 lb./ac. of G.L. were applied at the time of planting as B.D. Lime was added before planting the rhizomes at 400 lb./ac. 40 lb./ac. of K₂O has been supplied in the form of Pot. Sui. 45 days after planting. (vi) Local (medium). (vii) Unirrigated. (viii) Weeding, earthing up and matching. (ix) 167.2". (x) 25.1.1960.

2. TREATMENTS:
   1. Full dose of manure applied at planting.
   2. Half dose applied at planting and the other half 45 days after planting.
   3. Half dose applied at planting, 1 applied 45 days after planting and the remaining 65 days after planting.
   4. 1 dose applied at planting, the remaining dose divided into 3 equal parts and given 30, 45 and 65 days after planting.
   5. N.A.

Manure: 100 lb./ac. of N supplied through cow dung, A/S and G.L. in equal ratio.

3. DESIGN:
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 14' x 26' (b) 12' x 24'. (v) Yes. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) Attack of leaf spot disease and shoot borer—Cupravit and D.D.T. sprayed with an interval of 1 week. (iii) The percentage of sprouting, mean no. of tillers/plant, mean no. of modes, mean length of shoots, length and breadth of leaf and yield of rhizomes. (iv) (a) 1959—N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) Nil.

5. RESULTS:
   (i) 5184 lb./ac. (ii) 1280 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of rhizomes in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>4853</td>
<td>5514</td>
<td>4872</td>
<td>5521</td>
<td>5161</td>
</tr>
<tr>
<td>S.E./mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>522.4 lb./ac.</td>
</tr>
</tbody>
</table>

CROP: Ginger.
Site: Ettumannoor, Peroor (c.f.).

Ref.: K. 57(11).
Type: 'M'.

Object: To demonstrate and study the effect of K in conjunction with N and P₂O₅ on Ginger yield.

1. BASAL CONDITIONS:
2. TREATMENTS:
(I) Cultivators' practice.
(2) 50 lb./ac. of N + 50 lb./ac. of P₂O₅.
(3) 50 lb./ac. of N + 50 lb./ac. of P₂O₅ + 100 lb./ac. of K.
Half the dose at planting and the other half two months after planting.

3. DESIGN:
(i) (ii) Representative fields were selected without randomisation. No. of trials is N.A. (iii) (a) 20 cents.
(b) N.A. (iv) Yes.

4. GENERAL:
(i) Very unfavourable season due to untimely rains. (ii) Decaying disease and pinja/attack was noticed in a few fields. (iii) Yield of rhizomes. (iv) (a) 1957—contd. (b) and (c) N.A. (v) (a) and (b) N.A. (vi) Nil.
(vii) Expt. was conducted on cultivators' field.

5. RESULTS:
(i) 6699 lb./ac. (ii) N.A. (iii) Treatment differences are significant. (iv) Av. yield of rhizomes in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>6115</td>
<td>5972</td>
<td>8109</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>-487 lb./ac.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Ginger.


Object: To determine the optimum tilth and time of planting for Ginger.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) Nil. (ii) (a) Brown to red clayey soil. (b) Refer soil analysis, Ambalavayal.
   (iii) As per treatments. (iv) (a) Three ploughings and forming beds. (b) Sown in pits on the seed bed.
   (c) N.A. (d) 5'x5'”. (e) N.A. (v) 20 tons of powdered C.M. applied at planting as B.D. (vi) Local.
   (vii) Unirrigated. (viii) Three weedings, earthing up and mulching with G.L. at 2000 lb./ac. (ix) 84.00’.
   (x) 23.1.1957.

2. TREATMENTS:
   Main-plot treatments: 3 levels of ploughing: P1 = 1, P2 = 3 and P3 = 5.
   Sub-plot treatments: 4 dates of planting: D1 = 15.4.1956, D2 = 1.5.1956, D3 = 15.5.1956 and D4 = 1.6.1956.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/block; 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) Main-plot:
   24’x20’. (b) Sub-plot; 20’x6’. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Leaf spot disease—1% Bordeaux mixture sprayed. (iii) Rhizome yield. (iv) (a)
   1955—N.A. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 22954 lb./ac. (ii) (a) 2197 lb./ac. (b) 1780 lb./ac. (iii) D effect alone is highly significant. (iv) Av.
   yield of rhizomes in lb./ac.

\[
\begin{array}{ccc|c}
P_1 & P_2 & P_3 & \text{Mean} \\
28183 & 28593 & 27625 & 28146 \\
25800 & 25577 & 28100 & 25726 \\
20849 & 20849 & 19732 & 23476 \\
16754 & 18056 & 17293 & 17349 \\
\hline
22896 & 22259 & 22599 & 22934 \\
\end{array}
\]

S.E. of difference of two

1. P marginal means = 633 lb./ac.
2. D marginal means = 592 lb./ac.
3. D means at the same level of P = 1090 lb./ac.
4. P means at the same level of D = 1028 lb./ac.
BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) Nil. (ii) (a) Loamy to red clayey. (b) Refer soil analysis, Ambalavayal. (iii) As per treatments. (iv) (a) As per treatments. (b) Sown in pits. (c) 1200 lb./ac. (d) 9' x 9'. (e) N.A. (v) 20 ton/ac. of C.M. applied at planting. (vi) Local. (vii) Unirrigated. (viii) Weeding, 3 earthings and mulching with G.L. at 20000 lb./ac. (ix) 90.10'. (x) 15.1.1958.

TREATMENTS:

Main-plot treatments:
3 levels of ploughing: \( P_1 = 1 \), \( P_2 = 2 \) and \( P_3 = 3 \).

Sub-plot treatments:
4 dates of planting: \( D_1 = 15.4.1957 \), \( D_2 = 1.5.1957 \), \( D_3 = 15.5.1957 \) and \( D_4 = 1.6.1957 \).

DESIGN:

(i) Split-plot. (ii) (a) 3 main-plots/block; 4 sub-plots/main-plot. (b) N.A. (iii) 7. (iv) (a) N.A. (b) 6' x 9'. (v) Nil. (vi) Yes.

GENERAL:

(i) Satisfactory. (ii) Slight infection of leaf spot disease—1% Bordeaux mixture sprayed. (iii) Yield of rhizomes. (iv) (a) N.A. (b) No. (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

RESULTS:

(a) 13733 lb./ac. (b) 2066 lb./ac. (c) 1593 lb./ac. (d) D effect alone is highly significant. (iv) Av. yield of rhizomes in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>( P_1 )</th>
<th>( P_2 )</th>
<th>( P_3 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( D_1 )</td>
<td>18031</td>
<td>19944</td>
<td>18295</td>
<td>18757</td>
</tr>
<tr>
<td>( D_2 )</td>
<td>15172</td>
<td>15477</td>
<td>15157</td>
<td>15335</td>
</tr>
<tr>
<td>( D_3 )</td>
<td>11754</td>
<td>11702</td>
<td>10905</td>
<td>11452</td>
</tr>
<tr>
<td>( D_4 )</td>
<td>7926</td>
<td>8031</td>
<td>7871</td>
<td>7941</td>
</tr>
</tbody>
</table>

Mean 13269 13790 13057 13373

S.E. of difference of two

1. P marginal means = 551 lb./ac.
2. D marginal means = 491 lb./ac.
3. D means at the same level of P = 849 lb./ac.
4. P means at the same level of D = 920 lb./ac.


Object: To determine the optimum tilth and time of planting of Ginger.

Ref: K. 58(15). Type: 'C'.

BASAL CONDITIONS:

(i) (a) Nil (b) Nil. (c) Nil. (ii) (a) Loamy to red clayey. (b) Refer soil analysis, Ambalavayal. (iii) As per treatments. (iv) (a) As per treatments. (b) Sown in beds. (c) N.A. (d) 9' x 9'. (e) N.A. (v) The crop was mulched with green leaf at 20000 lb./ac. and 20 ton/ac. of powdered C.M. applied at planting. (vi) Local. (vii) Unirrigated. (viii) Weeding, 3 earthings and mulching with G.L. at 20000 lb./ac. (ix) 95.61'. (x) 22.1.1959.

TREATMENTS:

Main-plot treatments:
3 levels of ploughings: \( P_1 = 1 \), \( P_2 = 2 \) and \( P_3 = 5 \).

Sub-plot treatments:
4 dates of planting: \( D_1 = 15.4.1958 \), \( D_2 = 1.5.1958 \), \( D_3 = 15.5.1958 \) and \( D_4 = 1.6.1958 \).
3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/block; 4 sub-plots/main-plot. (iii) 7. (iv) (a) N.A. (b) 6'x19.5'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Yield of rhizomes. (iv) (a) N.A. (b) Nil. (c) N.A. (d) and (b) Nil. (v) and (vi) Nil.

5. RESULTS:
(i) 3569 lb./ac. (ii) (a) 2598 lb./ac. (b) 2285 lb./ac. (iii) D effect alone is highly significant. (iv) Av. yield of rhizomes in lb./ac.

<table>
<thead>
<tr>
<th>D1</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>Mean</th>
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<td>20787</td>
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<td>15322</td>
<td>12656</td>
<td>15165</td>
<td>14381</td>
<td></td>
</tr>
<tr>
<td>11290</td>
<td>10259</td>
<td>11872</td>
<td>11140</td>
<td></td>
</tr>
<tr>
<td>7235</td>
<td>6384</td>
<td>7190</td>
<td>6936</td>
<td></td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. P marginal means = 654.4 lb./ac.
2. D marginal means = 716.8 lb./ac.
3. D means at the same level of P = 1252.0 lb./ac.
4. P means at the same level of D = 1254.4 lb./ac.

---

Crop :- Ginger.

Object :- To determine the optimum spacing for Ginger.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Nil. (c) Nil. (ii) (a) Brown to red clayey. (b) Ref.: soil analysis, Ambalavayal. (iii) 29.5.1955. (iv) (a) 3 ploughings and forming of beds. (b) Seed planted in pits. (c) N.A. (d) As per treatments. (e) N.A. (f) 20 tons/ac. of powdered C.M. broadcast at planting. (vii) Local. (viii) Unirrigated. (ix) Weeding was given thrice at intervals of 45 days and the crop was earthed up twice. (x) 82.00'.

2. TREATMENTS:
5 Spacings: S1=6'x6', S2=9'x6', S3=9'x9', S4=12'x9' and S5=12'x12'.

3. DESIGN:
(i) R.B.D. (ii) (a) 5 (b) N.A. (iii) 7. (iv) (a) 9'x21' except for P3 plots where the net plot size is 9'x20'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Medium infection of leaf spot disease—1%. Bordeaux mixture sprayed. (iiii) Yield of rhizomes. (iv) (a) 1953—N.A. (b) and (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 6455 lb./ac. (ii) 1021 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of rhizomes in lb./ac.

Ref :- K. 55(16).
Type :- 'C'.
Crop: Ginger.  
Object: To determine the optimum spacing for Ginger crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil.  (ii) (a) Brown to red clayey.  (b) Refer soil analysis, Ambalavayal.  (iii) 8.5.1955.  
   (iv) (a) Three ploughings and forming beds.  (b) Sown in pits.  (c) N.A.  (d) As per treatments.  (e) N.A.  
   (v) 20 tons/ac. of C.M. was applied at planting as B.D.  (vi) Local.  (vii) Unirrigated.  (viii) Three weedings, earthing up and mulching with G.L. at 20000 lb./ac.  
   (ix) 84.0%.  (x) 28.11.1957.

2. TREATMENTS:
   Same as in exp. no. 16 on page 219.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 5.  (b) N.A.  (iii) 6.  (iv) (a) and (b) 21’x9’.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  (ii) Light infection of leaf spot -1% Bordeaux mixture sprayed.  (iii) Weight of rhizomes.  
   (iv) (a) 1953 - N.A.  (b) No.  (c) N.A.  (v) (a) and (b) N.A.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 29468 lb./ac.  (ii) 2144 lb./ac.  (iii) Treatment differences are highly significant.  
   (iv) Av. yield of rhizomes in lb./ac.

<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>25401</td>
<td>22405</td>
<td>19408</td>
<td>19938</td>
<td>15259</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>876 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. RESULTS:
(i) 13516 lb./ac. (ii) 3646 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of rhizomes in lb./ac.

<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>14790</td>
<td>15327</td>
<td>13790</td>
<td>13149</td>
<td>10528</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1489 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Ginger.  
Object: To determine the optimum spacing for Ginger crop.

1. BASAL CONDITIONS:
(i) (a) to (c) Nil. (ii) (a) Loamy to red clayey. (b) Refer soil analysis, Ambalavayal. (iii) 21.4.1958. (iv) (a) 3 ploughings and forming seed beds. (b) sown in pits. (c) N.A. (d) As per treatments. (e) N.A. (f) 20 tons/ac. of powdered cow dung applied at planting. (vi) Local. (vii) Unirrigated. (viii) 3 weedings, earthing up, and mulching with 20,000 lb./ac. of G.L. (ix) 95.6°. (x) 24.1.1959.

2. TREATMENTS:
Same as in expt. no. 16 on page 219.

3. DESIGN:
(i) R.B.D. (ii) 5. (b) N.A. (iii) 6. (iv) (a) and (b) 18'x9'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Yield of rhizomes. (iv) (a) N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 16469 lb./ac. (ii) 2621 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of rhizomes in lb./ac.

<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>
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<td>13644</td>
<td>17786</td>
<td>19354</td>
<td>20742</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1070 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Ginger.  
Object: To determine the optimum spacing for Ginger crop.

1. BASAL CONDITIONS:
(i) (a) to (c) Nil. (ii) (a) Loamy to red clayey. (b) Refer soil analysis, Ambalavayal. (iii) 29.4.1959. (iv) (a) Four ploughings and removing weeds and stubbles. (b) to (e) N.A. (f) 10 tons/ac. of C.M. applied at planting by putting in the pit. (vi) Local. (vii) Unirrigated. (viii) Mulching with 15,000 lb./ac. of G.L. and 4 weedings. (ix) 80° to 90°. (x) 5.1.1960.

2. TREATMENTS:
Same as in expt. no. 16 on page 219.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) 100'x12'. (iii) 6. (iv) (a) 20'x12'. (b) 18'x9'. (v) 1 ft. wide pathways are provided with each bed. (vi) Yes.
4. GENERAL:
(i) Good. (ii) Nil. (iii) Germination counts, tiller counts and rhizome yield. (iv) (a) 1955—N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 14714 lb./ac. (ii) 3574 lb./ac. (iii) The treatment differences are significant. (iv) Av. yield of rhizomes in lb./ac.

<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>1460</td>
<td>16617</td>
<td>16752</td>
<td>13633</td>
<td>11966</td>
<td></td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1460 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Ginger.  
Site: Ginger Res. Stn., Thodupuzha.  
Object: To find the effect of different spacings on yield of Ginger.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Nil (c) Nil. (ii) (a) Loam (b) Refer soil analysis, Thodupuzha. (iii) 15.5.1958. (iv) (a) one digging, preparing seed beds of size 12'x6' and 6' high (b) Planting seed bits in lines (c) 300 lb./ac. (d) As per treatments. (e) N.A. (v) 10 C.L./ac. of C.M. at planting, (vi) Local. (vii) Unirrigated. (viii) Weeding, earthing up and mulching with 20000 lb./ac. of G.L. (ix) 90° to 130°. (x) 1.1.1959.

2. TREATMENTS:
6 spacings: S_1 = 6'x6', S_2 = 6'x9', S_3 = 9'x9', S_4 = 9'x12', S_5 = 9'x12' and S_6 = 12'x12'.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 12'x24'. (b) For S_1: 22'x10', S_2: 21'x10', S_3: 21'x9', S_4: 20'x10', S_5: 20'x9' and S_6: 20'x8'. (v) One row all around the net plot. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Yield of rhizomes. (iv) (a) 1958—contd. (b) N.A. (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1059 lb./ac. (ii) 323 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of rhizomes in lb./ac.

<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>932</td>
<td>1132</td>
<td>855</td>
<td>880</td>
<td>1422</td>
<td>1134</td>
</tr>
<tr>
<td>S.E. of means</td>
<td>156 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Ginger.  
Ref: K. 58(22).  
Type: 'CM'.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Nil (c) Nil. (ii) (a) Brown to red clayey. (b) Refer soil analysis, Ambalavayal. (iii) 6.5.1957. (iv) (a) Ploughings three and forming beds (b) Sown in pits on the seed bed. (c) N.A. (d) 9'x9'. (e) N.A. (v) 20 tons of C.M. applied at planting as B.D. Mulching with G.L. at 20000 lb./ac. (vi) Local. (vii) Unirrigated. (viii) Three weedings followed by earthing up. (ix) 81.03°. (x) 31.1.57.
2. TREATMENTS:

All combinations of (1) and (2)

1. 2 cultural treatments: C₀ = no shade and C₁ = shade.
2. 5 levels of mulch: M₀ = no mulch, M₁ = 10000 lb/ac. of G.L. at planting, M₂ = M₁ + 5000 lb/ac. 45 days after planting and M₃ = M₂ + 5000 lb/ac. 90 days after planting. Shade provided by *Pandal*. G.L. given as mulch.

3. DESIGN:

(i) R.B.D. (ii) (a) 8, (b) N.A. (iii) 6. (iv) (a) N.A. (b) 6' × 19.5'. (v) Nil. (vi) Yes.

4. GENERAL:

(i) N.A. (ii) Leaf spot disease - 1%. Bordeaux mixture sprayed. (iii) Yield of rhizomes. (iv) (a) 1955—1956 (instead of shade, two forms of mulch were tried in 1955) (b) No (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 14259 lb/ac. (ii) 2384 lb/ac. (iii) M and C effects are highly significant. Interaction is not significant. (iv) Av. yield of rhizomes in lb/ac.

<table>
<thead>
<tr>
<th></th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C₀</td>
<td>10722</td>
<td>15376</td>
<td>17610</td>
<td>17498</td>
<td>15302</td>
</tr>
<tr>
<td>C₁</td>
<td>11243</td>
<td>11511</td>
<td>15264</td>
<td>14818</td>
<td>13217</td>
</tr>
</tbody>
</table>

S.E. of C marginal means = 487 lb/ac.
S.E. of M marginal means = 688 lb/ac.
S.E. of body of table = 973 lb/ac.

Crop: Ginger.
Ref: K. 57(23).
Type: 'CM'.

Object:—To determine the effect of shade and optimum dose of leaf mulch for Ginger.
Crop: Ginger.  

Object: To determine the effect of shade and the optimum dose of leaf mulch for Ginger.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil. (ii) (a) Loamy to red clayey soil. (b) Refer soil analysis, Ambalavayal. (iii) 16.4.1958.  
   (iv) (a) Three ploughings and forming beds. (b) Sown in pits. (c) N.A. (d) 9'x9'. (e) N.A.  
   (ix) 95.61%. (x) 27.11.1959.

2. TREATMENTS:
   Same on in exp't no. 22 on page 222.

3. DESIGN:
   (i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 6'x19.15'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) Nil. (iii) Yield of ginger. (iv) (a) 1957-1958. (b) No. (c) N.A. (v) (a) and (b) Nil.  
   (vi) and (vii) Nil.

5. RESULTS:
   (i) 18675 lb./ac. (ii) 26661 lb./ac. (iii) Main effect of M and interaction CxM are highly significant. C  
   effect is also significant. (iv) Av. yield of rhizomes in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C₀</td>
<td>8254</td>
<td>18924</td>
<td>18802</td>
<td>21035</td>
<td>16754</td>
</tr>
<tr>
<td>C₁</td>
<td>13712</td>
<td>18615</td>
<td>20291</td>
<td>22711</td>
<td>18831</td>
</tr>
<tr>
<td>Mean</td>
<td>10983</td>
<td>18772</td>
<td>19546</td>
<td>21873</td>
<td>17792</td>
</tr>
</tbody>
</table>

S.E. of C marginal mean = 421 lb./ac.  
S.E. of M marginal mean = 596 lb./ac.  
S.E. of body of table = 841 lb./ac.

---

Crop: Ginger.  
Site: Ginger Res. Stn., Thodupuzha.

Object: To ascertain the effect of different spacings, seed size and levels of manure on Ginger yield.
1. BASAL CONDITIONS:

(I) (a) to (c) Nil. (ii) (a) Laterite soil. (b) Refer soil analysis, Thodupuzha. (iii) 22.6.1959. (iv) (a) Digging, levelling and preparing seed beds. (b) Sowing in pits (c) N.A. (d) As per treatments. (e) N.A. (v) Nil. (vi) Local (medium). (vii) Unirrigated. (viii) Three seedings, earthing up and mulching with G.L. (ix) 167.2". (x) 24.1.1960.

2. TREATMENTS:

Main-plot treatments:
Six spacings : $S_1=6'\times 6'$, $S_2=6'\times 9'$, $S_3=9'\times 9'$, $S_4=6'\times 12'$, $S_5=9'\times 12'$ and $S_6=12'\times 12'$.

Sub-plot treatments:
All combinations of (1) and (2)
- (1) 3 seed sizes : $R_1=\frac{1}{2}$" to 1", $R_2=1"$ to 2" and $R_3=2\frac{1}{2}"$ to $3\frac{1}{2}"$.
- (2) 2 levels of manure : $M_1=10$ and $M_2=20$ C.L./ac. of C.M.

The manures were applied in two equal doses, half at planting and the other half 45 days after planting.

3. DESIGN:

(i) Split-plot. (ii) (a) 6 main plots/block ; 6 sub plots/main plot. (b) 84'x156'.

3. GENERAL:

(i) Normal. (ii) Attack of shoot-borer and leaf-spot—D.D.T. and Cupravit sprayed. (iii) No. of tillers/plant, no. of modes, length of shoots, average length and breadth of leaves and rhizome yield. (iv) (a) - 1959—N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) N.A.

4. RESULTS:

(i) 4499 lb./ac. (ii) (a) 2113 lb./ac. (b) 1017 lb./ac. (iii) $S$ effect is highly significant while that of $R$ is significant. Others are not significant. (iv) Av. yield of rhizomes in lb./ac.

<table>
<thead>
<tr>
<th></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>Mean</th>
<th>$M_1$</th>
<th>$M_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_1$</td>
<td>6485</td>
<td>4519</td>
<td>4074</td>
<td>3554</td>
<td>2695</td>
<td>2940</td>
<td>4043</td>
<td>4168</td>
<td>5617</td>
</tr>
<tr>
<td>$R_2$</td>
<td>5965</td>
<td>4604</td>
<td>4865</td>
<td>3619</td>
<td>4566</td>
<td>3252</td>
<td>4483</td>
<td>4471</td>
<td>4495</td>
</tr>
<tr>
<td>$R_3$</td>
<td>7493</td>
<td>5710</td>
<td>4433</td>
<td>4538</td>
<td>4641</td>
<td>3006</td>
<td>4970</td>
<td>4664</td>
<td>5277</td>
</tr>
<tr>
<td>Mean</td>
<td>6648</td>
<td>4944</td>
<td>4457</td>
<td>3914</td>
<td>3964</td>
<td>3006</td>
<td>4989</td>
<td>4534</td>
<td>4463</td>
</tr>
</tbody>
</table>

4. RESULTS:

$S$ marginal means $= 862.8$ lb./ac. 5. $S$ means at the same level of $R=1043.5$ lb./ac.

