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FIELD

EXPERIMENTS

VOL. 10 PART 2

ORISSA

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 utilization 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.

New Delhi,
March 26, 1965.

A. D. Pandit
Vice-President,
Indian Council of Agricultural Research.
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 to 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 one 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 agroclimatic 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 1952-55.

At the Institute of Agricultural Research Statistics the work under the scheme was carried out under the supervision of Shri. T.P. Abraham, Assistant Statistician, 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, Harbhajan 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.

NEW DELHI,
March 25, 1965.

V.G. PANSE

Statistical Adviser,

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<td>1. Andhra Pradesh (Hyderabad)</td>
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<td></td>
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<td>Shri L. Venkatatratnam, Deputy Director of Agriculture (Research).</td>
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<td>Shri R.S. Roy, Principal, Agricultural Research Institute, Sabour.</td>
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<td>Shri H.C. Kothari, Statistician, Department of Agriculture,</td>
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<td>9. Orissa (Bhubaneswar)</td>
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<td>Shri D. Misra, Principal, Uttakal Krushi Mahavidyalaya, Bhubaneswar.</td>
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<td>10. West Bengal (Calcutta)</td>
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</table>
11. **Madras**
   **(Coimbatore)**
   - **Late Shri M. Bhavani Sankar Rao,**
   - **P. Prabhakara Rao**
   - **V. Venkateswara Rao**
   - Vice-Principal and Secretary, Research Council, Agricultural College and Research Institute, Coimbatore.
   - **Shri T. Natarajan,**
   - Agronomist.
   - **Shri A.H. Sarma,**
   - Extension Specialist.
   - **Shri V. Raman,**
   - Secretary, Research Council.
   - **Shri K.R. Nagaraja Rao,**
   - Secretary, Research Council.

12. **Assam**
   - **T.K. Gupta**
   - Dr. S.R. Barooah,
   - Director of Agriculture, Assam.
   - **Shri B.N. Duara,**
   - Joint Director of Agriculture, Assam.

13. **Mysore**
   **(Bangalore)**
   - **K.A. Balakrishnan**
   - **Shri M.A. Wall,**
   - Director of Statistics,
   - **Shri B.V.S. Rao,**
   - Assistant Director of Statistics.

14. **Kerala**
   **(Trivandrum)**
   - **V.N. Iyer**
   - **Shri M. Janardanan Nair,**
   - Director of Agriculture.
   - **Shri N. Shankara Menon**
   - Director of Agriculture.
   - **Shri P.D. Nair,**
   - Director of Agriculture.
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
- Amm. 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
K—Potash
B.M.—Bone meal
Mur. Pot.—Muriate of Potash
Pot. Sul.—Potassium Sulphate
Super—Super Phosphate
Zn. Sul.—Zinc Sulphate
CuS—Copper Sulphate
G.M.—Green Manure
F.Y.M.—Farm Yard Manure
F.W.C.—Farm Waste Compost
F.M.—Fish Manure
G.N.C.—Groundnut cake
M.C.—Municipal Compost
T.C.—Town Compost
lb.—Pounds
Srs.—Seers
B.D.—Basal dressing
C.L.—Cart load
Dical. Phos.—Dicalcium 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) (a) 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.d.—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.d.—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.
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<th>Metric Equivalent</th>
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<tr>
<td>1 acre</td>
<td>0.404606 hectare</td>
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<td>1 gram</td>
<td>0.035274 ounce</td>
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<td>2.</td>
<td>Wheat</td>
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<td>5.</td>
<td>Brinjal; Egg plant</td>
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<tr>
<td>Niger</td>
<td>207</td>
</tr>
<tr>
<td>Berseem</td>
<td>209</td>
</tr>
<tr>
<td>Nagpur orange</td>
<td>210</td>
</tr>
</tbody>
</table>
MAP OF ORISSA STATE SHOWING AGRO-CLIMATIC REGIONS, SOILS, AGRICULTURAL RESEARCH STATIONS ETC.

LEGEND:
- RED SOILS
- RED & GREEN FOREST SOIL
- SALINE SOILS
- ALLUVIAL SOILS
- LATERITE SOILS
- BLACK SOILS
- MIXED RED & BLACK SOILS

AGRI. RES. STNS.
DIST. H. Q.
RIVERS & TRIBUTARIES
DIST. BOUNDARIES
AGRO-CLIM. REGN. BOUNDARY
ORISSA

1. General:

The State of Orissa lies on the eastern coast of India with 4 of its 13 districts lying along the coast. On the other three sides it is surrounded by the States of West Bengal, Bihar, Madhya Pradesh and Andhra Pradesh. The State has a geographical area of 38,504 thousand acres and a reporting area of 38,401 thousand acres. The land utilization figures for this State are provided in table 1 below:

| TABLE 1. Land utilization statistics of Orissa State (1958-59.) |
|-----------------------------|------------------|
| (Area in '000 acres.)       |                   |
| 1. Reporting area           | 38,401            |
| 2. Forests                  | 8,799             |
| 3. Barren & uncultivable land | 3,557           |
| 4. Land put to non-agricultural uses | 2,717 |
| 5. Culturable waste         | 3,504             |
| 6. Permanent pastures & other grazing land | 1,819 |
| 7. Land under miscellaneous tree crops | 1,143 |
| 8. Current fallows           | 2,269             |
| 9. Other fallow land         | 739               |
| 10. Net area sown            | 13,854            |
| 11. Total cropped area       | 14,714            |
| 12. Area sown more than once | 860               |

2. Topography:

In the north is the plateau—the continuation of Chotanagpur plateau of Bihar—with a gentle rolling form and undissected flat lands cut by steep sided valleys. In the middle or heart of the state is the table land. This consists of watersheds of the three rivers, the Baranani, the Brahmani and the Mahanadi. The hills in table-land are not long continuous ranges, but are generally scattered in groups, running in the east and west direction and the entire area slopes from west to east. To the east and south-west of this table-land lies the Eastern Ghat division or the upland. These are ranges of dissected steep sided mountain ranges with canyons and fertile inter-mountain valleys and high plateaus or ‘Dangarala’. The fourth is the coastal tract lying between the Eastern Ghat hill ranges and the Bay of Bengal.

The state can be divided into four distinct regions: (1) the northern plateau or lowland, (2) the central table-land, (3) the Eastern Ghat region or upland, and (4) the coastal tract.

The northern plateau, forms a part of the southern extension of the ‘Central belt of India’ and lies between 20° North latitude and 79°—87° East longitude. The hill ranges stretch from north to south and rise to an elevation of 2,500 to 3,500 ft. above sea level. On the extreme east, there lies the Similipal range of Mayurbhanj district. The central portion consists of rugged forest clad hills interspersed with fertile valleys. Considerable deposit of limestone in the nodular forms are found in this tract. The plateau is rich in iron ores, limestone and coal deposit and so has great potentialities for industrial development.

The central table land is the region of the Brahmani and the Mahanadi basins land and covers an area of about 14,259 sq. miles. The northern half of the Brahmani basin is thickly wooded and sparsely populated while the southern half contains a large number of fertile valleys. The Mahanadi basin spreads out into fertile plains, undulating landscape with a gradual slope from the northern or southern hill ranges of the Mahanadi.
The Eastern Ghat region is a section of the great line of Eastern Ghat which traverses the east coast of the Peninsular India and covers an area of about 17,190 sq. miles. The hill ranges run from north to south and are nowhere more than 30 miles from the sea.

The coastal belt covers an area of about 12,331 sq. miles and consists of three distinct tracts differing widely in their physical aspect. The first is a marshy weed land; the second is the cultivated alluvial plains, formed from the deposits of the rivers; and the third is the broken hill region and undulating tract which gradually ascends into weed land and hills of the central table-land.

3. Rain fall and climatic conditions:

The state is in the subtropical belt of medium pressure. The characteristic features of its climate are high temperature and medium rainfall. But topography has influenced the climate of this region and four well-defined seasons prevail in this state:

1. Cold dry winter—December, January, February
2. Hot dry summer—March, April, May
3. Monsoon warm wet seasons—June, July, August, September
4. Cool autumn—October, November

The coastal region, due to proximity to the Bay, has a heavier rainfall. Most parts of the state have also a high rainfall owing to hillyness and forest cover. The state is also affected by cyclonic storms from the Bay of Bengal which cross the coast of Orissa and cause heavy rainfall in the Eastern Ghat. The average annual rainfall of the state is 58 inches, with 72 rainy days; about 45 inches are received during June to September, with 10 to 16 days of rain in each month. July receives maximum rains while December and January are the driest months, with a maximum of about 3° of rainfall.

The mean annual maximum temperature is 91°F, it rises to 101°F in April and May and falls to 97°F and 93°F in June and July respectively. The mean minimum is 73°F, it falls to 59°F or 60°F in December and January.

There is great variation in the humidity in different sections of Orissa. In Koraput, the humidity ranges from 92 per cent saturation in August and September, the wettest months, to 60 per cent in March and 61 per cent in April and May. Koraput is the dampest part of the state during the rainy season. The central table land has the lowest relative humidity during March, April and May. In the driest part of the state, the relative humidity varies from 51 to 54 per cent during the same months. The relative humidity of the coastal area is highest and it never falls below 70 per cent.

4. Soils:

*Northern plateau:* The plateau consists of iron ore series of the upper Dharwar system and is rich in hematite, limonite and thick and extensive deposits of magnetite and dolomitic limestone in the western section. The tract has a type of soil known as red soil. The soil is neutral in reaction, poor in organic matter and plant nutrients. Lime content is small while that of magnesium is negligible and of phosphate low. They are comparatively more open in texture and vary from loamy to sandy and rarely clayey. These characteristics are most marked in the Baramhati subdivision of Mayurbhanj and the Bonai basin of Sundergraph district.

*Central table land:* The relief, the type of native vegetation and the rocks that form the parent material of the central table land afford bases to subdivide into at least three zones each with a distinct soil type (1) north east section with yellow earth, (2) central and south west section of black earth, and (3) eastern plain of laterite soil extending up to where the Mahanadi discharges into the delta region.

Yellow earth is the predominant soil type of the region between the 11e and the champali in Rairakhol. Yellow soils are predominant on smooth relief where ground water stands at a depth of a few feet.
Whole of the central section of the table land comprising Athamlik Angul and Boudhi sub-divisions on either side of the Mahanadi and the area between the Sukil and the Loisinga Zamindari district, consists of black earth popularly known as the ‘black cotton soil or regur of India’. The soils in general have a higher content of clay. Lime concretions known as kankar or genguti are found mixed with soil. The high clay content of the soil makes it crack during summer and sticky during the rainy season.

The soil is alkaline in reaction and the pH varies from 7.5 to 8.5. It generally contains soluble salts in all horizons though these do not reach the toxic limit for plant growth. Percentage of potassium, lime and magnesium are high but the nitrogen content is low, as is common in the Indian soil, ranging between 0.12 percent to 0.05 percent.

**Eastern Ghat**: Topography has played an important part in soil formation of this region. Differences in slope and elevation are usually associated with differences in drainage which has a strong influence on the development of soil and the uses to which they are put. The high humidity coupled with luxuriant forest vegetation creates an environments for the development of a group of soil. There is therefore a vertical distribution of zonal soil types viz., skeletal soil on the upper portion of the slope laterite, gray brown pod soil and valley soil.

**Coastal division** :- There are four well defined divisions of the deltaic alluvial soils from north to south as detailed below:

1. **North section** :- Delta of North Balasore formed by the Suvarnreka, the Burabalong the Kansaboner and the salandi. The soil is more sandy or sandy loam.

2. **Central section** :- Delta of Baitarani and Brahmani. This includes part of Bhadrak sub division and Jaipur sub-division. Soil varies from clay loam to stiff clay.

3. **Mahanadi delta** :- Delta of the Mahanadi and her tributaries in the Cuttack and in the Puri districts, stratified into clay silt, sandy and gritty.

4. **Rushikulaya delta** :- More sandy in nature. Except the Rushikulya delta, a large part of the other delta areas are subjected to flood.

5. **Irrigation**:

The State has a total irrigated area of 2414 thousand acres. The extent of area irrigated through different sources is given in table 2 below:

<table>
<thead>
<tr>
<th>Source</th>
<th>Acreage</th>
<th>% area irrigated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government canals</td>
<td>487</td>
<td>20.2</td>
</tr>
<tr>
<td>Private canals</td>
<td>69</td>
<td>2.9</td>
</tr>
<tr>
<td>Tanks</td>
<td>1223</td>
<td>50.6</td>
</tr>
<tr>
<td>Wells</td>
<td>94</td>
<td>3.9</td>
</tr>
<tr>
<td>Other sources</td>
<td>541</td>
<td>22.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2414</td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

6. **Agricultural Production and Normal cropping pattern**.

Important crop of this area is paddy. Rest are all subsidiary crops occupying smal areas. The total area, production and average yield of various crops in this state are given in table 3 below:
### TABLE 3
Area, production and av. yield per acre of principal crops (1963—64).

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area in '000 acres</th>
<th>Production in '000 tons</th>
<th>Yield in lb./ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>10,641</td>
<td>4238</td>
<td>892.1</td>
</tr>
<tr>
<td>Ragi</td>
<td>136</td>
<td>26</td>
<td>428.2</td>
</tr>
<tr>
<td>Maize</td>
<td>77</td>
<td>13</td>
<td>378.2</td>
</tr>
<tr>
<td>Other cereals</td>
<td>144</td>
<td>43</td>
<td>668.9</td>
</tr>
<tr>
<td>Pulses</td>
<td>2,144</td>
<td>423</td>
<td>441.9</td>
</tr>
<tr>
<td>Sesamum</td>
<td>242</td>
<td>20</td>
<td>185.1</td>
</tr>
<tr>
<td>Rape &amp; Mustard</td>
<td>130</td>
<td>28</td>
<td>482.5</td>
</tr>
<tr>
<td>Groundnut</td>
<td>145</td>
<td>53</td>
<td>818.8</td>
</tr>
<tr>
<td>Other Oilseeds</td>
<td>91</td>
<td>20</td>
<td>492.3</td>
</tr>
<tr>
<td>Mesta</td>
<td>38</td>
<td>75</td>
<td>2**</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>79</td>
<td>1554</td>
<td>19.67*</td>
</tr>
<tr>
<td>Jute</td>
<td>135</td>
<td>467</td>
<td>3 5**</td>
</tr>
</tbody>
</table>

* Yield of cane in ton/ac.
** Bales of 400 lb./ac.

7. Experimentation and Agricultural Research.

There were in all 207 experiments conducted during the period 1954-59 reported from this state. Besides, 145 experiments collected under the Model Agronomy Experiments, T.C.M.

### TABLE 4
Distribution of experiments crop-wise and type-wise

<table>
<thead>
<tr>
<th>Crop</th>
<th>M</th>
<th>MV</th>
<th>C</th>
<th>CV</th>
<th>CM</th>
<th>IM</th>
<th>D</th>
<th>DI</th>
<th>CMV</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>56</td>
<td>15</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td></td>
<td>91</td>
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<tr>
<td>Wheat</td>
<td>9</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<td>10</td>
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<tr>
<td>Maize</td>
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<tr>
<td>Bhindi</td>
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<tr>
<td>Brinjal</td>
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<tr>
<td>Biri and Mung</td>
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<td>Sugarcane</td>
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<td>Jute</td>
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<tr>
<td>Groundnut</td>
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</tr>
</tbody>
</table>

Total          | 116| 18 | 26| 7  | 14 | 17 | 2 | 1  |     | 207   |
experiments and the Simple Fertilizer Trial Schemes of the Indian Council of Agricultural Research and the experiments conducted on cultivators' fields by the State during this period have also been included in the compendium. Experiments with manurial combination of treatments formed about 75% of the total of which about 56% were purely of manurial type. Among food crops paddy accounted for the largest number of experiments conducted, about 44% of the experiments being on this crop. Among cash crops the largest number of experiments were conducted on Sugarcane these being about 15% of the total. Agricultural Research Stations at Bhubaneswar and Sambalpur are the two principal Research Stations in the State. Table 4 below gives the crop and typewise breakup of the experiments type-wise.

About 54.6% of the trials were laid out with Randomised block design and about 35.3% of the trials were with split plot and rest with confounded arrangement of treatments. Block size varied from 32 to 18 in case of R.B.D. while in split plot arrangement the no. of main plots varied from 2 to 12 and the no. of sub-plots per main plot generally varied from 2 to 9, although in a number of experiments with varieties forming part of the treatments as many as 45 sub-plots per main-plot were also recorded. The net plot size in an R.B.D. ranged between 1/1200th to 1/36.3 of an acre. In case of split-plot designs the net plot size varied from 1/2075 to 1/85th of an acre. Experiments with as many as 9 replications have been obtained while there have been a few experiments with 1/8th factional replicate.
PARTICULARS OF RESEARCH STATIONS AND SOIL ANALYSIS

1. Citrus Fruit Research Station, Angul.

A. General information:
   (i) Dhenakanal district, 16 miles from Meemamandali R.S. Lat. 21° N/Long. 83.2°E, Alt. -N.A.  
   (ii) It represents red laterite soil tract (black cotton type of soil).  
   (iii) Started in 1946.  
   (iv) Only perennial crops.  
   (v) Research on citrus varieties and collection of different varieties are the main aspects of research.

B. Normal rainfall in mm.:

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Rainfall (mm)</td>
<td>121</td>
<td>368</td>
<td>124</td>
<td>132</td>
<td>58</td>
<td>58</td>
<td>-</td>
<td>-</td>
<td>31</td>
<td>13</td>
<td>925</td>
</tr>
</tbody>
</table>

(Av. based on rainfall data for 1957-58).

C. Irrigation and drainage facilities:
   (i) Facilities available since 1948.  
   (ii) There is a proper drainage system.

D. Soil type and soil analysis:
   (i) Red loamy soil with an average depth of 2.1", black colour and medium structure.  
   (ii) Chemical analysis and (iii) Mechanical analysis—N.A.

E. No. of experiments:
   Nagpur orange 9, Total=9.

2. Agricultural and Demonstration Farm, Barpalli.

A. General information:
   (i) 32 miles from Sambalpur R.S.  
   (ii) to (v) N.A.

B. Normal rainfall in D. Soil type and soil analysis:

C. Irrigation and drainage facilities:
   (i) (a) Facilities available since 1948. (b) Tanks are available for irrigation. (ii) There is a proper drainage system.

D. Soil type and soil analysis:
   (i) Red loamy soil with an average depth of 2.1", black colour and medium structure.  
   (ii) Chemical analysis and (iii) Mechanical analysis—N.A.

E. No. of experiments:
   Sugarcane 1, Niger 3, Total=4.

3. Rice Research Sub-Station, Berhampur.

A. General information:
   (i) Ganjam district, 6 miles from Berhampur R.S.; Lat 19.5°N/Long. 81.3°E, Alt. N.A.  
   As for general topography, the research station has (a) high land depending on the vagaries of the monsoon and low land having facilities.  
   (ii) It represents coastal tract having red and clay soils.  
   (iii) Started in 1932.  
   (iv) Paddy, Dhaincha, Mung, Biri and Kulthi are the various crops tried in experimentation.  
   (v) Breeding improved paddy varieties is the main programme of research.

B. Normal rainfall in mm.:

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall (mm)</td>
<td>63</td>
<td>242</td>
<td>245</td>
<td>54</td>
<td>564</td>
<td>288</td>
<td>-</td>
<td>22</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>1422</td>
<td></td>
</tr>
</tbody>
</table>

(Av. based on rainfall data for 1938-39. This year rainfall was abnormal).

C. Irrigation and drainage facilities:
   (i) Facilities available since 1946.  
   (ii) No proper drainage is available.
D. Soil type and soil analysis:

(i) Laterite soil, slight grey in colour, to a depth of 9" to 1½' and has very fine sandy structure with clay colloidal patch. (ii) Chemical analysis and (iii) Mechanical analysis—N.A.

E. No. of experiments:
Paddy 17, Total=17.

4. State Research Station, Bhubaneswar.

A. General information:

(i) Puri district, 4 miles from Bhubaneshwar R.S. Lat. 20.2° N/Long. 86.1° E/Alt. 85'.
(ii) It represents small valley tract with adjoining red soils. Land remains marshy and the water patches are called dahals. There is also a part of high land tract. (iii) Started in 1954. (iv) Paddy after paddy is the usual pattern. (v) Research with cultural, Rotational manuraiul and irrigational trials on paddy, wheat, pulses and oilseeds.

B. Normal rainfall in mm.:

<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>249</td>
<td>324</td>
<td>238</td>
<td>221</td>
<td>162</td>
<td>142</td>
<td>32</td>
<td>8</td>
<td>49</td>
<td>39</td>
<td>45</td>
<td></td>
<td>1555</td>
</tr>
</tbody>
</table>

(Av. based on rainfall data for the period 1950-53).

C. Irrigation and drainage facilities:

(i) (a) Facilities available since 1957. (b) Tank irrigation. (ii) Open drainage system is available.

D. Soil type and soil analysis:

(i) Red and yellow lateritic soils with varying depth from shallow to 10'. The soil has grey colour with yellow sub-soil and light red soil with deep red sub-soil. Red soils have comparatively looser structure than other paddy soils which are more compact with stiff sub-soil.

(ii) Chemical analysis.

<table>
<thead>
<tr>
<th>Sand</th>
<th>Silt</th>
<th>Clay</th>
<th>Total carbon</th>
<th>Exchangeable base</th>
</tr>
</thead>
<tbody>
<tr>
<td>80.2</td>
<td>13.0</td>
<td>5.5</td>
<td>0.54</td>
<td>Ca</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td>1.37</td>
</tr>
</tbody>
</table>

(iii) Mechanical analysis—N.A.

E. No. of experiments:
Paddy 49, Wheat 3, Bhindi 1, Brinjal 4, Potato 1, Sweet potato 7, Yam 2, Tapioca 4, Colacasia 3, Arrow root 1, Ginger 1, Biri and mung 1, Sugarcane 7, Groundnut 1, Linseed 1, Gingelly 3, and Niger 1, Total 91.

5. Cotton Research Station, Chakuli.

A. General information:

(i) Sambalpur district, 35 miles from Sambalpur R.S. Lat. 21°22' N/Long. 33°48' E/Alt. N.A. (ii) It represents upland tract of medium level. (iii) Started in 1956. (iv) Paddy, Cotton, Wheat, Groundnut and G.M. crops. (v) Research on economic cropping pattern suitable for Hirakud area.

B. Normal rainfall in mm.:

Details—N.A.

C. Irrigation and drainage facilities:

(i) (a) Facilities available. (b) Perennial supply from Hirakud reservoir. (ii) No proper drainage is available.
D. Soil type and soil analysis:
   (i) Shallow soil of 3' depth, reddish brown colour and spheroidal structure. (ii) The soil is acidic with a pH of 5.1 to 6.4. Soluble salt content is very low, available P is very low. (iii) Mechanical analysis—N.A.

E. No. of experiments:
   Cotton 3, Total=3.

6. Rice Research Sub-Station, Jeypore.
A. General information:
   (i) Koraput district, 106 miles from Vizianagaram R.S. Lat 18.2° N Long 82.5° E. Alt. 2500'. Laterite and clayey soils. (ii) Half of the experimental area represents plain tract and the other half terraced system. (iii) Started in 1937. (iv) G.M. followed by paddy and early paddy followed by wheat is generally adopted for cropping pattern. (v) Research on high yielding varieties of paddy and evolve varieties suitable for the tract. Study of cultural and manurial practices are the important aspects of the programme of research.