2. $R$ marginal means $= 293.5$ lb./ac. 6. $M$ means at the same level of $S=387.2$ lb./ac.

3. $M$ marginal means $= 219.4$ lb./ac. 7. $S$ means at the same level of $M=957.3$ lb./ac.

4. $R$ means at the same level of $S=719.1$ lb./ac. 8. Body of $M\times R$ table $= 293.6$ lb./ac.

S.E. of difference of two
1. $S$ marginal means $= 862.8$ lb./ac. 5. $S$ means at the same level of $R=1043.5$ lb./ac.

2. $R$ marginal means $= 293.5$ lb./ac. 6. $M$ means at the same level of $S=387.2$ lb./ac.

3. $M$ marginal means $= 219.4$ lb./ac. 7. $S$ means at the same level of $M=957.3$ lb./ac.

4. $R$ means at the same level of $S=719.1$ lb./ac. 8. Body of $M\times R$ table $= 293.6$ lb./ac.

Crop :- Ginger.  
Ref :- K. 55(26).  
Type :- 'D'.  
Object :- To find out a suitable and efficient fungicide for the control of soft rot disease.

4. BASAL CONDITIONS:

(I) (a) to (c) Nil. (ii) (a) Brown to red clay soil. (b) Refer soil analysis, Ambalavayal. (iii) 16.5.1955. (iv) (a) Three ploughings and forming beds. (b) Sown in pits (c) N.A. (d) $9'\times 3'$. (e) N.A. (v) 20 tons of powder C.M. applied at planting as B.D. (vi) Local. (vii) Unirrigated. (viii) Three seedings followed by earthing up. Mulching with G.L. at 20.00 lb./ac. (ix) 82.03. (x) 18.2.1956.
2. TREATMENTS:
1. Control.
2. Colloidal copper (3 gallons of stock solution in 40 gallons of water).
3. Chestnut compound (1 oz. compound in two gallons of water).
4. 0.1% wettable Ceresan at 1 pint per pit.

The fungicides were applied twice, once before planting and then one month after planting.

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 6' x 19.5'. (v) No. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Control measures as per treatments. (iii) Yield of rhizomes. (iv) (a) 1955—contd. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 21921 lb./ac. (ii) 1928 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of rhizomes in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>21695</td>
<td>20570</td>
<td>23734</td>
<td>21407</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>786 lb./ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Ginger.  
Ref: K. 56(27).  
Type: 'D'.

Object: To find out a suitable and efficient fungicide for the control of soft rot disease.

1. BASAL CONDITIONS:
(i) (a) to (e) Nil. (ii) (a) Brown to red clayey soil. (b) Refer soil analysis, Ambalavayal. (iii) 10.5.1956. (iv) (a) Three ploughings and cultivating beds. (b) Sown in pits. (c) —. (d) 9' x 9'. (e) N.A. (v) 20 tons of powdered C.M. applied at planting as B.D. (vi) Local. (vii) Unirrigated. (viii) Three weedings followed by earthing up. Mulching with G.L. at 20,000 lb./ac. (ix) 84'. (x) 25.1.1957.

2. TREATMENTS:
Same as in expt. no. 26 on page 225.

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) and (b) 6' x 20'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Under investigation. (iii) Yield of rhizomes. (iv) (a) 1955—contd. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 14505 lb./ac. (ii) 2290 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of rhizomes in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>11850</td>
<td>12409</td>
<td>17621</td>
<td>16132</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>934 lb./ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Ginger.  
Ref: K. 57(28).  
Type: 'D'.

Object: To find out a suitable fungicide to control the soft rot disease of Ginger.
1. BASAL CONDITIONS:
   (i) (a) to (c) Nil.  (ii) (a) Loamy to red clayey.  (b) Refer soil analysis, Ambalavayal.  (iii) 16-4-1957.
   (iv) (a) Ploughed three times and formed beds.  (b) Sown in pits.  (c) —.  (d) 9" x 9".  (e) N.A.  (v) 20 tons/ha.
   of powdered C.M. was applied at planting.  (vi) Local.  (vii) Unirrigated.  (ix) 90.1°.  (x) 14-1-1958.

2. TREATMENTS:
   Same as in expt. no. 26 on page 225.  Applied first immediately before planting and next 6 weeks after planting at 1 pint per pit.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 6.  (iv) (a) and (b) 6' x 19.5'.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) N.A.  (ii) Nil.  (iii) Yield of rhizomes.  (iv) (a) 1957-1958.  (b) No.  (c) N.A.  (v) (a) and (b) Nil.
   (vi) and (vii) Nil.

5. RESULTS:
   (i) 18475 lb./ac.  (ii) 1936 lb./ac.  (iii) Treatment differences are not significant.  (iv) Av. yield of rhizomes in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>17685</td>
<td>17621</td>
<td>20128</td>
<td>18366</td>
</tr>
<tr>
<td>S.E./mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   Ref: K. 58(29).
   Type: 'D'.

   Object: To find out a suitable and efficient fungicide for the control of soft-rot disease.

1. BASAL CONDITIONS:
   (i) (a) to (c) Nil.  (ii) (a) Loamy to red clayey.  (b) Refer soil analysis, Ambalavayal.  (iii) 19-2-1958.
   (iv) (a) Three ploughings and forming seed beds.  (b) Seed bits of weight 1 oz. were sown.  (c) N.A.  (d)
   9" x 9".  (e) N.A.  (v) Leaf mulch at 20000 lb./ac., 20 tons of C.M. applied at planting.  (vi) Local.  (vii)
   Unirrigated.  (viii) Weeding and three earthing up.  (ix) 95.61°.  (x) 26-4-1958.

2. TREATMENTS:
   Same as in expt. no. 28 on page 226.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 4.  (b) N.A.  (iii) 6.  (iv) (a) and (b) 6' x 19.5'.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) N.A.  (ii) Nil.  (iii) Yield of rhizomes.  (iv) (a) 1955-1956.  (b) No.  (c) N.A.  (v) (a) and (b) Nil.
   (vi) and (vii) Nil.

5. RESULTS:
   (i) 19230 lb./ac.  (ii) 3674 lb./ac.  (iii) Treatment differences are not significant.  (iv) Av. yield of rhizomes in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>19488</td>
<td>17741</td>
<td>15846</td>
<td>19846</td>
</tr>
<tr>
<td>S.E./mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   Ref: K. 59(30).
   Type: 'D'.

   Object: To find out an effective control measure against the soft-rot disease of Ginger caused by the Pythium or Seclrotrium species of fungi.
1. BASAL CONDITIONS:

(i) (a) to (c) Nil. (ii) (a) Virgin soil rich in organic matter. (b) Refer soil analysis, Ambalavayal. (iii) 9.5.1959. (iv) (a) Ploughed and tilled well. Weeds and stubbles are removed. (b) 10'x3' beds are formed. (c) N.A. (d) 12'x12'. (e) N.A. (f) 10 tons/ac. of C.M. applied at planting. (vi) Local (medium), (vii) Unirrigated. (viii) Mulching with 15000 lb/ac. of green leaf, weeding 4 times. (ix) 80° to 90°. (x) 4.1:1:500.

2. TREATMENTS:

1. Control
2. Applying colloidal copper (3 gallons of stock solution in 40 gallons of water) at 1 pint per pit.
3. Applying chestnut compound (1.02 in 2 gallons of water) at 1 pint per pit.
4. Applying wettable ceresan (0.1% solution) at 1 pint per pit.
5. Cupravit (0.4% solution) at 1 pint per pit.

3. DESIGN:

(i) R.B.D. (ii) (a) 5. (b) 110'x8'. (iii) 6. (iv) (a) E'x22'. (b) 6'x20'. (v) 1 ft. wide path ways after each bed and 2 ft. path ways after each plot. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Germination and tiller counts of plants were taken. (iv) 1955—contd. (b) No. (c) Nil. (v) (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 7020 lb/ac. (ii) 1513 lb/ac. (iii) Treatment differences are highly significant. (iv) Av. yield of rhizomes in lb/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av Yield</td>
<td>6607</td>
<td>7187</td>
<td>7804</td>
<td>8349</td>
<td>5155</td>
</tr>
</tbody>
</table>
| S.E./mean | -618 lb/ac.

Crop :- Pepper.
Centre :- Kottayam and Kanjiarpally. (c.f.)
Type :- 'M'.

Object :- To demonstrate and study the effect of potash in conjunction with N and P₂O₅ on Pepper yield.

1. BASAL CONDITIONS:

(i) (a) N.A. (b) Pepper. (c) N.A. (ii) Reclaimed soil in 2 fields and gravelly laterite in the remaining fields. (iii) On an average 27 lb. F.Y.M. and 12 lb. green leaf per vine. (iv) Karimunda (local). (v) (a) to (e) N.A. (vi) N.A. (vii) Unirrigated. (viii) Nil. (ix) 105.29'. (x) Feb.—March.

2. TREATMENTS:

1. Cultivator's usual practice.
2. 0.12 lb of N+0.18 lb of P per vine.
3. 0.12 lb of N+0.18 lb of P+0.24 lb of K per vine.

3. DESIGN:

(i) Representative fields were selected but without any randomisation. No. of trials N.A. (ii) 1/10 acre; 50 vines spaced 9'x9'. (iii) 8 vines. (iv) Yes.

4. GENERAL:

(i) Good. (ii) Pulli disease was noticed in two of the fields. No control measures taken. (iii) Yield of green pepper. (iv) (a) 1957—contd. (b) and (c) —. (v) (a) and (b) —. (vi) Nil. (vii) Expt. was conducted on cultivators' fields.

5. RESULTS:

(i) 8.39 lb/vine. (ii) N.A. (iii) The treatment differences are highly significant. (iv) Av. yield of green pepper in lb/vine.
## Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>6.92</td>
<td>7.66</td>
<td>10.58</td>
<td>-0.663 lb/vine.</td>
</tr>
</tbody>
</table>

### Crop: Sesamum (3rd crop).

**Site:** Oilseed Res. Stn., Kayamkulam.

**Object:** To find out the optimum dose of manure for Sesamum.

### BASAL CONDITIONS:

1. Paddy—paddy—sesamum. (b) Paddy. (c) C.M. at 4000 lb./ac. (ii) (a) Sandy loam. (b) N.A.
2. 24.1.1958. (iv) (a) 2 ploughings with wooden plough, 2 with iron plough, 2 harrowings and levellings with wooden beam. (b) Sown by dibbling. (c) — (d) 1'×1'. (e) Only one seedling hole allowed to grow. (ii) Nil. (vi) Local (early). (vii) Unirrigated. (viii) 2 hoeings and weedings. (ix) 1.77'.
3. 7.4.1958.

### 2. TREATMENTS:

1. 15 lb./ac. of N as C.M.
2. 30 lb./ac. of N as C.M.
3. 15 lb./ac. of N as C.M.+20 lb./ac. of P2O5 as B.M.+20 lb./ac. of K2O as wood ash.
4. 30 lb./ac. of N as C.M.+20 lb./ac. of P2O5 as B.M.+20 lb./ac. of K2O as wood ash.
5. Control.

Manures broadcast before sowing.

### 3. DESIGN:

1. R.B.D. (ii) 5. (b) N.A. (iii) 6. (iv) (a) 46'×13'. (b) 44'×11'. (v) One row all round the net plot. (vi) Yes.

### 4. GENERAL:

(i) Stunted growth due to less rain. Poor flowering and setting. (ii) Phyllody was noticed on a small scale. Infected plants pulled out and destroyed. (iii) Yield of sesamum. (iv) (a) 1958—contd. with modifications. (b) No. (c) Nil. (vi) and (vii) Nil.

### 5. RESULTS:

1. 3027 lb./ac. (ii) 582 lb./ac. (iii) Treatments are not significantly different. (iv) Av. yield of sesamum in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3082</td>
<td>2940</td>
<td>3184</td>
<td>3105</td>
<td>2824</td>
<td>-218 lb./ac.</td>
</tr>
</tbody>
</table>

---

### Crop: Sesamum.

**Site:** Oilseeds Res. Stn., Kayamkulam.

**Object:** To find out the optimum dose of manure required for Sesamum.

### 1. BASAL CONDITIONS:

1. (a) The land is double crop wet land and gingelly is cultivated after the harvest of second crop paddy.
2. (b) Paddy. (c) Six C.L. of C.M. at transplanting and A/S and Pot. Sul. at 1 cwt. each one month after transplanting.
3. (ii) (a) Sandy loam (b) N.A. (iii) 10.1.1959. (iv) (a) One digging with mummati and two harrowings with toothed country harrow. (b) to (e) N.A. (v) Nil. (vi) Onathukara (early). (vii) Unirrigated. (viii) Two inter cultivations with Kochuthumba. (ix) N.A. (x) 28.3.1959.

### TREATMENTS:

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

1. (1) 3 levels of N : N2=0, N1=15 and N3=30 lb./ac.
2. (2) 3 levels of P2O5 : P2=0, P3=15 and P4=30 lb./ac.
3. (3) 3 levels of K2O : K5=0, K6=15 and K7=30 lb./ac.
3. DESIGN:
(i) 3rd Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 3. (iv) (a) 15' x 7' (b) 12' x 6'. (v) ½ border all round the net plot to be discarded. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Nil. (iii) Oilseed yield. (iv) (a) 1957—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 416.8 lb./ac. (ii) 59.5 lb./ac. (iii) P and K effects are highly significant. Others are not significant. (iv) Av. yield of oilseed in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>313.7</td>
<td>443.4</td>
<td>456.3</td>
<td>404.5</td>
<td>447.3</td>
<td>378.6</td>
<td>387.6</td>
</tr>
<tr>
<td>N₁</td>
<td>391.5</td>
<td>404.5</td>
<td>623.6</td>
<td>473.2</td>
<td>403.2</td>
<td>631.9</td>
<td>385.0</td>
</tr>
<tr>
<td>N₂</td>
<td>342.3</td>
<td>438.2</td>
<td>517.3</td>
<td>432.6</td>
<td>457.6</td>
<td>560.0</td>
<td>280.1</td>
</tr>
<tr>
<td>Mean</td>
<td>349.2</td>
<td>428.7</td>
<td>532.4</td>
<td>436.8</td>
<td>436.0</td>
<td>523.3</td>
<td>350.9</td>
</tr>
<tr>
<td>P₀</td>
<td>312.4</td>
<td>418.7</td>
<td>576.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₁</td>
<td>423.9</td>
<td>505.6</td>
<td>640.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₂</td>
<td>311.2</td>
<td>361.7</td>
<td>379.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 11.4 lb./ac.
S.E. of body of any table = 19.8 lb./ac.

Crop :- Sesamum.
Site :- Oilseeds Res. Stn., Kayamkulam;
Ref :- K. 59(3).
Type :- 'M'.

Object :- To determine the optimum dose of different manures for Sesamum.

1. BASAL CONDITIONS:
(i) (a) Paddy—Paddy—Sesamum. (b) Paddy. (c) C.M. at 6 C.L/ac.+ 28 lb/ac. of Pot. Sul.+ 28 lb/ac. of A/S. (ii) (a) Sandy loam (b) N.A. (iii) 12.1.59. (iv) (a) 2 ploughings with country plough, 2 with iron plough, breaking the clots and levelling. (b) Dibbling with hand to a depth of 3' to 1' (c) 9' x 9'. (d) N.A. (v) Nil. (vi) Local (75 days duration). (vii) Unirrigated. (viii) Two weedings. (ix) 2.92'. (x) 28 and 29.3.1959.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 3 levels of N as A/S: \( N₂ = 0, N₃ = 15 \) and \( N₄ = 30 \) lb/ac.
(2) 3 levels of \( P₀ \) as Super: \( P₀ = 0, P₁ = 15 \) and \( P₂ = 30 \) lb/ac.
(3) 3 levels of \( K₀ \) O as Pot. Sul: \( K₀ = 0, K₁ = 15 \) and \( K₂ = 30 \) lb/ac.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 27. (b) 15' x 202'. (iii) 3. (iv) (a) 15' x 7' (b) 12' x 6'. (v) One row along length and two rows along breadth. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Sesamum yield. (iv) (a) 1959—contd. (b) No. (c) Nil. (v) (a) No. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 140.4 lb./ac. (ii) 57.1 lb./ac. (iii) Main effects of P and K are highly significant. Interaction P x K is significant. (iv) Av. yield of sesame in lb./ac.
Object:—To investigate the relative efficiency of different nitrogenous fertilizers at different levels.

1. BASAL CONDITIONS TO 3. DESIGN:
Same as in ext. no. 121 on pages 83 and 84 on paddy crop.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Sesamum yield. (iv) (a) 1959—contd. (b) N.A. (c) Nil. (v) Quilon. (vi) Nil. (vii) Expt. was conducted on cultivator's fields.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>304</td>
</tr>
<tr>
<td>N_0</td>
<td>469</td>
</tr>
<tr>
<td>N_1</td>
<td>494</td>
</tr>
<tr>
<td>N_2</td>
<td>494</td>
</tr>
<tr>
<td>N_3</td>
<td>370</td>
</tr>
<tr>
<td>N_4</td>
<td>502</td>
</tr>
<tr>
<td>G.M.</td>
<td>445 lb./ac.</td>
</tr>
<tr>
<td>S.E.</td>
<td>36.07 lb./ac.</td>
</tr>
<tr>
<td>No. of trials</td>
<td>4</td>
</tr>
</tbody>
</table>

Crop: Sesamum.
Centre: Palghat (c.f.).

Ref: K. 49(4).
Type: 'M'.

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

1. BASAL CONDITIONS TO 3. DESIGN:
Same as in ext. no. 111 on page 79 on paddy crop.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Sesamum yield. (iv) (a) 1959—Contd. (b) No. (c) N.A. (v) Palghat and Quilon. (vi) Nil. (vii) Nil. (vii) Expt. was conducted on cultivator's fields.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>313</td>
</tr>
<tr>
<td>N</td>
<td>411</td>
</tr>
<tr>
<td>P</td>
<td>379</td>
</tr>
<tr>
<td>N_0</td>
<td>527</td>
</tr>
<tr>
<td>N_1</td>
<td>346</td>
</tr>
<tr>
<td>N_2</td>
<td>477</td>
</tr>
<tr>
<td>N_3</td>
<td>428</td>
</tr>
<tr>
<td>N_4</td>
<td>568</td>
</tr>
<tr>
<td>G.M.</td>
<td>431 lb./ac.</td>
</tr>
<tr>
<td>S.E.</td>
<td>21.17 lb./ac.</td>
</tr>
<tr>
<td>No. of trials</td>
<td>4</td>
</tr>
</tbody>
</table>
Crop: Sesamum.  
Centre: Quilon (c.f.).

Object:—To investigate the relative efficiency of different nitrogenous fertilizers at different levels.

1. BASAL CONDITIONS TO 3. DESIGN:
Same as in expt. no. 121 on pages 83, 84 on paddy crop.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Sesamum yield. (iv) (a) 1955—contd. (b) No. (c) Nil.  (v) Palghat.
(vi) Nil. (vii) Expt. was conducted on cultivators’ fields.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n₁'</th>
<th>n₂'</th>
<th>n₃'</th>
<th>n₄'</th>
<th>n₅''</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>444</td>
<td>560</td>
<td>625</td>
<td>592</td>
<td>650</td>
<td>609</td>
</tr>
</tbody>
</table>

G.M.=586 lb./ac.; S.E.=21.53 lb./ac.; No. of trials=8.

Crop: Sesamum.  
Centre: Quilon (c.f.).

Object:—To study the response of Sesamum to levels of N, P and K applied individually and in combinations.

1. BASAL CONDITIONS TO 3. DESIGN:
Same as in expt. no. 111 on page 79 on paddy crop.

4. GENERAL:
Same as in expt. no. 5 on page 231 on sesameum crop.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n</th>
<th>p</th>
<th>np</th>
<th>k</th>
<th>nk</th>
<th>pk</th>
<th>npk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>436</td>
<td>543</td>
<td>510</td>
<td>625</td>
<td>494</td>
<td>592</td>
<td>592</td>
<td>749</td>
</tr>
</tbody>
</table>

G.M.=568 lb./ac.; S.E.=12.87 lb./ac.; No. of trials=8.

Crop: Groundnut.  
Centre: Palghat (c.f.).

Object:—To investigate the relative efficiency of different nitrogenous fertilizers at different levels.

1. BASAL CONDITIONS TO 3. DESIGN:
Same as in expt. no. 121 on page 83 and 84 on paddy crop.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) Groundnut yield. (iv) (a) 1959—contd. (b) No. (c) N.A. (v) No. (vi) Nil. (vii) Expt. was conducted on cultivators’ fields.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n₁'</th>
<th>n₂'</th>
<th>n₃'</th>
<th>n₄''</th>
<th>n₅''</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>839</td>
<td>1012</td>
<td>1284</td>
<td>1144</td>
<td>1506</td>
<td>1210</td>
</tr>
</tbody>
</table>

G.M.=1130 lb./ac.; S.E.=11.64 lb./ac.; No. of trials=2.
Crop :- Lemon Grass.  
Site :- Lemon Grass Res. Stn., Odakkali.  
Ref :- K. 54(1).  
Type :- 'M'.

Object :- To study the effect of different combinations of N, P and K on yield and quality of oil in Lemon Grass.

1. BASAL CONDITIONS:
   (i) Fallow land. (ii) (a) Typical laterite. (b) Refer soil analysis, Odakkali. (iii) By seed. (iv) Red Stalked grass (local)  
   (v) 28.4.1953; 9.8.1953. Sowing by broadcast in a nursery. Seed rate 15 lb./ac. The plants were transplanted along raised beds separated by furrows. Spacing 12" plant to plant and 15" between rows. Single plant per hole. (vi) 103 days. (vii) Nil. (viii) 3 Weeding. (ix) Nil. (x) Unirrigated. (xi) 100°. (xii) Genetally 4 to 5 harvests/year. The analysis is based on only one harvest done on 5.5.1954.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 2 levels of A/S : N₀=0, N₁=1 lb./plot.
   (2) 2 levels of Super : P₀=0, P₁=1.2 lb./plot.
   (3) 2 levels of Mur. of Pot. : K₀=0, K₁=0.4 lb./plot.

3. DESIGN:
   (i) 2² Fact. in R.B.D. (ii) (a) S. (b) N.A. (iii) 4. (v) 120 plants, plot of size 26'x6'. (vi) 2 foot furrow between plots and a foot path between blocks. (vii) Yes.

4. GENERAL:
   (i) Growth very good in NPK plots. (ii) Nil. (iii) Fresh weight of grass, yield of oil and citrus content. (iv) (a) 1953—contd. (b) N.A. (v) Nil. (vi) The experiment commenced with 120 plants per plot; but many plants died afterwards. The analysis is based on a single harvest of 120 plants per plot of size 20'x6' and hence not used for estimating per acre yield.