B. Normal rainfall in mm.:

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<tr>
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</thead>
<tbody>
<tr>
<td>Value</td>
<td>131</td>
<td>494</td>
<td>665</td>
<td>245</td>
<td>143</td>
<td>15</td>
<td>2</td>
<td>36</td>
<td>63</td>
<td>56</td>
<td>1570</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C. Irrigation and drainage facilities:
   (i) (a) and (b) N.A. (ii) National drainage is available.

D. Soil type and soil analysis:
   (i) Laterite soil varying from a depth of 1' and above soil is of light red, very light yellow of the black cotton soil type. (ii) Chemical and (iii) Mechanical analysis—N.A.

E. No. of experiments:
   Paddy 1, Total=1.

7. Sugarcane Research Sub-Station, Rayagada.
A. General information:
   (i) Kalahandi district, 2 miles from Rayagada R.S. (ii) to (v) N.A.

B. Normal rainfall in mm. to D. Soil type and soil analysis:
Details—N.A.

E. No. of experiments:
   Sugarcane 22, Total 22.

8. Agricultural Research Station, Sambalpur.
A. General information:
   (i) Sambalpur district, 2 miles from Sambalpur R.S. Lat 20°30' N Long 84° E. Alt. 595'. Central table land. (ii) It represents tract of Cuddapah rock system, resting uniformly on the schists and has a genesis of the Archean age. The rocks are normally horizontally bedded. The lowest land consists of sandy stone over laid by clays and clay succeeded by lime stone. (iii) Started 1954. (iv) During Kharif : G.M. paddy and Groundnut. During Rabi : Wheat, pulse as paddy. (v) Programme of Research is as follows.

   Agronomy Section: To evolve suitable crop pattern for the Hirakud area as to study cultural, manurial and irrigational aspects of major crops of this area.

   Botany Section: To introduce new crops and study on evolving new varieties of different crops in this area.
Chemistry Section: To study the effect of intensive cultivation through perennial irrigation on the soil of this area.

Mycology Section: To severly the aspect of diseases of major crops of this area and to study various control measures suitable for them.

Entomology Section: To study about the control of various pests attacking the major crops of this area.

B. Normal rainfall in mm.:

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<thead>
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</thead>
<tbody>
<tr>
<td>(Av. based on data for 1955)</td>
<td>332</td>
<td>335</td>
<td>366</td>
<td>554</td>
<td>89</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>1730</td>
</tr>
</tbody>
</table>

C. Irrigation and drainage facilities:

(i) Facilities available since 1955. (b) Tanks and lift irrigation. (ii) Proper drainage system is available.

D. Soil type and soil analysis:

(i) Soil depth varies from 2' to 3' with pale brown to dark grey colour and granularity to crumble structure. (ii) Chemical analysis: Total N—0.06 to 0.07%. Total P2O5—0.06 to 0.14%. Total K2O—0.52 to 0.62%. T.S.S.—0.05 to 0.09%. pH—5.1 to 7.5 Organic matter 0.34 to 0.68%. Total exchange capacity 15.4 to 27 m.e./m.g. (iii) Mechanical analysis—NA.

E. No. of experiments:

Paddy 23, Wheat 7, Maize 1, Brinjal 1, Potato 6, Sweet potato 1, Arhar 1, Sugarcane 1, Cotton 2, Jute 1, Tobacco 2, Groundnut 4, Berseem 2, Total 52.


A. General information:

(i) Phulbani district, 112 miles from Berhampur R.S., Lat 20.8° N/Long 34.2°E/Alt. 2535'. (ii) It represents valley situated at 15' above level to G. Udaygiri on the west. The tract is subject to soil erosion during rainy season. (iii) Started in 1943. (iv) N.A. (v) Research on turmeric studying the cultural, varietal and manurial aspects.

B. Normal rainfall in mm.:

<table>
<thead>
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<tbody>
<tr>
<td>(Figures relate to rainfall record for the year 1953)</td>
<td>196</td>
<td>271</td>
<td>337</td>
<td>232</td>
<td>85</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>13</td>
<td>9</td>
<td>127</td>
<td>1500</td>
</tr>
</tbody>
</table>

C. Irrigation and drainage facilities:

(i) Facilities available since 1944. (ii) Lift irrigation by pump. (iii) No drainage system.

D. Soil type and soil analysis:

(i) Clayey loam and sandy loam soils with depth 20' for red laterite and 15' for clay complex. Soil has red and brown colour. (ii) Chemical analysis—NA.
Crop: Paddy (Kharif).
Site: Rice Res. Sub-Station, Berhampur.

Object: To test the efficiency of Ammonium Chloride as a source of N.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) A/S at 40 lb./ac. of N. (ii) (a) Clay loam. (b) N.A. (iii) 22.6.1955/13.8.1955.
   (iv) (a) N.A. (b) Transplanting. (c) -. (d) N.A. (e) I. (v) Nil. (vi) B.A.M—3. (vii) Irrigated.

2. TREATMENTS:
   1. Control.
   2. 20 lb./ac. of N as Amm. Chloride.
   3. 20 lb./ac. of N as A/S.

   Manuring on 31.7.1955 behind the plough in furrows when the plot is wet.

3. DESIGN:
   (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) 12'×60'. (b) N.A. (v) Between plots I'. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) N.A. (iii) Weight of grain only. (iv) (a) 1955—56. (b) N.A. (c) Nil. (d) and (e) N.A. (v) and (vi) Nil.

5. RESULTS:
   (i) 23.24 lb./plot. (ii) 4.25 lb./plot. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./plot.
   Treatment
   Av. yield 18.95 25.57 25.20
   S.E./mean = 2.12 lb./plot.

Crop: Paddy (Kharif).
Site: Rice Res. Sub-Stn., Berhampur.

Object: To study the effect of application of different manures on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) 4.7.1956. (iv) (a) N.A. (b) and (c) N.A. (d) and (e) N.A. (f) Irrigated. (g) Nil. (h) 41'. (x) N.A.

2. TREATMENTS:
   7 manural treatments: M 0 =Control. M 1 =80 lb./ac. of Amm. Chloride at puddling. M 2 =80 lb./ac. of Amm. Chloride as deep placement. M 3 =100 lb./ac. of A/S at puddling. M 4 =100 lb./ac. of A/S as deep placement. M 5 =125 lb./ac. of Sod. Nitrate at puddling. M 6 =125 lb./ac. of Sod. Nitrate as deep placement.

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

4. GENERAL:
   (i) to (ii) N.A. (iv) (a) Not contd. (b) N.A. (c) Nil. (d) and (e) N.A. (vi) Nil. (vii) As net plot size is not available the means are given in lb./plot.

5. RESULTS:
   (i) 3.50 lb./plot. (ii) 2.23 lb./plot. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./plot.
Crop: Paddy (Kharij).


Object: To study the effect of artificial fertilizers in conjunction with organic manures.

1. BASAL CONDITIONS:

2. TREATMENTS:
   All combinations of (1), (2) and 3.
   1. 3 levels of N as A/S: N₀=0, N₁=20 and N₂=40 lb., ac.
   2. 3 levels of P₂O₅ as Super: P₀=0, P₁=20 and P₂=40 lb., ac.
   3. 3 levels of bulky manure: F₀=0, F₁=10 and F₂=20 C.L. ac. of F.Y. M.

3. DESIGN:
   (i) 3³ confd. (ii) (a) 3 blocks/replication; 9 plots/block. (b) N.A. (iii) 1. iv: a) 33° × 33°. (b) N.A. (v) 1 row around. (vi) Yes.

4. GENERAL:
   (i) Average. (ii) N.A. (iii) Biometric observations and yield. (iv) (a) 1955—1956. (b) No. (c) Nil. (vi) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 102 lb., ac. (ii) 116.0 lb., ac. (iii) Only N effect is significant. (iv) Av. yield of grain in lb., ac.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
<th>F₀</th>
<th>F₁</th>
<th>F₂</th>
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<td>N₀</td>
<td>873</td>
<td>925</td>
<td>870</td>
<td>889</td>
<td>822</td>
<td>917</td>
<td>930</td>
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<td>1042</td>
<td>1262</td>
<td>1064</td>
<td>1043</td>
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<tr>
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<td>1065</td>
<td>1029</td>
<td>947</td>
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<tr>
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<td>1132</td>
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</table>

S.E. of any marginal mean: —38.67 lb., ac.
S.E. of body of any table: —66.57 lb., ac.

Crop: Paddy (Kharij).


Object: To study the effects of organic and inorganic manures.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (b) N.A. (iii) 22.6.1956/19.7.1956. (iv) (a) Ploughing cross-ploughing in summer followed by laddering. Puddling at the time of planting. (b) to (d) N.A. (e) 4. (v) Nil. (vi) B.A.M—6 (late). (vii) Unirrigated. (viii) 2 weedings and 1 roguing. (ix) N.A. (x) N.A.
2. TREATMENTS:

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

(1) 3 levels of N as A/S: N₀ = 0, N₁ = 20 and N₂ = 40 lb/acre.

(2) 3 levels of P₂O₅ as Super: P₀ = 0, P₁ = 20 and P₂ = 40 lb/acre.

(3) 3 levels of bulky manure: F₀ = 0, F₁ = 100 and F₂ = 200 md/acre of F.Y.M.

3. DESIGN:

(i) 3² confd. (ii) (a) 3 blocks/replication; 9 plots/block. (b) N.A. (iii) 1. (iv) (a) 42' x 13'. (b) 40' x 11'.

(v) Yes.

4. GENERAL:

(i) Average. (ii) Nil. (iii) Tiller count, height measurement, grain and straw yield. (iv) (a) 1955—1958. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 2038 lb/acre. (ii) 262.0 lb/acre. (iii) None of the effects is significant. (iv) Av. yield of grain in lb/acre.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
<th>F₀</th>
<th>F₁</th>
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<td>1912</td>
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<td>N₁</td>
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<td>2206</td>
<td>1921</td>
<td>2110</td>
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<tr>
<td>N₂</td>
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<tr>
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<td>2069</td>
<td>2085</td>
<td>2038</td>
<td>1794</td>
<td>2056</td>
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<td>2268</td>
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</table>

S.E. of any marginal mean = 87.3 lb/acre.
S.E. of body of any table = 151.3 lb/acre.

Crop : Paddy.

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

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) N.A. (iv) (a) Ploughing and cross-ploughing in summer followed by laddering. Puddling at the time of planting. (b) to (d) N.A. (c) Sandy loam. (d) B.A.M.—6 (late). (vii) Unirrigated. (viii) 2 weedings and 1 roguing. (ix) and (x) N.A.

2. TREATMENTS:

Same as in expt. no. 56(21) on page 2.

3. DESIGN:

(i) 3² confd. (ii) (a) 3 blocks/replication; 9 plots/block. (b) N.A. (iii) 1. (iv) (a) N.A. (b) 1/117.33 ac. (v) 1 row around. (vi) Yes.

4. GENERAL:

(i) Average. (ii) N.A. (iii) Tiller count, height, grain and straw yield. (iv) (a) 1955—1958. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 2097 lb/acre. (ii) 354.0 lb/acre. (iii) None of the effects is significant. (iv) Av. yield of grain in lb/acre.
### Crop: Paddy (Kharif).

**Site:** Agri. Res. Stn., Bhubaneswar.

**Type:** 'M'.

Object: To study the response of Paddy to different levels of F.Y.M. and inorganic fertilizers.

#### 1. BASAL CONDITIONS:

1. (a) Nil. (b) Paddy. (c) As per treatments.  
2. (a) Sandy loam. (b) N.A.  
4. (a) to (c) N.A. (d) 9" x 9". (e) N.A.  
5. (vi) B.A.M—6 late.  
6. (ii) Unirrigated.  
8. (ix) 53.15".  

#### 2. TREATMENTS:

1. All combinations of (1), (2) and (3).  
2. (1) 3 levels of N as A/S: $N_0 = 0$, $N_1 = 20$, and $N_2 = 40$ lb./ac.  
3. (2) 3 levels of $P_2$ as Super: $P_0 = 0$, $P_1 = 20$, and $P_2 = 40$ lb./ac.  
4. (3) 3 levels of F.Y.M.: $F_0 = 0$, $F_1 = 8000$, and $F_2 = 16000$ lb./ac.

#### 3. DESIGN:

1. 3² confd.  
2. (a) 3 blocks/replication : 9 plots/block.  
3. (b) N.A.  
4. 1.  
5. (iv) (a) 29" x 15.  
6. (b) 27"-6" x 13"-6".  
7. (v) One row around.  
8. (vi) Yes.

#### 4. GENERAL:

1. Average.  
3. Tillers, height, weight of grain and straw.  
5. Yes.  
6. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

#### 5. RESULTS:

1. 2129 lb./ac.  
2. 486 lb./ac.  
3. No effect is significant.  
4. Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>$P_0$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>Mean</th>
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<td>2249</td>
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</table>

S.E. of any marginal mean = 162.0 lb./ac.  
S.E. of body of any table = 280.6 lb./ac.
Crop :- Paddy (Kharif).
Object :- To study the effect of N, P and K fertilizers with and without F.Y.M. on Paddy.

1. BASAL CONDITIONS :

2. TREATMENTS :
All combinations of (1), (2), (3) and (4)
(1) 3 levels of N as A/S: N0 = 0, N1 = 20 and N2 = 40 lb./ac.
(2) 3 levels of P2O5 as Super: P0 = 0, P1 = 20 and P2 = 40 lb./ac.
(3) 3 levels of K2O as Pot. Chloride: K0 = 0, K1 = 20 and K2 = 40 lb./ac.
(4) 2 levels of F.Y.M.: F0 = 0 and F1 = 8000 lb./ac.

3. DESIGN :
(i) 3^2 x 2 confd. (ii) (a) 6 blocks/replication; 9 plots/block (b) N.A. (iii) 1 (iv) (a) 18' > 24' (b) 16'/22'. (v) One row all round. (vi) Yes.

4. GENERAL :
(i) Average. (ii) Slight attack of stem-borer. (iii) Height, tillers, grain and straw yield. (iv) 6. 1958—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS :
(i) 1952 lb./ac. (ii) 359 lb./ac. (iii) N effect is significant. Others are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>K0</th>
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</table>

S.E. of N, P or K marginal mean = 84.6 lb./ac.
S.E. of F marginal mean = 69.1 lb./ac.
S.E. of body of N x P, N x K or P x K table = 146.6 lb./ac.
S.E. of body of F x N, F x P or F x K table = 113.7 lb./ac.

Crop :- Paddy (Kharif).
Object :- To study the effect of application of N, P and K with and without organic measures on the yield of Paddy.

1. BASAL CONDITIONS
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) 9.6.1959/10.7.1959. (iv) (a) 4 ploughings to 4' depth and levelling. (b) Transplanted. (c) --. (iv) 9' x 5'. (c) 4. (v) Nil. (vi) T-90 (late). (vii) Unirrigated. (viii) 2 hand weedicings and 1 weeding with Japanese weeder. (x) 51.99°. (x) 6.12.1959.
2. TREATMENTS and 3. DESIGN:
Same as in exp. no. 58,19; on page 5.

4. GENERAL:
(i) Average. (ii) Slight attack of case-worm and stem-borer. Endrine sprayed. (iii) Tillers, height, weight of grain and straw. (iv) [a] 1958—contd. (b) Yes. (c) No. (v) a, and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1870 lb./ac. (ii) 361.0 lb./ac. (iii) None of the effects is significant. (iv) Av yield of grain in lb./ac.

<table>
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<th>P2</th>
<th>K0</th>
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S.E. of N, P or K marginal mean = 85.1 lb./ac.
S.E. of F marginal mean = 69.5 lb./ac.
S.E. of body of N × P, N × K or P × K table = 147.4 lb./ac.
S.E. of body of F × N, F × P or F × K table = 120.3 lb./ac.

Crop :— Paddy (Kharif).
Site :— Agri. Res. Sta., Bhubaneswar.
Ref :— Or. 56(19).
Type :— ‘M’.

Object :— To find out the effect of continuous application of A/S with and without organic manures.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 8.7.1956-13.8.1956. (iv) (a) Ploughing and cross-ploughing in summer followed by ladderung. Puddling at planting. (b) N.A. (c) N.A. (d) 9’×9’. (e) 4. (f) Nil. (g) T-90 line. (h) Unirrigated. (i) 2 weekings. (j) and (k) N.A.

2. TREATMENTS:
Main-plot treatments :— 3 organic manures at 40 lb./ac. of N and control : M0=No manure. and M1=G.M, M2=G.N.C. and M3=F.Y.I.
Sub-plot treatments :— 5 levels of N as A/S : N0=0, N1=20, N2=40, N3=60 and N4=80 lb./ac.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots, block; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 45’×12’2 “. (b) 43’6”×10’4 “. (v) 9’×9’. (vi) Yes.

4. GENERAL:
(i) Average. (ii) Nil. (iii) Tiller count, height, length of earhead, grain and straw yield. (iv) a) 1956—contd. (b) Yes. (c) Nil. (v) a, and (b) Nil. (vi) and (vii) Nil.
5. RESULTS:
   (i) 1669 lb./ac.  (ii) (a) 428.0 lb./ac.  (b) 263.0 lb./ac.  (iii) No effect is significant.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
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S.E. of difference of two
1. M marginal means = 135.3 lb./ac.
2. N marginal means = 93.0 lb./ac.
3. N means at the same level of M = 186.0 lb./ac.
4. M means at the same level of N = 214.4 lb./ac.

---

**Crop:** Paddy (*Kharif*).
**Site:** Agri. Res. Stn., Bhubaneswar.
**Ref.:** Or. 57(7).
**Type:** 'M'.

Object: To find out the effect of continuous application of A/S with and without organic manures.

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) and (c) N.A.  (ii) (a) Sandy loam.  (b) N.A.  (iii) 6.7.1957/27.7.1957.  (iv) (a) Ploughing and cross-ploughing in summer followed by laddering. Puddling at planting.  (b) and (c) N.A.  (d) 9"x9".  (e) 4.  (v) Nil.  (vi) T-90 (late).  (vii) Unirrigated.  (viii) 2 weedings and one roguing.  (ix) N.A.  (x) 28.12.1967.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 56(19) on page 6.

4. GENERAL:
   (i) Average.  (ii) N.A.  (iii) Tiller count, height, grain and straw yield.  (iv) (a) 1956—contd.  (b) Yes.  (c) Nil.  (v) (a) and (b) N.A.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 2326 lb./ac.  (ii) (a) 1047 lb./ac.  (b) 437 lb./ac.  (iii) No effect is significant.  (iv) Av. yield of grain in lb./ac.

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

S.E. of difference of two
1. M marginal means = 331.0 lb./ac.
2. N marginal means = 154.5 lb./ac.
3. N means at the same level of M = 309.0 lb./ac.
4. M means at the same level of N = 431.3 lb./ac.
Crop :- Paddy (Khari).

Ref :- Or. 58(22).
Type :- 'M'.

Object :- To study the effect of continuous application of A'S with and without organic manures.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) Sandy loam. (b) N.A. (iii) 15.7, 16.8, 19.9.
   (iv) (a) 4 ploughings by country plough for 4" depth. (b) Transplanted. (c) 5.3 x 5.3. (d) 4. (e) Nil. (f) T-90 late. (g) Unirrigated. (h) 5.2 weeding with Japanese weeder. (i) Nil. (j) N.A.

2. TREATMENTS :
   Same as in exp. no. 59,19. on page 6.

3. DESIGN :
   (i) Split-plot. (ii) (a) 4 main-plots/block and 5 sub-plots/main-plot. (b) N.A. (iii) 45 x 12. (b) 44 x 11 - 2. (j) 6 x 6. (k) Yes.

4. GENERAL :
   (i) Average. (ii) Plots with 60 lb./ac. of N and 80 lb./ac. of N showed leafy growth. (iii) Slight attack of stem-borer. (iv) Tiller, height, grain and straw yield. (v) 1955 const. (vi) N.A. (vii) Nil. (viii) (a) and (b) Nil. (ix) Yes. (x) Nil.

5. RESULTS :
   (i) 1520 lb./ac. (ii) 260 lb./ac. (iii) 250.0 lb./ac. (iv) Only M effect is significant. (v) Yr. (vi) 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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</table>

S.E. of difference of two
1. M marginal means = 93.7 lb./ac.
2. N marginal means = 88.4 lb./ac.
3. N means at the same level of M = 176.8 lb./ac.
4. M means at the same level of N = 183.6 lb./ac.

Crop :- Paddy (Khari).

Ref :- Or. 59(4).
Type :- 'M'.

Object :- To study the effect of continuous application of A'S alone and in combination with organic manures.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) Sandy loam. (b) N.A. (iii) 5.6, 1959, 25.7, 1959.
   (iv) (a) 4 ploughings to 4" depth. (b) Transplanted. (c) 5.3 x 5.3. (d) 4. (e) Nil. (f) T-90 late. (g) Unirrigated. (h) 5.2 weeding with Japanese weeder and one hand weeding. (i) 51.33. (j) 25.12.1959.

2. TREATMENTS :
   Same as in exp. no. 56,19. on page 6.

3. DESIGN :
   (i) Split-plot. (ii) (a) 4 main-plots/block and 5 sub-plots/main-plot. (b) N.A. (iii) 45 x 12.2. (b) 43 x 10.8. (v) 9 x 9. (vi) Yes.
4. GENERAL:
(i) Average. (ii) Some plots were damaged by rats. (iii) Tillers, height and weight of grain and straw. (iv) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1740 lb./ac. (ii) (a) 477.8 lb./ac. (b) 335.0 lb./ac. (iii) Interaction M×N is significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>N_0</th>
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</table>

Mean: 1828 1845 1780 1610 1636 = 1740

S.E. of difference of two
1. M marginal means = 151.1 lb./ac.
2. N marginal means = 118.4 lb./ac.
3. N means at the same level of M = 236.9 lb./ac.
4. M means at the same level of N = 260.0 lb./ac.

---

Crop: Paddy (Kharif).

Object: To study the efficiency of various nitrogenous fertilizers on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 6.7.1956/26.7.1956. (iv) (a) Ploughing and cross ploughing in summer followed by laddering, puddling at the time of planting. (b) N.A. (v) 20 lb./ac. of P_2O_5 as Super. (vi) T—1242 (late). (vii) Unirrigated. (viii) 2 weedings and roguing. (ix) N.A. (x) 2.1.1957.

2. TREATMENTS:
All combinations of (1) and (2) + a control.
(1) 3 levels of N: N_1=20, N_2=40 and N_3=60 lb./ac.
(2) 3 sources of N: S_1=A/S, S_2=Ammonium chloride and S_3=Urea.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 25’×21’’. (b) 23’’×20’. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Average. (ii) Attacked by stem-borer. (iii) Tiller count, height, length of earhead, grain and straw yield. (iv) (a) 1955—contd. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 1600 lb./ac. (ii) 376 lb./ac. (iii) S effect is highly significant. Interaction N×S is significant. N effect is not significant. (iv) Av. yield of grain in lb./ac.

<table>
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Mean: 1633 1458 1821 = 1637
Crop :- Paddy \((\text{Kharif})\),

Object :- To study the efficiency of various nitrogenous fertilizers on the yield of Paddy.