5. RESULTS:
   (i) 32.44 lb./plot. (ii) 8.06 lb./plot. (iii) Main effect of P is highly significant. Other effects and interactions are not significant. (iv) Av. yield of grass adjusted in lb./plot.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>Mean</th>
<th>K₀</th>
<th>K₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₀</td>
<td>26.77</td>
<td>26.33</td>
<td>26.56</td>
<td>28.73</td>
<td>24.39</td>
</tr>
<tr>
<td>P₁</td>
<td>37.12</td>
<td>39.51</td>
<td>38.32</td>
<td>38.16</td>
<td>38.48</td>
</tr>
<tr>
<td>Mean</td>
<td>31.94</td>
<td>32.93</td>
<td>32.44</td>
<td>33.44</td>
<td>31.44</td>
</tr>
<tr>
<td>K₀</td>
<td>33.64</td>
<td>33.25</td>
<td>31.44</td>
<td>31.44</td>
<td>31.44</td>
</tr>
<tr>
<td>K₁</td>
<td>30.26</td>
<td>32.61</td>
<td>30.26</td>
<td>32.61</td>
<td>30.26</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 2.01 lb./plot.
S.E. of body of any table = 2.84 lb./plot.
2. TREATMENTS:
Same as in expt. no. 1 on page 233.

3. DESIGN:
(i) 2² Fact. in R.B.D. (ii) (a) & (b) N.A. (iii) 4. (iv) About 120 plants, plot of size 20'×6'. (v) 2 feet border between plots. (vi) Yes.

4. GENERAL:
(i) Growth very good in NPK plots. (ii) Nil. (iii) Fresh weight of grass, yield of oil and citral content. (a) 1953—cond. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
(i) 66.28 lb./plot. (ii) 11.67 lb./plot. (iii) Main effect of N is significant and of P is highly significant. Others are not significant. (iv) Av. yield of grass in lb./plot.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>F₀</td>
<td>46.61</td>
<td>71.54</td>
</tr>
<tr>
<td>F₁</td>
<td>60.43</td>
<td>85.55</td>
</tr>
<tr>
<td>Mean</td>
<td>53.52</td>
<td>79.04</td>
</tr>
<tr>
<td>K₀</td>
<td>50.84</td>
<td>55.20</td>
</tr>
<tr>
<td>K₁</td>
<td>99.19</td>
<td>78.00</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 2.92 lb./plot.
S.E. of body of any table = 4.12 lb./plot.

Crop :- Lemon Grass.
Site :- Lemon Grass Res. Stn., Odakkali.
Ref :- K. 58(3).
Type :- 'M'.

Object :- To study the effect of different combinations of N, P and K on the yield and quality of oil in Lemon Grass.

1. BASAL CONDITIONS:
(i) Fallow land. (ii) (a) Laterite. (b) Refer soil analysis, Odakkali. (iii) By seeds. (iv) Red stemmed grass—(local). (v) The plants were transplanted along raised beds separated by furrows. Sowing by broadcast in a nursery. Spacing 12' plant to plant and 15' between rows. Seed rate 15 lb./ac. Single plant per hole. (vi) 102 days. (vii) Nil. (viii) 2 weedings. (ix) Nil. (x) Unirrigated. (xi) 100'. (xii) 4 to 5 harvests in a year (23.6.1956 ; 7.8.1956; 3.10.1956, and 3.12.1956.)

2. TREATMENTS:
Same as in expt. no. 1 on page 233.
The manure was applied after each cutting of grass on 17.7.1956, 13.8.1956 and 13.12.1956. The plots were first mulched with hand forks and the manure sprinkled in the plots and mixed with the soil by hand hoeing.

3. DESIGN:
(i) 2² Fact. in R.B.D. (ii) (a) & (b) N.A. (iii) 4. (iv) About 120 plants per plot, plot of size 1/363 ac. (v) (a) Nil. (b) 2' furrow between plots. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Fresh weight of grass, yield of oil and citral content. (iv) (a) 1953—cond. (b) N.A. (v) The expt. was conducted only on a small scale due to limited facilities. The number of plants in each experimental plot was not the same and hence the analysis was attempted by the covariance technique utilizing the number of plants as the concomitant character. (vi) Nil.
5. RESULTS:

A. Yield of Grass.

(i) 24.8 lb./plot.  (ii) 3.4 lb./plot.  (iii) Main effects of N and P and interaction N x P are highly significant.  
(iv) Av. yield of grass adjusted in lb./plot.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₀</td>
<td>17.0</td>
<td>23.9</td>
<td>20.4</td>
<td>20.2</td>
</tr>
<tr>
<td>P₁</td>
<td>20.0</td>
<td>38.1</td>
<td>29.1</td>
<td>27.7</td>
</tr>
<tr>
<td>Mean</td>
<td>18.5</td>
<td>31.0</td>
<td>24.8</td>
<td>23.9</td>
</tr>
<tr>
<td>K₀</td>
<td>17.8</td>
<td>30.0</td>
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<td></td>
</tr>
<tr>
<td>K₁</td>
<td>19.2</td>
<td>32.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 0.85 lb./plot
S.E. of body of any table = 1.20 lb./plot

B. Yield of Oil.

(i) 17.5 c.c./plot.  (ii) 2.8 c.c./plot.  (iii) Main effect of N and P are highly significant. Interaction P x K is significant.  
(iv) Yield of oil in c.c. per plot.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
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</thead>
<tbody>
<tr>
<td>P₀</td>
<td>13.6</td>
<td>17.8</td>
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<td>16.5</td>
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<tr>
<td>P₁</td>
<td>15.9</td>
<td>22.7</td>
<td>19.3</td>
<td>17.1</td>
</tr>
<tr>
<td>Mean</td>
<td>14.8</td>
<td>20.2</td>
<td>17.5</td>
<td>16.8</td>
</tr>
<tr>
<td>K₀</td>
<td>14.6</td>
<td>19.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K₁</td>
<td>14.8</td>
<td>21.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 0.70 c.c./plot
S.E. of body of any table = 0.99 c.c./plot

Crop: Lemon Grass.
Site: Lemon Grass Res. Stn., Odakkali.

Ref: K. 57(4).
Type: 'M'.

Object: To study the effect of different combinations of N, P and K on the yield and quality of oil in Lemon Grass.

1. BASAL CONDITIONS:
   (i) Fallow land. (ii) (a) Laterite. (b) Refer soil analysis, Odakkali. (iii) By tiller separation. (iv) Red stemmed grass (local). (v) Transplanted in lines on 9.8.1953 on well prepared raised beds 1 foot apart and 1 plant per hole. (vi) 90 days. (vii) Nil. (viii) 2 weedings. (ix) Nil. (x) Rainfed. (xi) 100°.

2. TREATMENTS:
   Same as in expt. no. 1 on page 233.
   The manures were applied after each harvest. The soil was mulched with hand forks and the manure sprinkled and mixed with the soil.

3. DESIGN:
   (i) 2² Fact. in R.B.D.  (ii) (a) 8.  (b) N.A.  (iii) 4.  (iv) 2' x 2' ret (120 plants approximately). (v) Nil. (vi) Yes.
4. GENERAL:
(i) Fair. (ii) Nil. (iii) Fresh weight of grass, yield of oil per plot and citral content. (iv) (a) 1953—1957. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

A. Yield of Grass.
(i) 80.48 lb./plot. (ii) 1.28 lb./plot. (iii) Main effects of P and K are highly significant. Main effect of N and interaction N x K are significant. (iv) Av. yield of grass in lb./plot.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>Mean</th>
<th></th>
<th>K₀</th>
<th>K₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>K₁</td>
<td>61.44</td>
<td>71.50</td>
<td>65.70</td>
<td>K₀</td>
<td>61.12</td>
<td>71.81</td>
</tr>
<tr>
<td>K₀</td>
<td>88.50</td>
<td>100.50</td>
<td>94.50</td>
<td>K₁</td>
<td>82.31</td>
<td>106.69</td>
</tr>
<tr>
<td>Mean</td>
<td>74.97</td>
<td>86.00</td>
<td>80.48</td>
<td></td>
<td>71.72</td>
<td>89.25</td>
</tr>
</tbody>
</table>

B. Yield of Oil.
(i) 50.81 c.c./plot. (ii) 11.47 c.c./plot. (iii) Main effect of P is highly significant. Other effects and interaction are not significant. (iv) Av. yield of oil in c.c./plot.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>Mean</th>
<th></th>
<th>K₀</th>
<th>K₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₀</td>
<td>38.38</td>
<td>46.75</td>
<td>42.56</td>
<td>K₀</td>
<td>39.12</td>
<td>46.00</td>
</tr>
<tr>
<td>P₁</td>
<td>56.25</td>
<td>61.88</td>
<td>59.06</td>
<td>K₁</td>
<td>56.15</td>
<td>61.38</td>
</tr>
<tr>
<td>Mean</td>
<td>47.33</td>
<td>54.31</td>
<td>50.81</td>
<td></td>
<td>47.94</td>
<td>53.68</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 0.32 lb./plot
S.E. of body of any table = 0.45 lb./plot

Crop: Lemon Grass.
Site: Lemon Grass Res. Sta., Odakkali.

Object: To study the effect of different combinations of N, P and K on the yield of Lemon Grass.

1. BASAL CONDITIONS:
(i) Virgin land. (ii) Laterite loam. (b) Refer soil analysis, Odakkali. (iii) By vegetative multiplication and through seeds. (iv) Local. (v) 24.6.1959 to 28.6.1959. (vi) Uniform rooted slips were transplanted, row to row distance: one foot, plant to plant: 6". About three years. (vii) Nil. (viii) 2 weeding. (ix) Nil,

2. TREATMENTS:
All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S: N₀ = 0, N₁ = 100 and N₂ = 200 lb./ac.
(2) 3 levels of P₂₃O₅ as A/S: P₀ = 0, P₁ = 100 and P₂ = 200 lb./ac.
(3) 3 levels of K as Muriate of Potash: K₀ = 0, K₁ = 100 and K₂ = 200 lb./ac.
3. DESIGN:
(i) 3 Plots, confounding NPK. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) Net: 396 plants; gross: 480 plants. (v) One row around each plot. (vi) Yes.

4. GENERAL:
(i) Good vegetative growth. (ii) Nil. (iii) Only fresh weight of grass from each plot. (iv) (a) 1959—N.A. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
(i) 74.15 lb./plot. (ii) 9.92 lb./plot. (iii) Main effects of N, P and K and interactions N x P and N x K are highly significant. (iv) Av. yield of fresh grass in lb./plot.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>Mean</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₀</td>
<td>60.58</td>
<td>65.67</td>
<td>66.83</td>
<td>64.36</td>
<td>58.25</td>
<td>68.30</td>
<td>66.33</td>
</tr>
<tr>
<td>P₁</td>
<td>55.58</td>
<td>22.91</td>
<td>88.50</td>
<td>75.00</td>
<td>66.17</td>
<td>76.42</td>
<td>82.42</td>
</tr>
<tr>
<td>P₂</td>
<td>57.92</td>
<td>96.50</td>
<td>94.83</td>
<td>83.08</td>
<td>74.00</td>
<td>81.75</td>
<td>93.30</td>
</tr>
<tr>
<td>mean</td>
<td>57.36</td>
<td>81.69</td>
<td>83.39</td>
<td>74.15</td>
<td>66.14</td>
<td>75.55</td>
<td>80.75</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 2.34 lb./plot,
S.E. of body of any table = 4.05 lb./plot.

Crop: Lemon Grass.  
Site: Lemon Grass Res. Stn., Odakkali.  
Ref: K. 56(6).  
Type: ‘M’.

Object: To study the effect of a fertilizer mixture (terameal) containing N, P and K in the proportion of 7:10:5 on the yield and quality of oil in Lemon Grass.

1. BASAL CONDITIONS:

2. TREATMENTS:
(1) Control (untreated):  
(2) 600 lb. of terameal per acre (i.e. 6.17 lb. per plot).  
The manure was applied after each cutting at the rate of 600 lb. per acre. The dates of manure application were 13.7.1956, 10.9.1956 and 17.12.1956. The plots were mulched with hand forks and the manure sprinkled and covered lightly.

3. DESIGN:
(i) 2 x 2 L. Sq. (ii) (a) 2. (b) N.A. (iii) 6 (2 squares). (iv) About 463 excluding border plants in rows. (v) One row all round each plot discarded for border effects. A space of 2 to 3 feet was left as foot path between the plots. (vi) No.

4. GENERAL:
(i) Growth very good ; there was marked difference in vegetative growth between treated and control plots. (ii) Nil. (iii) Fresh weight of grass, yield of oil and citral content. (iv) (a) 1956—N.A. (b) N.A. (v) Analysis attempted by covariance technique with number of plants/plot as concomitant character. (vi) Nil.
5. RESULTS:

A. Yield of Grass

(i) 190.20 lb./plot. (ii) 7.12 lb./plot. (iii) Treatment difference is significant. (iv) Av. yield of grass (adjusted) in lb./plot.

Treatment

\[ \begin{array}{cc}
1 & 2 \\
\end{array} \]

Av. yield

\[ \begin{array}{cc}
133.3 & 247.0 \\
\end{array} \]

S.E./mean = 2.91 lb./plot.

B. Yield of Oil

(i) 109.35 c.c./plot. (ii) 19.96 c.c./plot. (iii) Treatment difference is not significant. (iv) Av. yield of oil (adjusted) in c.c./plot.

Treatment

\[ \begin{array}{cc}
1 & 2 \\
\end{array} \]

Av. yield

\[ \begin{array}{cc}
82.1 & 156.6 \\
\end{array} \]

S.E./mean = 6.92 c.c./plot.

Crop: Lemon Grass.

Site: Lemon Grass Res. Stn., Ojakali.

Object: To study the effect of setting fire to the field during summer on the yield and quality of oil in Lemon Grass.

1. BASAL CONDITIONS:

(i) Fallow land. (ii) (a) Laterite. (b) Refer soil analysis, Odakkali. (iii) By seed. (iv) Red stemmed grass—local. (v) 14.5.1955 to 18/3.1955. 4" spacing between plants and 8" between rows; single seedling/hole. (vi) N.A. (vii) Nil. (viii) 2 weedings and hoeing. (ix) Nil. (x) Untreated. (xi) 100'. (xii) 4 harvests on 20, 21.6.1956; 3 to 6.8.1956; 24, 25.9.1956 and 6, 7.11.1956.

2. TREATMENTS:

(i) Burning stubbles in the field. (ii) No burning (control).

3. DESIGN:

(i) 2 x 2 L. Sq. (ii) (a) 2. (b) N.A. (iii) 4 (2 squares). (iv) 2030 plants (approx.). (v) One row all round each plot was discarded. (vi) No.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Fresh weight of grass, yield of oil and citral content. (iv) (a) 1955 (late)—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

A. Yield of Grass

(i) 190.20 lb./plot. (ii) 7.12 lb./plot. (iii) Treatment difference is significant. (iv) Av. yield of grass in lb./plot.

Treatment

\[ \begin{array}{cc}
1 & 2 \\
\end{array} \]

Av. yield

\[ \begin{array}{cc}
322.75 & 324.12 \\
\end{array} \]

S.E./mean = 9.99 lb./plot.

B. Yield of Oil

(i) 109.35 c.c./plot. (ii) 19.96 c.c./plot. (iii) Treatment difference is not significant. (iv) Av. yield of oil in c.c./plot.

Treatment

\[ \begin{array}{cc}
1 & 2 \\
\end{array} \]

Av. yield

\[ \begin{array}{cc}
82.1 & 156.6 \\
\end{array} \]

S.E./mean = 6.92 c.c./plot.
Crop :- Lemon Grass.  
Site :- Lemon Grass Res. Stn., Odakkali.

Object :- To study the effect of setting fire to the fields during summer on the yield and quality of oil in Lemon Grass.

1. BASAL CONDITIONS:

2. TREATMENTS:
Same as in expt. no. 7 on page 238.

3. DESIGN:
(i) 2 x 2 L. Sq.  (ii) (a) 2.  (b) N.A.  (iii) 4 (2 squares).  (iv) 2000.  (v) One row around the net plot.  (vi) No.

4. GENERAL:
(i) Good.  (ii) Nil.  (iii) Fresh weight of grass, yield of oil in c.c. and citron content.  (iv) (a) 1955—contd.  (b) N.A.  (v) and (vi) Nil.

5. RESULTS:

A. Yield of Grass
(i) 190.2 lb./plot.  (ii) 5.83 lb./plot.  (iii) Treatment difference is not significant.  (iv) Av. yield of grass in lb./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>191.00</td>
<td>189.38</td>
<td>2.92 lb./plot</td>
</tr>
</tbody>
</table>

B. Yield of Oil
(i) 206 5 c.c./plot.  (ii) 0.85 c.c./plot.  (iii) Treatment difference is not significant.  (iv) Av. yield of oil in c.c./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>217.5</td>
<td>195.5</td>
<td>0.42 c.c./plot</td>
</tr>
</tbody>
</table>

Crop :- Lemon Grass.  
Site :- Lemon Grass Res. Stn., Odakkali.

Object :- To study the effect of setting fire to the fields during summer on the yield and quality of oil in Lemon Grass.

1. BASAL CONDITIONS:
(i) Fallow land.  (ii) (a) Laterite soil.  (b) Refer soil analysis, Odakkali.  (iii) By tiller separation.  (iv) Local variety, red stemmed.  (v) Transplanted 18 to 19/8.1955 on raised beds, plant to plant distance 4'.  Row to row 1 foot.  (vi) 90 days.  (vii) Nil.  (viii) One weeding.  (ix) Nil.  (x) Rainfed.  (xi) 140.74°.  (xii) 1.7.1958 to 2.7.1958, 18.8.1958 and 8.10.1958.

2. TREATMENTS:
Same as in expt. no. 7 on page 238.

3. DESIGN:
(i) 2 x 2 L. Sq.  (ii) (a) 2.  (b) N.A.  (iii) 4 (2 squares).  (iv) 2000 plants.  (v) Nil.  (vi) No.

4. GENERAL:
(i) Good.  (ii) Nil.  (iii) Weight of grass and yield of oil.  (iv) (a) 1955—contd.  (b) N.A.  (v) and (vi) Nil.
5. RESULTS:

A. Yield of Grass
(i) 180.8 lb./plot. (ii) 24.4 lb./plot. (iii) Treatment difference is not significant. (iv) Av. yield of grass in lb./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>175.12</td>
<td>186.62</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=12.20 lb./plot.</td>
<td></td>
</tr>
</tbody>
</table>

B. Yield of Oil
(i) 203.9 c.c./plot. (ii) 49.1 c.c./plot. (iii) Treatments are not significantly different. (iv) Av. yield of oil in c.c./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>207.8</td>
<td>200.0</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=24.6 c.c./plot.</td>
<td></td>
</tr>
</tbody>
</table>

Crop : Lemon Grass.
Site : Lemon Grass Res. Stn., Odakkali.
Object : To study the effect of transplanting against direct sowing on the yield and quality of lemon grass oil.
Ref : K. 56(10).
Type : 'C'.

1. BASAL CONDITIONS:
(i) Fallow land. (ii) (a) Laterite. (b) Refer soil analysis, Odakkali. (iii) By seeds. (iv) Red stemmed grass—local. (v) As per treatments 12" spacing between plants. (vi) The age of transplanted and direct sown plants are same (about 3 to 3½ months). (vii) Nil. (viii) 2 weedings and one hoeing. (ix) Nil. (x) Unirrigated. (xi) 100%. (xii) 18, 19, 20.9.1956; 2, 3, 8, 1956 ; 19, 20, 9, 1956 and 5, 6, 11.1956.

2. TREATMENTS:
(1) Direct sowing.
(2) Transplanted.
Seed at the rate of 15 lbs per acre was sown in a nursery on 14.5.1955. On the same day, seed was dibbled in the direct sown plots in lines previously prepared with the aid of ropes (more or less like the Japanese method). From 16 to 17.8.1955 healthy seedlings of uniform size were transplanted in the transplanted plot in rows 1’ apart at a spacing of 4’”. Thinning was done in direct sown plots to maintain equal no. of plants under both treatments.

3. DESIGN:
(i) 2 x 2 L. Sq. (ii) (a) 2. (b) N.A. (iii) 6 (3 squares). (iv) 1470 (approximately) ; plot size 24’ x 22’. (v) One row around the plot. (vi) No.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Fresh weight of grass, yield of oil and citral content. (iv) (a) 1955 (late)—condt. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

A. Yield of Grass
(i) 314.2 lb./plot. (ii) 22.59 lb./plot. (iii) Treatment difference is not significant. (iv) Av. yield of grass in lb./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>235.6</td>
<td>372.7</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=9.01 lb./plot.</td>
<td></td>
</tr>
</tbody>
</table>

B. Yield of Oil
(i) 10.72 oz./plot. (ii) 0.44 oz./plot. (iii) Treatment difference is not significant. (iv) Av. yield of oil in oz./plot.
Treatment 1 2
Av. yield 10.50 10.94
S.E./mean =0.18 oz./plot.

**Crop :- Lemon Grass.**

**Ref :- K. 57(11).**

**Site :- Lemon Grass Res. Stn., Odakkali.**

**Type :- 'C'.**

Object :- To study the effect of transplanting against direct sowing on the yield and quality of oil in Lemon Grass.

1. **BASAL CONDITIONS :**

2. **TREATMENTS :**
   (1) Direct sowing.
   (2) Transplanting.

3. **DESIGN :**
   (i) 2×2 L. Sq. (ii) 2. (b) N.A. (iii) 4 (2 squares). (iv) plot size 23' 4"×20'. 1470 plants. (v) One row all round the oct plot. (vi) No.

4. **GENERAL :**
   (i) Good. (ii) Nil. (iii) Fresh weight of grass, yield of oil and citral content. (iv) (a) 1955—continued. (b) N.A. (v) and (vi) Nil.

5. **RESULTS :**

   **A. Yield of Grass**

   (i) 201.1 lb./plot. (ii) 23.3 lb./plot. (iii) Treatment difference is not significant. (iv) Av. yield of fresh grass in lb./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>188.6</td>
<td>213.6</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>11.65 lb./plot.</td>
<td></td>
</tr>
</tbody>
</table>

   **B. Yield of Oil**

   (i) 230.0 c.c./plot. (ii) 17.4 c.c./plot. (iii) Treatment difference is not significant. (iv) Av. yield of oil in c.c./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>224</td>
<td>235</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>8.7 c.c./plot</td>
<td></td>
</tr>
</tbody>
</table>
1. BASAL CONDITIONS:

2. TREATMENTS:
(1) Direct sowing.
(2) Transplanting.

3. DESIGN:
(i) 2x2 L. Sq. (ii) (a) 2. (b) N.A. (iii) 4 (2 squares). (iv) 1470 plants. (v) Nil. (vi) No.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Fresh weight of grass and yield of oil. (iv) (a) 1955—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
A. Yield of Grass
(i) 156.9 lb./plot. (ii) 13.08 lb./plot. (iii) Treatment difference is not significant. (iv) Av. yield of grass in lb./plot.
Treatment
1 2
Av. yield 145.1 168.6
S.E./mean —6.54 lb./plot.
B. Yield of Oil
(i) 216.0 c.c./plot. (ii) 11.3 c.c./plot. (iii) Treatment difference is not significant. (iv) Av. yield of oil in c.c./plot.
Treatment
1 2
Av. yield 217.5 234.5
S.E./mean —5.6 c.c./plot.