1. BASAL CONDITIONS :
   (i) (a) Nil. b) and (e) N.A. (ii) a) Sandy loam. b) N.A. (iii) 6.7.1957, 4, 5.8.1957. (iv) a) Ploughing and cross ploughing in summer followed by laddering. Puddling at the time of planting. (b) to (c) N.A. (v) 20 lb/ac. of \(\text{P}_2\text{O}_5\) as Super. (vi) T-1242 (late). (vii) Unirrigated. (viii) 2 weedings and roguing. (ix) N.A. (x) 17.12.1957.

2. TREATMENTS :
   All combinations of 1) and 2) a control.
   (1) 3 levels of N : N\(_1\) = 20, N\(_2\) = 10 and N\(_3\) = 60 lb/ac.
   (2) 5 sources of N : S\(_1\) = A.S., S\(_2\) = Ammonium Chloride, S\(_3\) = Urea, S\(_4\) = A/S, N. and S\(_5\) = C.A.N.

3. DESIGN :
   (i) R.B.D. (ii) a) 16. (b) N.A. (iii) 4. (iv) a) 28'x15'-7''. (b) 26'-5'x14'-7''. (v) One row accompanied. (vi) Yes.

4. GENERAL :
   (i) Average. (ii) Attacked by stem-borer. (iii) Tiller count, height, length of ear, ear weight of grain and straw. (iv) a 1955-1959. (v) No. (c) Nil. (vi) a; and (b) N.A. (vii) and (viii) Nil.

5. RESULTS :
   (i) 2153 lb/ac. (ii) 689 lb/ac. (iii) S effect is significant and N effect is highly significant. (iv) Av. yield of grain in lb/ac.

<table>
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<td>1779</td>
</tr>
</tbody>
</table>

S.E. of N marginal mean = 154.1 lb/ac.
S.E. of S marginal mean = 198.9 lb/ac.
S.E. of body of table or control mean = 344.5 lb/ac.

Crop :- Paddy \((\text{Kharif})\),

Object :- To study the efficiency of various nitrogenous fertilizers on the yield of Paddy.

1. BASAL CONDITIONS :
   (i) (a) Nil. b) Paddy. c) N.A. (ii) (a) Sandy loam. b) N.A. (iii) 23.6.1958. (iv) a) 2 ploughings to 4' depth. (b) Transplanted. (c) --. (d) 9'x9'. (e) 4. (v) 20 lb/ac. of \(\text{P}_2\text{O}_5\) as Super applied at the time of planting. (vi) T-1242 (late). (vii) Unirrigated. (viii) Weeding and roguing. (ix) 51.67%. (x) 4, 5.12.1958.

2. TREATMENTS :
   Same as in exp. no. 57(4) above.
3. DESIGN:
(i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) 28'×15'-5". (b) 26'-6"×14'. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Average. (ii) Slight attack of stem-borer. (iii) Height, tiller, grain and straw weight. (iv) (a) 1955—1959. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2297 lb./ac. (ii) 272 lb./ac. (iii) Treatment differences 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>
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<td>2192</td>
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S.E. of N marginal mean = 60.82 lb./ac.
S.E. of S marginal mean = 78.52 lb./ac.
S.E. of body of table or control mean = 136.00 lb./ac.

Crop :- Paddy (Kharif).
Object :-To study the efficiency of various nitrogenous fertilizers on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) 6, 7.8.1959 (iv) (a) Puddling and ploughing before transplanting. (b) Transplanting. (c) —. (d) 9"×5". (e) 2. (f) 20 lb./ac. of P2O5 as Super. (vi) T—1242 (late). (vii) Irrigated. (viii) Weeding and roguing. (ix) 47.94°. (x) 8.12.1959.

2. TREATMENTS:
Same as in exp. no. 57(4) on page 10.

3. DESIGN:
(i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) 27.5×18'. (b) N.A. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Attack of mealy bug. Endrex was sprayed. (iii) Height, tiller, no. of ear heads, no. of grains per ear head and grain yield. (iv) (a) 1955—1959. (b) Yes. (c) Nil. (d) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1422 lb./ac. (ii) 341 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>S4</th>
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<td>N3</td>
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<td>1499</td>
<td>1191</td>
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<td>1542</td>
<td>1443</td>
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Ref :- Or. 59(19).
Type :- 'M'.

Crop :- Paddy (Kharif).
Object :-To study the efficiency of various nitrogenous fertilizers on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) 6, 7.8.1959 (iv) (a) Puddling and ploughing before transplanting. (b) Transplanting. (c) —. (d) 9"×5". (e) 2. (f) 20 lb./ac. of P2O5 as Super. (vi) T—1242 (late). (vii) Irrigated. (viii) Weeding and roguing. (ix) 47.94°. (x) 8.12.1959.

2. TREATMENTS:
Same as in exp. no. 57(4) on page 10.

3. DESIGN:
(i) R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) 27.5×18'. (b) N.A. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Attack of mealy bug. Endrex was sprayed. (iii) Height, tiller, no. of ear heads, no. of grains per ear head and grain yield. (iv) (a) 1955—1959. (b) Yes. (c) Nil. (d) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1422 lb./ac. (ii) 341 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>S4</th>
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<td>1499</td>
<td>1191</td>
<td>1334</td>
<td>1542</td>
<td>1443</td>
</tr>
</tbody>
</table>
Crop :- Paddy (*kharif*).


Ref :- Or. 55(16).

Type :- 'M'.

Object :- To find out the effect of different times of application of N on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 2, 30" 1955. (iv) (a) Ploughing and cross ploughing in summer followed by laddering. (b) Transplanted. (c) d N.A. (e) 2, 30" 20 lb.ac. of P\(_2\)O\(_5\) (vi) T=1242 (late), (vii) Unirrigated, (viii) 2 weedings and one roguing. (ix) and (x) N.A.

2. TREATMENTS:

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

(1) 2 sources of 40 lb.ac. of N : S\(_1\)=Urea and S\(_2\)=A.S.

(2) 7 times of application of N : T\(_1\)=Before planting, T\(_2\)=At planting, T\(_3\)=At tillering, T\(_4\)=at planting+\(\frac{1}{2}\) at tillering, T\(_5\)=at planting+\(\frac{1}{2}\) at tillering+\(\frac{1}{2}\) one week before flowering and T\(_6\)=at planting+\(\frac{1}{2}\) at tillering+\(\frac{1}{2}\) one week before flowering.

3. DESIGN :

(i) R.B.D. (ii) 15. (b) N.A. (iii) 3. (iv) 3\(\times\)3\(\times\)3. (v) 160 ac. (vi) One row around. (vi) Yes.

4. GENERAL:

(i) Average. (ii) N.A. (iii) Tilling, height, yield of grain and straw. (iv) 1955-1959. (b) No. v Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 1697 lb.ac. (ii) 125.0 lb.ac. (iii) T effect, interaction S\(\times\)T and control vs others are highly significant. S effect is not significant. (iv) Av. yield of grain in lb.ac.

Control=1380 lb.ac.

<table>
<thead>
<tr>
<th></th>
<th>T(_1)</th>
<th>T(_2)</th>
<th>T(_3)</th>
<th>T(_4)</th>
<th>T(_5)</th>
<th>T(_6)</th>
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<td>1715</td>
<td>1572</td>
<td>1650</td>
<td>1850</td>
<td>1447</td>
<td>1647</td>
<td>1930</td>
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<tr>
<td>S(_2)</td>
<td>1687</td>
<td>2100</td>
<td>1362</td>
<td>1525</td>
<td>1985</td>
<td>1887</td>
<td>1715</td>
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<tr>
<td>Mean</td>
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<td>1836</td>
<td>1511</td>
<td>1687</td>
<td>1716</td>
<td>1767</td>
<td>1822</td>
</tr>
</tbody>
</table>

S.E. of S marginal mean = 27.28 lb.ac.
S.E. of T marginal mean = 51.03 lb.ac.
S.E. of body of table or control mean = 72.17 lb.ac.

---

Crop :- Paddy (*kharif*).


Ref :- Or. 56(18).

Type :- 'M'.

Object :- To find out the effect of different times of application of N on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 8.6, 1956, 18.7, 1956. (iv) (a) Ploughing and cross ploughing in summer followed by laddering. Puddling at the time of planting. (b) and (c) N.A. (d) 90°\(\times\)90°. (e) N.A. (v) 20 lb.ac. of P\(_2\)O\(_5\) as Super+5000 lb.ac. of F.Y.M. (vi) T=1242 (late), (vii) Unirrigated, (viii) 2 weedings and roguing. (ix) and (x) N.A.
2. TREATMENTS:
Same as in exp. no. 55(16) on page 12.

3. DESIGN:
(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 3. (iv) (a) 29'x15'. (b) 27'x31'. (v) 9'x9'. (vi) Yes.

4. GENERAL:
(i) Average. (ii) Attack of stem-borer in all and by blue-green algae in two plots. (iii) Tiller count, height, grain and straw yield. (iv) (a) 1955—1959. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) und (vii) Nil.

5. RESULTS:
(i) 1066 lb./ac. (ii) 149 lb./ac. (iii) T effect is significant. Control vs others is highly significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.

Control=798 lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
<th>T_5</th>
<th>T_6</th>
<th>T_7</th>
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</tr>
</thead>
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<td>1090</td>
<td>1047</td>
<td>1042</td>
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<td>802</td>
<td>1002</td>
<td>1093</td>
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<tr>
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<td>1023</td>
<td>1068</td>
<td>1112</td>
<td>1161</td>
<td>1017</td>
<td>1085</td>
</tr>
</tbody>
</table>

S.E. of S marginal mean = 32.51 lb./ac.
S.E. of T marginal mean = 60.83 lb./ac.
S.E. of body of table or control mean = 86.03 lb./ac.

Crop :- Paddy (Kharij).

Ref :- Or. 57(5).
Type :- ‘M’.

Object :- To find out the effect of different times of application of N on Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 7.6.1957/9.7.1957. (iv) (a) Ploughing and cross ploughing in summer followed by laddering. Puddling at the time of planting. (b) and (c) N.A. (d) 9'x9'. (e) 3. (v) 20 lb./ac. of P_2O_5 as super-5000 lb./ac. of F.Y.M. (vi) T—1242 (late). (vii) Unirrigated. (viii) 2 weedings and 1 roguing. (ix) N.A. (x) N.A.

2. TREATMENTS and 3. DESIGN:
Same as in exp. no. 55(16) on page 12.

4. GENERAL:
(i) Average. (ii) Stem-borer attack. Bordeaux mixture sprayed. (iii) Tiller count, height, grain and straw weight. (iv) (a) 1955—1959. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 2374 lb./ac. (ii) 233 lb./ac. (iii) No effect is significant. (iv) Av. yield of grain in lb./ac.

Control=2171 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>2239</td>
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<td>2332</td>
<td>2312</td>
<td>2464</td>
<td>2567</td>
<td>2388</td>
</tr>
</tbody>
</table>

S.E. of S marginal mean = 50.84 lb./ac.
S.E. of T marginal mean = 95.12 lb./ac.
S.E. of body of table or control mean = 134.50 lb./ac.
Crop: Paddy \( (\text{Khari}) \)


Ref: Or. 58(13).

Type: 'M'.

Obj: To study the most suitable time of application of N on Paddy.

1. BASAL CONDITIONS:
   (a) Nil. (b) Paddy. (c) N.A. (d) Sandy loam. (e) N.A. (f) 20.7.1958; 3. 4.9.1958. (iv) 4 ploughings to 4" depth. (v) Transplanted. (c) 40½ x 9". (iv) 20 lb./ac. of \( \text{P}_2\text{O}_5 \) as Super in the time of planting. (v) T = 10' 7". (vi) Unirrigated. (vii) Weeding and removal of rogues. (viii) Control.

2. TREATMENTS:
   Same as in expt. no. 5516 on page 12.

3. DESIGN:
   (i) R.B.D. (ii) 15. (b) N.A. (iii) 3. (iv) a) 42'x13'. (b) 40'6"x11'6". (v) One row all around.

4. GENERAL:
   (i) Average. (ii) Slight attack of stem-borer. (iii) Height, tillers, grain and straw yield. (iv) a. 1955—1959. (b) No. (c) Nil. (v) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1617 lb./ac. (ii) 335 lb./ac. (iii) No effect is significant. (iv) Av. yield of grain in lb./ac.

\[
\begin{array}{ccccccc}
    & T_1 & T_2 & T_3 & T_4 & T_5 & T_6 \\
S_1 & 1851 & 1660 & 1803 & 1383 & 1812 & 1719 & 1435 & 1673 \\
S_2 & 1397 & 1617 & 1282 & 1630 & 1514 & 1672 & 1648 & 1537 \\
Mean & 1624 & 1633 & 1542 & 1506 & 1663 & 1696 & 1566 & 1605 \\
\end{array}
\]

S.E. of S marginal mean = 17.3 lb./ac.

S.E. of T marginal mean = 136.8 lb./ac.

S.E. of body of table or control mean = 193.4 lb./ac.

Crop: Paddy \( (\text{Khari}) \)


Ref: Or. 59(9).

Type: 'M'.

Obj: To study the most suitable time of application of N.

1. BASAL CONDITIONS:
   (a) Paddy. (b) Paddy. (c) 10,000 lb./ac. F.Y.M of 30 lb./ac of N as A.S and 30 lb./ac of \( \text{P}_2\text{O}_5 \) as Super. (d) Sandy loam. (e) N.A. (f) 12, 13, 7.1959. (iv) a. Ploughing and cross ploughing. (b) Transplanted. (c) 9½ x 9". (d) 20 lb./ac of \( \text{P}_2\text{O}_5 \) as Super +10,000 lb./ac of F.Y.M. (v) T = 90. (vi) Unirrigated. (vii) Weeding by Japanese weeder. (viii) Control.

2. TREATMENTS and 3. DESIGN:
   Same as in expt. no. 55/16 on page 12.

3. GENERAL:
   (i) Good. (ii) Mild attack of mealy bug. Endrex sprayed. (iii) Height, tillers, no. of the effective earhead, and no. of grains per earhead. (iv) a. 1955—1959. (b) Yes. (c) Nil. (d) Nil. (e) and (f) Nil.

3. RESULTS:
   (i) 1812 lb./ac. (ii) 314.0 lb./ac. (iii) No effect is significant. (iv) Av. yield of grain in lb./ac.
<table>
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<tr>
<th></th>
<th>T_1</th>
<th>T_2</th>
<th>T_3</th>
<th>T_4</th>
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<td>1742</td>
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<td>1707</td>
<td>1991</td>
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<td>1734</td>
<td>1814</td>
<td>1920</td>
<td>1669</td>
<td>1806</td>
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</table>

S.E. of S marginal mean = 68.52 lb./ac.
S.E. of T marginal mean = 128.20 lb./ac.
S.E. of body of table or control mean = 181.30 lb./ac.

Crop :- Paddy (Kharif).


Object :- To study the effect of P_2O_5 on mineralisation of green matter and its effect on the succeeding Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 25.7.1958, 27.3.1958. (iv) (a) 4 ploughings to 4" depth by country plough. (b) Transplanting. (c) —. (d) 9" × 9". (e) 4. (v) Nil. (v) T-90 (late). (vii) Unirrigated. (viii) Weeding with Japanese weeder and hand weeding. (ix) 34.20°. (x) 7.12.1958.

2. TREATMENTS:
   1. Control.
   2. Dhanicha alone
   3. Dhanicha+B.M. at the time of sowing dhanicha.
   4. Dhanicha+B.M. at the time of puddling.
   5. Dhanicha+5000 lb./ac. of cow dung at the time of sowing dhanicha.
   6. B.M. at the time of puddling.
      B.M. applied at 20 lb./ac. of P_2O_5.

3. DESIGN:
   (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 5. (iv) (a) 29°×15°. (b) 27°-6°×13 -6°. (v) 9°×9° (v) Yes.

4. GENERAL:
   (i) Average. (ii) Slight attack of stem-borer. (iii) Height, tillers, grain and straw weight.

5. RESULTS:
   (i) 2143 lb./ac. (ii) 250 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>
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<td>2127</td>
<td>2162</td>
<td>2316</td>
<td>2214</td>
<td>1998</td>
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</table>

S.E./mean = 111.8 lb./ac.

Crop :- Paddy (Kharif).


Object :- To find the effect of P_2O_5 on mineralisation of green matter and its effect on the succeeding Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Mung in rabi. (c) Nil. (ii) (a) Sandy loam. (b) N.A. (iii) 5.7.1959, 21.8.1959. (iv) (a) 4 ploughings by country plough to 4" depth. (b) Transplanting. (c) —. (d) 9°×9°. (e) 4. (v) Nil. (v) T-90 (late). (vii) Unirrigated. (viii) Weeding with Japanese weeder. (ix) 46.78°. (x) 11 and 12.12.1959.
2. TREATMENTS and 3. DESIGN :
Same as in exp. no. 58/21 on page 15.

4. GENERAL :
(i) Average. (ii) Slight attack of stem-borer. (iii) Tiller, height, grain and straw yield. (iv) 1955—N.A. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5 RESULTS :
(i) 2130 lb./ac. (ii) 246 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>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1918</td>
<td>2200</td>
<td>2221</td>
<td>2338</td>
<td>2150</td>
<td>1930</td>
</tr>
<tr>
<td>S.E., mean</td>
<td>-110.0 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (R. iri).  

Object :- To find the effect of placement of phosphate fertilizers on Paddy.

1. BASAL CONDITIONS :
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy-loam. (b) Sand 80.2%, silt 13.0%, clay 0.5%. Total N 0.36%. (b) 20, 71.9, 1955. (iv) (a) 4 ploughings with mould board and (a) plough to 4' deep, twice laddering. (b) Transplanted. (c) (d) 9. 9. (e) 2. (f) 30 lb./ac. of N as AS. (vi) 7—9 (late). (vii) Unirrigated. (viii) 2 weeding. (ix) 58.8%. (x) N.A.

2. TREATMENTS :
All combinations of (1), (2) and (3)—2 controls one in each block.
(1) 2 sources of P$_2$O$_5$: S$_1$ = Super and S$_2$ = Ammon. Phos.
(2) 2 levels of P$_2$O$_5$: P$_1$ = 20 and P$_2$ = 40 lb./ac.
(3) 4 methods of application : M$_1$ = Broadcasting at puddling, M$_2$ = Drilling, M$_3$ = Dipping the seedlings in mud slash and M$_4$ = Applied in the form of pellets.

3. DESIGN :
(i) (4 x 2 x 2) confd. fact. (ii) (a) 9 : 2 blocks/replication b) N.A. (iii) 3. (iv) a 33 X 33 b) N.A. (v) One row on either side. (vi) Yes.

4. GENERAL :
(i) Average. (ii) N.A. (iii) Height, tillers and yield. (iv) 1955—N.A. (b) and (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS :
(i) 1763 lb./ac. (ii) 169.2 lb./ac. (iii) Main effects of M and control vs others are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Control=1543 lb./ac.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>P$_1$</td>
</tr>
<tr>
<td>P$_2$</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>M$_1$</td>
</tr>
<tr>
<td>M$_2$</td>
</tr>
<tr>
<td>M$_3$</td>
</tr>
<tr>
<td>M$_4$</td>
</tr>
</tbody>
</table>
Crop :- Paddy (Kharif).

Object :- To study the effect of different levels and forms of \( \text{P}_2\text{O}_5 \) on the yield of Paddy.

1. BASAL CONDITIONS : 
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 8.7.1956/4.8.1956. (iv) (a) 4 ploughings to 4' depth by country plough. (b) Transplanted. (c) —. (d) 9'x9'. (e) 4. (v) 20 lb./ac. of N as A/S excepting control plot. (vi) B. A. M—6 (late). (vii) Unirrigated. (viii) 2 weedings and 1 roguing. (ix) 50 37'. (x) 18.12.1956.

2. TREATMENTS : 
   All combinations of (1) and (2)+a control (no manure)
   (1) 3 levels of \( \text{P}_2\text{O}_5 \) : \( P_0 =0 \), \( P_1 =20 \) and \( P_2 =40 \) lb./ac.
   (2) 3 sources of \( \text{P}_2\text{O}_5 \) : \( S_1 =B.M. \), \( S_2 =\text{Rock phosphate} \) and \( S_3 =\text{Super.} \)

3. DESIGN : 
   (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) 42'x13'. (b) 40'-6"X11'-6". (v) 9"X9". (vi) Yes.

4. GENERAL : 
   (i) Average. (ii) N.A. (iii) Height, tillers, grain and straw weight. (iv) (a) 1956—cond. (b) and (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS : 
   (i) 1944 lb./ac. (ii) 496 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

   \[
   \begin{array}{ccc|c}
   S_1 & S_2 & S_3 & \text{Mean} \\
   \hline
   P_1 & 2458 & 2040 & 1809 & 2102 \\
   P_2 & 1811 & 1952 & 2058 & 1940 \\
   \text{Mean} & 2145 & 2013 & 1892 & 2017 \\
   \end{array}
   \]

   S.E. of P marginal mean = 165.3 lb./ac.
   S.E. of S marginal mean = 202.5 lb./ac.
   S.E. of body of table = 286.4 lb./ac.
   S.E. of control mean = 143.2 lb./ac.

---

Crop :- Paddy (Kharif).

Object :- To study the effect of different forms and levels of \( \text{P}_2\text{O}_5 \) on the yield of Paddy.

1. BASAL CONDITIONS : 
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 9.6.1957/10.7.1957. (iv) (a) 4 ploughings to 4' depth. (b) Transplanting. (c) —. (d) 9'x9'. (e) 4. (v) 20 lb./ac. of N as A/S excepting control. (vi) B. A. M—6 (late). (vii) Unirrigated. (viii) 2 weedings and 1 roguing. (ix) 32.28'. (x) 1.12.1957.
2. TREATMENTS:
All combinations of (1) and (2) a control
1) 2 levels of P$_2$O$_5$: P$_1$ = 20 and P$_2$ = 40 lb/ac.
2) 4 sources of P$_2$O$_5$: S$_1$ = R.@ e. phosphate, S$_2$ = B.M., S$_3$ = Super and S$_4$ = Hyper phosphate

3. DESIGN:
(i) R.B.D. (ii) (a) 9, b. N.A. (iii) 3, (iv) A. 4(2)13, b 4(0)6 11 15, iv 9 9 9, vii Yes.

4. GENERAL:
(i) Average. (ii) N.A. (iii) Tillers, height, grain and straw yield. (iv) a 1956 contd. b No. (c) Nil (v) a and b Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2011 lb/ac. (ii) 397.9 lb/ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P$_1$</td>
<td>1933</td>
<td>2147</td>
<td>2019</td>
<td>2050</td>
</tr>
<tr>
<td>P$_2$</td>
<td>1909</td>
<td>2038</td>
<td>2217</td>
<td>1925</td>
</tr>
<tr>
<td>Mean</td>
<td>1921</td>
<td>2092</td>
<td>2118</td>
<td>1988</td>
</tr>
</tbody>
</table>

S.E. of S marginal mean = 162.4 lb/ac.
S.E. of P marginal mean = 114.9 lb/ac.
S.E. of body of table or control mean = 229.7 lb/ac.

Crop :- Paddy (Kharif).

Object :- To study the effect of different forms and levels of P$_2$O$_5$ on the yield of Paddy.

1. BASAL CONDITIONS:

2. TREATMENTS and 3. DESIGN:
Same as in expt. no. 57/14: on page 17.

4. GENERAL:
(i) Average. (ii) N.A. (iii) Height, tiller, grain and straw yield. (iv) a 1956—contd. b No. (e) Nil. (f) a and b Nil. (g) and (h) Nil.