Crop : Mandarin Orange.

Object : To determine a suitable root-stock for Mandarin Orange to ward off the decline malady of this fruit.

1. BASAL CONDITIONS:
(i) Uncultivated forest land. (ii) (a) Brown to red clayey. (b) Refer soil analysis, Ambalavayal. (iii) Seed propagation. (iv) Mandarin orange. (v) 13.11.1950/30.6.1952. Square method of planting. 22 feet spacing. (vi) One year and seven months. (vii) Nil. (viii) Sickle weeding and ploughing twice a year during June and Sept. The following manurial doses were given to each tree: A/S 3 lb., Super 1.5 lb., wood ash 6 lb., and cattle manure 100 lb. (ix) Nil. (x) Rainfed. (xi) 87.69°. (xii) Not yet started bearing.

2. TREATMENTS:
(1) Budder plants of mandarin orange 1/6 on rough lemon.
(2) Budder plants of mandarin orange on kichili.
(3) Budder plants of mār'arın orange on sweet orange.
(4) Budder plants of mandarin orange on marmalade orange.
(5) Budder plants of mandarin orange on Wynad country orange.
(6) Unworked seedling mandarin orange.

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

4. GENERAL:
(i) Normal. (ii) Severe shoot borer attack was observed from May to Aug. in all the years for which
systematic clipping of borer affected shoots was done. (iii) Measurement of girth, height and spread in cms. (iv) (a) 1952—contd. (b) N.A. (v) Treatment 2 in one replication was missing. (vi) Nil.

5. RESULTS:

A. Girth measurement

(i) 8.85 cm./tree. (ii) 1.25 cm./tree. (iii) Treatment differences are highly significant. (iv) Av. girth in cm./tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. girth</td>
<td>12.76</td>
<td>8.28</td>
<td>7.33</td>
<td>7.45</td>
<td>9.12</td>
<td>8.85</td>
</tr>
</tbody>
</table>

S.E./mean (excluding treatment 2) = 0.52 cm./tree.

B. Height of tree

(i) 130.2 cm./tree. (ii) 19.4 cm./tree. (iii) Treatment differences are highly significant. (iv) Av. height in cm./tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. height</td>
<td>157.5</td>
<td>112.7</td>
<td>106.8</td>
<td>127.7</td>
<td>132.7</td>
<td>144.3</td>
</tr>
</tbody>
</table>

S.E./mean (excl. treatment 2) = 7.9 cm./tree.

Crop: Mandarin Orange.
Ref: K. 55(2).
Type: 'C'.

Object: To determine a suitable root-stock for Mandarin Orange to ward off the decline malady of this fruit.

1. BASAL CONDITIONS:

(i) Uncultivated forest land. (ii) (a) Brown red clayey. (b) Refer soil analysis, Ambalavayal. (iii) Seed sown. (iv) Mandarin orange. (v) 15.11.1950/30.6.1952 square method of planting, 22' spacing. (vi) One year and 7 months. (vii) Nil. (viii) Sickle weeding and ploughing twice a year during June and Sept. The following manurial doses were given to each tree. A/S 4 lb., Super 2 lb., woodash 8 lb. cattle manure 100 lb. (ix) Nil. (x) Rainfed. (xi) 78.0'. (xii) Not yet started bearing.

2. TREATMENTS:

Same as in expt. no. 1 on page 242.

3. DESIGN:

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) 1. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Normal. (ii) Slight shoot borer attack was observed from May to Aug. in all the years for which systematic clipping of borer affected shoots was done. (iii) Measurement of girth, height and spread in cms. (iv) (a) 1952—contd. (b) N.A. (v) Treatment 3 in one replication was missing. (vi) Nil.

5. RESULTS:

A. Girth measurement

(i) 16.79 cm./tree. (ii) 1.93 cm./tree. (iii) Treatment differences are highly significant. (iv) Mean girth in cm./tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>21.35</td>
<td>16.89</td>
<td>14.50</td>
<td>14.72</td>
<td>16.93</td>
<td>17.20</td>
</tr>
</tbody>
</table>

S.E./mean (excl. treatment 3) = 0.79 cm./tree.

S.E. of difference of treatment 3 with any other treatment mean = 1.18 cm./tree.

B. Height of tree

(i) 183.0 cm./tree. (ii) 21.4 cm./tree. (iii) Treatment differences are not significant. (iv) Mean height of trees in cm./tree.
Crop: Mandarin Orange.  
Ref: K. 56(3).  
Type: 'C'.

Object: To determine a suitable root-stock for Mandarin Orange to ward off the decline malady of this fruit.

1. BASAL CONDITIONS:
   (i) Virgin land.  (ii) (a) Brown red clayey soil. (b) Refer soil analysis, Ambalavayal. (iii) Seed sowing.  
   (iv) Mandarin orange.  (v) 15.11.1950/30.6.1952; Square method of planting; 22’ spacing.  
   (vi) One year and 7 months.  (vii) Nil.  (viii) Sickle weeding and ploughing twice a year during June and September.  
   5 lb. of A/S, 30 lb. of Super, 10 lb. of wood ash and 150 lb. of C.M. per tree per year broadcast around the plants and covered by ploughing in the month of September.  (ix) Nil.  (x) Irrigated. (xi) 86.26'.  
   (xii) Trees not yet started bearing.

2. TREATMENTS:
   Same as in exp. no. 1 on page 242.

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

4. GENERAL:
   (i) Satisfactory.  (ii) Nil.  (iii) Measurement of girth, height and spread.  (iv) (a) 1952—contd. (b) N.A.  
   (v) Treatment 2 is missing in the first replication.  (vi) Nil.

5. RESULTS:

   A. Girth measurements
   (i) 22.31 cm./tree.  (ii) 2.56 cm./tree.  (iii) Treatment differences are highly significant.  (iv) Mean girth in cm./tree.

   Treatment  1  2  3  4  5  6
   Mean  27.62  19.32  20.22  22.20  21.23  23.30
   S.E./mean (excl. treatment 2)  = 1.05 cm./tree.
   S.E. of difference of treatment 2 with any other treatment mean  = 1.57 cm./tree.

   B. Height of trees
   (i) 225.6 cm./tree.  (ii) 27.6 cm./tree.  (iii) Treatment differences are not significant.  (iv) Mean height in cm./tree.

   Treatment  1  2  3  4  5  6
   Mean  238.8  229.3  201.5  215.3  217.4  251.5
   S.E./mean (excl. treatment 2)  = 11.3 cm./tree.
   S.E. of difference of treatment 2 with any other treatment mean  = 16.9 cm./tree.
1. BASAL CONDITIONS:
(i) Virgin land. (ii) (a) Brown red clayey soil. (b) Refer soil analysis, Ambalavayal. (iii) Seed sowing. (iv) Mandarin orange. (v) 15.11.1950/30.6.1952; square method of planting; 22' spacing. (vi) One year and 7 months. (vii) Nil. (viii) Sickle weeding and ploughing twice a year during June and Sept. The following manurial doses were given to each tree: 6 lb. of A/S, 3 lb. of Super, 12 lb. of wood ash and 150 lb. of C.M. (ix) Nil. (x) Unirrigated. (xi) 96.14". (xii) Trees not yet started bearing.

2. TREATMENTS:
Same as in expt. no. 1 on page 212.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) Nil. (v) Yes.

4. GENERAL:
(i) Normal. (ii) Severe shoot borer attack was observed from May to Aug. in all the years for which systematic clipping of borer affected shoots was done. (iii) Measurement of girth, height and spread. (iv) (a) 1952—cond. (b) N.A. (v) Treatment 2 in 1st replication is missing. (vi) Nil.

5. RESULTS:
A. Girth measurement
(i) 27.62 cm./tree. (ii) 4.10 cm./tree. (iii) Treatment differences are highly significant. (iv) Mean girth in cm./tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>33.95</td>
<td>24.42</td>
<td>25.97</td>
<td>27.15</td>
<td>25.81</td>
<td>28.31</td>
</tr>
</tbody>
</table>

S.E. (mean excl. treatment 1) = 1.68 cm./tree.
S.E. of difference of treatment 2 with any other treatment mean = 2.50 cm./tree.

B. Height of trees
(i) 210.7 cm./tree. (ii) 2.91 cm./tree. (iii) Treatment differences are significant. (iv) Mean height in cm./tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>279.0</td>
<td>212.0</td>
<td>230.5</td>
<td>236.5</td>
<td>254.8</td>
<td>281.5</td>
</tr>
</tbody>
</table>

S.E. (mean excl. treatment 2) = 1.19 cm./tree.
S.E. of difference of treatment 2 with any other treatment mean = 1.78 cm./tree.

Crop: Mandarin Orange.
Ref: K. 58(5)
Type: ‘C’.

Object: To determine the best root-stock for Mandarin Orange to ward off the decline malady of this fruit.

1. BASAL CONDITIONS:
(i) Virgin land. (ii) (a) Brown red clayey loam. (b) Refer soil analysis, Ambalavayal. (iii) Seedlings and buddlings. (iv) Mandarin orange. (v) 30.6.52, 22 feet between plants, square method of planting. (vi) One year and 7 months. (vii) Nil. (viii) Weeding and mulching throughout the year (200 lb mulch per tree per year.) 7 lb. of A/S+1.5 lb. of Super+14.0 lb. of wood ash+150 lb. of cattle manure was applied during the year per tree. (ix) Nil. (x) Unirrigated. (xi) 88.07". (xii) All trees have not started bearing.

2. TREATMENTS:
Same as in experiment no. 1 on page 242.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) Nil. (v) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Severe attack of shoot borer was observed from May to August in all the years for which systematic clipping of borer affected shoots was done. (iii) Measurement of girth, height and spread. (iv) (a) 1952—cond. (b) N.A. (v) and (vi) Nil.
5. RESULTS:

A. Girth measurement

(i) 31.2 cm./tree. (ii) 7.9 cm./tree. (iii) Treatment differences are not significant. (iv) Mean girth in cm./tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>38.9</td>
<td>26.8</td>
<td>30.9</td>
<td>28.7</td>
<td>31.2</td>
<td>32.0</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=3.2 cm./tree.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. Height of trees

(i) 279.7 cm./tree. (ii) 37.3 cm./tree. (iii) Treatment differences are not significant. (iv) Mean height in cm./tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>307.7</td>
<td>238.8</td>
<td>264.8</td>
<td>261.7</td>
<td>283.5</td>
<td>301.7</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=15.2 cm./tree.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Mandarin Orange.
Ref: K. 54(6).
Type: 'C'.

Object: To compare the orchard performance of two kinds of progenies on different root-stocks.

1. BASAL CONDITIONS:

(i) Virgin land. (ii) (a) Brown red clayey. (b) Refer soil analysis, Ambalavayal. (iii) By seed. (iv) Mandarin orange. (v) 15.11.50/22.6.52. Square method of planting; 22 feet spacing. (vi) 1½ years. (vii) Nil. (viii) E. Sickie weeding and ploughing twice a year during June and September. The following manurial doses were given to each tree: A/S 3 lbs., Super 1.5 lbs., wood ash 6 lbs., and Cattle manure 100 lbs. (ix) Nil. (a) Unirrigated. (a) 87.69 in 106 rainy days. (x) Trees not yet started bearing.

2. TREATMENTS:

1. Budder plants of mandarin orange on rough lemon.
2. Seedlings of same scion.

3. DESIGN:

(i) 2x2 L. Sq. (ii) (a) 2, (b) N.A. (iii) 8 (4 squares). (iv) 4. (v) Nil. (vi) No.

4. GENERAL:

(i) Normal. (ii) Severe shoot borer attack was observed from May to August in all the years for which systematic clipping of borer affected shoots was done. (iii) Measurements of height, girth and spread. (iv) (a) 1952-1955. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

A. Girth measurement

(i) 9.28 cm./tree. (ii) 0.50 cm./tree. (iii) Treatment difference is highly significant. (iv) Mean girth in cm./tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>11.32</td>
<td>7.25</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=0.18 cm./tree.</td>
<td></td>
</tr>
</tbody>
</table>

B. Height of trees

(i) 128.5 cm./tree. (ii) 4.18 cm./tree. (iii) Treatment difference is highly significant. (iv) Height in cm./tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>140.59</td>
<td>116.41</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=1.48 cm./tree.</td>
<td></td>
</tr>
</tbody>
</table>
Crop : Mandarin Orange.  

Object :—To compare the orchard performance of two kinds of progenies on different rootstocks.

1. BASAL CONDITIONS :
   (i) Virgin land. (ii) (a) Brown red clayey. (b) Refer soil analysis, Ambalavayal. (iii) By seed. (iv) Mandarin Orange.  
   (v) 15.11.1950/16.1952, square method of planting with a spacing of 22 feet. (vi) 1½ years.  
   (vii) Nil. (viii) Sickle weeding and ploughing twice a year during June and Sept. The following manurial doses were given to each tree : A/S 4 lb., Super 2 lb., woodash 8 lb. and C.M. 100 lb. (ix) Nil.  
   (x) Nil. (xi) 1951-52. (xii) Trees have not started bearing.

2. TREATMENTS :
   Same as in exp. no. 6 on page 246.

3. DESIGN :
   (i) 2 x 2 L. Sq. (ii) (a) (b) N.A. (iii) 8 (4 squares). (iv) 4. (v) Nil. (vi) No.

4. GENERAL :
   (i) Normal. (ii) Severe shoot borer attack was observed from May to Aug. in all the years for which systematic clipping of borer affected shoots was done. (iii) Measurements of height, girth and spread.  
   (iv) (a) 1952-1955. (b) N.A. (v) and (vi) Nil.

5. RESULTS :

   A. Girth measurements
   (i) 16.4 cm./tree. (ii) 1.0 cm./tree. (iii) Treatment difference is highly significant. (iv) Av. girth in cm./tree.
   Treatment | 1  | 2  |
   Mean       | 18.6 | 14.2 |
   S.E./mean  = 0.35 cm./tree.

   B. Height of trees
   (i) 193.3 cm./tree. (ii) 13.4 cm./tree. (iii) Treatment difference is not significant. (iv) Mean height in cm./tree.
   Treatment | 1  | 2  |
   Mean       | 201.7 | 184.9 |
   S.E./mean  = 4.7 cm./tree.

Crop : Mango.  

Object :—To compare the influence of mono-embryonic and poly-embryonic rootstocks.

1. BASAL CONDITIONS :
   (i) Virgin land. (ii) (a) Gravelly laterite. (b) Refer soil analysis, Taliparamba. (iii) Grafting. (iv) As per treatment.  
   (v) 19.8.1957; forming pits 3' x 3' x 3' and planting at a spacing of 30' x 30'. (vi) One year.  
   (vii) 50 lb. compost/plant. (viii) Weeding and scrapping round the plants every year in August before manuring. Manuring at 8 oz/plant of A/S in 1st year and 1 lb/plant thereafter. (ix) Pineapple, vegetables and pulses. (x) Unirrigated. (xi) 143.98°. (xii) Trees have not started bearing.

2. TREATMENTS :

   Treatment | Scion       | Root stock |
   (1)        | Bennet Alphonso | Chandrakaran. |
   (2)        | Benishan       | Chandrakaran. |
   (3)        | Bennet Alphonso | Bappukali. |
   (4)        | Benishan       | Bappukali. |
   (5)        | Bennet Alphonso | Puliyan. |
   (6)        | Benishan       | Puliyan. |
3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 8. (iv) 2. (v) Nil. (vi) yes.

4. GENERAL:
(i) Satisfactory. (ii) Borers—Gusaro sprayed. (iii) Growth measurements, girth of stock and scion, height and spread. (iv) (a) 1957—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
(i) 85.1 cm./plant. (ii) 13.8 cm./plant. (iii) Treatment differences are highly significant. (iv) Mean height in cm./plant.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>86.2</td>
<td>4.9 cm./plant</td>
</tr>
<tr>
<td>2</td>
<td>101.4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>75.5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>108.6</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>65.4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>73.7</td>
<td></td>
</tr>
</tbody>
</table>

Object :-To compare the influence of mono-embryonic and poly embryonic root-stocks.

Ref : K. 58(2).

Type : ‘C’.

Crop :- Mango.

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

1. BASAL CONDITIONS :
(i) to (x) same as in experiment 1 on page 247. (xi) 142.56'. (xii) Trees have not started bearing.

2. TREATMENTS to 4. GENERAL :
Same as in experiment no. 1 on page 247.

5. RESULTS:
(i) 121.7 cm./plant. (ii) 21.8 cm./plant. (iii) Treatment differences are highly significant. (iv) Mean height in cm./plant.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>134.7</td>
<td>7.7 cm./plant</td>
</tr>
<tr>
<td>2</td>
<td>134.9</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>120.0</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>135.2</td>
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<tr>
<td>5</td>
<td>98.2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>107.2</td>
<td></td>
</tr>
</tbody>
</table>

Ref : K. 59(3).

Type : ‘C’.

Crop :- Mango.

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

Object :-To compare the influence of mono-embryonic and poly-embryonic root-stocks.

1. BASAL CONDITIONS :
(i) to (x) same as in experiment no. 1 on page 247. (xi) 191.76'. (xii) Trees have not started bearing.

2. TREATMENTS to 4. GENERAL :
Same as in experiment no. 1 on page 247.

5. RESULTS:
(i) 143.7 cm./plant. (ii) 21.7 cm./plant. (iii) Treatment differences are highly significant. (iv) Mean height in cm./plant.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>165.4</td>
<td>7.7 cm./plant</td>
</tr>
<tr>
<td>2</td>
<td>153.8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>144.8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>147.5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>119.6</td>
<td></td>
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<tr>
<td>6</td>
<td>131.1</td>
<td></td>
</tr>
</tbody>
</table>
Crop :- Sapota. 
Site :- Agri. Res. Stn., Taliparamba.
Object :- To determine the most suitable root-stock for Sapota.

1. BASAL CONDITIONS:
(i) Virgin land. (ii) (a) Gravely laterite. (b) Refer soil analysis, Taliparamba. (iii) Grafting (iv) Local. (v) 19.6.1951 in pits 3'x3'x3', spacing 25'x25'. (vi) One year. (vii) 50 lb compost/tree. (viii) Weeding, digging and cleaning round basins twice in a year during July and Dec. (ix) Nil. (x) Unirrigated. (xi) 156.61" (1954), 137.54" (1955), 131.50" (1956), 143.98" (1957), 142.56" (1958) and 191.76" (1959.) (xii) Once in 3 months.

2. TREATMENTS :

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Scion</th>
<th>Root-stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Local sapota</td>
<td>Local sapota</td>
</tr>
<tr>
<td>(2)</td>
<td>Local sapota</td>
<td>Bassia longifolia</td>
</tr>
<tr>
<td>(3)</td>
<td>Local sapota</td>
<td>Manilkara hexandra</td>
</tr>
</tbody>
</table>

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

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Girth stock, and height of scion. (iv) (a) 1951—contd. (b) N.A. (v) Plants under treatment (2) failed in all the years. Reasons not available. (vi) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>Mean 1</th>
<th>S.E./Mean 1</th>
<th>Mean 2</th>
<th>S.E./Mean 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1954</td>
<td>117.53 cm./tree</td>
<td>96.83</td>
<td>137.81</td>
<td>21.45 cm./tree</td>
<td>-7.58 cm./tree</td>
</tr>
<tr>
<td>1955</td>
<td>154.91 cm./tree</td>
<td>132.54</td>
<td>177.29</td>
<td>93.00 cm./tree</td>
<td>-13.79 cm./tree</td>
</tr>
<tr>
<td>1956</td>
<td>175.95 cm./tree</td>
<td>154.27</td>
<td>197.63</td>
<td>56.78 cm./tree</td>
<td>-20.08 cm./tree</td>
</tr>
<tr>
<td>1957</td>
<td>201.15 cm./tree</td>
<td>174.05</td>
<td>228.25</td>
<td>53.71 cm./tree</td>
<td>-19.0 cm./tree</td>
</tr>
<tr>
<td>1958</td>
<td>253.48 cm./tree</td>
<td>191.76</td>
<td>191.76</td>
<td>65.19 cm./tree</td>
<td>-25.19 cm./tree</td>
</tr>
</tbody>
</table>
Crop: Areca nut. 
Object: To find the optimum level of irrigation, depth of sowing of nuts and age of mother tree.

1. BASAL CONDITIONS:
(i) The site was previously used for a botanical garden. (ii) (a) Loam. (b) Refer soil analysis, Mannuthy. (iii) By seed. (iv) Local. (v) 30.11.1974. Sowing in raised beds. As per treatments. (vi) The experiment was restricted to study the germination only. (vii) Half a cart load of sand was applied per a cent of land at the time of preparing the seed bed. (viii) (a) Periodical weeding. (b) Providing shade during the summer months. (ix) Yes. (x) As per treatments. (xi) 55.96° during the period of observation. (xii) N.A.

2. TREATMENTS:
All combinations of (1), (2) and (3).
(1) 3 levels of irrigation: I1=Daily, I2=once in two days and I3=once in 3 days.
(2) 3 depths of sowing nuts: D1=1", D2=2" and D3=3".
(3) Age of mother tree: A1=Young, A2=Middle and A3=Old.

3. DESIGN:
(i) 3² Confid. fact. design. (ii) 9. (iii) 4. (iv) 64 nuts/plot. (v) Double guard rows between 2 plots. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Germination counts taken per 64 nuts sown per plot. (iv) (a) Conducted only for one season. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
(i) 30.12 nuts/plot. (ii) 2.16 nuts/plot. (iii) Treatment differences are not significant. (iv) Av. germination count/plot.

<table>
<thead>
<tr>
<th></th>
<th>I1</th>
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<td>31.92</td>
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<td>29.83</td>
<td>29.42</td>
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</table>

S.E. of any marginal mean = 0.36 nuts/plot.
S.E. of body of any table = 0.62 nuts/plot.
Crop :- Robusta Coffee.  
Site :- Chellote Estate, Kalpetta, Wynaad.  

Object :- To find out the response of Coffee to manuring with N, P and K.