5. RESULTS:
(i) 1998 lb/ac. (ii) 308.0 lb/ac. (iii) None of the effects is significant. iv Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
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</thead>
<tbody>
<tr>
<td>P$_1$</td>
<td>2130</td>
<td>2163</td>
<td>1841</td>
<td>1988</td>
</tr>
<tr>
<td>P$_2$</td>
<td>2104</td>
<td>1843</td>
<td>2026</td>
<td>2060</td>
</tr>
<tr>
<td>Mean</td>
<td>2117</td>
<td>2003</td>
<td>1934</td>
<td>2024</td>
</tr>
</tbody>
</table>
Crop :- Paddy (Kharif).


Object :- To determine the response of Paddy to different levels and forms of P₂O₅.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) N.A.  
   (ii) (a) Sandy loam. (b) N.A.  
   (iii) 21.6.1959/13.7.1959. (iv) (a) Ploughing and puddling once before transplanting. (b) Transplanting. (c) —. (d) 9" to 9". (e) 3 to 4. (f) 20 lb./ac. of N as A/S broadcast on the day before transplanting. (vi) B.A.M.—6 (late). (vii) Unirrigated. (viii) Weeding with Japanese weeder followed by hand weeding, roguing at flowering. (ix) N.A. (x) 24.12.1959.

2. TREATMENTS :
   Same as in exp. no. 57(14) on page 17.

3. DESIGN :
   (i) R.B.D.  
   (ii) (a) 9. (b) N.A.  
   (iii) 4. (iv) (a) 1/80 ac. (b) 1/91.1 ac. (v) One row alround. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) Infestation by mealy bugs and heavy caterpiller. Endrex was sprayed. 
   (iii) No. of effective tillers, height of plants, length of earhead, no. of grains and chaff per earhead and grain yield. 
   (iv) (a)1956—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1841 lb./ac.  
   (ii) 363 lb./ac.  
   (iii) Control vr others alone is significant. (iv) Av. yie'd of grain in lb./ac.

   Control=1372 lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>1685</td>
<td>1868</td>
<td>1936</td>
<td>1657</td>
<td>1786</td>
</tr>
<tr>
<td>P₂</td>
<td>2004</td>
<td>2141</td>
<td>2141</td>
<td>1771</td>
<td>2014</td>
</tr>
<tr>
<td>Mean</td>
<td>1844</td>
<td>2005</td>
<td>2038</td>
<td>1714</td>
<td>1900</td>
</tr>
</tbody>
</table>

S.E. of S marginal mean = 128.3 lb./ac.
S.E. of P marginal mean = 90.8 lb./ac.
S.E. of body of table or control mean = 181.5 lb./ac.

Crop :- Paddy (Kharif).


Object :- To find out the effect of organic wastes and green leaves in combination with Super and to find their residual value.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Mung. (c) 40 lb./ac. of P₂O₅ as Super.  
   (ii) (a) Sandy loam. (b) N.A.  
   (iii) 30.6.1959/30.7.1959. (iv) (a) 4 ploughings to 4" depth by country plough. (b) Transplanting. (c) —. (d) 9"x9". (e) 4. (f) Nil. (vi) T—90 (late). (vii) Unirrigated. (viii) Weeding with Japanese weeder. (ix) 47.37". (x) 25.12.1959.
2. TREATMENTS:
All combinations of (1) and (2):
(1) 2 levels of Super: $S_0 = 0$ and $S_1 = 1$ md. ton of organic waste or green leaves.
(2) 6 green manures: $M_0 =$ Control, $M_1 =$ Night soil compost, $M_2 =$ Dhanis ha, $M_3 =$ Sann hemp, $M_4 =$ Glycricidia and $M_5 =$ Ipomea cornea.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 3. (iv) (a) $24' \times 21'$. (b) $22' \times 19'$. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Average in two replications and poor in one replication. (ii) Slight attack of stem-borer. (iii) Tillers, height, weight of grain and straw.

5. RESULTS:
(i) 1494 lb./ac. (ii) 336.0 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>$M_0$</th>
<th>$M_1$</th>
<th>$M_2$</th>
<th>$M_3$</th>
<th>$M_4$</th>
<th>$M_5$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1654</td>
<td>1451</td>
<td>1369</td>
<td>1543</td>
<td>1464</td>
<td>1741</td>
<td>1537</td>
</tr>
<tr>
<td>1203</td>
<td>1642</td>
<td>1638</td>
<td>1394</td>
<td>1468</td>
<td>336.0</td>
<td>1452</td>
</tr>
<tr>
<td>Mean</td>
<td>1428</td>
<td>1546</td>
<td>1504</td>
<td>1468</td>
<td>1553</td>
<td>1494</td>
</tr>
</tbody>
</table>

S.E. of $S$ marginal mean = 79.2 lb./ac.
S.E. of $M$ marginal mean = 137.2 lb./ac.
S.E. of body of table = 194.0 lb./ac.

Crop :- Paddy.
Site :- Agri. Res. Sta., Bhubaneswar.
Ref :- Or. 57(3).
Type :- 'M'.

Object :- To study the effect of C, A, N on the yield of Paddy.

1. BASAL CONDITIONS:
(i) a Nil. b and c N.A. (ii) a Sandy loam, b N.A. e, N.A, 9.8.1957. (iii) a to e. N.A. 20 lb./ac. of $P_2O_5$ as Super before planting. (iv) $T_1$ = 141 medium. (v) Untreated. (vi) 2 weeding.

2. TREATMENTS:
$T_0 =$ Control.
$T_1 =$ 40 lb./ac. of N 14 days after transplanting.
$T_2 =$ 20 lb. ac. of N 14 days after transplanting and 20 lb. ac. one month after transplanting.
$T_3 =$ 20 lb. ac. of N 14 days after transplanting and 20 lb. ac. one month after transplanting + 10 lb./ac. one week before flowering.
$T_4 =$ 40 lb. ac. of N 14 days after transplanting.
N applied as C/A/N in $T_1$, $T_2$, and $T_3$ and as A/S in $T_4$.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) a $22' \times 19'6'$. b $20'9' \times 18'. (v) 9' \times 9'$. (vi) Yes.

4. GENERAL:
(i) Average. (ii) Nil. (iii) Height, tiller, weight of grain and straw. (iv) (a) 1958—N.A. (b) N.A. (c) Nil. (v) a and b N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 2431 lb./ac. (ii) 313 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$T_0$</th>
<th>$T_1$</th>
<th>$T_2$</th>
<th>$T_3$</th>
<th>$T_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2099</td>
<td>2562</td>
<td>2409</td>
<td>2581</td>
<td>2506</td>
</tr>
<tr>
<td>S.E. mean</td>
<td>=156.5 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop :- Paddy (Kharif).

Object :- To find out the suitability of split application of N for Paddy.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) 20 lb./ac. of N as A/S top dressed. (ii) (a) Sandy loam. (b) N.A. (iii) 20.8.1957 and 21.8.1957. (iv) (a) and (b) Ploughing during summer followed by three puddings. Twice ladinger at the time of transplanting. (c) to (e) N.A. (v) No. (vi) T=90 (late and improved variety). (vii) Unirrigated. (viii) Two weedings. (ix) and (x) N.A.

2. TREATMENTS :
   T1 = 10 lb./ac. of N at puddling+10 lb./ac. one month after puddling+10 lb./ac. at flowering.
   T2 = 15 lb./ac. of N at puddling+15 lb./ac. one month after puddling.
   T3 = 30 lb./ac. of N at puddling.
   T4 = 30 lb./ac. of N one month after puddling.
   T5 = 30 lb./ac. of N before flowering.
   N applied as A/S.

3. DESIGN :
   (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 34’x10’. (b) 33’x9’. (v) 9”x6”. (vi) Yes.

4. GENERAL:
   (i) Poor due to drought. (ii) N.A. (iii) Yield of grain. (iv) (a) and (b) No (c) Nil. (v) (a) and (b) Nil. (vi) Heavy rains affected the yield. (vii) Nil.

5. RESULTS:
   (i) 111 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>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1261</td>
<td>1064</td>
<td>1068</td>
<td>1276</td>
<td>885</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>=108.5 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).

Object :- To find out the response of Paddy to application of N and P.

1. BASAL CONDITIONS :
   (i) (a) Paddy—Fallow. (b) Nil. (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 7.6.1959/7.7 1959. (iv) (a) 2 ploughings with mould board plough. Puddling with desi plough before planting to 4”-5” depth. (b) Line planting. (c) 15 srs./ac. approximately. (d) 9”x9”. (e) 3-4. (v) F Y.M. at 5003 lb./ac. (vi) T=1242 (late). (vii) Nil. (viii) Once weeding with Japanese weeder followed by hand weeding. (ix) 47.94”. (x) 17.12.1959.

2. TREATMENTS :
   All combinations of (1) and (2)
   (1) 3 levels of N : N0=0, N1=30 and N2=60 lb./ac.
   (2) 3 levels of P2O5 : P0=0, P1=30 and P2=60 lb./ac.
   N as A/S and P2O5 as Super.

3. DESIGN :
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 9. (iv) (a) 15’x29’. (b) 13’x17’. (v) One row all round. (vi) Yes.

4. GENERAL :
   (i) Normal. (ii) Rat damage in some plots. No control measure. Endreex was sprayed during growth period to control mealy bugs. (iii) Height, no. of tillers, length of earhead, no. of chaff and grain per earhead—grain and straw yield. (iv) (a) 1958—continuing. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.
5. RESULTS:

(i) 2139 lb./ac.  (ii) 355 lb./ac.  (iii) Main effects of N and P are not significant. Interaction N×P is significant.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>1975</td>
<td>2229</td>
<td>1857</td>
<td>2020</td>
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<td>N₂</td>
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<td>2092</td>
<td>2224</td>
<td>2248</td>
</tr>
<tr>
<td>Mean</td>
<td>2132</td>
<td>2209</td>
<td>2077</td>
<td>2139</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 68.3 lb./ac.
S.E. of body of table = 118.5 lb./ac.

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

Object: To study the effect of P₂₀₀₀ applied to previous legume crop on the yield of succeeding cereal crop.

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) Biri + Mung.  (c) As per treatments.  (ii) (a) Sandy loam.  (b) N.A.  (i) 25.6 1958 and 27.7.1958.  (iv) (a) Ploughing, 4 cross ploughings to 4" depth followed by laddering.  (b) Transplanting  (c) 20 lb./ac.  (d) 9"x9".  (e) Nil.  (v) T=141 (medium).  (vi) Unirrigated.  (vii) 2 weedings and roguing.  (ix) Kharif 50.43".  (x) 28.11.1958.

2. TREATMENTS:
   Main-plot treatments:
   All combinations of (1) and (2) + one control (fallow).
   (1) 2 legumes: L₁ = Biri and L₂ = Mung.
   (2) 3 levels of P₂₀₀₀: P₀ = 0, P₁ = 40 and P₂ = 80 lb./ac.

   Sub-plot treatments:
   3 levels of N as A/S: N₀ = 0, N₁ = 15 and N₂ = 30 lb./ac.
   N as A/S to be applied to the cereal crop grown in all the plots including fallow plots.

3. DESIGN:
   (i) Split-plot.  (ii) (a) 7 main-plots/replication; 3 sub-plots/main-plot.  (b) N.A.  (i) 3.  (iv) (a) 20°3' x 21°6'.  (b) 15°9' x 20°.  (v) One row around the net plot.  (vi) Yes.

4. GENERAL:
   (i) Good.  (ii) N.A.  (iii) Height, tiller and no. of grain and straw.  (iv) (a) 1956—cond.  (b) Yes.  (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 2702 lb./ac.  (ii) (a) 498 lb./ac.  (b) 393 lb./ac.  (iii) None of the effects is significant.  (iv) Av. yield of grain in lb./ac.

Fallow: N₀ = 2602, N₁ = 2592 and N₂ = 2694 lb./ac.

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<th>P₂</th>
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</table>
Object:—To study the effect of \( \text{P}_2\text{O}_5 \) applied to previous legume crop on the yield of succeeding cereal crop.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Legume. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 16.7.1959 (iv) (a) Puddling and 4 ploughings to 4" depth with mould board and desi plough. (b) Transplanting. (c) and (d) N.A. (e) 2. (v) 10,000 lb./ac. of F.Y.M. broadcast before puddling. (vi) T—141 (medim). (vii) Unirrigated. (viii) Weeding. (ix) 47.94". (x) 20.12.1959.

2. TREATMENTS:
   Same as in expt. no. 58(38) on page 22.

3. DESIGN:
   (i) Split-plot. (ii) (a) 7 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 27'x16'. (b) N.A. (v) One row around the net-plot. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Attack of mealy bug and smut; Endrex sprayed. (iii) Height, tiller count, no. of earheads, no. of grains/head and yield. (iv) (a) 1956—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) N.A. (vii) The Kharif experiment started in a new site on paddy and so the treatments of legume and phosphate not applied. Hence the exp. is analysed as R.B.D.

5. RESULTS:
   (i) 1799 lb./ac. (ii) 277.3 lb./ac. (iii) N effect is highly significant. (iv) Av. yield of paddy in lb./ac.

    Treatment  \( N_0 \)  \( N_1 \)  \( N_2 \)  
    Av. yield  1655  1798  1944
    S.E./mean  =60.5 lb./ac.
4. GENERAL:
(i) Good. (ii) Slight attack of stem-borer. (iii) Tillers, height, grain and straw yield Nil. (iv) (a) and (b) Nil. (v) and (vi) Nil.

5. RESULTS:
(i) 2098 lb./ac. (ii) 280.7 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

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Crop :- Paddy (Kharif).
Ref :- Or. 59(29).
Type :- 'M'.

Object :- To determine the best method of application of phosphatic fertilizers with suitable type and optimum dose of the fertilizer.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Fallow. (c) N.A. (d) Sandy loam. (e) N.A. (f) 18.7.1959.-12.8.1959. (g) 3 ploughings and cross ploughings, two laddering and puddling. (h) Transplanted. (i) 15 srs./ac. (j) 9" x 9". (k) 3-4. (l) F.Y.M. at 5000 lb./ac. broadcast at ploughing. (m) N at 30 lb./ac. as A.S broadcast at planting. (n) T-1242. (o) Unirrigated. (p) Weeding and interculture with Japanese weeder, hand weeding and roguing. (q) 27 and 28.12.1959.

2. TREATMENTS:
All combinations of (1) (2) and (3 + 3 controls one in each block)
(1) 3 sources of P₂O₅ : S₁-Super, S₂-Dicalcium phosphate and S₃-Rock phosphate.
(2) 3 methods of application : M₁-Broadcasting at puddling, M₂-Dipping the seedlings in mud slash mixed with fertilizer before transplanting and M₃=Applying as pellets placed near the roots of the seedlings.
(3) 2 levels of P₂O₅ : P₁=20 and P₂=40 lb./ac.

3. DESIGN:
(i) 3 x 2 = 6 confd. (ii) a: 7 : 3 blocks/replication. (b) N.A. (c) 3. (d) (a) 16/. "22. (e) 15" x 20". (f) One row around. (g) Yes.

4. GENERAL:
(i) Below normal. (ii) Attack of mealy bugs in nearly all the plots. Sprayed Endrex. (iii) Tillers, height, length of earhead, no. of grains and chaff per earhead, grain and straw yield. (iv) (a) 1956—contd. (b) No. (c) Nil. (d) (a) and (b) Nil. (e) and (vi) Nil.

5. RESULTS:
(i) 1738 lb./ac. (ii) 291.0 lb./ac. (iii) S effect alone is significant. (iv) Av. yield of grain in lb./ac.
Crop: Paddy (Kharif).

Object: To find the effect of trace elements and potash on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A.  (ii) (a) Sandy-loam.  (b) Analysis of control plot: sand 80.2%, clay 0.54%, silt 13.0%, total No. 0.036, base exchangeable capacity 2.70. (iii) 22.8.1955. (iv) (a) 4 ploughings with mould board and desi plough to 4' depth. Twice laddering. (b) N.A. (c) Transplanted. (d) 9'x9' (e) 2.
   (v) 20 lb./ac. of N as A/S, 20 lb./ac. of P2O5 as Super. (vi) T-90 (late). (vii) Unirrigated. (viii) 2 weedings and one roguing. (ix) 53.88. (x) N.A.

2. TREATMENTS:
   1/4 of all combinations of (1) to (8)
   (1) 2 levels of MgSO4: a0=0 and a1 = 2 cwt./ac.
   (2) 2 levels of FeSO4: b0=0 and b1=100 lb./ac.
   (3) 2 levels of MnSO4: c0=0 and c1 = 80 lb./ac.
   (4) 2 levels of ZnSO4: d0=0 and d1 = 20 lb./ac.
   (5) 2 levels of CuSO4: e0=0 and e1=20 lb./ac.
   (6) 2 levels of boron as borax : f0=0 and f1=10 lb./ac.
   (7) 2 levels of molybdenum as sodium molybdate : g0=0 and g1 = 2 oz./ac.
   (8) 2 levels of potash as K2SO4 : h0=0 and h1=20 lb./ac.

3. DESIGN:
   (i) 1/8 fractional replicate of 28. Fact.  (ii) (a) 8 plots/block and 4 blocks/replication.  (b) N.A. (iii) 1/8 replicate. (iv) (a) 33' x 33'. (b) N.A. (v) One row allround. (vi) Yes.

4. GENERAL:
   (i) Average.  (ii) N.A.  (iii) Height, tiller and yield data. (iv) (a) 1955—contd.  (b) and (c) Nil.  (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1485 lb./ac.  (ii) 197.6 lb./ac.  (iii) None of the effects is significant. (iv) Mean responses in lb./ac.

<table>
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<tr>
<th>Treatment</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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<td>64.5</td>
<td>-37.3</td>
<td>-18.9</td>
<td>-11.0</td>
<td>-57.5</td>
<td>30.7</td>
<td>23.3</td>
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</table>

S.E. of mean response = -49.4 lb./ac.

---

Control=1700 lb./ac.

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<td>1856</td>
<td>1824</td>
<td>1912</td>
<td>1864</td>
<td>1681</td>
<td>1867</td>
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</table>

Mean

1661 1685 1887

1744 1696 1791

S.E. of S or M marginal mean
S.E. of P marginal mean
S.E. of body of S×P or M×P table
S.E. of body of S×M table

= 68.6 lb./ac.
= 56.0 lb./ac.
= 97.0 lb./ac.
= 127.0 lb./ac.
Crop: Paddy (Kharif).


Ref: Or. 56(16).

Type: 'M'.

Object: To find the effect of trace elements and potash on the growth and yield of Paddy and incidence of diseases.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (b) N.A. (iii) 7.6.1956; 8. 9.7.1956. (iv) (a) 4 ploughings with mould board plough and country plough 4" depth, twice laddering. B N.A. (v) Transplanted. (d) 9' x 9'. (e) 4 seedlings/hole. (v) 20 lb./ac. of N as A/S and 20 lb. ac of P₂O₅ as Super. (vi) T.--o 'late. (vii) Untirrigated. (viii) 2 weedings and one roguing. (ix) 54.8°. (x) N.A.

2. TREATMENTS:
   Same as in exp. no. 55(17) on page 25.

3. DESIGN:
   (i) 1/8 fractional replicate of 2× Fact. (ii) (a) 8 plots/block; 4 blocks replications. (b) N.A. (iii) 1,8 replicate. (iv) (a) 45' x 18'. (b) 43' x 16'. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Average. (ii) Presence of blue green algae. (iii) Tiller count, height, wt. of grain and straw. (iv) a 1955--cond. (v) a N.A. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1922 lb./ac. (ii) 215 lb./ac. (iii) None of the effects is significant. (iv) Mean responses in lb./ac

<table>
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<th>Treatment</th>
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<td>45.0</td>
<td>59.8</td>
<td>123.0</td>
<td>64.0</td>
<td>23.8</td>
<td>3.2</td>
<td>102.0</td>
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<tr>
<td>S.E. of mean response</td>
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Crop: Paddy (Kharif).


Ref: Or. 57(32).

Type: 'M'.

Object: To find out the effect of trace elements and potash on the growth and yield of Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) Sandy loam. (b) N.A. (iii) 34.6.1957-16.7.1957 (iv) (a) 4 ploughings with mould board and desi plough to 4 depth, twice laddering. B N.A. (c) Transplanted. (d) 9' x 9'. (e) 4 seedlings/hole. (v) 20 lb./ac. of N as A/S and 20 lb. ac of P₂O₅ as Super. (vi) T.--o 'late. (vii) Untirrigated. (viii) 2 weedings and one roguing. (ix) 29.93°. (x) 2.12.1957.

2. TREATMENTS:
   Same as in exp. no. 55(17) on page 25.

3. DESIGN:
   (i) 1/8 fractional replicate of 2× Fact. (ii) (a) 8 plots/block; 4 blocks replications. (b) N.A. (iii) 1/8 replicate. (iv) (a) 27' 3" x 16'. (b) 25' 9" x 14'6. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Average. (ii) Leaf spot disease, withering and twisting of young leaves was noticed. (iii) Tiller, height and weight of grain and straw. (iv) (a) 1955-58. (b) Yes. (c) Nil. (v) a and b Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1922 lb./ac. (ii) 330.8 lb./ac. (iii) None of the effects is significant. (iv) Mean response in lb./ac

<table>
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<th>C</th>
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<td>26.8</td>
<td>119.0</td>
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<td>64.2</td>
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<tr>
<td>S.E. of mean response</td>
<td>82.7 lb./ac.</td>
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</table>
Crop :- Paddy (Kharij).
Type :- 'M'.

Object :- To study the effect of direct application of P on a legume and effect of N to the succeeding Paddy crop.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Legumes (biri and mung). (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) 25.6.1957/18.7.1957. (iv) (a) 2 ploughings and cross ploughings followed by laddening. (b) Transplanting. (c) 20 lb./ac. (d) 9"x9". (e) 4 seedlings/hole. (v) Nil. (vi) T—141 (medium). (vii) Unirrigated. (viii) 2 weedings and roguing. (ix) 29.93". (x) 24.11.1957.

2. TREATMENTS :
   Main-plot treatments :
   All combinations of (1) and (2) + a fallow.
   (1) 2 legumes : L1=Mung and L2=Biri.
   (2) 3 levels of P20 : P0=0, P1=40 and P2=80 lb./ac.
   Sub-plot treatments :
   3 levels of N as A/S: N0=0, N1=15 and N2=30 lb./ac.

3. DESIGN :
   (i) Split-plot. (ii) (a) 7 main-plots/block and 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 20'3">21' 6". (b) 18' 9"x20'. (v) One row around. (vi) Yes.

4. GENERAL :
   (i) Satisfactory. (ii) N.A. (iii) Height, tiller count, weight of grain and straw. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS :
   (i) 2568 lb./ac. (ii) (a) 753.5 lb./ac. (b) 229.8 lb./ac. (iii) Effect of fallow vs. legumes is significant. Interaction of main treatments x sub. treatments is highly significant. (iv) Av. yield of paddy in lb./ac.

\[
\begin{array}{cccc|ccc}
N_0 & N_1 & N_2 & \text{Mean} & L_1 & L_2 \\
\hline
P_0 & 2277 & 2496 & 2512 & 2428 & 2376 & 2481 \\
P_1 & 2311 & 2561 & 2751 & 2508 & 2503 & 2633 \\
P_2 & 2700 & 2686 & 2737 & 2708 & 2377 & 3038 \\
\hline
\text{Mean} & 2430 & 2608 & 2667 & 2568 & 2419 & 2717 \\
\text{L}_1 & 2192 & 2448 & 2617 & & & \\
\text{L}_2 & 2668 & 2768 & 2716 & & & \\
\end{array}
\]

S.E. of difference of two
1. L marginal means =205.1 lb./ac. 5. L means at the same level of N =223.1 lb./ac.
2. P marginal means =251.2 lb. ac. 6. N means at the same level of P =132.7 lb./ac.
3. N marginal means =76.6 lb./ac. 7. P means at the same level of N =273.5 lb./ac.
4. N means at the same level of L =108.3 lb./ac. 8. N mean in the fallow plots =181.6 lb./ac.

Crop :- Paddy (Kharij).
Site :- Turmeric Res. Stn., G. Udaygiri.
Type :- 'M'.

Object :- To study the effect of Urea and A/S on the yield of Paddy.

1 BASAL CONDITIONS :
2. TREATMENTS:
1. Urea.
2. A.S.N.
3. Control.
Amount of fertilizers along with time and method of application is N.A.

3. DESIGN:
(a) R.B.D. (ii) a 1. (b) N.A. (iii) 2. (iv) a 42'×32'. (b) 20'×30'. (v) Round. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Grain yield. (iv) a, N.A. (v) and (vi) N.A. (vii) and (viii) N.A.

5. RESULTS:
(i) 4386 lb./ac. (ii) 275.2 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.
Treatment 1 2 3
Av. yield 3848 5028 4253
S.E.(mean) = 194.6 lb./ac.

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Crop : Paddy / Kharif.
Site : Rice Res. Stn., Jeypore.

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Crop : Paddy / Kharif.
Site : Rice Res. Stn., Jeypore.

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Crop : Paddy / Kharif.

---

Object : To study the effect of Super and Hyper Phos. and B.M. on Paddy yield.
1. BASAL CONDITIONS:
(i) (a) No. (b) and (c) N.A. (ii) (a) Clay. (b) N.A. (iii) 21 and 22.8.1954. (iv) (a) 6 ploughings.
4" to 6" deep with country plough and 2 laddering. (b) Transplanted. (c) Nil. (d) N.A. (e) 2.
(v) Nil. (vi) T=141 (medium). (vii) Unirrigated. (viii) 2 weedings. (ix) 0.18". (x) 30.11.1954 and
1.12.1954.

2. TREATMENTS:
Main-plot treatments:
3 levels of P2O5 as Super : P0=0, P1=20 and P2=40 lb./ac.
Sub-plot treatments:
5 levels of N : N0=0, N1=20, N2=40 lb./ac. of N as A/S, N3=20 and N4=40 lb./ac. of N as Urea.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/block ; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 11′×33′.
(b) 9′×31′. (v) 1′ allround. (vi) Yes.

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

5. RESULTS:
(i) 3310 lb./ac. (ii) (a) 390.3 lb./ac. (b) 495.0 lb./ac. (iii) Main effect of N and interaction N×P are highly
significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>N0</th>
<th>N1</th>
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<th>N4</th>
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</table>

Mean 2615 3455 3695 3253 3352 3310

S.E. of difference of two
1. P marginal means =123.3 lb./ac.
2. N marginal means =202.1 lb./ac.
3. N means at the same level of P =350.1 lb./ac.
4. P means at the same level of N =336.7 lb./ac.

Crop :- Paddy (Kharif).
Site :- Agri. Res. Sta., Sambalpur.

Ref :- Or. 58(5).
Type :- 'M'.

Object :- To study the effect of compost and B.M on Paddy crop.

1 BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) N.A. (iv) (a) 6 ploughings with
country plough 4"—6" deep and laddering. (b) Transplanted in lines. (c) 20 lb./ac. (d) 8"×6". (e) 2.

2. TREATMENTS:
1. Control.
2. Compost at 1 ton/ac.
3. Compost and B.M. mixed at the time of preparing compost.
4. Compost and B.M. mixed at the time of application.
Amount of compost and B.M. in treatments 3 and 4 N.A.

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 30′×12′. (b) 29′4″×11′6″ (v) 1 row on one side. (vi) Yes.
4. GENERAL:
(i) and (ii) N.A. (iii) Height, tillers, length of earhead and grain yield. (iv) a. 1958—N.A. b and (c) Nil. (v) and (b) Nil. vi and vii. Nil.

5. RESULTS:
i) 3062 lb./ac. (ii) 129.0 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>
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<tr>
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</table>

S.E. of mean = 57.7 lb./ac.

Crop: Paddy (Kharif).
Ref: Or. 58(7).
Type: 'M'.

Object: To study the effect of N applied at different times.

1. BASAL CONDITIONS:

2. TREATMENTS:
All combinations of (1) and (2) + a control.
(1) 2 sources of N: N1 =Ca(OH)2 and N2 =A.S.
(2) 7 times of application: T1 =Before planting, T2 =14 days after planting, T3 =1 month after planting, T4 =Half before planting + half one month after planting, T5 =Half 14 days and the other half one month after planting, T6 =Before planting + 1 one week before flowering and T7 =2 two weeks after planting + 1 one month after planting + 1 one week before flowering.

3. DESIGN:
(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 3. (iv) a. 18°×12°. b. 17°×11°. c. 1 row on either side. (v) Yes.

4. GENERAL:
i) Lodged. (ii) N.A. (iii) Yield of grain, height. No. of tillers and length of earhead. (iv) a. 1958—contd. (b) and (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) N.A.

5. RESULTS:
i) 2721 lb./ac. (ii) 617 lb./ac. (iii) None of the effects is significant. iv Av. yield of grain in lb./ac.

Control=2813 lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
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S.E. of marginal mean of N = 135 lb./ac.
S.E. of marginal mean of T = 252 lb./ac.
S.E. of body of table = 356 lb./ac.
Crop : Paddy (Kharif).

Object : To study the effect of N applied at different times.

1. BASAL CONDITIONS :
   (i) (a) Paddy - Mung. (b) Mung. (c) N.A. (ii) (a) Clay. (b) N.A. (iii) 21.8.1959. (iv) (a) 4 ploughings, one cross ploughing, puddling and 2 ladderings. (b) 20 lb./ac. (c) Transplanted. (d) 9" x 6". (e) 2 seedlings per hole. (v) 32 lb./ac. of P₂O₅. (vi) T-141 (medium). (vii) Irrigated. (viii) 2 weedings and gap filling on 8.9.1959. (ix) 22.32". (x) 1.12.1959.

2. TREATMENTS :
   Same as in expt. no. 58(7) on page 30.

3. DESIGN :
   (i) R.B.D. (ii) (a) 15. (b) 102' x 39'. (iii) 3. (iv) (a) 18' x 12'. (b) 16' x 11'. (v) One row around. (vi) Yes.

4. GENERAL :
   (i) Good. (ii) Nil. (iii) Height, effective tillers, length of earhead and grain yield. (iv) (a) N.A. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS :
   (i) 3293 lb./ac. (ii) 433 lb./ac. (iii) None of the effects 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>
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</table>

S.E. of N marginal mean = 94 lb./ac.
S.E. of T marginal mean = 176 lb./ac.
S.E. of body of table = 248 lb./ac.

Crop : Paddy (Kharif).

Object : To find out the best combination of N and P for Paddy.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Clay. (b) N.A. (iii) 13, 14.8.1955. (iv) (a) 6 to 8 ploughings to 6" depth with country plough and laddering. (b) Transplanted. (c) 20 lb./ac. (d) 9" x 6". (e) 2 seedlings/hole. (f) Nil. (g) T-141 (medium). (h) Unirrigated. (i) N.A. (ix) 67.97". (x) 4 to 6.12.1955.

2. TREATMENTS :
   All combinations of (1) and (2)
   (1) 4 levels of N as A/S : N₀ = 0, N₁ = 20, N₂ = 40 and N₃ = 60 lb./ac.
   (2) 3 levels of P₂O₅ as Super : P₀ = 0, P₁ = 40 and P₂ = 60 lb./ac.

3. DESIGN :
   (i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 22' x 30'. (b) 20' x 28'. (v) 1' around. (vi) Yes.

4. GENERAL :
   (i) and (ii) N.A. (iii) Height, no. of tillers and grain yield. (iv) (a) 1955-1956. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :
   (i) 1742 lb./ac. (ii) 175 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.
Crop: Paddy (Kharif).

Object: To find out the best combination of N and P for Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) 5 C.L.ac. of F.Y.M. and 100 lb. ac. of A.S. (i) 1 emy. (ii) N.A. (iii) 7.8.1956. (iv) (a) 6 ploughings 4' to 6' deep with country plough followed by laddering. (b) Transplanting. (c) 20 srs/ac. (d) 9'×6'. (e) 2 seedlings/hole. (f) Nil. (g) T=141 medium. (h) Nil. (i) Two weedicings. (j) 7.52'. (k) 13.12.1956.

2. TREATMENTS:
Same as in expit. no. 55(7) on page 31.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) a. 28'×12'. (b) 27'×11'. (v) 1 row alround. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1955-1956. (b) No. (c) Nil. (d) A and (e) N.A. (f) and (g) N.L.

5. RESULTS:
(i) 3251 lb. ac. (ii) 427 lb. ac. (iii) Main effect of N is highly significant Interaction N and P is significant. (iv) Av. yield of grain in lb. ac.

<table>
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<tr>
<th></th>
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<th>N₂</th>
<th>N₃</th>
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</table>

Mean 1767 1819 1748 1635 1742

S.E. of N marginal mean = 51 lb. ac.
S.E. of P marginal mean = 44 lb. ac.
S.E. of body of table = 88 lb. ac.

---

Crop: Paddy (Kharif).

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

Ref: Or. 56(25). Type: 'M'.

Ref: Or. 55(12). Type: 'M'.

---
1. BASAL CONDITIONS:

(i) (a) Nil. (ii) Paddy. (c) A/S at 20, 40 and 60 lb./ac. and Super at 20, 40 and 60 lb./ac. (ii) (a) Cher. (b) N.A. (iii) 30, 31, 8.1955. (iv) (a) 6 to 8 ploughings to 6' depth. (b) Transplanted. (c) and (d) N.A. (e) 2 seedlings/hole. (v) Nil. (vi) T-141 (medium). (vii) Unirrigated. (viii) 2 weedings after one month and after 2 months of planting. (ix) 67.97°. (x) 7, 8.12.1955.

2. TREATMENTS:

Main-plot treatments:
4 sources of 10 lb./ac. of N + a control: S0=No manure (control), S1=F.Y.M., S2=Dhaincha G.M. and S4=G.N.C.

Sub-plot treatments:
All combinations of (1) and (2)
(1) 2 levels of N as A/S: N0=0 and N1=20 lb./ac.
(2) 2 levels of P2O5 as Super: P0=0 and P1=40 lb./ac.

Manures applied on 30.8.1955.

3. DESIGN:

(i) Split-plot. (ii) 4 main-plots/block; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 11'x33'. (b) 9'x31'. (v) 1' alround. (vi) Yes.

4. GENERAL:

(i) No lodging. (ii) N.A. (iii) Height, tiller, grain and straw yield. (iv) (a) 1955—contd. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 3125 lb./ac. (ii) (a) 312.3 lb./ac. (b) 231.4 lb./ac. (iii) Main effect of S and interaction main-plot X sub-plot are significant. (iv) Av. yield of grain in lb./ac. 4

<table>
<thead>
<tr>
<th></th>
<th>S0</th>
<th>S1</th>
<th>S2</th>
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</table>

S.E. of difference of two
1. S marginal means =110.4 lb./ac.
2. N or P marginal means = 57.8 lb./ac.
3. N or P means at the same level of S =115.7 lb./ac.
4. S means at the same level of N or P =137.4 lb./ac.
S.E. of body of N X P table = 57.8 lb./ac.

Crop :- Paddy (Kharif).
Object :- To study the effect of organic and inorganic manures on Paddy.

Ref :- Or. 56(27).
Type :- 'M'.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) 5 C.L./ac. of F.Y.M. and 100 lb./ac. of A/S. (ii) (a) Loam. (b) N.A. (iii) 14.8.1956. (iv) (a) 6 ploughings with country plough 4' to 6' deep, laddering and levelling. (b) Transplanted. (c) N.A. (d) 9'x6'. (e) N.A. (v) Nil. (vi) T-141 (medium). (vii) Nil. (viii) Two weedings. (ix) N.A. (x) 7.12.1956.

2. TREATMENTS:

Same as in expt. no. 55(12) on page 32.
3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 30' x 11'.
(b) 29.3' x 10'. (v) 1 row around. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) N.A. (iii) Height and grain yield. (iv) (a) 1955—1956. (b) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 3260 lb./ac. (ii) (a) 303.3 lb./jac. (b) 420.0 lb./jac. (iii) None of the effects is significant. (iv) Av.
yield of grain in lb./jac.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
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<th>S3</th>
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</table>

S.E. of difference of two
1. S marginal means
2. N or P marginal means
3. N or P means at the same level of S
4. S means at the same level of N or P
S.E. of body of N x P table

Crop: Paddy (Kharif).
Object: To study the effect of G.M. and A/S on Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Clay loam. (b) pH 5.9. (iii) 22.7.1957. (iv) (a) Puddling. (b) Transplanting. (c) N.A. (d) 9' x 6'. (e) 2 seedlings/hole. (v) Nil. (vi) T-141 (medium). (vii) Irrigated. (viii) Weeding, hoeing with Japanese weeder and gap filling. (ix) N.A. (x) 12.12.1957.

2. TREATMENTS:
1. No manure.
2. 30 lb./ac. of P_2O_5 as Super.
3. 20 lb./ac. of N as G.M. + 30 lb./ac. of P_2O_5.
4. 20 lb./ac. of N as A/S + 30 lb./ac. of P_2O_5.
5. 10 lb./ac. of N as A/S + 10 lb./ac. of N as G.M. + 30 lb./ac. of P_2O_5.
6. 30 lb./ac. of N as G.M. + 30 lb./ac. of P_2O_5.
7. 30 lb./ac. of N as A/S + 30 lb./ac. of P_2O_5.
8. 15 lb./ac. of N as A/S + 15 lb./ac. of N as G.M. + 30 lb./ac. of P_2O_5.

3. DESIGN:
(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 22' x 12'. (b) 21' x 10'. (v) 1 row around. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) At the time of harvest 10 plants were selected at random and height of plant, no. of effective tillers, length of earhead and grain yield were taken. (iv) (a) No. (b) and (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 3260 lb./ac. (ii) 339.2 lb./jac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./jac.
Treatment | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
Av. yield    | 3476 | 3773 | 3551 | 4032 | 4026 | 3254 | 3841 | 3798 |
S.E./mean    | =169.6 lb./ac. |

Crop :- Paddy *(Kharij)*.  
Type :- 'M'.

Object:--To find out the comparative effect of A/S and Ammo. Chloride on the yield of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Clay. (b) N.A. (iii) 31.7.1956/1.8.1956. 
(iv) (a) 6 ploughings with country plough 4' to 6' deep, laddering and levelling. (b) Transplanted. (c) 20 lb./ac. (d) 7'×6'.

2. TREATMENTS:
Main-plot treatments:
3 levels of N: N1=20, N2=40 and N3=60 lb./ac.
Sub-plot treatments:
2 sources of N: S1=A/S and S2=Ammo. Chloride.
Manures applied on 31.7.1956.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/block; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 20'×16.5' 
(b) 18.5'×15.5' (v) 1 row around. (vi) Yes.

4. RESULTS:
(i) 2463 lb./ac. (ii) (a) 589 lb./ac. (b) 247 lb./ac. (iii) Interaction N×S alone is significant. (iv Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
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</tbody>
</table>

S.E. of difference of two
1. N marginal means =294 lb./ac. 
2. S marginal means =101 lb./ac. 
3. S means at the same level of N =175 lb./ac. 
4. N means at the same level of S =320 lb./ac. 

Crop :- Paddy *(Kharij)*.  
Type :- 'M'.

Object:--To find out a suitable combination of N, P and K for Paddy crop.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sannhemp. (c) Nil. (ii) (a) Clay. (b) N.A. (iii) 10.8.1958. 
(iv) (a) 6 ploughings. 4' to 6' deep with country plough, 3 puddlings and laddering. (b) Transplanted. (c) 20 lb./ac. (d) 6'×6'.
2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 2 levels of N as A/S: N₀ = 0 and N₁ = 20 lb./ac.
(2) 2 levels of P₀ as Super: P₀ = 0 and P₁ = 20 lb./ac.
(3) 2 levels of K₂O as Pot. Sul.: K₀ = 0 and K₁ = 20 lb./ac.

3. DESIGN:
(i) 2⁴ Fact. in R.B.D. 
   (a) 8.  
   (b) N.A.  
   (iii) 4.  
   (iv) 15' × 13'.  
   (v) 1 row all round.  
   (vi) Yes.

4. GENERAL:
(i) and (ii) N.A.  
   (iii) Height, tillers, length of earhead and grain yield.  
   (iv) N.A.  
   (c) Nil.  
   (v) (a) Barpalli.  
   (b) N.A.  
   (vi) and (vii) N.A.

5. RESULTS:
(i) 575 lb./ac.  
   (ii) 175 lb./ac.  
   (iii) Main effects of N and P are significant and interaction N × K is highly significant.  
   (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>Mean</th>
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S.E. of any marginal mean = 44 lb./ac.
S.E. of body of any table = 62 lb./ac.

Crop :- Paddy ('Kharif').
Ref :- Or. 58(4).
Type :- 'M'.

Object :- To find out a suitable combination of N, P and K for Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil.  (b) and (c) N.A.  
   (ii) (a) Clay loam.  
   (b) N.A.  
   (iii) 23.8.1958.  
   (iv) (a) 6 ploughings with country plough 4' to 6' deep and laddering.  
   (b) Transplanting.  
   (c) 20 lb./ac.  
   (d) 6' × 6.6'.  
   (e) 2 seedlings/hole.  
   (v) Nil.  
   (vi) T-1242 (late).  
   (vii) N.A.  
   (viii) 2 weedings.  
   (x) N.A.  
   (x) 27.12.1958.

2. TREATMENTS:
Same as in expt. no. 58,3 on page 35.

3. DESIGN:
(i) R.B.D.  
   (ii) 8.  
   (b) N.A.  
   (iii) 4.  
   (iv) a) 13'-7'' × 16'.  
   (b) 12'-5.4'' × 15'.  
   (v) 1 row all round.  
   (vi) Yes.

4. GENERAL:
(i) and (ii) N.A.  
   (iii) Height, length of earhead, no. of tillers and grain yield.  
   (iv) N.A.  
   (c) Nil.  
   (v) (a) Paramanpur.  
   (b) N.A.  
   (vi) and (vii) Nil.

5. RESULTS:
(i) 1101 lb./ac.  
   (ii) 269 lb./ac.  
   (iii) Main effect of N alone is highly significant.  
   (iv) Av. yield of grain in lb./ac.
Object:—To find out a suitable combination of N, P and K for Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Samhemp. (c) Nil. (ii) (a) Clay. (b) N.A. (iii) 5.8.1958. (iv) (a) 6 ploughings 4' to 6' deep and laddering. (b) Transplanted. (c) N.A. (d) 6'×6'. (e) 2 seedlings/hole. (vi) Nil. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 12.11.1958.

2. TREATMENTS:
   Same as in expt. no. 58(3) on page 35.

3. DESIGN:
   (i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 15'×13'. (b) 14'×12'. (v) 1 row around. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Height of plant, no. of tillers and grain yield. (iv) (a) 1958—contd. (b) and (c) Nil. (v) (a) Paramanpur and Barpalli. (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 632 lb./ac. (ii) 243 lb./ac. (iii) Main effect of P and interaction N×K are highly significant. Main effect of N is significant. (iv) Av. yield of grain in lb./ac.

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S.E. of any marginal mean =61 lb./ac.
S.E. of body of any table =86 lb./ac.
Crop :- Paddy (Kharif).

Site :- M. A. E. Farm, Barpalli.

Ref :- Or. 57(MAE).

Type :- 'M'.

Object :-To study the long term effect of N, P, K an1 bulky manure.

1. BASAL CONDITIONS :

(i) Nil. (ii) Clay loam. (iii) Fallow. (iv) Organic carbon 0.51%.

2. TREATMENTS :

Main-plot treatments : 3 levels of lime: \( L_0 = 0 \), \( L_1 = 500 \) and \( L_2 = 750 \) lb./ac.

Sub-plot treatments : All combinations of (1), (2) and (3).

3. DESIGN :

(i) Split-plot. (ii) 3 main-plots/block ; 8 sub-plots/main-plot. (b) N.A. (iii) 14'×14'. (b) 13' 6"×13' 6". (v) one row all round.

5. RESULTS :

(i) 2080 lb./ac. (ii) (a) 315.5 lb./ac. (b) 210.0 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.
1. BASAL CONDITIONS:
(i) (a) Maize—Paddy—Cotton. (b) Maize. (c) Nil. (ii) (a) Red loam. (b) N.A. (iii) 3rd week of August, 1957. (iv) (a) 3 ploughings and 2 plankings before sowing. (b) Transplanting. (c) —. (d) 9' x 6'. (e) N.A. (c) Nil. (vi) T—141 (medium). (vii) N.A. (viii) 1 to 2 weedings after sowing. (ix) N.A. (x) N.A.

2. TREATMENTS:
All combinations of (1), (2), (3) and (4)
(1) 3 levels of N as A/S: N0 = 0, N1 = 20 and N2 = 40 lb./ac.
(2) 3 levels of P2O5 as Super: P0 = 0, P1 = 20 and P2 = 40 lb./ac.
(3) 3 levels of K2O as Mur. of Pot.: K0 = 0, K1 = 20 and K2 = 40 lb./ac.
(4) 2 levels of bulky manure: F0 = 0 and F1 = 5000 lb./ac.
N applied by broadcasting at the time of planting and by top dressing. P2O5 broadcast at planting and top dressed and K2O applied by broadcast at planting and top dressed.

3. DESIGN:
(i) 3x2 fact. conf. (ii) (a) 9 plots/block; 6 blocks/replication. (b) N.A. (iii) 1. (iv) (a) N.A. (b) 1/100 ac. (dimensions N.A.) (v) N.A. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Case-worm attack noticed during September-October, but controlled by cultural operations.
(iii) Nil. (iv) (a) 1956—contd. (b) Yes. (c) No. (v) Kendrapara. (vi) Due to drought conditions during growth stage, crop was affected adversely. (vii) Cumulative and residual effect studied together. N, P or K marginal means based on 36 observations.

5. RESULTS:
(i) 2118 lb./ac. (ii) 112.6 lb./ac. (iii) Main effects of F, N and P and interactions N × P, F × N, F × P are highly significant. Interaction FNP is significant while other effects are not significant. (iv) Av. yield of grain in lb./ac.

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S.E. of marginal mean of N, P or K  = 18.77 lb./ac.
S.E. of body of N × P, N × K or P × K table  = 32.56 lb./ac.
S.E. of body of N × F, P × F or K × F table  = 26.54 lb./ac.

Crop :— Paddy (Kharif).
Site :— M.A.E. Farm, Barpalli.

Object :— To study the long term effect of N, P, K and bulky manure.