1. BASAL CONDITIONS:

2. TREATMENTS:
   Main-plot treatments :
   4 levels of N:  N₁ = 40, N₂ = 60, N₃ = 80 and N₄ = 100 lb./ac.
   Sub plot treatments:
   M₁ = N applied in two equal doses once in the pre-blossom and once in the post-blossom period.  M₂ = N applied in 3 equal doses once in pre-blossom, once in pre-monsoon and once in post-monsoon periods.  M₃ = M₂ + 30 lb./ac.  P₂O₅ applied in 2 doses, once in pre-blossom and once in post-blossom season and M₄ = M₃ + 40 lb./ac.  K₂O applied in 2 equal doses, once in the pre-blossom and once in post-blossom season.  N applied as A/S, P₂O₅ as rock phos. and K₂O as Mur. of Potash.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 4 Main-plots/block, 4 sub plots/main-plot.  (b) N.A.  (iii) 2.  (iv) Gross: 42 plants (60' X 70').  Net : 20 plants (40' X 50').  (v) One row all round the net plot.  (vi) Yes.

4. GENERAL:
   (i) Good.  (ii) Nil.  (iii) Yield of ripe cherry, floats in the harvest and yield of clean coffee.  (iv) (a) 1555—

5. RESULTS:
   (i) 3.38 lb./plant.  (ii) (a) 1.25 lb./plant.  (b) 0.74 lb./plant.  (iii) Effect of M is significant.  Other effect and interaction are not significant.  (iv) Av. yield of coffee in lb./plant.

<table>
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<tr>
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<td>4.39</td>
<td>3.28</td>
<td>3.52</td>
<td>3.38</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. N marginal means = 0.62 lb./plant.
2. M marginal means = 0.37 lb./plant.
3. M means at a level of N = 0.74 lb./plant.
4. N means at a level of M = 0.89 lb./plant.

Crop :- Robusta Coffee.  
Site :- Chellote Estate, Kalpetta, Wynaad.  

Object :- To determine the response of Coffee to manuring with N, P and K.

1. BASAL CONDITIONS:
   (i) N.A.  (ii) (a) Reddish coloured latosol.  (b) N.A.  (iii) By seedling.  (iv) Robusta (local).  (v) Date of planting—N.A.  (vi) Method of planting at a spacing of 10' x 10'.  (vii) N.A.  (viii) Nil.  (ix) Weeding, suckering, handling of manures, shade regulation and scuffling. (x) Nil.  (xi) Rainfed.  (xii) 125.50'

2. TREATMENT:
   Same as in exp't no. 56(1) above.
3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block, 4 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) Gross: 42 plants (70' x 60'). Net: 20 plants (30' x 40'). (v) One row all round the net plot. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of ripe cherry, floats in the harvest and yield of clean coffee. (iv) (a) 1955—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
(i) 4.97 lb/plant. (ii) (a) 2.91 lb/plant. (b) 1.51 lb/plant. (iii) None of the effects and interaction is significant. (iv) Av. yield of coffee in lb/plant.

<table>
<thead>
<tr>
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<th>N3</th>
<th>N4</th>
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<td>4.45</td>
<td>3.70</td>
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</tr>
<tr>
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<td>6.20</td>
<td>4.05</td>
<td>3.70</td>
<td>4.81</td>
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<tr>
<td>M3</td>
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<td>5.50</td>
<td>3.55</td>
<td>4.05</td>
<td>4.89</td>
</tr>
<tr>
<td>M4</td>
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<td>6.15</td>
<td>6.15</td>
<td>5.30</td>
<td>6.11</td>
</tr>
<tr>
<td>Mean</td>
<td>5.76</td>
<td>5.39</td>
<td>4.55</td>
<td>4.19</td>
<td>4.97</td>
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</table>

S.E. of difference of two
1. N marginal means = 1.01 lb/plant.
2. M marginal means = 0.75 lb/plant.
3. M means at a level of N = 1.51 lb/plant.
4. N means at a level of M = 1.65 lb/plant.

Crop: Coffee. Ref: K. 58 and 59(3). Type: 'M'.

Site: Chellette Estate, Kalpetta, Wynand.

Object:—To determine the response of Coffee to manuring with N, P and K.

1. BASAL CONDITIONS:
(i) N.A. G.L. and compost were applied occasionally. (ii) (a) Reddish coloured laterite and gravely laterite. (b) N.A. (iii) By seeding (iv) Robusta (imported). (v) 13 to 15 years in 1955, sq. method of planting at a spacing of 10' x 10'. (vi) 18 months. (vii) Nil. (viii) 2 or 3 weedings, 3 scufflings in May—June, Sept and Nov.—Dec. (ix) Pepper vines in few plots. (x) Rainfed. (xi) 110°—130°. (xii) Beginning of Jan. to end of Feb.

2. TREATMENTS:
Same as in exp. no. 56 on page 251.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block and 4 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) Gross: 42 plants, Net: 20 plants. (v) one row all round the net plot. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Shot pole borer attacking the tender shoots controlled by limiting shade and weeding and by removal and trimming of attacked branches. (iii) Yield of ripe cherry, floats in the harvest and yield of clean coffee. (iv) (a) 1955—contd. (b) N.A. (v) Nil. (vi) Nil.

5. RESULTS:
1958
(i) 8.65 lb/plant. (ii) (a) 3.80 lb/plant. (b) 2.10 lb/plant. (iii) None of the effects is significant. (iv) Av. yield of coffee in lb/plant.
Crop = Robusta Coffee.  
Site = Krishna Estate, Kalpetta, Wayand.  
Ref = K. 56 and 57(4).  
Type = ‘M’.  

Object:—To find out the response of Coffee to manuring with N, P and K.

1. BASAL CONDITIONS:

2. TREATMENTS:
   Same as in expt. no. 56(1) on page 251.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 4 main-plots/block, 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) Gross: 42 plants (63’x54’). Net: 20 plants (45’x36’).  (v) One row all round the net plot (vi) Yes.

4. GENERAL:
   (i) Good.  (ii) Nil. (iii) Yield of ripe cherry, floats in the harvest and yield of clean coffee.  (iv) (a) 1955—contd.  (b) N.A.  (v) and (vi) Nil.
5. RESULTS:

(i) 6.30 lb./plant. (ii) (a) 1.06 lb./plant. (b) 0.70 lb./plant. (iii) Effect of M is significant. Effect of N and interaction M x N are not significant. (iv) Av. yield of coffee in lb./plant.

<table>
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<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
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<tr>
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<td>6.70</td>
<td>6.40</td>
<td>6.15</td>
<td>5.96</td>
<td>6.30</td>
</tr>
</tbody>
</table>

S.E. of difference of two:
1. N marginal means = 0.43 lb./plant.
2. M marginal means = 0.28 lb./plant.
3. M means at the same level of N = 0.58 lb./plant.
4. N means at the same level of M = 0.65 lb./plant.

(i) 4.22 lb./plant. (ii) (a) 1.36 lb./plant. (b) 1.31 lb./plant. (iii) None of the effects is significant. (iv) Av. yield of coffee in lb./plant.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
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<th>N3</th>
<th>N4</th>
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<td>2.57</td>
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<tr>
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<td>4.53</td>
<td>5.00</td>
<td>5.03</td>
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<tr>
<td>Mean</td>
<td>4.66</td>
<td>3.89</td>
<td>3.76</td>
<td>4.57</td>
<td>4.22</td>
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</table>

S.E. of difference of two:
1. N marginal means = 0.55 lb./plant.
2. M marginal means = 0.54 lb./plant.
3. M means at the same level of N = 1.07 lb./plant.
4. N means at the same level of M = 1.08 lb./plant.

Crop: Robusta Coffee. Ref: K. 58 and 59(5).
Site: Krishna Estate, Kalpetta, Wynaad. Type: ‘M’.

Object: To find out the response to manuring with N, P and K.

1. BASAL CONDITIONS:
(i) G.L. and compost were applied occasionally. (ii) (a) Reddish coloured latosol and gravelly laterite. (b) N.A. (iii) By seedling. (iv) Robusta (Imported.). (v) 1940. Square method of planting at a spacing of 9’ x 9’. (vi) 18 months. (vii) Nil. (viii) 2 or 3 weedings, 3 scufflings in May—June, Sept. and Nov.—Dec. (ix) Pepper vines in few plots. (x) Rainfed. (xi) About 105”.

2. TREATMENTS:
Same as in exp. no. 56(1) on page 251.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block, 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) Gross: 42 plants, (63’ x 54’). Net: 20 plants (45’ x 36’). (v) One row around the net plot. (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) Shot pole borer attacking the tender shoots; controlled by limiting shade and weeding and by removal and burning of attacked branches. (iii) Yield of ripe cherry, floats in the harvest and yield of clean coffee. (iv) a) 1955—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
1958
(i) 6.30 lb./plant. (ii) (a) 2.76 lb./plant. (b) 1.23 lb./plant. (iii) None of the effects is significant. (iv) Av. yield of coffee in lb./plant.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
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<th>Mean</th>
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<td>5.97</td>
<td>7.02</td>
<td>6.32</td>
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<td>M4</td>
<td>5.76</td>
<td>7.48</td>
<td>5.93</td>
<td>5.02</td>
<td>6.05</td>
</tr>
</tbody>
</table>

Mean   6.04 6.86 6.16 6.12 6.30

S.E. of difference of two
1. N marginal means 1.13 lb./plant.
2. M marginal means 0.50 lb./plant.
3. M means at the same level of N 1.01 lb./plant.
4. N means at the same level of M 1.43 lb./plant.

1959
(i) 4.04 lb./plant. (ii) (a) 1.03 lb./plant. (b) 1.03 lb./plant. (iii) None of the effects is significant. (iv) Av. yield of coffee in lb./plant.

<table>
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<th>N3</th>
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Mean   3.68 4.11 4.49 3.87 4.04

S.E. of difference of two
1. N marginal means 0.42 lb./plant.
2. M marginal means 0.42 lb./plant.
3. M means at the same level of N 0.84 lb./plant.
4. N means at the same level of M 0.54 lb./plant.

Crop: Robusta Coffee.
Site: Maniancode Estate, Kalpetta, Wynaad.
Ref.: K. 57(6).
Type: 'M'.
Object: To find out the response of Coffee to manuring with N, P and K.

1. BASAL CONDITIONS:
(i) N.A. (ii) (a) Reddish coloured latosol. (b) N.A. (iii) By seedling. (iv) Robusta. (v) Date of planting N.A. Square method of planting at a spacing of 9'x9'. (vi) N.A. (vii) Nill. (viii) Weeding, sucker- ing, handling of manures, shade regulation and scuffling. (ix) Nill. (x) Rainfed. (xi) 98.00°. (xii) 1957.
2. TREATMENTS:

(I) 40 lb. N+30 lb. P<sub>2</sub>O<sub>5</sub>+40 lb. K<sub>2</sub>O per acre.
(2) 60 lb. N+30 lb. P<sub>2</sub>O<sub>5</sub>+40 lb. K<sub>2</sub>O per acre.
(3) 60 lb. N+45 lb. P<sub>2</sub>O<sub>5</sub>+30 lb. K<sub>2</sub>O per acre.
(4) 80 lb. N+60 lb. P<sub>2</sub>O<sub>5</sub>+80 lb. K<sub>2</sub>O per acre.
(5) 60 lb. N+60 lb. P<sub>2</sub>O<sub>5</sub>+80 lb. K<sub>2</sub>O per acre.
(6) 45 lb. N+60 lb. P<sub>2</sub>O<sub>5</sub>+80 lb. K<sub>2</sub>O per acre.

3. DESIGN:

(i) 6x6 L. Sq. (ii) (a) 6. (b) N.A. (iii) 6. (iv) Net : 20 plants (45'x36'). (v) One row all round the net plot. (vi) No.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of ripe cherry, floats in the harvest and yield of clean coffee. (iv) (a) 1956—cond.

5. RESULTS:

(i) 117 lb./plot. (ii) 29.6 lb./plot. (iii) Treatment differences are highly significant. (iv) Av. yield of coffee in lb./plot.

<table>
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<th>Treatment</th>
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<th>3</th>
<th>4</th>
<th>5</th>
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<td>116</td>
<td>127</td>
<td>117</td>
<td>126</td>
<td>111</td>
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<td>S.E./mean</td>
<td>= 11.1 lb./plot.</td>
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<td></td>
</tr>
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</table>


Object: To find out the response of Coffee to manuring with N, P and K.

1. BASAL CONDITIONS:


2. TREATMENTS:

(1) 60 lb./ac. of N as A/S.
(2) 60 lb./ac. of N as A/S+45 lb./ac. of P<sub>2</sub>O<sub>5</sub> as Hyper Phos.
(3) Tr. 1+60 lb./ac of K<sub>2</sub>O as Mur. of Pot.
(4) 45 lb./ac. of P<sub>2</sub>O<sub>5</sub> as Hyper Phos+33 lb./ac. of K<sub>2</sub>O as Mur. of Pot.
(5) Tr. 2+60 lb./ac of K<sub>2</sub>O as Mur. of Pot.
(6) Control.

3. DESIGN:

(i) 6x6 L. Sq. (ii) (a) 6. (b) N.A. (iii) 6. (iv) Net : 20 plants (45'x36'). (v) One row all round the net plot. (vi) Yes.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Yield of ripe cherry, floats in the harvest and yield of clean coffee. (iv) (a) 1956—cond.

5. RESULTS:

(i) 133 lb./plot. (ii) 29.6 lb./plot. (iii) Treatment differences are highly significant. (iv) Av. yield of coffee in lb./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>168</td>
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<tr>
<td>S.E./mean</td>
<td>= 12.1 lb./plot.</td>
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Crop: Robusta Coffee. Ref: K. 58 and 59(8).
Site: Maniancode Estate, Kalpetta, Wynad. Type: 'M'.

Object: To find out the response of Coffee to manuring with N, P and K—Series I.

1. BASAL CONDITIONS:
   (i) N.A. Only G.L. and compost were applied occasionally. (ii) Reddish coloured latosol—Red loam.
   (b) N.A. (iii) By seedlings. (iv) Robusta (imported). (v) The trees were 11 years old at the commencement of the experiment in 1955; square method of planting at a spacing of 8' x 8'. (vi) 18 months. (vii) Nil.
   (viii) 2 or 3 weedings, 3 scufflings (May-June, Sept. and Nov.-Dec.). (ix) Pepper vines in few plots. (x) Rainfed. (xi) 100°—110°. (xii) Beginning of Jan. to end of Feb.

2. TREATMENTS:
   1. 40 lb./ac. of N + 30 lb./ac. of P 0 6 + 40 lb./ac. of K 0 6.
   2. 60 lb./ac. of N + 30 lb./ac. of P 0 6 + 40 lb./ac. of K 0 6.
   3. 80 lb./ac. of N + 45 lb./ac. of P 0 6 + 60 lb./ac. of K 0 6.
   4. 60 lb./ac. of N + 60 lb./ac. of P 0 6 + 80 lb./ac. of K 0 6.
   5. 40 lb./ac. of N + 60 lb./ac. of P 0 6 + 60 lb./ac. of K 0 6.

3. DESIGN:
   (i) 6 x 6 L. Sq. (ii) 6. (b) N.A. (iii) 6. (iv) Gross: 42 plants; Net: 20 plants. (v) One row all round the net plot. (vi) N.A.

4. GENERAL:
   (i) Satisfactory. (ii) Shoot-borer attacking the tender shoots—controlled by limiting shade, weeding and by the removal and burning of the attacked branches. (iii) Yield of ripe cherry, floats in harvest and yield of clean coffee. (iv) (a) 1955—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
   1988
   (i) 67.56 lb./plot. (ii) 15.15 lb./plot. (iii) Treatment differences are not significant. (iv) Av. yield (adjusted) of coffee in lb./plot.

   Treatment  
   1  2  3  4  5  6  
   Av. yield 72.35 67.74 75.18 56.73 67.08 66.27  
   S.E./mean (adjusted) = 6.27 lb./plot.

   1959
   (i) 91.28 lb./plot. (ii) 13.12 lb./plot. (iii) Treatment differences are not significant. (iv) Av. yield (adjusted) of coffee in lb./plot.

   Treatment  
   1  2  3  4  5  6  
   Av. yield 86.54 85.15 99.35 91.02 93.14 92.46  
   S.E./mean = 6.33 lb./plot.

---

Crop: Robusta Coffee. Ref: K. 58 and 59(9).
Site: Maniancode Estate, Kalpetta, Wynad. Type: 'M'.

Object: To find out the response of Coffee to manuring with N, P and K—Series II.

1. BASAL CONDITIONS:
   (i) N.A. Only G.L. and compost were applied occasionally. (ii) Reddish coloured latosol—Red loam.
   (b) N.A. (iii) By seedlings. (iv) Robusta (imported). (v) The trees were 11 years old at the commencement of the experiment in 1955; square method of planting at a spacing of 8' x 8'. (vi) N.A. (vii) Nil. (viii) 2 or 3 weedings, 3 scufflings (May-June, Sept. and Nov.-Dec.). (ix) Pepper vines in few plots. (x) Rainfed. (xi) 100°—110°. (xii) 1st Jan. to 28th Feb.
2. TREATMENTS:
1. 60 lb./ac. of N.
2. 60 lb./ac. of N+45 lb./ac. of P₂O₅.
3. 60 lb./ac. of N+60 lb./ac. of K₂O.
4. 45 lb./ac. of P₂O₅+60 lb./ac. of K₂O.
5. 60 lb./ac. of N+45 lb./ac. of P₂O₅+60 lb./ac. of K₂O.
6. Control.

3. DESIGN:
(i) 6'x6' L. Sq. (ii) (a) 6. (b) N.A. (iii) 6. (iv) Gross : 42 plants ; Net : 20 plants. (v) One row around the net plot. (vi) No.

4. GENERAL:
(i) Satisfactory. (ii) Shoot-borer attacking the tender shoots—controlled by limiting shade, weeding and by removal and burning of attacked branches. (iii) Yield of ripe cherry, floats in the harvest and yield of clean coffee. (iv) (a) 1955—contd. (b) N.A. (v) to (vii) Nil.

5. RESULTS:
1958
(i) 85.73 lb./plot. (ii) 20.89 lb./plot. (iii) Treatment differences are significant. (iv) Av. yield (adjusted) of coffee in lb./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>77.39</td>
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<td>97.60</td>
<td>96.11</td>
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<tr>
<td>S.E./mean</td>
<td>8.71 lb./plot.</td>
<td></td>
<td></td>
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<td></td>
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</table>

1959
(i) 78.45 lb./plot. (ii) 15.14 lb./plot. (iii) Treatment differences are highly significant. (iv) Av. yield (adjusted) of coffee in lb./plot.

<table>
<thead>
<tr>
<th>Treatment</th>
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<tr>
<td>Av. yield</td>
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<td>88.82</td>
<td>73.01</td>
<td>85.68</td>
<td>85.15</td>
<td>49.41</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>6.28 lb./plot</td>
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</table>

Crop = Robusta Coffee.  Ref = K. 56 and 57(10).
Site = North Carolina Estate, Kalpetta, Wynad. Type = 'M'.
Object = To find out the response of Coffee to manuring with N, P and K.

1. BASAL CONDITIONS:
(i) N.A. (ii) (a) Reddish coloured latosol. (b) N.A. (iii) By seedlings. (iv) Robusta. (v) Date of planting N.A., square method of planting at a spacing of 10'x10'. (vi) N.A. (vii) Nil. (viii) Weeding, suckering, application of manures, shade regulation and scuffling. (ix) Nil. (x) Rainfed. (xi) and (xii) N.A.

2. TREATMENTS:
Same as in exp. no. 56(1) on page 251.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block ; 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) Gross : 42 plants (10'x60') ; Net : 20 plants (50' x 40'). (v) One row around the net plot. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of ripe cherry, floats in the harvest and yield of clean coffee. (iv) (a) 1955—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
1956
(i) 8.23 lb./plant. (ii) (a) 4.37 lb./plant. (b) 1.70 lb./plant. (iii) Main effect of M is significant. Main effect of N and interaction N x M are not significant. (iv) Av. yield of coffee in lb./plant.
Crop: Robusta Coffee.  
Ref: K. 58 and 59(11).  
Site: North Carolina Estate, Kalpetta, Wynad. Type: "M".  
Object: To determine the response of Coffee to manuring with N, P and K.

1. BASAL CONDITIONS:  
(i) N.A., only G.L. was applied occasionally. (ii) (a) Reddish coloured latossol—Red loam. (b) N.A. (iii) By seedlings. (iv) Robusta—Imported. (v) 6 to 7 years at the beginning of the exp. in 1955; sq. method of planting at 10'x10' spacing for rep. I and II and 9'x9' for rep. III. (vi) 18 months. (vii) Nil. (viii) 2 or 3 weedings 3 scufflings May-June, Sept. and Nov.-Dec. (ix) Pepper vines in few plots. (x) Rainfed. (xi) 110-130°. (xii) Beginning of Jan. to the end of Feb.

2. TREATMENTS:  
Same as in exp. no. 56(1) on page 251.

3. DESIGN:  
(i) Split-plot. (ii) 4 main-plots/block and 4 sub-plots/main-plot. (iii) 3. (iv) Gross: 42 plants; Net: 20 plants. (v) One row around the net plot. (vi) Yes.

4. GENERAL:  
(i) Satisfactory. (ii) Shoot-borer attacking the tender-shoot—controlled by limiting shade, weeding and by removal and burning of attacked branches. Yield of ripe cherry, floats in the harvest and yield of clean coffee. (iii) (a) 1955—contd. (b) N.A. (v) and (vi) Nil.

<table>
<thead>
<tr>
<th></th>
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<th>N₃</th>
<th>N₄</th>
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<tr>
<td>M₂</td>
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<td>7.52</td>
<td>7.94</td>
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</table>

S.E. of difference of two  
1. N marginal means  
2. M marginal means  
3. M means at the same level of N  
4. N means at the same level of M

1957  
(i) 4.74 lb./plant.  
(ii) (a) 2.60 lb./plant.  
(b) 1.53 lb./plant.  
(iii) Only effect of M is significant.  
(iv) Av. Yield of coffee in lb./plant.

<table>
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<tr>
<th></th>
<th>N₁</th>
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<td>M₂</td>
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<td>4.17</td>
<td>4.93</td>
<td>4.11</td>
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<tr>
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<td>5.93</td>
<td>4.74</td>
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S.E. of difference of two  
1. N marginal means  
2. M marginal means  
3. M means at the same level of N  
4. N means at the same level of M

---
5. RESULTS:

1958

(i) 14.78 lb./plant.  (ii) (a) 4.79 lb./plant.  (b) 3.37 lb./plant.  (iii) None of the effects is significant.  (iv) Av. yield of coffee in lb./plant.

<table>
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<td>13.32</td>
<td>17.03</td>
<td>16.76</td>
<td>14.29</td>
</tr>
<tr>
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<td>11.30</td>
<td>12.82</td>
<td>16.57</td>
<td>18.57</td>
<td>15.82</td>
</tr>
<tr>
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<td>13.47</td>
<td>13.65</td>
<td>22.06</td>
<td>15.08</td>
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<tr>
<td>Mean</td>
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<td>13.74</td>
<td>15.71</td>
<td>18.19</td>
<td>14.78</td>
</tr>
</tbody>
</table>

S.E. of difference of two

1. N marginal means = 1.96 lb./plant.
2. M marginal means = 1.38 lb./plant.
3. M means at the same level of N = 2.76 lb./plant.
4. N means at the same level of M = 3.09 lb./plant.