1. BASAL CONDITIONS:
(i) (a) Maize—Paddy—Cotton. (b) Maize. (c) Nil. (ii) (a) Red loam. (b) N.A. (iii) 28 to 30.6.1958/14, 15.8.1958. (iv) (a) 3 ploughings. (b) Transplanting. (c) —. (d) 9' x 6'. (e) N.A. (v) 500 lb./ac. of F.Y.M. to experimental area and 36 lb. of A/S to seed bed. (vi) T—141 (medium). (vii) Unirrigated. (viii) 3 weedings. (ix) N.A. (x) 4.12.1958.

Ref:— Or. 58 (MAE).
Type :— 'M'.
2. TREATMENTS:
Same as in expt. no. 57(MAE) on page 38.
(Each plot divided into 3 sub-plots to study the cumulative, residual and direct effects).

3. DESIGN:
(i) $3^2 \times 2$. (ii) (a) 9 plots/block ; 6 blocks/replication. (b) N.A.
(iii) 1. (iv) a: 1/80 ac. (b) 1/100 ac.
(v) and (vi) N.A.

4. GENERAL:
(i) Good. (ii) 2 to 3% of the crop damaged due to incidence of case-worm and borer attack while 2% of the crop attacked by wild rats. (iv) (a) 1956—contd. (b) Yes. (c) No. (v) (a) and (b); Kendrapara. (vi) Drought conditions during the month of September 1958 affected the crop. (vii) Nil.

5. RESULTS:

Cumulative Effect

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Residual Effect

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Direct Effect

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Av. yield of grain in lb./ac.
Crop :- Paddy (Kharif).  
Site :- M.A.E. Farm, Barpalli.  
Ref :- Or. 59(MAE).  
Type :- 'M'.

Object :- To study the long term effect of N, P, K and bulky manure.

1. BASAL CONDITIONS :
   (i) (a) Maize-Paddy-Cotton. (b) Maize. (c) Nil. (ii) (a) Red loam. (b) N.A. (c) Nil. (iv) (a) 3 ploughings. (b) Transplanted. (c) Nil. (v) Nil. (vi) T-141 (medium). (vii) Unirrigated. (viii) to (x) N.A.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4)
   (1) 3 levels of N as A/S: N0 = 0, N1 = 30 and N2 = 60 lb./ac.
   (2) 3 levels of P2O5 as Super: P0 = 0, P1 = 30 and P2 = 60 lb./ac.
   (3) 3 levels of K2O as Mur. of Potash: K0 = 0, K1 = 30 and K3 = 60 lb./ac.
   (4) 2 levels of F.Y.M.: F0 = 0 and F1 = 4000 lb./ac.

3. DESIGN:
   (i) 3 x 2 fact. confd. Interaction NPK2 is confd. (ii) (a) 9 plots/block; 6 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 33' x 16.5'. (b) 31' x 14.5'. (v) 1' around. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Attack of wild rats in most of the plots specially in plots with treatments N0 P0 K0 F0, N0 P1 K0 F0 in all the phases; N0 P0 K1 F0 in cumulative effect, in N0 P0 K0 F1 (direct and residual effects). (iii) Grain yield. (iv) (a) 1957 (kharif) - contd. (b) Yes. (c) N.A. (v) (a) Kendrapara. (b) Nil. (vi) Nil. (vii) Values of plots severely damaged by rats were estimated.

5. RESULTS:
   Cumulative Effect
   (i) 2875 lb./ac. (ii) 718.8 lb./ac. (iii) Only N effect is highly significant. (iv) Av. yield of grain in lb./ac.
### Direct Effect

(i) 2544 lb ac. (ii) 718.8 lb ac. (iii) Only interaction P X K is highly significant. (iv) Av. yield of grain in lb ac

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### Residual Effect

(i) 2641 lb ac. (ii) 718.8 lb ac. (iii) Only P effect is highly significant. (iv) Av. yield of grain in lb ac

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</table>

S E of marginal mean of N, P or K
S E of body of N x P, N x K or P x K table
S E of body of N x L, P x F or K x P table
(for cumulative direct and residual effects,
= 169.4 lb ac.
= 293.4 lb ac.
= 239.6 lb ac.
Crop: Paddy (Kharif).

Site: M.A.E. Farm, Barpalli.

Object:—Type IV—To study the effect of direct application of phosphate on a legume vs direct effect of N to the succeeding Paddy crop.

1. BASAL CONDITIONS:
(i) (a) No. (b) Legumes. (c) As per treatments. (ii) (a) Red loam. (b) N.A. (iii) July 1957/August 1957. (iv) (a) 3-4 ploughings and 2 plankings before sowing. (b) Transplanting. (c) 25 lb/ac, in nursery. (d) 9'x6'. (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) 1—2 weedings after sowing. (x) N.A. (x) Dec. 1957.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1) and (2) + a control (fallow plot L_0 P_0).

(1) 2 legumes: L_1 = Pea and L_2 = Gram.

(2) 3 levels of P_2O_5 as Super: P_0 = 0, P_1 = 40 and P_2 = 80 lb/ac.

Sub-plot treatments:
3 levels of N as A/S: N_0 = 0, N_1 = 15 and N_2 = 30 lb/ac.
P_2O_5 applied to legumes and N applied to Paddy by broadcasting at the time of planting.

3. DESIGN:
(i) Split-plot. (ii) (a) 7 main-plots/block; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/100 ac. (c) N.A. (c) Yes.

4. GENERAL:
(i) Crop adversely affected due to dry conditions. (ii) Case-worm attack noticed during Septmber—October but controlled by cultural operations. Borer attack also noticed. (iii) Grain yield only. (iv) (a) No. (b) No. (c) N.A. (v) (a) Kendrapara. (b) Nil. (vii) Due to drought conditions during growth stage crop was effected adversely. Rain lacked during the month of September to November. (vii) Legume yields are L_1 P_0 = 1613, L_1 P_1 = 1703, L_1 P_2 = 1860, L_2 P_0 = 1637, L_2 P_1 = 1769 and L_2 P_2 = 1934 lb/ac.

5. RESULTS:
(i) 1729 lb/ac. (ii) (a) 85.4 lb/ac. (b) 93.2 lb/ac. (iii) N, P and control vs others effects are highly significant. Interactions N X L and N X P are significant. Other effects are not significant. (iv) Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
<th>L_0 P_0</th>
<th>L_1 P_0</th>
<th>L_1 P_1</th>
<th>L_1 P_2</th>
<th>L_2 P_0</th>
<th>L_2 P_1</th>
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<td>1797</td>
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<tr>
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<td>2110</td>
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<td>2203</td>
<td>2333</td>
<td>2430</td>
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<tr>
<td>Mean</td>
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<td>1617</td>
<td>1640</td>
<td>1705</td>
<td>1764</td>
<td>1861</td>
<td>1932</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. LP marginal means =40.26 lb/ac.
3. N means at the same level of LP =76.10 lb/ac.
4. LP means at the same level of N =74.03 lb/ac.

Crop: Paddy (Kharif).

Site: M.A.E. Farm, Barpalli.

Object:—Type V—To study the most suitable time for the application of N.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) 3rd week of July/middle of August. (iv) (a) Ploughings. (b) Transplanted. (c) —. (d) 9'x6'. (e) N.A. (v) 20 lb/ac. of P_2O_5. (vi) N.A. (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) December.

Ref: Or. 57(MAE).
Type: — M'.

Ref: Or. 56(MAE).
Type: — M'.
2. TREATMENTS:

All combinations of (I and 2) + a control

(1) 2 sources of N: S1 = Urea and S2 = A/S.

(2) 7 times of application: T1 = Application of fertilizers before planting, T2 = application of fertilizers at planting, T3 = application of fertilizers at tilling, T4 = application of fertilizers half before planting and half at planting, T5 = application of fertilizers half at planting and half at tilling, T6 = application of fertilizers before planting and half at planting and half at tilling, and T7 = application of fertilizers each at planting, at tilling and one week before flowering.

3. DESIGN:

(i) R.B.D. (ii) a, 15. (b) N.A. (iii) 3. (iv) a, 33. (v) b, 29. (vi) N.A. (vii) Yes.

4. GENERAL:

(i) Good. (ii) N.A. (iii) Yield of paddy. (iv) a, 1956—cond. (b) N.A. (c) No. (v) a Kendrapara (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 2636 lb. ac. (ii) 438.0 lb. ac. (iii) Control vs others and T effects are highly significant. (iv) Av. yield of grain in lb. ac.

<table>
<thead>
<tr>
<th>S1</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
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<th>T6</th>
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<td>3036</td>
<td>2600</td>
<td>2600</td>
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<td>3016</td>
<td>2954</td>
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<td>2608</td>
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</tbody>
</table>

S.E. of T marginal mean = 178.8 lb. ac.
S.E. of S marginal mean = 95.6 lb. ac.
S.E. of body of T x S table or control mean = 252.9 lb. ac.

Crop :- Paddy (Kharif).
Site :- M.A.E. Farm, Barpalli.
Object :- Type V—To study the most suitable time for the application of N.

1. BASAL CONDITIONS to 4. GENERAL:

Same as in exp. no. 56(MAE) on page 43.

5. RESULTS:

(i) 2470 lb. ac. (ii) 90.6 lb. ac. (iii) All effects except S effect are highly significant. (iv) Av. yield of grain in lb. ac.

<table>
<thead>
<tr>
<th>S1</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
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<td>2623</td>
<td>2582</td>
<td>2443</td>
<td>2305</td>
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</tbody>
</table>

S.E. of T marginal mean = 37.0 lb. ac.
S.E. of S marginal mean = 19.8 lb. ac.
S.E. of body of table or control mean = 52.3 lb. ac.
Crop :- Paddy (Kharif).

Site :- M.A.E. Farm, Barpalli.

Ref :- Or. 58(MAE).

Type :- 'M'.

Object :- Type V — To study the most suitable time for the application of N.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) 19.8.1958. (iv) (a) 3 ploughings. (b) Transplanted. (c) -. (d) 9” x 6”. (e) N.A. (v) Nil. (vi) T—1242 (late). (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 14.1.1959.

2. TREATMENTS and 3. DESIGN:
   Same as in expt. no. 56(MAE) on page 43.

4. GENERAL:
   (i) Good. (ii) 4 to 5% crop damaged due to attack of case worm and borer, 6% crop damaged by wild rats.
   (iii) Grain and straw yield. (iv) (a) 1956—contd. (b) N.A. (c) Nil. (v) (a) No. (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2674 lb./ac. (ii) 473.6 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

Control=2617 lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
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<td>2858</td>
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</table>

S.E. of S marginal mean = 103.3 lb./ac.
S.E. of T marginal mean = 193.3 lb./ac.
S.E. of body of table or control mean = 273.4 lb./ac.

Crop :- Paddy.

Site :- M.A.E. Farm, Barpalli.

Ref :- Or. 59(MAE).

Type :- 'M'.

Object :- Type V — To study the most suitable time for the application of N.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) N.A. (iv) (a) Ploughing. (b) Transplanting. (c) -. (d) 9” x 6”. (e) N.A. (v) 4000 lb./ac. of cowdung manure. (vi) T—1246 (late) 158 days. (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) N.A.

2. TREATMENTS and 3. DESIGN:
   Same as in expt. no. 56(MAE) on page 43.

4. GENERAL:
   (i) Good. (ii) N.A. (iii) Grain yield. (iv) (a) 1956 (kharif)—contd. (b) N.A. (c) Nil. (v) (a) No. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1948 lb./ac. (ii) 438.0 lb./ac. (iii) T effect is highly significant. Control vs others effect is significant while no other effect is significant. (iv) Av. yield of grain in lb./ac.

Control=1325 lb./ac.

<table>
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</tr>
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<td>1810</td>
<td>2697</td>
<td>1631</td>
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</table>

Mean 2007
1980
1993
Crop: - Paddy (Kharif).
Site: - M.A.E. Farm, Barpalli.

Ref: - Or. 56(MAE).
Type: - 'M'.

Object: - Type VI—To study the effect of different types and levels of phosphate along with different methods of placement.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) First week of August. (iv) (a) N.A. 'b' Transplanted. (c) —. (d) 9' x 6'. (e) N.A. (v) 5.000 lb./ac. of F.Y M. (vi) N.A. (vii) Irrigated. (viii) and (ix) N.A. (x) End of December, 1956.

2. TREATMENTS:
   (1) 2 doses of P₂O₅: P₁ = 20 and P₂ = 40 lb./ac.
   (2) 2 sources of P₂O₅: S₁ = Super and S₂ = Ammo. Phos.
   (3) 4 methods of application of P₂O₅: M₁ Fertilizers broadcast before puddling, M₂ = Fertilizers drilled before puddling, M₃ = Seedings drilled in mud slash and M₄ = Applied as pellets at transplanting. N equalised by applying A/S at the rate of 30 lb./ac. of N.

3. DESIGN:
   (i) 2 x 4 Fact. confd. (ii) 3 plots 1 bio. 2 blocks replication. b) N.A. (ii) 3. (iv) 'a' N.A. 'b' 1/100 ac. (v) N.A. (v) Yes.

4. GENERAL:
   (i) Nil. (ii) Incidence of case worm. Control measures adopted. (iii) Grain yield. (iv) (a) to (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 3202 lb./ac. (ii) 277.5 lb./ac. (iii) Only P effect is significant. (iv) Av. yield of grain in lb. ac.

<table>
<thead>
<tr>
<th></th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
<th>M₄</th>
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<th>S₁</th>
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<td>3333</td>
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</table>

S.E. of marginal mean of P or S = 56.6 lb./ac.
S.E. of marginal mean of M = 80.1 lb./ac.
S.E. of body of P x S table = 80.1 lb./ac.
S.E. of body of P x M or S x M table = 113.3 lb./ac.

Crop: - Paddy (Kharif).
Site: - M.A.E. Farm, Barpalli.

Ref: - Or. 58(MAE).
Type: - 'M'.

Object: - Type VI—To study the effect of different types and levels of phosphate along with different methods of placement.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) 2nd week of August. (iv) (a) 3 ploughings. (b) Transplanting. (c) —. (d) 9' x 6'. (e) Nil. (v) and (vi) N.A. (vii) Irrigated. (viii) 3 weedings. (ix) and (x) N.A.
2. TREATMENTS:
All combinations of (1), (2) and (3)+3 control plots/replication.
(1) 2 doses of P₂O₅: P₁=20 and P₂=40 lb/ac.
(2) 3 sources of P₂O₅: S₁=Super, S₂=Ammo. Phos. and S₃=Dicalcium Phosphate.
(3) 3 methods of placement of P₂O₅: M₁=Broadcast, M₂=Dipping in slush and M₃=Pellet form.

3. DESIGN:
(i) 3⁵×2+3 Fact. confd. (ii) 7 ; 3 blocks/replication. (b) N.A. (iii) 4. (iv) (a) 33'×16.5'. (b) 3¹'×14.5'. (v) 1' aloud. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Worm and stem-borer. (iii) Grain yield. (iv) (a) 1956—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2143 lb/ac. (ii) 261.7 lb/ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
<th></th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
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</table>

S.E. of marginal mean of M or S = 53.4 lb/ac.
S.E. of marginal mean of P = 43.6 lb/ac.
S.E. of body of M×S table = 98.9 lb/ac.
S.E. of body of M×P or S×P table or control mean = 75.5 lb/ac.

Crop = Paddy (Kharij).
Site = M.A.E. Farm, Barpalli.

Ref = Or. 59(MAE).
Type = 'M'.

Object = Type VI—To study the effect of different types and levels of phosphate along with different methods of placement.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Fallow. (c) Nil. (ii) (a) Clay to clay loam. (b) N.A. (iii) 14, 15, 16, 1959. (iv) (a) 5 ploughings besides puddling after rec. (b) Transplanting (c)—. (d) 9'×6'. (e) N.A. (v) 50 lb. of cowdung per plot. (vi) T—1242 (late). (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) 28.12.1959.

2. TREATMENTS and 3. DESIGN:
Same as in exp. no. 58(MAE) on page 46.
Hyperphosphate applied in the absence of Ammo. Phos.

3. GENERAL:
(i) Germination good. (ii) Nearly 3% of the plots were damaged severely by blast. Treated with endrex.
(iii) Grain and straw yield. (iv) (a) 1956 (Kharij)—contd. (b) No. (c) Nil. (v) (a) and (b) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 2405 lb/ac. (ii) 255.1 lb/ac. (iii) M effect is significant, P effect and interaction S×M are highly significant. Other effects are not significant. (iv) Av. yield of grain in lb/ac.
Crop :- Paddy (Kharif).  
Site :- M.A.E. Farm, Kendrapara.  
Ref :- Cr. 56(MAE).  
Type :- 'M'.

Object:—Type II—To study the long term effects of three levels of N, P, K and 2 levels of bulky manure.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  
   (ii) Sandy loam to clay loam.  
   (iii) 7.8.1956.  
   (iv) (a) N.A.  
   (b) Transplanted.  
   (v) 9°.  
   (vi) N.A.  
   (vii) T—141 medium.  
   (viii) Unirrigated.  
   (ix) N.A.  
   (x) 17.12.1956.
2. TREATMENTS:
   (1) 3 levels of N as A/S: N₀ =0, N₁ =30 and N₂ =60 lb./ac.
   (2) 3 levels of P₂O₅ as Super : P₀ =0, P₁ =30 and P₂ =60 lb./ac.
   (3) 3 levels of K₂O as Pot. Sulphate : K₀ =0, K₁ =30 and K₂ =60 lb./ac.
   (4) 2 levels of F.Y.M. = F₀ =0 and F₁ =5,000 lb./ac.
   Fertilizers broadcast at planting.
3. DESIGN:
   (i) 3×2 Fact confd. Interaction NPK alone is confd. in F₀ and F₁.  
   (ii) 9 plots/block; 6 blocks-replication.
   (b) N.A.  
   (iii) 1.  
   (iv) a) 33°.  
   (v) 29°.  
   (vi) Yes.
4. GENERAL:
   (i) Poor germination in general.  
   (ii) Rice ‘burnt’ disease noticed at a later stage.  
   (iii) Grain and straw yield.  
   (iv) a) 1956—contd.  
   (b) Yes.  
   (c) Nil.  
   (d) Barpalli.  
   (e) Nil.  
   (vi) and (vii) Nil.
5. RESULTS:
   (i) 2299 lb./ac.  
   (ii) 352.0 lb./ac.  
   (iii) Interaction NPK alone is significant.  
   (iv) Av. yield of grain in lb./ac.

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<th></th>
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Mean: 2281 2353 2263 2270 2316 2312 2302 2296 2293

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Mean: 2381 2353 2263 2270 2316 2312 2302 2296 2293

Crop :- Paddy (Kharif).
Site :- M.A.E. Farm, Kendrapara.
Ref :- Cr. 56(MAE).
Type :- 'M'.
Crop: Paddy (Kharif).
Site: M.A.E. Farm, Kendrapara.

Object: Type II—To study the long term effects of three levels of N, P, K and 2 levels of bulky manure.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) (a) Mahanadi alluvium. (b) N.A. (iii) N.A. (iv) (a) Preliminary and final puddling. (b) Transplanted. (c) —. (d) 9"x6". (e) N.A. (v) N.A. (vi) T—141 (medium). (vii) Irrigated. (viii) Weeding. (ix) and (x) N.A.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 56(MAE) on page 48.

4. GENERAL:
   (i) Good. (ii) Rice grass-hoppers in general attacked. Light trap was used. (iii) Grain and straw yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) Barpalli. (b) Nil. (vi) (a) Due to general drought conditions stunted crop growth was observed. (vii) Nil.

5. RESULTS:
   (i) 3324 lb./ac. (ii) 213.3 lb./ac. (iii) N effect is highly significant. Interaction F X P is significant while other effects are not significant. (iv) Av. yield of grain in lb./ac.

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S.E. of marginal mean of F = 67.7 lb./ac.
S.E. of N, P or K marginal mean = 83.0 lb./ac.
S.E. of body of N X P, N X K or P X K table = 143.7 lb./ac.
S.E. of body of N X F, P X F or K X F table = 117.3 lb./ac.
2. TREAITMENTS and 3. DESIGN:
Same as in expt. no. 56(MAE) on page 48.

4. GENERAL:
(i) Normal growth throughout the growing period. (ii) Rice grass-hoppers in general were noticed and light traps were used. (iii) Grain and straw yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) Barpsi. (b) Nil. (vi) Heavy wind and rains. (vii) Nil.

5. RESULTS:
(i) 2712 lb./ac. (ii) 216.8 lb./ac. (iii) Only N effect is highly significant. (iv) Av. yield of grain in lb./ac.

<table>
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S.E. of marginal mean of F = 41.7 lb./ac.
S.E. of N, P or K marginal mean = 51.1 lb./ac.
S.E. of body of N×P, N×K or P×K table = 88.5 lb./ac.
S.E. of body of N×F, P×F or K×F table = 72.3 lb./ac.

Crop :- Paddy (Kharif).
Ref :- Or. 59(MAE).
Site :- M. A. E. Farm, Kendrapara.
Type :- 'M'.
Object :- Type II.—To study the long term effects of three levels of N, P, K and 2 levels of bulky manure.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Mahanadi alluvium. (b) Nil. (iii) 27.II.1959. (iv) a' N.A. (b) Transplanted.
(c) —. (d) 9' x 6'. (e) N.A. (v) 5000 lb./ac. of F.Y.M. (vi) T—141 (medium). (vii) Irrigated, (viii) Weeding and roguing. (ix) N.A. (x) 28.11.1959.

2. TRE.AI'TENTS and 3. DESIGN:
Same as in expt. no. 56(MAE) on page 48.

4. GENERAL:
(i) Good. (ii) Part of the crop was affected by smut. (iii) Straw and grain yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) a' Barpalli. (b) Nil. (vi) Heavy grain loss due to heavy rains. (vii) Nil.

5. RESULTS:
(i) 2753 lb./ac. (ii) 197.3 lb./ac. (iii) Only N effect is highly significant. (iv) Av. yield of grain in lb./ac.
Crop: Paddy *(Kharif).*

Site: M. A. E. Farm, Kendrapara.

Object: Type IV—To study the effect of direct application of phosphate on a legume vs direct effect of N to the succeeding Paddy crop.

### 1. BASAL CONDITIONS:
- (i) (a) Nil. (b) and (c) As per treatments.
- (iv) (a) Preliminary and final puddlings. (b) Transplanting. (c) 40 lb./jac. in nursery. (d) 9" x 6".
- (e) N.A.

### 2. TREATMENTS:
- **Main-plot treatments:**
  - All combinations of (1) and (2) + a control (fallow plot L₀P₀)
  - (1) 2 legumes L₁ = Moong and L₂ = Biri.
  - (2) 3 levels of P₂ as Super: P₀ = 0, P₁ = 40 and P₂ = 80 lb./jac.
- **Sub-plot treatments:**
  - 3 levels of N as A/S: N₀ = 0, N₁ = 15 and N₂ = 30 lb./jac.
  - P₂O₅ applied to legumes and N applied to paddy crop broadcast at transplanting.

### 3. DESIGN:
- (i) Split-plot. (ii) (a) 7 main-plots blocs; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b): 1/100 ac. (v) N.A. (vi) Yes.

### 4. GENERAL:
- (i) Stunted crop growth observed. (ii) Rice grass-hoppers in general attacked. (iii) Grain and straw yield.
- (iv) (a) and (b) No. (c) Nil. (v) (a) Barpalli. (b) Nil. (vi) Drought conditions prevailed. (vii) Legume yields are L₁P₀ = 3036, L₁P₁ = 3267, L₁P₂ = 3036, L₂P₀ = 3349, L₂P₁ = 3119 and L₂P₂ = 3193 lb./ac.

### 5. RESULTS:
- (i) 3174 lb./ac. (ii) (a) 214.1 lb./ac. (b) 308.9 lb./ac. (iii) Interaction L × P alone is significant. (iv) Av. yield of grain in lb./ac.
<table>
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<th>Crop: Paddy (kharif).</th>
<th>Site: M. A. E. Farm, Kendrapara.</th>
<th>Ref: Or. 58(MAE).</th>
<th>Type: M.</th>
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</table>

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) As per treatments. (ii) (a) Recent alluvium. (b) N. A. (iii) 22.8.1958. (iv) (a) Ploughings, cross ploughing and levelling twice. (v) Transplanted in lines. (c) 48C bundles of seedlings/ac. (d) 9' x 6'. (e) Nil. (v) Nil. (vi) T—141 medium. (vii) Irrigated. (viii) Weeding. (ix) N. A. (x) 11.12.1958.

2. TREATMENTS and 3. DESIGN:

Same as in exp. no. 57(MAE) on page 51.

4. GENERAL:

(i) Normal. (ii) At flowering stage, almost all the plots were subjected to half lodged condition and empty grains were observed. Rats attacked almost all plots. (iii) Grain and straw yield. (iv) 1957—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) Heavy wind and rains. (vii) Nil.

5. RESULTS:

(i) 2096 lb./ac. (ii) 241.6 lb./ac. (b) 216.8 lb./ac. (iii) Only N effect is highly significant. (iv) Av. yield of grain in lb./ac.

| N₀ | 1900 | 1993 | 1857 | 2020 | 2047 | 2017 | 15.07 |
| N₁ | 2023 | 2210 | 2157 | 2113 | 1980 | 1933 | 2170 |
| N₂ | 2010 | 2137 | 2377 | 2047 | 2383 | 2225 | 2123 |
| Mean | 1978 | 2003 | 2110 | 2060 | 2137 | 2086 | 2067 |

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S.E. of difference of two

1. LP marginal means
2. N marginal means
3. N means at the same level of LP
4. LP means at the same level of N

-112.9 lb. ac.
-66.9 lb. ac.
-177.0 lb. ac.
-184.0 lb. ac.
Crop :- Paddy (Kharif).
Site :- M.A.E. Farm, Kendrapara.
Object :- Type IV—To study the effect of direct application of phosphate on a legume vs. effect of N to the succeeding cereal Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil (b) and (c) As per treatments. (ii) (a) Mahanadi alluvium. (b) Nil. (iii) 29.7.1959. (iv) (a) N.A. (b) Transplanting in lines. (c) 480 bundles of seedlings. (d) 9"×6". (e) N.A. (v) Nil. (vi) T—I41 (medium). (vii) Irrigated. (viii) Weeding and roguing were done. (ix) N.A. (x) 29.11.1959.

2. TREATMENTS and 3. DESIGN:
   Same as in expt. no. 57 (MAE) on page 51.

4. GENERAL:
   (i) Good. (ii) Part of the crop affected by paddy smut. (iii) Grain and straw yield. (iv) (a) 1957–contd. (b) No. (c) Nil. (v) Barpalli. (vi) Heavy loss in the form of empty grain due to heavy rains and storm. (vii) Nil.

5. RESULTS:
   (i) 2441 lb./ac. (ii) (a) 256.4 lb./ac. (b) 208.3 lb./ac. (iii) Interaction LP×N effect is 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. LP marginal means =120.9 lb./ac.
2. N marginal means = 64.3 lb./ac.
3. N means at the same level of LP =170.1 lb./ac.
4. LP means at the same level of N =184.1 lb./ac.

---

Crop :- Paddy (Kharif).
Site :- M.A.E. Farm, Kendrapara.
Object :- Type V—To study the most suitable time for the application of N to Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Recent alluvium. (b) N.A. (iii) 10.8.1956. (iv) (a) Ploughings. (b) Transplanted. (c)−(d) and (e) N.A. (v) 5000 lb./ac. of F.Y.M. (vi) T—141. (vii) Unirrigated. (viii) N.A. (ix) N.A. (x) 4.12.1956.

2. TREATMENTS and 3. DESIGN:
   Same as in expt. no. 56 (MAE) on page 46.

4. GENERAL:
   (i) Good. (ii) Rice 'burnt' disease found at a later stage. (iii) Grain and straw yield. (iv) (a) to (c) No. (v) (a) Barpalli. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2429 lb./ac. (ii) 239.6 lb./ac. (iii) Control vs. others effect is highly significant. S effect is significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.
Control = 1876 lb./ac.

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S.E. of marginal mean of T = 97.8 lb./ac.
S.E. of marginal mean of S = 52.3 lb./ac.
S.E. of body of table or control mean = 138.3 lb./ac.

Crop := Paddy (Kharij).
Site := M.A.E. Farm, Kendrapara.

Object := Type VI—To study the effect of different types and levels of phosphate along with different methods of placement.

1. BASAL CONDITIONS:
   (i) a) to c) N.A.  (ii) a) Recent alluvium.  (b) N.A.  (iii) 22.8.1956.  (iv) a. N.A.  (b) Transplanting.  (c) =.  (d) and (e) N.A.  (v) 5000 lb./ac. of FYM.  (vi) T = 1242 (late).  (vii) Unirrigated.  (viii) and (ix) N.A.  (x) 29.12.1956.

2. TREATMENTS:
   All combinations of (1), (2) and (3):
   (1) 3 sources of P2O5: S1 = Super, S2 = Dicalcium phosphate and S3 = Ammon. phosph.
   (2) 2 levels of P2O5: P1 = 20 and P2 = 40 lb. ac.
   (3) 3 methods of application of P2O5: M1 = Broadcasting at puddling time, M2 = dipping the seedlings in mud-slash mixed with the fertilizers before transplanting and M3 = application in the form of pellets to be placed near the roots at the time of planting.

N equalised by applying A/S to make up 30 lb. ac. of N at planting time.

3. DESIGN:
   (i) 3×2 fact. confd.  (ii) a) 6 plots/block; 3 blocks/replication.  (b) N.A.  (iii) 4.  (iv) 33'×16.5'.  (b) 29'×15'.  (v) 2'×9'.  (vi) Yes.

4. GENERAL:
   (i) Good.  (ii) Silver-shoot attack to a negligible extent.  (iii) Grain and straw yield.  (iv) (a) and (b).  No.  (c) Nil.  (v) (a) Barpalli.  (b) Nil.  (v) and (vi) Nil.

5. RESULTS:
   (i) 2174 lb./ac.  (ii) 150.0 lb./ac.  (iii) M effect is highly significant, interaction S×M×P is significant while other effects are not significant.  (iv) Av. yield of grain in lb. ac.

<table>
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<td>P1</td>
<td>2252</td>
<td>2012</td>
<td>2277</td>
<td>2194</td>
<td>2185</td>
<td>2189</td>
<td>2268</td>
</tr>
<tr>
<td>P2</td>
<td>2257</td>
<td>2092</td>
<td>2112</td>
<td>2154</td>
<td>2211</td>
<td>2144</td>
<td>2106</td>
</tr>
<tr>
<td>Mean</td>
<td>2274</td>
<td>2072</td>
<td>2194</td>
<td>2174</td>
<td>2198</td>
<td>2136</td>
<td>2187</td>
</tr>
<tr>
<td>M1</td>
<td>2317</td>
<td>2041</td>
<td>2235</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td>2170</td>
<td>2087</td>
<td>2151</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td>2276</td>
<td>2087</td>
<td>2197</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop: Paddy.  
Site: M.A.E. Farm, Kendrapara.  
Ref: Or. 56(TCM).  
Type: 'M'.

Object:—Type VI (TCM)—To study the direct, residual and cumulative effects of phosphate application to Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) (a) Recent alluvium. (b) N.A. (iii) 4, 5.8.1956. (iv) (a) N.A. (b) Transplanting. (c)—. (d) and (e) N.A. (v) 5,000 lb./ac. of F.Y.M. (vi) B.A.M.—9 (late). (vii) Unirrigated. (viii) No. (ix) N.A. (x) 17.12.1956.

2. TREATMENTS:
   Treatment 1 2 3 4 5 6 7 8 9 10 11 12
   First year 0 C C P1 P2 0 0 0 0 P 1 P2 P2
   Second year 0 C C 0 0 P1 P2 0 0 P 1 P2 P2
   Third year. 0 C C 0 0 0 0 P1 P2 P1 P2 P2

Treatments are three-year course rotations with 11 distinct treatments. Plots under one treatment do not receive any fertilizer N or P. Plots under the other ten treatments receive a basal application of N. One of the ten treatments consists of the application of basal dose of N only. This treatment which serves as control is applied to two plots in each block. Various symbols denote: P1 = 10 lb./ac., P2 = 20 lb./ac., and P3 = 40 lb./ac. of P2O5.

3. DESIGN:
   (i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 33'X33'. (b) 27'X27'. (v) 3' alrcund. (vi) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Rice 'burnt' disease. (iii) Grain and straw yield. (iv) (a) 1953—contd. (b) Yes. (c) N.A. (v) (a) No. (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 2278 lb./ac. (ii) 252.5 lb./ac. (iii) Treatment differences are highly significant. Control vs. others is also highly significant. (iv) Av. yield of grain in lb./ac.
   Treatment 1 2 3 4 5 6 7 8 9 10 11 12
   Av. yield 1819 2221 2102 2158 2055 2283 2167 2480 2393 2608 2834
   S.E./mean except 2,3=126.3 lb./ac. S.E./mean for 2, 3 = 89.3 lb./ac.

Crop: Paddy.  
Site: M.A.E. Farm, Kendrapara.  
Ref: Or. 57(TCM).  
Type: 'M'.

Object:—Type VI (TCM)—To study the cumulative, residual and direct effects of phosphate application to Paddy.

1. BASAL CONDITIONS:
   (i) (a) Paddy—Paddy. (b) Paddy. (c) As per treatments. (ii) (a) Mahanadi alluvium. (b) N.A. (iii) July—August. (iv) (a) Preliminary and final puddlings. (b) Transplanting. (c) 40 lb./ac. in nursery. (d) 9'X6'.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 56(TCM) above.
4. GENERAL:
(i) Stunted crop growth observed. (ii) Rice grass-hoppers attacked in general and light trap was used to control. Damaged by rats. (iii) Grain yield. (iv) (a, 1953—contd. (b) Yes. (c) Nil. (v) (a) No. (b) Nil. (vi) Drought conditions generally prevailed. (vii) Nil.

5. RESULTS:
(i) 3491 lb./ac. (ii) 271.8 lb./ac. (iii) Control vs. others effect is significant. (iv) Avg. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>S.E./mean excluding (2, 3)</th>
<th>S.E./mean for (2, 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3293</td>
<td>135.9 lb./ac.</td>
<td>91.2 lb./ac.</td>
</tr>
<tr>
<td>2</td>
<td>3433</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3454</td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td>3513</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3483</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3495</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3528</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>3440</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3465</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3536</td>
<td></td>
<td></td>
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<tr>
<td>11</td>
<td>3633</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>3514</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharij).
Site :- M.A.E. Farm, Kendrapara.
Object :- Type VI (TCM)—To study the cumulative, residual and direct effect of phosphate application to Paddy.

1. BASAL CONDITIONS:
(i) (a) Paddy—paddy, (b) Paddy. (c) As per treatments. (ii) (a) Recent alluvium. (b) N.A. (c) 29.7.1958. (iv) (a) Ploughing and cross ploughing. (b) Transplanted. (c) 480 bundles of seedlings/ac. (d) 9"x6". (e) N.A. (f) Nil. (g) B.A.M.—9 (late). (vi) Irrigated. (vii) Nil. (viii) N.A.

2. TREATMENTS and 3. DESIGN:
Same as in exp. no. 56(TCM) on page 55.

4. GENERAL:
(i) Good. (ii) Rice grass hoppers. (iii) Grain and straw yield. (iv) (a) 1953—contd. (b) Yes. (c) Nil. (v) (a) No. (b) Nil. (vi) Heavy wind and rains. (vii) Nil.

5. RESULTS:
(i) 3253 lb./ac. (ii) 294.6 lb./ac. (iii) Only control vs. others effect is highly significant. (iv) Avg. yield of grain in lb./ac.

Crop :- Paddy (Kharij).
Centre :- Bolangir (c.f.).
Object :- Type A—To study the response of Paddy to N, P2O5 and K2O applied alone and in combinations.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red loam. (iii) N.A. (iv) Local. (v) (a) Ploughings and plantings. (b) Transplanting. (c) —. (d) and (e) N.A. (vi) July—August. (vii) Unirrigated. (viii) N.A. (ix) N.A. (x) N.A.

2. TREATMENTS:
0 —Control no manure—
N = 20 lb./ac. of N as A.S.
K = 20 lb. as K2O as Mur. of Potash.
NP = 20 lb./ac. of N as A.S + 20 lb./ac. of P2O5 as Super.
PK = 20 lb./ac. of K2O as Mur. of Potash.
NPK = 20 lb./ac. of N as A.S + 20 lb./ac. of P2O5 as Super + 20 lb./ac. of K2O as Mur. of Potash.
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 crops, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of Type A and the other half of Type B on crops other than the legumes. The three trials on legumes are of Type C. Residual effects of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/80 ac. (b) 1/40 ac. (iv) Yes.

4. GENERAL:
(i) Normal to good. (ii) N.A. (iii) Grain yield. (iv) (a) N.A. (b) No. (c) Nil. (v) (a) As per treatments. (b) Nil. (vi) and (vii) N.A.

5. RESULTS:

**Crop :- Paddy (Kharif).**
**Centre :- Balasore (c.f.)**

Object :- Type A—To study the response of Paddy to N, P₂O₅ and K₂O applied alone and in combinations.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Paddy. (c) N.A. (ii) Saline. (iii) N.A. (iv) Dest. (v) (a) 5 to 7 ploughings. (b) Transplanting. (c) —. (d) and (e) N.A. (vi) July—August. (vii) Unirrigated. (viii) 2 weedicides; 2 intercultivations and roguing. (ix) N.A. (x) Nov.—December.

2. TREATMENTS to 4. GENERAL:
Same as in expno. 58(SFT) Type A on page 56 conducted at Bolangir.

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>2386</td>
<td>2543</td>
<td>2436</td>
<td>2946</td>
<td>2353</td>
<td>2781</td>
<td>2650</td>
<td>2872</td>
</tr>
</tbody>
</table>

G.M.=2621 lb./ac.; S.E.=86.0 lb./ac. and no. of trials=4.

---

**Crop :- Paddy (Kharif).**
**Centre :- Cuttack (c.f.)**

Ref :- Or. 58(SFT).
Type :- 'M'.

Object :- Type A—To study the response of Paddy to N, P₂O₅ and K₂O applied alone and in combinations.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red alluvial. (iii) N.A. (iv) Local. (v) (a) to (e) N.A. (vi) July—August. (vii) Unirrigated. (viii) and (ix) N.A. (x) Nov.—Dec.

2. TREATMENTS to 4. GENERAL:
Same as in expno. 58(SFT) Type A on page 56 conducted at Bolangir.

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>
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</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3357</td>
<td>3752</td>
<td>3588</td>
<td>3859</td>
<td>3481</td>
<td>3769</td>
<td>3703</td>
<td>3925</td>
</tr>
</tbody>
</table>

G.M.=3679 lb./ac.; S.E.=51.2 lb./ac. and no. of trials=7.
Crop: Paddy (Kharif).
Centre: Dhenkanal (cf).

Object: Type A—To study the response of Paddy to N, P2O5, and K2O applied alone and in combinations.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red loam. (iii) N.A. (iv) Local. (v) (a) Ploughings and plankings. (b) Transplanting. (c)—. (d) and (e) N.A. (vi) July—August. (vii) N.A. (viii) N.A. (ix) N.A. (x) Nov.—Dec.

2. TREATMENTS to 4 GENERAL:
   Same as in expt. no. 58 (SFT) Type A on page 56 conducted at Bolangir.

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>npk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3061</td>
<td>3095</td>
<td>3110</td>
<td>4575</td>
<td>3777</td>
<td>4320</td>
<td>4180</td>
</tr>
</tbody>
</table>

G.M. = 4095 lb./ac.; S.E. = 178.6 lb./ac. and no. of trials = 12.

Crop: Paddy (Kharif).
Centre: Ganjam (cf).

Object: Type A—To study the response of Paddy to N, P2O5, and K2O applied alone and in combinations.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red and black. (iii) N.A. (iv) Local. (v) (a) 3 to 5 ploughings and 3 plankings. (b) Transplanting. (c)—. (d) and (e) N.A. (vi) July—August. (vii) N.A. (viii) N.A. (ix) N.A. (x) Nov.—December.

2. TREATMENTS to 4 GENERAL:
   Same as in expt. no. 58 (SFT) Type A on page 56 conducted at Bolangir.

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>4937</td>
<td>5365</td>
<td>5176</td>
<td>5612</td>
<td>5052</td>
<td>5785</td>
<td>5530</td>
<td>5900</td>
</tr>
</tbody>
</table>

G.M. = 5420 lb./ac.; S.E. = 161.5 lb./ac. and no. of trials = 2.
Crop :- Paddy (Kharif).
Centre :- Ganjam (c.f).

Object :- Type A—To study the response of Paddy to N, P2O5 and K2O applied alone and in combinations.

1. BASAL CONDITIONS :
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red soil. (iii) N.A. (iv) Local. (v) (a) 3 to 5 ploughings, 2 plantings etc. (b) Transplanting. (c)— (d) and (e) N.A. (vi) August—Sept. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) December.

2. TREATMENTS to 4. GENERAL :
   Same as in expt. no. 58(SFT) Type A on page 56 conducted at Bolangir.

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>2222</td>
<td>2839</td>
<td>2757</td>
<td>2888</td>
<td>2576</td>
<td>2847</td>
<td>2746</td>
<td>3143</td>
</tr>
<tr>
<td>G.M. = 2752 lb./ac.; S.E. = 64.5 lb./ac. and no. of trials = 14.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).
Centre :- Kalahandi (c.f).

Object :- Type A—To study the response of Paddy to N, P2O5 and K2O applied alone and in combinations.

1. BASAL CONDITIONS :
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red loam. (iii) N.A. (iv) Local. (v) (a) Ploughings and plantings. (b) Transplanting. (c)— (d) and (e) N.A. (vi) July—August. (vii) Unirrigated. (viii) and (ix) N.A. (x) Nov. 1958.

2. TREATMENTS to 4. GENERAL :
   Same as in expt. no. 58(SFT) Type A on page 56 conducted at Bolangir.

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>1876</td>
<td>2526</td>
<td>2288</td>
<td>3102</td>
<td>2172</td>
<td>3028</td>
<td>2962</td>
<td>3563</td>
</tr>
<tr>
<td>G.M. = 2690 lb./ac.; S.E. = 72.1 lb./ac. and no. of trials = 10.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (Kharif).
Centre :- Kalahandi (c.f).

Object :- Type A—To study the response of Paddy to N, P2O5 and K2O applied alone and in combinations.

1. BASAL CONDITIONS :
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red soil. (iii) N.A. (iv) Local. (v) (a) Ploughings and plantings. (b) Transplanting. (c)— (d) and (e) N.A. (vi) July—August. (vii) Unirrigated. (viii) N.A. (ix) N.A. (x) Nov. 1959.

2. TREATMENTS to 4. GENERAL :
   Same as in expt. no. 58(SFT) Type A on page 56 conducted at Bolangir.

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>1473</td>
<td>2543</td>
<td>2345</td>
<td>2600</td>
<td>2205</td>
<td>2098</td>
<td>2189</td>
<td>2707</td>
</tr>
<tr>
<td>G.M. = 2270 lb./ac.; S.E. = 337.1 lb./ac. and no. of trials = 7.</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
Crop - Paddy (Kharif).
Centre - Koraput (c.f.).

Object - Type A - To study the response of Paddy to N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O applied alone and in combinations.

1. BASAL CONDITIONS:
   (i) a) N.A. b) Paddy. c) N.A. (ii) Red loam. (iii) and (iv) N.A. (v) to (x) N.A.
   (vi) Irrigated. (vii) N.A. (ix) and (x) N.A.

2. TREATMENTS to 4. GENERAL:
   Same as in exp. no. 58 (SFT). Type A on page 56 conducted at Bolangir.

5. RESULTS:
   Treatment | 0 | n | p | np | k | nk | pk | npk
   Av. yield  1662 | 2268 | 2172 | 2403 | 1761 | 2271 | 2139 | 2633
   G.M. = 2166 lb./ac.; S.E. = 101.2 lb./ac. and no. of trials = 7.

Crop - Paddy (Kharif).
Centre - Mayurbhanj (c.f.).

Object - Type A - To study the response of Paddy to N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O applied alone and in combinations.

1. BASAL CONDITIONS:

2. TREATMENTS to 4. GENERAL:
   Same as in exp. no. 58 (SFT). Type A on page 56 conducted at Bolangir.

5. RESULTS:
   Treatment | 0 | n | p | np | k | nk | pk | npk
   Av. yield  2469 | 3300 | 3259 | 3666 | 3036 | 3703 | 4847
   G.M. = 3535 lb./ac.; S.E. = 138.1 lb./ac. and no. of trials = 15.

Crop - Paddy (Kharif).
Centre - Mayurbhanj (c.f.).

Object - Type A - To study the response of Paddy to N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O applied alone and in combinations.

1. BASAL CONDITIONS:
   (i) a) N.A. b) Paddy. c) N.A. (i) Red soil. (ii) N.A. (iii) Local. (iv) 2 to 3 ploughings and plantings. (v) Transplanting. (vi) - (x) and (c) N.A. (vi) Mid July 1-58. (vii) Unirrigated. (viii) N.A. (ix) N.A. (x) November.

2. TREATMENTS to 4. GENERAL:
   Same as in exp. no. 58 (SFT). Type A on page 56 conducted at Bolangir.

5. RESULTS:
   Treatment | 0 | n | p | np | k | nk | pk | npk
   Av. yield  2556 | 3020 | 2864 | 3451 | 2707 | 3250 | 3394 | 4090
   G.M. = 3138 lb./ac.; S.E. = 135.3 lb./ac. and no. of trials = 15.
Crop: Paddy (Kharif).
Centre: Puri (c.f.).
Ref: Or. 58(SFT).
Type: ‘M’.

Object:—Type A—To study the response of Paddy to N, P₂O₅ and K₂O applied alone and in combinations.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red alluvial. (iii) N.A. (iv) Improved. (v) (a) Ploughing. (b) Transplanting. (c) —. (d) and (e) N.A. (vi) July—August. (vii) N.A. (viii) N.A. (ix) N.A. (x) December.

2. TREATMENTS to 4. GENERAL:
   Same as in expt. no. 58(SFT) Type A on page 56 conducted at Bolangir.

5. RESULTS:

   Treatment | Av. yield | n  | p  | np | k  | nk | pk | npk |
   ----------|-----------|----|----|----|----|----|----|-----|
   0         | 1448      | 1925| 1925| 2074| 1794| 2279| 2090| 2650 |

G.M. = 2023 lb./ac.; S.E. = 123.9 lb./ac. and no. of trials = 7.

Crop: Paddy (Kharif).
Centre: Puri (c.f.).
Ref: Or. 59(SFT).
Type: ‘M’.