1959

(i) 2.67 lb./plant.  (ii) (a) 1.53 lb./plant.  (b) 0.92 lb./plant.  (iii) None of the effects is significant.  (iv) Av. yield (adjusted) of coffee in lb./plant.

<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>3.66</td>
<td>2.52</td>
<td>2.92</td>
</tr>
<tr>
<td>M2</td>
<td>2.54</td>
<td>2.70</td>
<td>3.45</td>
<td>1.98</td>
<td>2.67</td>
</tr>
<tr>
<td>M3</td>
<td>2.21</td>
<td>3.06</td>
<td>2.34</td>
<td>2.63</td>
<td>2.56</td>
</tr>
<tr>
<td>M4</td>
<td>3.09</td>
<td>2.31</td>
<td>2.07</td>
<td>2.67</td>
<td>2.73</td>
</tr>
<tr>
<td>Mean</td>
<td>2.72</td>
<td>2.63</td>
<td>2.38</td>
<td>2.45</td>
<td>2.67</td>
</tr>
</tbody>
</table>

S.E. of difference of two

1. N marginal means = 0.62 lb./plant.
2. M marginal means = 0.38 lb./plant.
3. M means at the same level of N = 0.75 lb./plant.
4. N means at the same level of M = 0.90 lb./plant.

Crop :- Robusta Coffee.  
Site :- Pathiripara Estate, Kalpetta, Wynad.  
Type :- 'M'.

Object: —To find out the response of Coffee to manuring with N, P and K.

1. BASAL CONDITIONS:


2. TREATMENTS:

Same as in expt. no. 56(1) on page 251.

3. DESIGN:

(i) Split-plot.  (ii) (a) 4 main-plots/block ; 4 Sub-plots/main-plot.  (b) N.A.  (iii) 3.  (iv) Gross : 42 plants (63'x54').  Net : 20 plants (45'x36').  (v) One row all round the net plot discarded.  (vi) Yes.
4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of ripe cherry, floats in the harvest and yield of clean coffee. (iv) (a) 1955—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

1956
(i) 14.68 lb./plant. (ii) (a) 3.50 lb./plant. (b) 2.59 lb./plant. (iii) Only interaction N x M is significant. (iv) Av. yield of coffee in lb./plant.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
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<th>N4</th>
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<td>13.23</td>
<td>15.32</td>
<td>15.01</td>
<td>15.17</td>
<td>14.68</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. N marginal means = 1.42 lb./plant.
2. M marginal means = 0.94 lb./plant.
3. M means at the same level of N = 1.88 lb./plant.
4. N means at the same level of M = 2.17 lb./plant.

1957
(i) 5.16 lb./plant. (ii) (a) 1.37 lb./plant. (b) 0.98 lb./plant. (iii) Only interaction N x M is significant. (iv) Av. yield of coffee in lb./plant.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>Mean</th>
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<td>4.83</td>
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S.E. of difference of two
1. N marginal means = 0.56 lb./plant.
2. M marginal means = 0.37 lb./plant.
3. M means at the same level of N = 0.74 lb./plant.
4. N means at the same level of M = 0.85 lb./plant.

Crop: Robusta Coffee.
Site: Pathiripara Estate, Kalpetta, Wynad.
Ref.: K. 58 and 59(13).
Type: 'M'.

Object: To find out the response of Coffee to manuring with N, P and K.

1. BASAL CONDITIONS:
(i) N.A. Only C.L. (ii) (a) Reddish coloured latosol—clayey. (b) N.A. (iii) By seedlings. (iv) Robusta (imported). (v) The trees were 12 to 16 years old at the commencement of the expt. in 1955; square method of planting, with 9' x 9' spacing. (vi) 18 months. (vii) Nil. (viii) 2 or 3 weedings, 3 scuffings (May-June, Sept. and Nov.-Dec.). (ix) Pepper vines in a few plots. (x) Rainfed. (xi) 100 hours. (xii) Beginning of Jan. to Feb. end.

2. TREATMENTS:
Same as in expt. no. 56(I) on page 251.
3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block, 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) Gross : 42 plants; Net : 20 plants (45'x36'). (v) One row around the net plot. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Shoot-borer attacking the tender shoots—controlled by limiting shade, weeding and by removal and burning of attacked branches. (iii) Yield of ripe cherry, floats in harvest and yield of clean coffee. (iv) (a) 1955—could. (b) Nil. (v) and (vi) Nil.

5. RESULTS:
(i) 13.28 lb/plant. (ii) (a) 5.55 lb/plant. (b) 3.45 lb/plant. (ii) Only interaction N x M is significant. (iv) Av. yield of coffee in lb/plant.

<table>
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<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>Mean</th>
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<td>12.76</td>
<td>11.82</td>
<td>15.66</td>
<td>13.28</td>
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</table>

S.E. of difference of two
1. N marginal means = 2.36 lb/plant.
2. M marginal means = 1.44 lb/plant.
3. M means at the same level of N = 2.82 lb/plant.
4. N means at the same level of M = 3.32 lb/plant.

5. RESULTS:
(i) 6.70 lb/plant. (ii) (a) 2.39 lb/plant. (b) 2.21 lb/plant. (iii) None of the effects is significant. (iv) Av. yield of coffee in lb/plant.

<table>
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<tr>
<th></th>
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S.E. of difference of two
1. N marginal means = 0.98 lb/plant.
2. M marginal means = 0.50 lb/plant.
3. M means at the same level of N = 1.81 lb/plant.
4. N means at the same level of M = 1.84 lb/plant.

**Crop:** Coconut.  
**Site:** Central Coconut Res. Stn., Kasaragod.  
**Object:** To determine the response of Coconut to combinations of N, P and K with and without a green manure crop grown in between Coconut trees.  
**Ref:** K. 54 to 58(1).  
**Type:** 'M'.
1. **BASAL CONDITIONS**:

(i) Part of the area was under different expt. 3 years prior to this expt. no manuring had been done. (ii) (a) Red loam. (b) Refer soil analysis, Kasaragod. (iii) Acquired plantation—seed propagation. (iv) Ordinary tall variety of the west coast. (v) Plantation was raised by cultivators. Spacings vary from 25' to 30'. (vi) N.A. (vii) Nil. (viii) 2 ploughings and 2 hoeings. (ix) Nil. (x) Unirrigated. (xi) 141.7" in 1954, 158.8" in 1955, 151.5" in 1956, 134.8" in 1957 and 130.5" in 1958. (xii) One harvest each month.

2. **TREATMENTS**:

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

1. 3 levels of N as A/S: N₀ = 0, N₁ = 0.75 lb./tree and N₂ = 1.50 lb./tree per year.
2. 3 levels of P₂O₅ as Super: P₀ = 0, P₁ = 0.75 lb./tree and P₂ = 1.50 lb./tree per year.
3. 3 levels of K₂O as Muri. Pot.: K₀ = 0, K₁ = 0.75 lb./tree. and K₂ = 1.50 lb./tree. per year.
4. 2 levels of O.M.: G₀ = G.M. and G₁ = G.M. crop sown and incorporated in the field.

Manure was applied in shallow basins 5' to 6' in radius and 6' to 9' deep dug round the base of the trees and covered with soil.

3. **DESIGN**:

(i) 3³×2 confd. (ii) 6 plots/block ; 9 blocks/replication. (b) N.A. (iii) 2. (iv) Sample of 4 trees randomly selected. (v) No. (vi) Yes.

4. **GENERAL**:

(i) Normal. (ii) Slight attack of rats and rhinoceros beetle. (iii) Yield of nuts, no. of female flowers and leaves. (iv) (a) 1953—contd. (b) N.A. (v) Nil. (vi) In 1954, a few trees died due to lightning in first replication.

5. **RESULTS**:

1954

<table>
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<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>K₀</th>
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<tr>
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<td>196</td>
<td>190</td>
<td></td>
</tr>
</tbody>
</table>

S.E. of marginal mean of N, P or K = 8.8 nuts/4 trees.
S.E. of marginal mean of G = 7.1 nuts/4 trees.
S.E. of body of N×P, N×K or P×K table = 17.5 nuts/4 trees.
S.E. of body of N×G, P×G or K×G table = 12.4 nuts/4 trees.

1955

(i) 239 nuts/4 trees. (ii) 47.34 nuts/4 trees. (iii) Main effect of N alone is highly significant. (iv) Av. number of nuts/4 trees.
### 1956

(i) 235 nuts/4 trees.  (ii) 43.44 nuts/4 trees.  (iii) Interaction \( K \times G \) is highly significant and \( N \times F \times G \) is significant. Others are not significant.  (iv) Av. number of nuts/4 trees.

<table>
<thead>
<tr>
<th></th>
<th>( N_0 )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( P_0 )</th>
<th>( P_1 )</th>
<th>( P_2 )</th>
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</table>

S.E. of marginal mean of \( N, P \) or \( K \) = 7.0 nuts/4 trees.
S.E. of marginal mean of \( G \) = 6.4 nuts/4 trees.
S.E. of body of \( N \times P, N \times K \) or \( P \times K \) table = 15.8 nuts/4 trees.
S.E. of body of \( N \times G, P \times G \) or \( K \times G \) table = 11.2 nuts/4 trees.

### 1957

(i) 213 nuts/4 trees.  (ii) 44.66 nuts/4 trees.  (iii) None of the effects is significant.  (iv) Av. number of nuts/4 trees.

<table>
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<tr>
<th></th>
<th>( N_0 )</th>
<th>( N_1 )</th>
<th>( N_2 )</th>
<th>( P_0 )</th>
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<th>( P_2 )</th>
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</table>
1958

Mean


(i) 236 nuts/4 trees. (ii) 49.40 nuts/4 trees. (iii) Main effects of N and K are highly significant. Main effect of P and interaction N×P×K are significant. (iv) Av. number of nuts/4 trees.

<table>
<thead>
<tr>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>K0</th>
<th>K1</th>
<th>K2</th>
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<td>245</td>
<td>248</td>
<td>236</td>
</tr>
</tbody>
</table>

S.E. of marginal mean of N, P or K = 7.8 nuts/4 trees.
S.E. of marginal mean of G = 6.4 nuts/4 trees.
S.E. of body of N×P, N×K or P×K table = 15.6 nuts/4 trees.
S.E. of body of N×G, P×G or K×G table = 11.0 nuts/4 trees.

Crop :- Coconut. Ref :- K, 56 to 58(2).
Site :- Central Coconut Res. Stn., Kasaragod. Type :- ‘M’.

Object :-To study the relative response of the Coconut palms to N applied in different forms.

1. BASAL CONDITIONS:
   (i) The trees were under uniform manurial and cultural operations. (ii) (a) Sandy loam. (b) Refer soil analysis, Kasaragod. (iii) Ordinary tall west coast. (v) No systematic method of planting with 30' spacing. (vi) 1 year. (vii) Nil. (viii) 2 ploughings and a junior hoe. (ix) Unirrigated. (xi) 151', 135', 130' in 1956, 1957, 1958 on 132, 114 and 104 rainy days respectively, (xii) Monthly harvest.

2. TREATMENTS:
9 manurial treatments: M₀=Control (no manure). M₁=Urea, M₂=Urea, M₃=M₄=Urea, M₅=A/S/N, M₆=M₇=Cal. Cyanamide and M₈=G.N.C. 1 lb./tree of N, 1/2 lb./tree of P₂O₅ as Super and 1.0 lb./tree of K₂O as Muriate. were applied to all plots. Manures applied in Aug.-Sept. in basins of 6" radius and 9" deep dug round the base of trees.

8. DESIGN:
   (i) C.R.D. (ii) (a) 9 (b) N.A. (iii) 5. (iv) 1 tree. (v) Nil. (vi) No.

4. GENERAL:
   (i) Satisfactory. (ii) Rhinoceros beetle; regularly searched and killed. (iii) No. of nuts, no. female flowers and setting %. No. of leaves on the crown, girth below crown and height measurements. (iv) (a) 1956—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
1956
   (i) 65.1 nuts/4 trees. (ii) 77.83 nuts/4 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/4 trees.
## Crop: Coconut.  
Ref: K. 57 to 59(3).  
Site: Central Coconut Res. Stn., Kasaragod.  
Type: 'M'.

Object: To study the effect of application of manures to Coconut palms.

### 1. BASAL CONDITIONS:

1. The area received uniform manural and cultural operations.
2. Red loam.
3. By seedlings.
4. Ordinary tall west coast.
5. No systematic method of planting; 30 spacing.
6. 1957, 1958, 1959 on 114, 104 and 135 rainy days respectively.

### 2. TREATMENTS:

1. Control
2. Application of manures in basins.
3. Opening basins only.
5. Forming mummarty holes alone.
6. Application of manures by broadcasting and covering by ploughing.
7. Ploughing alone.

Manures applied per tree at 1 lb. of N as A/5 + 0.5 lb. of P₂O₅ as Super + 1.0 lb. of K₂O as Mur. Pot. Manures applied in August and September.

### 3. DESIGN:

1. R.B.D.
2. (a) 7, (b) N.A.  (c) 4.
3. (v) N.A.  (vi) Yes.

### 4. GENERAL:

1. Satisfactory.
2. Rhinoceros beetle regularly watched and killed.
3. No. of nuts, no. of female flowers and percentage setting, no. of leaves in the crown, girth below crown and height.

### 5. RESULTS: 1957

284.3 nuts/5 trees. (ii) 75.4 nuts/5 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/5 trees.

<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>
<th>M₈</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>62.2</td>
<td>77.7</td>
<td>74.9</td>
<td>59.0</td>
<td>65.2</td>
<td>62.0</td>
<td>72.8</td>
<td>60.0</td>
<td>51.3</td>
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<tr>
<td>S.E./mean</td>
<td>11.4 nuts/tree.</td>
<td></td>
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</tbody>
</table>

(1) 53.0 nuts/tree. (ii) 18.9 nuts/tree. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/tree.

<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>
<th>M₈</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>63.6</td>
<td>45.1</td>
<td>50.0</td>
<td>51.0</td>
<td>58.5</td>
<td>51.5</td>
<td>43.1</td>
<td>47.5</td>
<td>55.7</td>
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<td>S.E./mean</td>
<td>7.7 nuts/tree.</td>
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</table>

(1) 68.6 nuts/tree. (ii) 22.9 nuts/tree. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/tree.
1958

(i) 295.1 nuts/5 trees. (ii) 59.6 nuts/5 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/5 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tr>
<td>Av. yield</td>
<td>301.5</td>
<td>274.0</td>
<td>291.5</td>
<td>315.0</td>
<td>274.5</td>
<td>308.0</td>
<td>301.5</td>
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<tr>
<td>S.E./mean</td>
<td>29.8 nuts/5 trees.</td>
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</table>

1959

(i) 292.2 nuts/5 trees. (ii) 72.5 nuts/5 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/5 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tr>
<td>Av. yield</td>
<td>326.8</td>
<td>253.5</td>
<td>231.3</td>
<td>328.8</td>
<td>270.5</td>
<td>370.0</td>
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<tr>
<td>S.E./mean</td>
<td>36.3 nuts/5 trees.</td>
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</table>

Crop: Coconut.  
Site: Central Coconut Res. Stn., Kayamkulam.  
Ref: K. 54 to 59 (4).  
Type: 'M'.

Object: To study the effect of application of micro-nutrients in controlling the root and leaf disease of Coconut palm.

1. BASAL CONDITIONS:

(i) The area (a diseased coconut garden) was acquired in 1947. There was no regular manuring and cultivation till then. (ii) (a) Sandy. (b) Refer soil analysis, Kayamkulam. (iii) Naturally cross pollinated seed. (iv) Ordinary tall west coast. (v) N.A. Av. spacing 25'. (vi) N.A. (vii) For the years 1954, 1955 and 1959: 0.75 lb./tree per year of N as G.N.C., 0.75 lb./tree per year of P as ground B.M., 1.50 lb./tree per year of K as Pot. Sut.; 224 lb./ac. of lime per year and sannhemp as G.M. raised in situ. G.M. sown sufficiently early and lime applied during preparatory cultivation., G.M. crop is pulled out, chopped and N, P and K broadcast uniformly and then ploughed in. For other years: (viii) Two ploughings with country plough, piling up mounds and strengthening bunds and to control weeds. (ix) Nil. (x) Unirrigated. (xi) 90". (xii) Eight harvests in a year at intervals of 45 days.

2. TREATMENTS:

All combinations of (1), (2), (3), (4), (5), (6) and (7):

(1) 2 levels of Mg as Mg. Sulf.: A0 = 0 and A1 = 0.100 lb./tree.
(2) 2 levels of B as Sod. Bor.: B0 = 0 and B1 = 0.057 lb./tree.
(3) 2 levels of Cu as C/S: C0 = 0 and C1 = 0.125 lb./tree.
(4) 2 levels of Mn as Ferrous Sulf.: E0 = 0 and E1 = 0.125 lb./tree.
(5) 2 levels of Zn as Zn. Sulf.: G0 = 0 and G1 = 0.133 lb./tree.
(6) 2 levels of Mo as Amm. Molybdate: F0 = 0 and F1 = 1.000 gms/tree.
(7) 2 levels of Fe as Ferrous Sulf.: D0 = 0 and D1 = 0.125 lb./tree.

The salts were powdered, mixed and broadcast uniformly in shallow belt 1½" away from the trunk of trees up to a radius of 5" and the area is forked well.

3. DESIGN:

(i) 22 conf'd., with interactions ABC, CDE, ADP, BPE, BDG, AEG, CPG, ABDE, BCDF, ACDF, BCED, ABFG, DEFG and ABCDEFG. (ii) (a) 8 plots/block and 16 blocks/replication. (b) N.A. (iii) and (iv) b. (v) Nil. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Attack of rhinoceros beetle, red palm weevil and rhadinia cater-piller—control measures N.A. (iii) There were 3 categories of trees i.e. healthy trees and trees in early and advanced stages of disease. Observations made: area no. and measurement of leaves, no. of flower bunches and female flowers, shedding of buttons, yield of good and barren nuts. (iv) (a) 1953—contd. (b) N.A. (v) and (vi) Nil.
5. RESULTS:

<table>
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<th>Mean response</th>
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<td>B x D x G is highly significant. Main effect of C and interaction B x G are significant; Main effect of A is highly significant. Interactions B x D, B x E, A x D x E, A x C x G and B x E x G are significant. (iv) Mean and differential responses in nuts/tree.</td>
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h=healthy; e=Early stage disease; a=advanced stage disease.

(b) S.E. of mean response = 3.61 nuts/tree; S.E. of differential response = 5.10 nuts/tree.
(e) S.E. of mean response = 2.67 nuts/tree; S.E. of differential response = 3.78 nuts/tree.
(a) S.E. of mean response = 1.70 nuts/tree; S.E. of differential response = 2.40 nuts/tree.
5. RESULTS (Contd.)

(iii) (h): Interaction A × F and B × C × F are significant; (e): Main effect of C and interaction E × F × G are significant; (a): Main effect of A alone is highly significant.

Mean and differential responses in nuts/tree.

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Mean and differential responses: (a) = 2.10 nuts/tree; (b) = 5.31 nuts/tree; (c) = 3.10 nuts/tree.
5. RESULTS: (Contd.)

(i) (b): 61.85 nuts/tree; (c): 37.76 nuts/tree; (a): 23.01 nuts/tree. (ii) (h): 27.45 nuts/tree; (e): 23.34 nuts/tree; (a): 18.72 nuts/tree. (iii) (h): Interaction C × E is highly significant. Interaction A × G is significant; (e): None of the effects is significant; (a) Main effect of A is highly significant. (iv) Mean and differential responses in nuts/tree.

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Differential responses

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| (h) S.E. of mean response | = 3.43 nuts/tree; S.E. of differential response | = 4.85 nuts/tree. |
| (e) S.E. of mean response | = 2.92 nuts/tree; S.E. of differential response | = 4.13 nuts/tree. |
| (a) S.E. of mean response | = 2.34 nuts/tree; S.E. of differential response | = 3.31 nuts/tree. |
5. RESULTS: (Contd.)

1957

(i) (h) 56.04 nuts/tree; (e) 33.07 nuts/tree; (a): 20.38 nuts/tree.

(ii) (h) 26.06 nuts/tree; (e): 22.66 nuts/tree; (a): 17.24 nuts/tree.

(iii) Interaction $\text{DXG}$ is highly significant. Interaction $A \times C$, $B \times D$ and $A \times F \times G$ are significant.

(iv) Mean and differential responses in nuts/tree.

Differential responses

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(b) S.E. of mean response = 3.26 nuts/tree; S.E. of differential response = 4.61 nuts/tree.

(c) S.E. of mean response = 2.83 nuts/tree; S.E. of differential response = 4.00 nuts/tree.

(a) S.E. of mean response = 2.16 nuts/tree; S.E. of differential response = 3.05 nuts/tree.
5. RESULTS: (Contd.)

1958

(i) (h): 55.22 nuts/tree; (e): 30.95 nuts/tree (a): 17.49 nuts/tree (ii) (h): 30.51 nuts/tree; (e): 23.88 nuts/tree; (a): 16.38 nuts/tree (iii) (h): Interaction AXG is significant. (e): Interactions BXG and EX F X G are significant; (a): Main effect of A alone is highly significant. (iv) Mean and differential responses in nuts/tree.

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(b) S.E. of mean response = 3.81 nuts/tree; S.E. of differential response = 5.39 nuts/tree

(c) S.E. of mean response = 2.98 nuts/tree; S.E. of differential response = 4.22 nuts/tree

(a) S.E. of mean response = 2.05 nuts/tree; S.E. of differential response = 2.90 nuts/tree
5. RESULTS: (Contd).

1959

(i) (b): 59.78 nuts/tree; (e): 56.34 nuts/tree; (a): 23.02 nuts/tree. (ii) (b): 34.38 nuts/tree; (e): 24.69 nuts/tree; (a): 21.81 nuts/tree. (iii) (b): Interactions B×F and C×D×F are significant; (e): Main effect A is highly significant. Interactions B×F and C×G are significant; (a): Main effect A alone is highly significant. (iv) Mean and differential responses in nuts/tree.

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<td>1.12</td>
<td>−0.64</td>
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</tbody>
</table>

(b) S.E. of mean response = 4.27 nuts/tree; S.E. of differential response = 0.64 nuts/tree.

(c) S.E. of mean response = 3.09 nuts/tree; S.E. of differential response = 4.36 nuts/tree.

(a) S.E. of mean response = 2.75 nuts/tree; S.E. of differential response = 3.86 nuts/tree.
Crop: Coconut Palm.  Ref: K. 54 to 59(5).

Site: Reg. Coconut Res. Stn., Kumarakom.  Type: 'M'.

Object: To find the optimum dose of manure on reclaimed clayey soil of the back water area for Coconut.

1. BASAL CONDITIONS:
   (i) The area was standardised for three years prior to the exp. and during this period 280 cubic ft./ac. of sand and 10 lb./ac. of ash was applied uniformly. Age of trees range from 20 to 50 years. (ii) (a) Clayey loam. (b) N.A. (iii) By seedlings. (iv) Tipica (ordinary tall). (v) Trees stand on long and narrow bunds with channels. Spacing between 25' to 30'. (vi) N.A. (vii) 280 cubic ft./ac. of river sand 1120 lb./ac. of limo spread uniformly during Oct.-Nov. (viii) Digging the area with local mummattf. (ix) Nil. (x) Unirrigated. (xi) 113.4", 134.7" in 1954, 177.9" in 1955, 137.6" in 1956,137.6" in 1957, N.A. in 1958 and 143.6" in 1959. (xii) 8 harvests in a year at an interval of 45 days.

2. TREATMENTS:
   1. Control.
   2. 0.25 lb. of N+0.25 lb. of P+0.50 lb. of K per tree.
   3. 0.25 lb. of N+0.25 lb. of P+1.00 lb. of K per tree.
   4. 0.50 lb. of N+0.25 lb. of P+1.00 lb. of K per tree.
   5. 0.50 lb. of N+0.50 lb. of P+1.00 lb. of K per tree.
   6. 0.50 lb. of N+0.50 lb. of P+1.50 lb. of K per tree.

   N as A/S, P,O as B.M. and K as Mur. Pot. were applied. Manures applied during August-September in long line trenches of dimensions 10'x3'x1'.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) 8 effective trees. (v) Two guard trees are left. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Attack of rhinocerous beetles, leaf-crit, wilt disease and stem bleeding—beetles were picked out and bordeaux mixture sprayed. (iii) No. of nuts and female flowers, height of trunk and girth of collar and no. of leaves per tree. (iv) (a) 1952—1959. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

1954
   (i) 466 nuts/8 trees. (ii) 67 nuts/8 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/8 trees.

   Treatment 1  2  3  4  5  6
   Av. yield 446 432 436 472 494 514
   S.E./mean = 27 nuts/8 trees.

1955
   (i) 670 nuts/8 trees. (ii) 52 nuts/8 trees. (iii) Treatment differences are significant. (iv) Av. yield of nuts/8 trees.

   Treatment 1  2  3  4  5  6
   Av. yield 540 647 640 703 738 752
   S.E./mean = 21 nuts/8 trees.

1956
   (i) 557 nuts/8 trees. (ii) 63 nuts/8 trees. (iii) Treatment differences are significant. (iv) Av. yield of nuts/8 trees.

   Treatment 1  2  3  4  5  6
   Av. yield 450 508 590 562 621 609
   S.E./mean = 26 nuts/8 trees.

1957
   (i) 526 nuts/8 trees. (ii) 63 nuts/8 trees. (iii) Treatment differences are highly significant. (iv) Av. yield of nuts/8 trees.
Crop: Coconut.  
Type: 'M'.

Object: To find the optimum dose of manure for Coconut trees in red loamy soils.

1. BFSAL CONDITIONS:
(i) The area was receiving mammonm digging since 1948. Sannbemp was raised and buried in this area.
(ii) (a) Red loam. (b) Refer soil analyses. Neyyathinkara. (iii) Seed nuts. (iv) Ordinary tall variety of west coast. (v) Date of planting N.A. Spacing irregular. (vi) N.A. (vii) 50 lb./tree of G.N. was given at the time of applying N and K in shallow trenches. (viii) Making basins around the tree to a radius of 6' and giving mammonm digging. (ix) Nil for 1954 to 1957 and tapioca for the years 1958 and 1959. (x) Unirrigated. (xi) 75° in 1954 to 1956, 60° in the years 1957 to 1959. (xii) 7 harvests in a year at intervals of 45-50 days.

2. TREATMENTS:
M0 = No manure (control).
M1 = 0.25 lb. of N + 0.25 lb. of P₂O₅ + 0.30 lb. of K₂O per tree.
M2 = 0.25 lb. of N + 0.25 lb. of P₂O₅ + 1.00 lb. of K₂O per tree.
M3 = 0.50 lb. of N + 0.25 lb. of P₂O₅ + 1.00 lb. of K₂O per tree.
M4 = 0.50 lb. of N + 0.75 lb. of P₂O₅ + 1.00 lb. of K₂O per tree.
M5 = 0.50 lb. of N + 0.75 lb. of P₂O₅ + 1.50 lb. of K₂O per tree.
N as A/S, P₂O₅ as Super and K₂O as Mur. Pot. were applied.

3. DESIGN:
(i) R.B.D. (ii) (a) 6, (b) N.A. (iii) 6. (iv) Sample of 8 trees selected randomly. (v) Sufficient number of guard rows left. (vi) Yes.

4. GENERAL:
(i) Satisfactory. Drought conditions in 1958. (ii) Nil, (iii) No. of nuts, leaves, female flowers and bunches per tree. (iv) (a) 1952—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

1954
(i) 57.5 nuts/8 trees. (ii) 64.6 nuts/8 trees. (iii) Treatment differences are highly significant. (iv) Av. yield of nuts/8 trees.

<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>374.2</td>
<td>502.7</td>
<td>596.2</td>
<td>617.3</td>
<td>525.2</td>
<td>609.5</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>30.4 nuts/8 trees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1955

(i) 641.5 nuts/8 trees.  (ii) 87.8 nuts/8 trees.  (iii) Treatment differences are highly significant.  (iv) Av. yield of nuts/8 trees.

<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. yield</td>
<td>418.5</td>
<td>581.5</td>
<td>715.3</td>
<td>753.3</td>
<td>678.8</td>
<td>700.8</td>
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</table>

S.E./mean = 35.9 nuts/8 trees.

1956

(i) 472 nuts/8 trees.  (ii) 80 nuts/8 trees.  (iii) Treatment differences are highly significant.  (iv) Av. yield of nuts/8 trees.

<table>
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<th>Treatment</th>
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<th>$M_1$</th>
<th>$M_2$</th>
<th>$M_3$</th>
<th>$M_4$</th>
<th>$M_5$</th>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>291</td>
<td>476</td>
<td>502</td>
<td>530</td>
<td>482</td>
<td>549</td>
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</table>

S.E./mean = 32.0 nuts/8 trees.

1957

(i) 530.3 nuts/8 trees.  (ii) 81.5 nuts/8 trees.  (iii) Treatment differences are highly significant.  (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$M_0$</th>
<th>$M_1$</th>
<th>$M_2$</th>
<th>$M_3$</th>
<th>$M_4$</th>
<th>$M_5$</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>297.0</td>
<td>517.7</td>
<td>577.0</td>
<td>630.0</td>
<td>559.5</td>
<td>600.7</td>
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</table>

S.E./mean = 33.3 nuts/8 trees.

1958

(i) 484.2 nuts/8 trees.  (ii) 46.0 nuts/8 trees.  (iii) Treatment differences are highly significant.  (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$M_0$</th>
<th>$M_1$</th>
<th>$M_2$</th>
<th>$M_3$</th>
<th>$M_4$</th>
<th>$M_5$</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>271.0</td>
<td>461.3</td>
<td>503.5</td>
<td>557.0</td>
<td>487.0</td>
<td>625.3</td>
</tr>
</tbody>
</table>

S.E./mean = 18.8 nuts/8 trees.

1959

(i) 638 nuts/8 trees.  (ii) 83.3 nuts/8 trees.  (iii) Treatment differences are highly significant.  (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>$M_1$</th>
<th>$M_2$</th>
<th>$M_3$</th>
<th>$M_4$</th>
<th>$M_5$</th>
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<tbody>
<tr>
<td>Av. yield</td>
<td>375</td>
<td>607</td>
<td>583</td>
<td>767</td>
<td>691</td>
<td>802</td>
</tr>
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</table>

S.E./mean = 34.0 nuts/8 trees.

Crop : Coconut.


Ref. : K. 54 to 58(7).

Type : "M".

Object :—To find out the best potassic fertilizer that can effectively replace ash.

1. BASAL CONDITIONS :

(i) An experimental area from 1942 to 1948 to study the effect of O.N.C. and A/S.  (ii) (a) Gravelly laterite. (b) Refer soil analysis, Pilicode.  (iii) By seed nuts.  (iv) Tall west coast.  (v) Triangular method with 30’ spacing. Surface planting on 23.5.1918.  (vi) One year old.  (vii) 4 lb./tree of A/S and 100 lb./tree of O.L. in addition to scheduled dose of potassic manure per year broadcast and ploughed in.  (viii) 3 ploughings.  (ix) Nil.  (x) Unirrigated.  (xi) 174.5’ in 1964, 137.6’ in 1955, 120.2’ in 1956, 174.2’ in 1957, and 114.8’ in 1958.  (xii) Monthly harvests.

2. TREATMENTS :

3 sources to supply 1 lb./tree of K$_2$O per year : $S_1$=Pot. Sul., $S_2$=Mar. Pot. and $S_3$=Ash.

3. DESIGN :

(i) R.B.D.  (ii) (a) N-A.  (iii) S. (iv) Sample of 6 trees selected randomly.  (v) Yes.  (vi) Yes.
4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Girth, height, no. of leaves and yield of nuts. (iv) (a) 1951—cond. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

1964

(i) 265.3 nuts/6 trees. (ii) 62.39 nuts/6 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/6 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
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<th>S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>262.8</td>
<td>299.4</td>
<td>233.8</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>27.9 nuts/6 trees.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1965

(i) 289.5 nuts/6 trees. (ii) 66.34 nuts/6 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/6 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
</tr>
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<tbody>
<tr>
<td>Av. yield</td>
<td>279.8</td>
<td>287.0</td>
<td>301.8</td>
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<tr>
<td>S.E./mean</td>
<td>29.67 nuts/6 trees.</td>
<td></td>
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</table>

1966

(i) 330.2 nuts/6 trees. (ii) 56.48 nuts/6 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/6 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>335.6</td>
<td>366.2</td>
<td>288.8</td>
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<tr>
<td>S.E./mean</td>
<td>25.26 nuts/6 trees.</td>
<td></td>
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</table>

1987

(i) 223.0 nuts/6 trees. (ii) 37.16 nuts/6 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/6 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>240.0</td>
<td>293.8</td>
<td>228.8</td>
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<td>S.E./mean</td>
<td>16.26 nuts/6 trees.</td>
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Crop :- Coconut.
Object :- To find out the effect of applying lime to Coconut.

Ref :- 54 to 57(8).
Type :- 'M'.

1. BASAL CONDITIONS:

(i) Usual manurial and cultural operations—3 ploughings and one intercultivation. 3 lb./tree of A/S+2 lb./tree of M+20 lb./tree of A/S/N+100 lb./tree of G.M. (ii) Gravely laterite. (iii) By seedlings. (iv) Ordinary tall west coast. (v) 1929, in 3' cube pits—3' spacing. (vi) One year. (vii) Nil. (viii) One ploughing and two diggings. (ix) G.M. crop raised. (x) Unirrigated. (xi) N.A. (xii) Monthly harvests.

2. TREATMENTS:

2 levels of lime applied at the time of digging : L0=0 and L1=5 lb./tree.
3. DESIGN:
(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 12. (iv) t. (v) Nil. (vi) No.

4. GENERAL:

5. RESULTS:

1954
(i) 52.66 nuts/tree. (ii) 14.49 nuts/tree. (iii) Treatment difference is not significant. (iv) Av. yield of nuts/tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>56.66</td>
<td>48.66</td>
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<tr>
<td>S.E./mean</td>
<td>4.18</td>
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</tr>
</tbody>
</table>

1955
(i) 55.15 nuts/tree. (ii) 24.73 nuts/tree. (iii) Treatment difference is not significant. (iv) Av. yield of nuts/tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>45.00</td>
<td>65.33</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>7.14</td>
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</tr>
</tbody>
</table>

1956
(i) 35.29 nuts/tree. (ii) 12.89 nuts/tree. (iii) Treatment difference is not significant. (iv) Av. yield of nuts/tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>34.33</td>
<td>36.75</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>3.72</td>
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</tbody>
</table>

1957
(i) 42.08 nuts/tree. (ii) 18.19 nuts/tree. (iii) Treatment difference is not significant. (iv) Av. yield of nuts/tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>44.16</td>
<td>40.00</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>5.25</td>
<td></td>
</tr>
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</table>

Crop: Coconut.  
Type: 'M'.

Object: To find out the best method of applying manures to Coconut in gravelly laterite soils.

1. BASAL CONDITIONS:
(i) Husks and leaves buried in trenches 6' wide and 1' deep. Exp. started in 1937 but discontinued in 1942. 3 ploughings annually with iron plough. (ii) (a) Gravelly laterite. (b) Refer soil analysis, Pilicode. (iii) By seed nuts. (iv) West coast tall. (v) Planted on 23.5.1918 in pits of size 3'×3'×3' by triangular method with a spacing of 30'. (vi) One year. (vii) 44 lb./tree of A/S+30 lb./tree of Ash+100 lb./tree of G.L. applied per year. (viii) 5 ploughings and 1 intercultivation. (ix) G.M. raised and applied. (x) Unirrigated. (xi) Planted on 23.5.1918 in pits of size 3'×3'×3' by triangular method with a spacing of 30'. (xii) One year. (xiii) 44 lb./tree of A/S+30 lb./tree of Ash+100 lb./tree of G.L. applied per year. (xiv) 5 ploughings and 1 intercultivation. (xv) G.M. raised and applied. (xvi) Unirrigated. (xvii) 44 lb./tree of A/S+30 lb./tree of Ash+100 lb./tree of G.L. applied per year. (xviii) 5 ploughings and 1 intercultivation. (xix) G.M. raised and applied. (xx) Unirrigated.

2. TREATMENTS:
3 methods of application of manures: 
M₁=In circular basins round each tree to a radius of 8' and depth of 1', M₂=Broadcast over entire area and ploughed in and M₃=In linear trenches 2' wide and 1' deep in between rows of trees.
3. DESIGN:
   (i) R.B.D.  (ii) (a) 3.  (b) N.A.  (iii) 5.  (iv) Sample of 4 trees selected randomly.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Satisfactory.  (ii) Minor attack of rhinoceros beetle.  (iii) No. of leaves and female flowers and yield of nuts.  (iv) 1948—contd.  (b) N.A.  (v) and (vi) Nil.

5. RESULTS:

1954
(i) 210.5 nuts/4 trees.  (ii) 45.21 nuts/4 trees.  (iii) Treatment differences are not significant.  (iv) Av. yield of nuts/4 trees.
   Treatment  M₁  M₂  M₃
   Av. yield  195.8  221.2  214.6
   S.E./mean = 20.2 nuts/4 trees.

1955
(i) 176.7 nuts/4 trees.  (ii) 43.60 nuts/4 trees.  (iii) Treatment differences are not significant.  (iv) Av. yield of nuts/4 trees.
   Treatment  M₄  M₅  M₆
   Av. yield  192.2  164.6  173.4
   S.E./mean = 19.5 nuts/4 trees.

1956
(i) 218.2 nuts/4 trees.  (ii) 38.34 nuts/4 trees.  (iii) Treatment differences are not significant.  (iv) Av. yield of nuts/4 trees.
   Treatment  M₄  M₅  M₆
   Av. yield  214.8  211.2  228.6
   S.E./mean = 17.1 nuts/4 trees.

1957
(i) 149.9 nuts/4 trees.  (ii) 41.48 nuts/4 trees.  (iii) Treatment differences are not significant.  (iv) Av. yield of nuts/4 trees.
   Treatment  M₅  M₆  M₇
   Av. yield  142.8  158.8  148.2
   S.E./mean = 18.5 nuts/4 trees.

1958
(i) 161.4 nuts/4 trees.  (ii) 44.89 nuts/4 trees.  (iii) Treatment differences are not significant.  (iv) Av. yield of nuts/4 trees.
   Treatment  M₃  M₄  M₅
   Av. yield  197.4  129.6  157.2
   S.E./mean = 20.1 nuts/4 trees.

---

Crop : Coconut.
Type = 'M'.
Object: To find out the optimum doses of N, P and K for Coconut palms in laterite gravelly soil.

1. BASAL CONDITIONS:
2. **TREATMENTS:**

1. Control.
2. 0.25 lb. of N+0.25 lb. of P₂O₅+0.50 lb. of K₂O per tree.
3. 0.25 lb. of N+0.25 lb. of P₂O₅+1.00 lb. of K₂O per tree.
4. 0.50 lb. of N+0.25 lb. of P₂O₅+1.00 lb. of K₂O per tree.
5. 0.50 lb. of N+0.75 lb. of P₂O₅+1.00 lb. of K₂O per tree.
6. 0.50 lb. of N+0.75 lb. of P₂O₅+1.50 lb. of K₂O per tree.

N as A/S, P₂O₅ as B.M. and K₂O as Mur. Pot. were applied.

3. **DESIGN:**

   (i) R.B.D.  
   (ii) (a) 6.  
   (b) N.A.  
   (iii) 6.  
   (iv) Sample of 8 trees randomly selected.  
   (v) Sufficient guard rows left.  
   (vi) Yes.

4. **GENERAL:**

   (i) Satisfactory.  
   (ii) Slight attack of beetles; bud-rot and leaf disease—beetles picked off; spraying of Bordeaux mixture.  
   (iii) No. of nuts, female flowers and leaves.  
   (iv) 1951—contd.  
   (b) N.A.  
   (v) Nil.  
   (vi) Severe nut fall noticed in 1956.

5. **RESULTS:**

   **1954**

   (i) 409 nuts/8 trees.  
   (ii) 33.9 nuts/8 trees.  
   (iii) Treatment differences are not significant.  
   (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>404</td>
<td>406</td>
<td>399</td>
<td>388</td>
<td>436</td>
<td>421</td>
</tr>
</tbody>
</table>
   | S.E./mean | 13.8 nuts/8 trees.  

   **1955**

   (i) 494 nuts/8 trees.  
   (ii) 78.0 nuts/8 trees.  
   (iii) Treatment differences are not significant.  
   (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>436</td>
<td>493</td>
<td>468</td>
<td>524</td>
<td>480</td>
<td>562</td>
</tr>
</tbody>
</table>
   | S.E./mean | 31.8 nuts/8 trees.  

   **1956**

   (i) 283.0 nuts/8 trees.  
   (ii) 40.9 nuts/8 trees.  
   (iii) Treatment differences are significant.  
   (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>239</td>
<td>260</td>
<td>327</td>
<td>278</td>
<td>305</td>
<td>291</td>
</tr>
</tbody>
</table>
   | S.E./mean | 16.7 nuts/8 trees.  

   **1957**

   (i) 405 nuts/8 trees.  
   (ii) 79.6 nuts/8 trees.  
   (iii) Treatment differences are not significant.  
   (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>388</td>
<td>404</td>
<td>432</td>
<td>350</td>
<td>436</td>
<td>419</td>
</tr>
</tbody>
</table>
   | S.E./mean | 32.5 nuts/8 trees.  

   **1958**

   (i) 261 nuts/8 trees.  
   (ii) 59.6 nuts/8 trees.  
   (iii) Treatment differences are not significant.  
   (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>250</td>
<td>236</td>
<td>244</td>
<td>231</td>
<td>319</td>
<td>287</td>
</tr>
</tbody>
</table>
   | S.E./mean | 24.4 nuts/8 trees.  

---
Crop : Coconut. 
Site : Central Coconut Res. Str., Kasaragod. 

Object : To compare the effect of different cultural practices on the yield of Coconut.

1 BASAL CONDITIONS:

2. TREATMENTS:
5 cultural operations: C_1=No intercultural operations (control), C_2=2 ploughings with iron plough, C_3=1 digging, C_4=Filing mounds and levelling and C_5=Forming basins and covering.

The operations were done between July-August and November-December depending upon rainfall distribution.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) Sample of ten trees selected randomly. (v) Sufficient guard rows left. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) No. of nuts, female flowers and leaves. (iv) (a) 1952—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

1954
(i) 461.4 nuts/10 trees. (ii) 79.42 nuts/10 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/10 trees.
Treatment C_1 C_2 C_3 C_4 C_5
Av. yield 444.0 440.2 488.2 479.8 464.8

S.E./mean = 39.7 nuts/10 trees.

1955
(i) 410 nuts/10 trees. (ii) 73.89 nuts/10 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/10 trees.
Treatment C_1 C_2 C_3 C_4 C_5
Av. yield 397.8 375.2 412.5 426.5 437.8

S.E./mean = 36.9 nuts/10 trees.

1956
(i) 453.6 nuts/10 trees. (ii) 74.17 nuts/10 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/10 trees.
Treatment C_1 C_2 C_3 C_4 C_5
Av. yield 416.5 434.5 409.2 461.8 456.2

S.E./mean = 37.1 nuts/10 trees.

1957
(i) 400.2 nuts/10 trees. (ii) 71.04 nuts/10 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/10 trees.
Treatment C_1 C_2 C_3 C_4 C_5
Av. yield 400.5 372.5 415.2 390.2 400.5

S.E./mean = 35.5 nuts/10 trees.

1958
(i) 394.4 nuts/10 trees. (ii) 85.32 nuts/10 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/10 trees.
Crop: Coconut.

Object: To determine suitable intercultural operations for Coconut.

1. BASAL CONDITIONS:
   (i) Standardisation of area three years prior to the expt. with uniform treatment. Age of trees varied from 20 to 50 years. (ii) (a) Clayey loam. (b) N.A. (iii) By seedlings. (iv) Tipica-ordinary tall west coast. (v) Trees stand on long and narrow bunds with channels in between. Spacing 25' to 30'. (vi) N.A. (vii) 280 cubic ft./ac. of river sand, 4 ton/ac. of lime and 10 lb./ac. of ash were broadcast uniformly. (viii) As per treatments. (ix) Nil. (x) Unirrigated. (xi) 113.4" in 1954, 134" in 1955, 118" in 1956, 138" in 1957, N.A. in 1958 and 144" in 1959. (xii) 8 harvests at an interval of 45 days each.

2. TREATMENTS:
   T1 - Uncultivated.
   T2 - Forming mounds on the bunds around trees in Aug.-Sept. and levelling in Dec.-Jan.
   T3 - Shallow diggings with local mummatties.
   T4 - Deep diggings with koordalies.
   Treatments T3 and T4 given in Oct.-Nov.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 8. (iv) 8 effective trees. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Severe attack of leaf-rot, wilt and stem bleeding diseases and rhinoceros beetle. (iii) No. of nuts, female flowers and leaves and setting %.

5. RESULTS:

1954
(i) 374 nuts/8 trees. (ii) 69.8 nuts/8 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>364</td>
<td>398</td>
<td>394</td>
<td>350</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1.5</td>
<td>2.5</td>
<td>1.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

1955
(i) 439 nuts/8 trees. (ii) 56.8 nuts/8 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>424</td>
<td>467</td>
<td>451</td>
<td>413</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

1956
(i) 369.4 nuts/8 trees. (ii) 61.3 nuts/trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>388.5</td>
<td>402.6</td>
<td>385.9</td>
<td>350.8</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1.5</td>
<td>2.5</td>
<td>1.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

1957
(i) 313.8 nuts/8 trees. (ii) 58.43 nuts/trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>388.5</td>
<td>402.6</td>
<td>385.9</td>
<td>350.8</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1.5</td>
<td>2.5</td>
<td>1.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>
Crop : Coconut.  
Ref. : K. 54 to 59(13).  
Type : 'C'.

Object : To find out suitable and economical cultural operations in the Coconut gardens of red loamy soils.

1. BASAL CONDITIONS :
   (i) Digging the area, raising G.M. and then burying G.M. in situ in trenches. (ii) (a) Red loam. (b) Refers soil analysis, Neyyathinkara. (iii) By seed nuts. (iv) Ordinary tail west coast. (v) Date of planting N.A. (vi) Spacing irregular. (vii) N.A. (viii) 0.50 lb. of N as A/S + 0.25 lb. of P₂O₅ as B.M. and 1 lb. of K₂O as Mur Pot. per tree given as B.D. (ix) Very often Tapioca grown. (x) Unirrigated. (xi) 75' in 1954, 1955 and 1956, 60' in 1957, 1958 and 1959. (xii) 6 harvests at intervals of two months.

2. TREATMENTS :
   1. Making basins round the trees to a radius of 5' from the base.
   2. Ploughing the entire area without basins.

3. DESIGN :
   (i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 7. (iv) 8 effective trees. (v) Sufficient guard rows left. (vi) No.

4. GENERAL :
   (i) Good. (ii) Nil. (iii) No. of nuts/tree, no. of leaves, bunches and female flowers and setting percentage. (iv) (a) 1952—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS :
   1954
   (i) 595.0 nuts/8 trees. (ii) 34.78 nuts/8 trees. (iii) Treatment difference is not significant. (iv) Av. yield of nuts/8 trees.
   Treatment  T₁  T₂  T₃  T₄
   Av. yield  591.7  598.3
   S.E./mean = 13.1 nuts/8 trees.

1955
   (i) 726.7 nuts/8 trees. (ii) 26.57 nuts/8 trees. (iii) Treatment difference is not significant. (iv) Av. yield of nuts/8 trees.
## Crop: Coconut

**Site:** Agri. Res. Stn., Nileshwar.

**Type:** 'C'.

**Object:** To find out the proper depth at which Coconut seedlings should be planted in pure littoral sand.

### Basal Conditions:

1. **N.A.**
2. **Pure sandy.**
3. **Refer soil analysis, Nileshwar.**
4. **By seed-nuts**
5. **Tall west coast.**
6. **1939, Triangular method of planting at 25' spacing.**
7. **One year.**
8. **3 lb. A/S, 5 lb. F.M., 20 lb. ash and 100 lb. G.L. or C.M. per tree per year applied during June and Nov.**
9. **2 ploughings with iron plough.**
10. **Nil.**
11. **Unirrigated.**
12. **Rate of production of loaves and no. of functioning leaves.**

### Treatments:

2 depths of planting seedlings in pits: \( D_1 = \text{y'} \) and \( D_2 = \text{y}. \)

### Design:

1. **L. Sq.**
2. **(a) 2. (b) N.A. (iii) 6. (iv) 12. (v) Nil. (vi) No.**

### General:

1. **Normal.**
2. **Rhinoceros beetle was periodically looked and killed.**
3. **Rate of production of leaves and no. of functioning leaves.**
4. **1939—contd. (b) N.A. (v) and (vi) Nil.**

### Results:

**1954**

1. **7.27 leaves/tree.**
2. **0.05 leaves/tree.**
3. **Treatment difference is highly significant.**
4. **Av. no. of leaves/trees**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>( D_1 )</th>
<th>( D_2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. no. of leaves</td>
<td>7.49</td>
<td>7.05</td>
</tr>
</tbody>
</table>

**S.E./mean = 0.02 leaves/tree.**
1955

(i) 8.01 leaves/tree. (ii) 0.18 leaves/tree. (iii) Treatment difference is highly significant. (iv) Av. no. of leaves/tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. no. of leaves</td>
<td>8.58</td>
<td>7.44</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.08 leaves/tree.</td>
<td></td>
</tr>
</tbody>
</table>

1956

(i) 8.24 leaves/tree. (ii) 0.60 leaves/tree. (iii) Treatment difference is not significant. (iv) Av. no. of leaves/tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. no. of leaves</td>
<td>8.61</td>
<td>7.88</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.25 leaves/tree.</td>
<td></td>
</tr>
</tbody>
</table>

1957

(i) 8.81 leaves/tree. (ii) 0.08 leaves/tree. (iii) Treatment difference is not significant. (iv) Av. no. of leaves/tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. no. of leaves</td>
<td>8.83</td>
<td>8.79</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.03 leaves/tree.</td>
<td></td>
</tr>
</tbody>
</table>

1958

(i) 9.68 leaves/tree. (ii) 0.44 leaves/tree. (iii) Treatment difference is not significant. (iv) Av. no. of leaves/tree.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. no. of leaves</td>
<td>9.76</td>
<td>9.60</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.18 leaves/tree.</td>
<td></td>
</tr>
</tbody>
</table>

Crop: Coconut. Ref: K. 54 to 58(15).
Site: Agri. Res. Stn., Pilicode. Type: 'C'.

Object: To find out the correct depth to which the soil should be tilled in a Coconut garden.

1. BASAL CONDITIONS:
(i) 3 ploughings annually. 3 lb. of A/S + 2 lb. of B.M. + 100 lb. of G.L. compost per tree per year. Two cultivations annually. (ii) a) Gravelly laterite. (b) Refer soil analysis, Pilicode. (iii) By seedlings. (iv) West coast exotic and selfed progenies of Kasaragod parents. (v) 1926—27 triangular method of planting with 30' spacing. (vi) One year. (vii) In 1954, 100 lb./tree of G.L. and compost applied in circular basins. 3 lb./tree of A/S was also applied. Application of ash restricted to the quantity obtained by burning of coconut leaves etc. In 1955, 1000 lb. of G.M. was applied to the trees, 30 lb./tree of Nitro. Phos. was broadcast. For other years—N.A. (viii) As per treatments. (ix) G.M. crop raised. (x) Undrilled. (xi) 174° in 1954, 138° in 1955, 120° in 1956, 174° in 1957 and 115° in 1958. (xii) Monthly harvest.

2. TREATMENTS:
1. Digging 5' deep with massive, forming mounds in Aug.-Sept. and levelled in Dec.-January.
2. 3 ploughings 4' deep with monsoon plough.
3. 3 ploughings 6' deep with Cooper—34 plough. Ploughings given roughly at intervals of two months beginning from July.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) Sample of 4 trees randomly selected. (v) Sufficient guard rows left. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) No. of leaves, female flowers and yield of nuts. (iv) (a) 1948—contd. (b) N.A. (v) Nil. (vi) Yield data for 1957 was not available.
5. RESULTS:

1954
(i) 161.9 nuts/4 trees. (ii) 41.60 nuts/4 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/4 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
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<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>142.7</td>
<td>173.0</td>
<td>170.0</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>17.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1955
(i) 203.6 nuts/4 trees. (ii) 61.79 nuts/4 trees. (iii) Treatment differences are highly significant. (iv) Av. yield of nuts/4 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>127.8</td>
<td>293.8</td>
<td>189.2</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>25.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1956
(i) 202.9 nuts/4 trees. (ii) 49.90 nuts/4 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/4 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>197.2</td>
<td>190.3</td>
<td>221.2</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>19.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1958
(i) 136.2 nuts/4 trees. (ii) 25.53 nuts/4 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/4 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>127.5</td>
<td>131.5</td>
<td>149.5</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>10.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop : Coconut.
Ref : K. 54 to 58(16).
Type : 'C'.
Object : To find out the effect of ploughing with different ploughs and digging the soil on the yield of Coconut.

1. BASAL CONDITIONS:
(i) 3 lb. of A/S, 2 lb. of B.M. and 100 lb. of G.L. compost per tree every year. The field ploughed twice and harrowed once or twice yearly. (ii) (a) Laterite gravelly. (b) Refer soil analysis, Pilicode. (iii) Seedlings. (iv) Ordinary tall west coast variety. (v) One year old seedlings planted on 9.6.1959 before the south west monsoon in pits of size 3' X 3' X 3' by triangular method with 30' spacing. (vi) One year.

2. TREATMENTS:
1. 1 ploughing with monsoon plough in August and September.
2. 2 ploughings with monsoon plough in June and September.
3. 3 ploughings with monsoon plough in June, September and November.
4. 1 digging with mummatty 9' deep in August and September.

3. DESIGN:
1. R.B.D. (ii) 4. (b) N.A. (iii) S. (iv) Sample of 4 trees randomly selected. (v) Sufficient guard rows left. (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) Nil. (iii) Yield of nuts/tree. (iv) (a) 1942—cond. (b) N.A. (v) and (vi) N.A.

5. RESULTS:

1954
(i) 153.2 nuts/4 trees. (ii) 35.35 nuts/4 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/4 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>169.8</td>
<td>164.6</td>
<td>149.7</td>
<td>149.2</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>15.8 nuts/4 trees.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1955
(i) 156.5 nuts/4 trees. (ii) 33.04 nuts/4 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/4 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>167.6</td>
<td>138.6</td>
<td>168.4</td>
<td>149.6</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>15.2 nuts/4 trees.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1956
(i) 152.5 nuts/4 trees. (ii) 32.63 nuts/4 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/4 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>150.3</td>
<td>160.8</td>
<td>174.4</td>
<td>124.4</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>14.6 nuts/4 trees.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1957
(i) 120.8 nuts/4 trees. (ii) 31.19 nuts/4 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/4 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>117.2</td>
<td>140.8</td>
<td>129.8</td>
<td>95.6</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>14.0 nuts/4 trees.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1958
(i) 103.2 nuts/4 trees. (ii) 28.53 nuts/4 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/4 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>115.8</td>
<td>104.2</td>
<td>106.6</td>
<td>86.2</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>12.8 nuts/4 trees.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Coconut.
Ref: K. 54 to 58(17).
Type: 'C'.

Object: To find the best cultural operation in laterite gravelly soil for Coconut.

1. BASAL CONDITIONS:
(i) Uneven and undulating hilly slopes. (ii) (a) Laterite gravelly. (b) N.A. (iii) By seedlings from naturally cross-pollinated seed. (iv) Tall west coast. (v) Planting in 1915, 1916 and 1919. Triangular method with 30' spacing. (vi) N.A. (vii) 0.5 lb. of N as Amm. 0.25 lb. of P₂O₅ as B.M. and 1.00 lb. of K₂O as Mur. Pot. were applied per tree in circular trenches at a distance of 6' from the tree. (viii) As per treatments. (ix) Nil. (x) Unirrigated. (xi) 127'. (xii) 8 harvests at intervals of 1½ months.
2. TREATMENTS:
1. Control. 
2. Digging with Koorthalies to a radius of 6’ around the trees. 
3. Digging with Koorthalies to a radius of 6’ around the trees and a light hoeing after the north-east monsoon. 
4. Forting around the trees to a radius of 6’. 
5. Forting around the trees to a radius of 6’ and a light hoeing after the north-east monsoon.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) 8. (v) Sufficient guard rows left. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Slight attack of beetles, bud-rot and leaf disease—beetle picked and Bordeaux mixture sprayed. (iii) No. of leaves, tender nuts, buttons and yield of nuts. (iv) 1953—cond. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

1954
(i) 344.2 nuts/8 trees. (ii) 53.70 nuts/8 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>346.2</td>
<td>336.3</td>
<td>334.7</td>
<td>332.2</td>
<td>381.5</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>21.9 nuts/8 trees.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1955
(i) 344 nuts/8 trees. (ii) 49.0 nuts/8 trees. (iii) Treatment differences are significant. (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>343</td>
<td>361</td>
<td>309</td>
<td>314</td>
<td>392</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>20.0 nuts/8 trees.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1956
(i) 221.9 nuts/8 trees. (ii) 39.75 nuts/8 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>234.8</td>
<td>222.0</td>
<td>211.0</td>
<td>194.2</td>
<td>247.3</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>16.2 nuts/8 trees.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

1957
(i) 364.3 nuts/8 trees. (ii) 59.06 nuts/8 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>366.2</td>
<td>358.3</td>
<td>378.2</td>
<td>339.8</td>
<td>379.2</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>24.1 nuts/8 trees.</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

1958
(i) 199.6 nuts/8 trees. (ii) 48.74 nuts/8 trees. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/8 trees.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>206.3</td>
<td>213.0</td>
<td>169.3</td>
<td>189.0</td>
<td>219.8</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>19.9 nuts/8 trees.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Crop : Coconut. 
Object : To find out suitable manure and cultural operations for Coconut.

Ref : K. 58 and 59(18).
Type : ‘CM’.
1. BASAL CONDITIONS:
(i) 3 lb. of A/S, 20 lb. of ash and 100 lb. of G.L. per tree per year broadcast and ploughed in till July, 1957. The block was ploughed and worked in. Burying of husk in 1942 and 1943. (ii) (a) Gravely laterite. (b) Refer soil analysis, Palcode. (iii) By seedlings. (iv) West coast tall. (v) Surface planting on 24, 10, 1922 and the palms lowered in June, 1926 by 3'. Triangular method with 30’ spacing. (vi) Three month old seedlings. (vii) 100 lb. of G.L. and C.M. each and 30 lb. of A/S per tree per year broadcast in Aug.-Sept. (viii) As per treatments. (ix) Nil. (x) Unirrigated. (xi) N.A. (xii) Monthly harvests.

2. TREATMENTS:
(I) 3 ploughings in July, September and November (and applying 1 lb. of K₂O as Mur. Pot. per tree per year.
(2) Cultural operations as in (1) and applying 2 lb. of K₂O as Mur. Pot.
(3) 5 ploughings in July, August, September, October and November and applying 1 lb. of K₂O as Mur. Pot. per tree per year.
(4) Cultural operations as in (3) and applying 2 lb. of K₂O as Mur. Pot.
(5) 5 ploughings in July, August, September, October and November and applying 1 lb. of K₂O as Mur. Pot. per tree per year.
(6) Cultural operations as in (3) and applying 2 lb. of K₂O as Mur. Pot.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 5. (iv) 1. (v) Sufficient guard rows left. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Constant watch over pests and diseases. (iii) Yield of nuts. (iv) (a) 1957—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
1958
(i) 32.90 nuts/tree. (ii) 15.93 nuts/tree. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/tree.
Treatment 1 2 3 4 5 6
Av. yield 31.20 29.40 33.00 32.00 33.60 28.20
S.E./mean = 7.1 nuts/tree.

1959
(i) 52.03 nuts/tree. (ii) 24.44 nuts/tree. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/tree.
Treatment 1 2 3 4 5 6
Av. yield 53.60 52.40 53.60 46.00 51.20 55.60
S.E./mean = 10.9 nuts/tree.

Site: Central Coconut Res. Stn., Kasaragod. Type: 'IM'.
Object: To determine the response of Coconut to irrigation and manuring in summer months.

2. BASAL CONDITIONS:
(i) N.A. (ii) (a) Laterite and Clayey. (b) Refer soil analysis, Kasaragod. (ii) By seed-nuts. (iv) Ordinary tall west coast. (v) Date of planting N.A. No systematic method of planting; spacing 30'. (vi) One year.
(vii) Nil. (viii) 2 ploughings and 2 diggings. (ix) Nil. (x) As per treatments. (xi) 121.5’ in 1956, 134.7’ in 1957 and 130.5’ in 1958. (xii) Monthly harvests.

2. TREATMENTS:
1. Control.
2. Manuring in August-September.
3. Irrigation in summer.
4. Manuring in August-September+irrigation in summer.
5. Manuring in summer+irrigation in summer.
6. Manuring half-dose in August-September and manuring other half in summer+irrigation in summer.
Manures applied in basins of 6' radius and 9' depth at 1.0 lb./tree of N as A/S, 0.5 lb./tree of K2O as Mur. Pot. 8 gallons of water given twice a week in basins round the tree from 1st. week of December. Irrigation stopped with the commencement of monsoon in May-June.

3. DESIGN:
   (i) R.B.D. (ii) (a) S. (b) N.A. (iii) 5. (iv) I. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Rhinoceros beetle regularly searched and killed. (iii) No. of nuts, female flowers, leaves and setting %. (iv) (a) 1956—contd. (b) N.A. (v) and (vi) Nil.

5. RESULTS:
   1956
   (i) 44.1 nuts/tree. (ii) 23.81 nuts/tree. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/tree.
   Treatment  
   |   | 1  | 2  | 3  | 4  | 5  | 6  |
   |Av. yield|36.9|30.4|56.5|34.4|44.1|62.1|
   S.E./mean = 10.6 nuts/tree.

   1957
   (i) 47.0 nuts/tree. (ii) 12.88 nuts/tree. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/tree.
   Treatment  
   |   | 1  | 2  | 3  | 4  | 5  | 6  |
   |Av. yield|40.3|44.8|53.3|49.0|45.3|51.5|
   S.E./mean = 5.8 nuts/tree.

   1958
   (i) 43.8 nuts/tree. (ii) 21.27 nuts/tree. (iii) Treatment differences are not significant. (iv) Av. yield of nuts/tree.
   Treatment  
   |   | 1  | 2  | 3  | 4  | 5  | 6  |
   |Av. yield|27.7|47.9|62.2|32.4|49.8|42.5|
   S.E./mean = 9.5 nuts/tree.

Crop: Coconut.  
Site: Central Coconut Res. Stn., Kasaragod.  
Object: To find out a suitable substitute for Coconut milk.

1. BASAL CONDITIONS:
   (i) The area was under uniform manurai and cultural operations. (ii) (a) Red loam. (b) Refer soil analysis, Kasaragod. (iii) By seed-nuts. (iv) Ordinary tall west coast. (v) Date of planting N.A. No systematic method of planting; 30' spacing. (vi) One year. (vii) 3 lb. of A/S+3 lb. of Mur. Pot.+2 lb. of B.M. per tree applied in Aug. (viii) 2 ploughings and 2 interculturings. (ix) Nil. (x) Unirrigated. (xi) 134.8°. (xii) Monthly harvests.

2. TREATMENTS:
   1. Control.  
   2. 2,4-D, 30 ppm+IP/A, 40 ppm.  
   3. 2,4-D, 30 ppm+Coconut water.  
   4. 2,4-D, 30 ppm+IB/A, 40 ppm.  
   Treatment given against button shedding four times at intervals of one week after fertilization of female flowers.

3. DESIGN:
   (i) R.B.D. (ii) (a) S. (b) N.A. (iii) 5. (iv) I. (v) Nil. (vi) Yes.
4. GENERAL:
(i) Satisfactory. (ii) Rhinoceros beetle regularly searched and killed. (iii) As per I, II, III, and IV below. (iv) (a) and (b) N.A. (v) and (vi) Nil.

5. RESULTS:

I. % of nuts set:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Mean</th>
<th>S.E./plot</th>
<th>S.E./mean</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>29.71</td>
<td>52.54</td>
<td>50.85</td>
<td>45.50</td>
<td>44.65</td>
<td>7.20</td>
<td>3.22</td>
<td>Highly significant</td>
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</tbody>
</table>

II. No. of nuts set:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Mean</th>
<th>S.E./plot</th>
<th>S.E./mean</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>21.20</td>
<td>45.40</td>
<td>41.40</td>
<td>37.40</td>
<td>36.35</td>
<td>7.23</td>
<td>3.23</td>
<td>Significant</td>
</tr>
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</table>

III. Copra content (mm) :

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Mean</th>
<th>S.E./plot</th>
<th>S.E./mean</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>159.2</td>
<td>125.1</td>
<td>135.8</td>
<td>129.8</td>
<td>137.5</td>
<td>16.41</td>
<td>7.34</td>
<td>Significant</td>
</tr>
</tbody>
</table>

IV. Copra content/knigh (mm) :

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Mean</th>
<th>S.E./plot</th>
<th>S.E./mean</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3498.0</td>
<td>5438.7</td>
<td>5279.8</td>
<td>4709.2</td>
<td>4731.4</td>
<td>777.71</td>
<td>377.71</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Crop: Coconut. Ref: K. 57(21).
Site: Central Coconut Res. Stn., Kasaragod. Type: 'D'.

1. BASAL CONDITIONS:
(i) The area was under uniform manurial and cultural operations. (ii) (a) Red loam. (b) Refer soil analysis, Kasaragod. (iii) By seed-nuts. (iv) Ordinary tall west coast. (v) Date of planting N.A./No systematic method of planting; 3' spacing. (vi) One year. (vii) 3 lb. of A/F+3 lb. of Mur. Pot.+2 lb. of B.M. per tree applied in Aug.-Sept. A.G.M. crop also applied. (viii) 2 ploughings and 2 interculturings. (ix) Nil. (x) Unirrig.ated. (xi) 133'. (xii) Monthly harvest.

2. TREATMENTS:
1. Control.
2. 2, 4-D, 30 ppm+IF/A, 30 ppm.
3. 2, 4-D, 30 ppm+Coconut water.
4. 2, 4-D, 30 ppm+IF/A, 30 ppm.
Treatments given against button shedding four times at intervals of one week immediately after fertilisation of female flowers.

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

4. GENERAL:
(i) Satisfactory. (ii) Rhinoceros beetle regularly searched and killed. (iii) As per I, II, III and IV below. (iv) (a) 1957—N.A. (b) N.A. (v) and (vi) Nil.

5. RESULTS:

I. % of nuts set:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Mean</th>
<th>S.E./plot</th>
<th>S.E./mean</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>29.48</td>
<td>60.96</td>
<td>54.30</td>
<td>62.29</td>
<td>51.76</td>
<td>7.86</td>
<td>3.52</td>
<td>Significant</td>
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</table>
(i) to (iv) Refer below

<table>
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<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Mean</th>
<th>S.E./plot</th>
<th>S.E./mean</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>20.6</td>
<td>45.4</td>
<td>41.2</td>
<td>54.8</td>
<td>40.5</td>
<td>3.84</td>
<td>1.72</td>
<td>Significant</td>
</tr>
</tbody>
</table>

III. Copra content (gms):

(i) to (iv) Refer below

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Mean</th>
<th>S.E./plot</th>
<th>S.E./mean</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>172.3</td>
<td>118.3</td>
<td>132.0</td>
<td>122.6</td>
<td>136.3</td>
<td>11.60</td>
<td>5.19</td>
<td>Significant</td>
</tr>
</tbody>
</table>

IV. Copra content/bunch (gms):

(i) to (iv) Refer below

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Mean</th>
<th>S.E./plot</th>
<th>S.E./mean</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3339.4</td>
<td>5030.5</td>
<td>5243.7</td>
<td>6319.4</td>
<td>4983.2</td>
<td>639.3</td>
<td>285.9</td>
<td>Significant</td>
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