Object:—Type A—To study the response of Paddy to N, P₂O₅ and K₂O applied alone and in combinations.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Coastel. (iii) N.A. (iv) Improved. (v) (a) 6 ploughings. (b) Transplanting. (c) —. (d) and (e) N.A. (vi) July—August. (vii) N.A. (viii) N.A. (ix) N.A. (x) December.

2. TREATMENTS to 4. GENERAL:
   Same as in expt. no. 58(SFT) Type A on page 56 conducted at Bolangir.

5. RESULTS:

   Treatment | Av. yield | n  | p  | np | k  | nk | pk | npk |
   ----------|-----------|----|----|----|----|----|----|-----|
   0         | 2872      | 3514| 3168| 3711| 3127| 3793| 3390| 4690 |

G.M. = 3458 lb./ac.; S.E. = 89.9 lb./ac. and no. of trials = 3.

Crop: Paddy (Kharif).
Centre: Sambalpur (c.f.).
Ref: Or. 58(SFT).
Type: ‘M’.

Object:—Type A—To study the response of Paddy to N, P₂O₅ and K₂O applied alone and in combinations.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red and black. (iii) N.A. (iv) Local. (v) (a) Puddling, ploughing and planking. (b) Transplanting. (c) —. (d) and (e) N.A. (vi) First week of August, 1958. (vii) Un-irrigated. (viii) and (ix) N.A. (x) December, 1958.

2. TREATMENTS to 4. GENERAL:
   Same as in expt. No. 58(SFT) Type A on page 56 conducted at Bolangir.

5. RESULTS:

   Treatment | Av. yield | n  | p  | np | k  | nk | pk | npk |
   ----------|-----------|----|----|----|----|----|----|-----|
   0         | 1670      | 1934| 2098| 2246| 1687| 2024| 2312| 2674 |

G.M. = 2081 lb./ac. S.E. = 154.8 lb./ac. and no. of trials = 10.
Crop: Paddy (Kharif).
Centre: Sambalpur (c.f.).

Ref: Or. 59(SFT).
Type: 'M'.

Object: To study the response of Paddy to N, P₂O₅ and K₂O applied alone and in combinations.

1. BASAL CONDITIONS:
   (i) a. N.A. (b) Paddy. (c) N.A. (ii) Red soil. (iii) N.A. (iv) 3 to 7 ploughings and plantings. (v) 5 ploughings and plantings. (vi) Transplanting. (vii) - d and (e) N.A. (viii) First week of August. (ix) Unirrigated. (x) N.A. (xi) N.A. (xii) December.

2. TREATMENTS:
   Same as in expt. no. 58(SFT). Type A on page 56 conducted at Bolangir.

5. RESULTS:
   Treatment: 0
   Av. yield: 2041

   G.M.: 2612 lb. ac. S.E.: 95.0 lb. ac. and no. of trials = 4.

Crop: Paddy (Kharif).
Centre: Bolangir (c.f.).

Ref: 58(SFT).
Type: 'G.P.'

Object: To investigate the relative efficiency of different nutrient combinations at different doses.

1. BASAL CONDITIONS:

2. TREATMENTS:
   0 = Control
   n₁ = 30 lb. ac. of N as Urea.
   n₂ = 40 lb. ac. of N as Urea.
   n₃ = 20 lb. ac. of N as ASN.
   n₄ = 40 lb. ac. of N as ASN.
   n₅ = 20 lb. ac. of N as Ca N.
   n₆ = 40 lb. ac. of N as Ca N.

3. DESIGN:
   (i) Good. (ii) N.A. (iii) Grain yield. (iv) a: 1955--contd. (b) N. c. N.A. (v) a: As per treatments. (b) Nil. (vi) and (vii) Nil.

4. RESULTS:
   Treatment: 0
   Av. yield: 3023

   G.M.: 2921 lb. ac. S.E.: 181.0 lb. ac. and no. of trials = 8.
Object:—Type B—To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red. (iii) N.A. (iv) N.A. (v) (a) 3 ploughings. (b) Transplanting. (c) — (d) and (e) N.A. (vi) 1 to 10.8.1959. (vii) N.A. (viii) N.A. (ix) N.A. (x) 16 to 18.10.1959 and 3 to 7.11.1959.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 58 (SFT) Type B on page 62 conducted at Bolangir.

4. GENERAL:
   (i) Good. (ii) Case-worms. Controlled by dusting gammexane. (iii) Grain yield. (iv) (a) 1958—contd. (b) No. (c) N.A. (v) (a) As per treatments (b) No. (vi) and (vii) Nil.

5. RESULTS:
   Treatment | $n_1$ | $n_2$ | $n_3$ | $n_4$ | $n_5$ | $n_6$
---|---|---|---|---|---|---
Av. yield | 1514 | 1942 | 2008 | 1969 | 2090 | 2222 | 2584

G.M. = 2038 lb./ac.; S.E./mean = 65.2 lb./ac. and no. of trials = 4.

---

Crop:—Paddy (Kharif).
Centre:—Balasore (c.f.).
Ref:—Or. 59(SFT).
Type:—'M'.

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

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Saline. (iii) N.A. (iv) Improved. (v) (a) 4 ploughings and 2 plantings. (b) Transplanting. (c) — (d) and (e) N.A. (vi) Middle of August. (vii) N.A. (viii) 2 times weeding and roguing. (ix) N.A. (x) Nov. and Dec.

2. TREATMENTS:
   $n_1$ = Control (no manure).
   $n_2$ = 20 lb./ac. of N as A/S.
   $n_3$ = 40 lb./ac. of N as A/S.
   $n_4$ = 20 lb./ac. of N as Urea.
   $n_5$ = 40 lb./ac. of N as Urea.
   $n_6$ = 20 lb./ac. of N as C.A.N.
   $n_7$ = 40 lb./ac. of N as C.A.N.

3. DESIGN and 4. GENERAL:
   Same as in exp. no. 58 (SFT) Type B on page 62 conducted at Bolangir.

5. RESULTS:
   Treatment | $n_1$ | $n_2$ | $n_3$ | $n_4$ | $n_5$ | $n_6$
---|---|---|---|---|---|---
Av. yield | 2181 | 2419 | 2551 | 2534 | 2798 | 2534 | 2633

G.M. = 2521 lb./ac.; S.E./mean = 75.1 lb./ac. and no. of trials = 4.

---

Crop:—Paddy (Kharif).
Centre:—Cuttack (c.f.).
Ref:—Or. 58(SFT).
Type:—'M'.

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

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) Paddy. (c) N.A. (ii) Red alluvium. (iii) N.A. (iv) Local. (v) (a) to (e) N.A. (vi) to (x) N.A.
2. TREATMENTS to 4. GENERAL:
Same as in expt. no. 58(SFT) Type B on page 62 conducted at Bolangir.

5. RESULTS:

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<tr>
<th>Treatment</th>
<th>0</th>
<th>n_1</th>
<th>n_2</th>
<th>n_3</th>
<th>n_4</th>
<th>n_5</th>
<th>n_6</th>
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<tr>
<td>Av. yield</td>
<td>3300</td>
<td>3917</td>
<td>4131</td>
<td>3555</td>
<td>3645</td>
<td>3769</td>
<td>3719</td>
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</table>

G.M. = 3719 lb./ac.; S.E. = 49.5 lb./ac. and no. of trials = 8

---

Crop :- Paddy.  Centre :- Dhenkanal (c.f.).  
Object :- Type B—To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

1. BASAL CONDITIONS to 4. GENERAL:
Same as in expt. no. 58(SFT) Type B on page 62 conducted at Bolangir.

5. RESULTS:

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<th>Treatment</th>
<th>0</th>
<th>n_1</th>
<th>n_2</th>
<th>n_3</th>
<th>n_4</th>
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<tr>
<td>Av. yield</td>
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<td>2564</td>
<td>3012</td>
<td>3143</td>
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<td>3036</td>
<td>3530</td>
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</table>

G.M. = 3030 lb./ac.; S.E. = 161.8 lb./ac. and no. of trials = 12.

---

Crop :- Paddy.  Centre :- Dhenkanal (c.f.).  
Object :- Type B—To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

1. BASAL CONDITIONS:
(i) to (c) N.A.  (ii) N.A.  (iii) Red and black.  (iv) Local.  (v) 5 ploughings and 2 to 3 plantings.  
(b) Transplanting:  (c)  7  weeks.  (d) and (e) N.A.  (vi) July—August.  (vii) Irrigated.  (viii) N.A.  (ix) N.A.  
(x) December.

2. TREATMENTS to 4. GENERAL:
Same as in expt. no. 58(SFT) Type B on page 62 conducted at Bolangir.

5. RESULTS:

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<tr>
<th>Treatment</th>
<th>0</th>
<th>n_1</th>
<th>n_2</th>
<th>n_3</th>
<th>n_4</th>
<th>n_5</th>
<th>n_6</th>
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<tr>
<td>Av. yield</td>
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<td>5809</td>
<td>6221</td>
<td>5118</td>
<td>4929</td>
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<td>5349</td>
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</table>

G.M. = 5321 lb./ac.; S.E. = 161.8 lb./ac. and no. of trials = 7.

---

Crop :- Paddy.  Centre :- Ganjam (c.f.).  
Object :- Type B—To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

1. BASAL CONDITIONS:
(i) to (c) N.A.  (ii) Lateritic.  (iii) N.A.  (iv) Local.  (v) 5 Ploughings and rolling.  (vi) Transplanting.  
(c) 7 weeks.  (d) and (e) N.A.  (vi) Aug.—Sept.  (vii) Irrigated.  (viii) N.A.  (ix) N.A.  (x) Dec.  1958.

2. TREATMENTS to 4. GENERAL:
Same as in expt. no. 58(SFT) Type B on page 62 conducted at Bolangir.
5. **RESULTS:****

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<tr>
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<th>0&lt;sup&gt;''&lt;/sup&gt;</th>
<th>0&lt;sup&gt;'''&lt;/sup&gt;</th>
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<tr>
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<td>326</td>
<td>314</td>
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</table>
| G.M.      | 3047 lb./ac. | S.E./mean = 132.1 lb./ac. and no. of trials = 8.

- **Crop:** Paddy (Kharif).
- **Centre:** Ganjam (c.f.).
- **Object:** Type B—To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

### 1. BASAL CONDITIONS:
- (i) (a) to (c) N.A.  
- (ii) Red.  
- (iii) N.A.  
- (iv) Both local and improved.  
- (v) (a) Ploughings and rolling. (b) Transplanting. (c) —. (d) and (e) N.A.  
- (vi) July to Sept. 1959.  
- (vii) Irrigated.  
- (viii) N.A.  
- (ix) N.A.  

### 2. TREATMENTS:
- 0 = Control (no manure).  
- 0<sup>1</sup> = 20 lb./ac. of N as A/S.  
- 0<sup>2</sup> = 40 lb./ac. of N as A/S.  
- 0<sup>1</sup>' = 20 lb./ac. of N as Urea.  
- 0<sup>2</sup>' = 40 lb./ac. of N as Urea.

### 3. DESIGN and 4. GENERAL:
Same as in expt. no. 58(SFT) Type B on page 62 conducted at Bolangir.

### 5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>0&lt;sup&gt;1&lt;/sup&gt;</th>
<th>0&lt;sup&gt;2&lt;/sup&gt;</th>
<th>0&lt;sup&gt;1&lt;/sup&gt;'</th>
<th>0&lt;sup&gt;2&lt;/sup&gt;'</th>
<th>0&lt;sup&gt;1&lt;/sup&gt;''</th>
<th>0&lt;sup&gt;2&lt;/sup&gt;''</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2543</td>
<td>3563</td>
<td>3802</td>
<td>3431</td>
<td>3612</td>
<td>3160</td>
<td>3110</td>
</tr>
</tbody>
</table>
| G.M.      | 3399 lb./ac. | S.E./mean = 100.7 lb./ac. and no. of trials = 12.

---

- **Crop:** Paddy (Kharif).
- **Centre:** Kalahandi (c.f.).
- **Object:** Type B—To investigate the relative efficiency of different nitrogenous fertilizers at different dates.

### 1. BASAL CONDITIONS:
- (i) (a) to (c) N.A.  
- (ii) Red loam.  
- (iii) and (iv) N.A.  
- (v) (a) to (e) N.A.  
- (vii) Irrigated.  
- (viii) and (ix) N.A.  
- (x) Nov. 1958.

### 2. TREATMENTS to 4. GENERAL:
Same as in expt. no. 58(SFT) Type B on page 62 conducted at Bolangir.

### 5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>0&lt;sup&gt;1&lt;/sup&gt;</th>
<th>0&lt;sup&gt;2&lt;/sup&gt;</th>
<th>0&lt;sup&gt;1&lt;/sup&gt;'</th>
<th>0&lt;sup&gt;2&lt;/sup&gt;'</th>
<th>0&lt;sup&gt;1&lt;/sup&gt;''</th>
<th>0&lt;sup&gt;2&lt;/sup&gt;''</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1555</td>
<td>2123</td>
<td>2798</td>
<td>1901</td>
<td>2444</td>
<td>2304</td>
<td>3094</td>
</tr>
</tbody>
</table>
| G.M.      | 2317 lb./ac. | S.E./mean = 84.4 lb./ac. and no. of trials = 8.

---

- **Crop:** Paddy (Kharif).
- **Centre:** Kalahandi (c.f.).
- **Object:** Type B—To investigate the relative efficiency of different nitrogenous fertilizers at different doses.
1. **BASAL CONDITIONS**:
   (i) (a) to (c) N.A.  (ii) Red.  (iii) and (iv) N.A.  (v) (a) 2 to 4 ploughings.  (b) Transplanting.  (c) - .  (d) and (e) N.A.  (vi) 6 to 20.8.1959.  (vii) Unirrigated.  (viii) and (ix) N.A.  (x) 18 to 26.11.1959.

2. **TREATMENTS**:
   Same as in expt. no. 59(SFT) Type B on page 65 conducted at Ganjam.

3. **DESIGN and 4. GENERAL**:
   Same as in expt. no. 58(SFT) Type B on page 62 conducted at Bolangir.

5. **RESULTS**:
   Treatment | $n_1$ | $n_2$ | $n_1'$ | $n_2'$ | $n_1''$ | $n_2''$
   Av. yield | 1103 | 963 | 1094 | 1646 | 1744 | 2444 | 2946 | 2123
   G.M. = 1766 lb./ac. ; S.E. = 321.2 lb./ac. and no. of trials = 7

---

**Crop**: Paddy (Kharif).  
**Centre**: Mayurbhanj (c.f.).  
**Ref**: Or. 58(SFT).  
**Type**: ‘M’.

Object:—Type B—to investigate the relative efficiency of different nitrogenous fertlizers at different doses.

1. **BASAL CONDITIONS**:
   (i) (a) to (c) N.A.  (ii) Red loam.  (iii) and (iv) N.A.  (v) (a) to (e) N.A.  (vi) to (x) N.A.

2. **TREATMENTS** to 4. **GENERAL**:
   Same as in experiment no. 58(SFT) Type B on page 62 conducted at Bolangir.

5. **RESULTS**:
   Treatment | $n_1$ | $n_2$ | $n_1'$ | $n_2'$ | $n_1''$ | $n_2''$
   Av. yield | 2650 | 3259 | 3974 | 3283 | 3991 | 3922 | 4004
   G.M. = 3502 lb./ac. ; S.E. = 149.5 lb./ac. and no. of trials = 14

---

**Crop**: Paddy (Kharif).  
**Centre**: Mayurbhanj (c.f.).  
**Ref**: Or. 59(SFT).  
**Type**: ‘M’.

Object:—Type B—to investigate the relative efficiency of different nitrogenous fertlizers at different doses.

1. **BASAL CONDITIONS**:
   (i) (a to (c) N.A.  (ii) Red loam.  (iii) N.A.  (iv) Local (late).  (v) (a) 2 to 3 ploughings.  (b) Broadcasting and transplanting.  (c) to (e) N.A.  (vii) 22 to 30.5.1959 (broadcasting) and end of August 1959 (transplanting).  (viii) N.A.  (ix) 1 to 2 weedings.  (x) N.A.  (xi) End of Nov. and mid Dec. 1959.

2. **TREATMENTS**:
   Same as in expt. no. 59(SFT) Type B on page 65 conducted at Ganjam.

3. **DESIGN and 4. GENERAL**:
   Same as in expt. no. 58(SFT) Type B on page 62 conducted at Bolangir.

5. **RESULTS**:
   Treatment | $n_1$ | $n_2$ | $n_1'$ | $n_2'$ | $n_1''$ | $n_2''$
   Av. yield | 2057 | 1819 | 2156 | 2376 | 3094 | 3152 | 3785 | 2855 | 3242
   G.M. = 2637 lb./ac. ; S.E. mean = 112.9 lb./ac. and no. of trials = 15
Crop :- Paddy (Kharif).
Centre :- Puri (c.f.).

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

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Red alluvium. (iii) and (iv) N.A. (v) (a) to (e) N.A. (vi) to (x) N.A.

2. TREATMENTS to 4. GENERAL:
   Same as in expet. no. 58(SFT) Type B on page 62 conducted at Bolangir.

5. RESULTS:
   Treatment       0  n₁'  n₂'  n₃''  n₄''  n₅''  n₆''
   Av. yield       1983 2419 2460 2362 2444 2353 2501
   G.M. = 2360 lb./ac.; S.E. = 48.3 lb./ac. and no. of trials = 10.

Crop :- Paddy.
Centre :- Puri (c.f.).

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

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Coastal. (iii) N.A. (iv) N.A. (v) (a) (v) N.A. (vi) to (x) N.A.

2. TREATMENTS to 4. GENERAL:
   Same as in expet. no. 58 (SFT) Type B on page 62 conducted at Bolangir.

5. RESULTS:
   Treatment       0  n₁'  n₂'  n₃''  n₄''  n₅''  n₆''
   Av. yield       2098 2543 2888 2460 2773 2559 2757
   G.M. = 2583 lb./ac.; S.E. = 65.2 lb./ac. and no. of trials = 3.

Crop :- Paddy (Kharif).
Centre :- Sambalpur (c.f.).

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

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Red loam. (iii) and (iv) N.A. (v) (a) 4 ploughings and 2 plankings. (b) Transplanting. (c) N.A. (d) and (e) N.A. (vi) N.A. (vii) Irrigated. (viii) Nil. (ix) and (x) N.A.

2. TREATMENTS to 4. GENERAL:
   Same as in expet. no. 58 (SFT) Type B on page 62 conducted at Bolangir.

5. RESULTS:
   Treatment       0  n₁'  n₂'  n₃''  n₄''  n₅''  n₆''
   Av. yield       2378 2732 3316 3160 3472 2831 3242
   G.M. = 3019 lb./ac.; S.E. = 142.0 lb./ac. and no. of trials = 11.
Crop :- Paddy (Kharij).
Centre :- Cuttack (c.f.).
Object :- Type I (a) -- To assess the average response to N and P applied alone and in combination.

1. BASAL CONDITIONS:
   (a) Sandy loam to clay loam. pH 6.5.
   (b) Transplanted.
   (c) N.A.
   (d) First week of August.
   (e) Irrigated.
   (f) N.A.
   (g) Nov.-Dec.

2. TREATMENTS to 4. GENERAL:
   Same as in exp. no. 58 (SFT).

3. DESIGN:
   (a) 3 levels of N : N₁ = 20 and N₂ = 40 lb. /ac. 
   (b) 3 levels of P₂O₅ as Super : P₁ = 20 and P₂ = 40 lb. /ac.
   (c) 3 extra treatments : G₁ = 50 lb. /ac. of N + 40 lb. /ac. of P₂O₅, G₂ = 50 lb. /ac. of N + 80 lb. /ac. of P₂O₅, G₃ = 100 lb. /ac. of N + 10 lb. /ac. of P₂O₅, as A/S and P₂O₅ as Super.

4. RESULTS:
   (a) Mean yield of grain in lb. /ac.
   (b) Mean yield of grain in lb. /ac.

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<th>N₂</th>
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Crop: Paddy (*Kharif*).  
Centre: Cuttack (c.f.).  

Object: Type I (a)—To assess the average response to N and P applied alone and in combination.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Recent alluvium.  (iii) N.A.  (iv) N.A.  (v) (a) N.A.  (b) Transplant ed.  (c) to (e) N.A.  (vii) June—July.  (viii) N.A.  (ix) N.A.  (x) Nov.—Dec.

2. TREATMENTS to 4. GENERAL:
   Same as in expt. no. 54 (TCM) Type I (a) on page 68 conducted at Cuttack.

3. RESULTS:
   (i) N.A.  (ii) **249.3 lb./ac.**  (iii) Main effect of N is significant.  (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>S0</th>
<th>S1</th>
<th>S2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1639</td>
<td>2064</td>
<td>1908</td>
<td>2065</td>
<td>1764</td>
<td>1936</td>
<td>1782</td>
</tr>
<tr>
<td>1803</td>
<td>1956</td>
<td>2130</td>
<td>2243</td>
<td>1905</td>
<td>1742</td>
<td>1965</td>
</tr>
<tr>
<td>1828</td>
<td>2094</td>
<td>2008</td>
<td>1853</td>
<td>2140</td>
<td>1936</td>
<td>1977</td>
</tr>
<tr>
<td>1757</td>
<td>2038</td>
<td>2015</td>
<td>2054</td>
<td>1936</td>
<td>1820</td>
<td>1937</td>
</tr>
<tr>
<td>S0</td>
<td>—</td>
<td>2074</td>
<td>2202</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>—</td>
<td>1910</td>
<td>2092</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td>—</td>
<td>2130</td>
<td>1752</td>
<td>—</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of marginal mean of N, P or S (P×S or P×N table) = 83.1 lb./ac.
S.E. of marginal mean of S (N×S table) = 101.8 lb./ac.
S.E. of body of any table = 143.9 lb./ac.

Crop: Paddy (*Kharif*).  
Centre: Cuttack (c.f.).  

Object: Type II—To study the effect of different sources of N applied at different times.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Sandy loam to clay loam.  (iii) to (v) N.A.  (vi) Transplanting in 1st week of August.

2. TREATMENTS:
   All combinations of (1) and (2) + a control (no manure).
   (1) 2 sources of 30 lb./ac. of N: S1 = Urea and S2 = A/S.
   (2) 7 times of application N: T1 = Full application before planting, T2 = Full application at planting,
   T3 = Full application at tillering, T4 = ½ applied before planting and ½ applied at tillering, T5 = ½ applied at planting and ½ at tillering,
   T6 = ½ applied before planting, ½ applied at tillering and ½ applied a week before flowering and T7 = ½ applied at planting, ½ applied at tillering and ½ applied a week before flowering.

3. DESIGN:
   (i) R.B.D.  (ii) (a) 15.  (b) N.A.  (iii) 3.  (iv) (a) N.A.  (b) 27' × 27'.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) Normal.  (ii) No.  (iii) Yield of grain.  (iv) (a) 1953—contd.  (b) No.  (c) N.A.  (v) N.A.  (a) and (b) No.  (vi) Nil.  (vii) The trial was conducted at Sahaspur.

5. RESULTS:
   (i) 2639 lb./ac.  (ii) 179.3 lb./ac.  (iii) Control vs others and T effects are highly significant. No other effect is significant.  (iv) Av. yield of grain in lb./ac.
Control—2107 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>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>2798</td>
<td>2888</td>
<td>2156</td>
<td>2732</td>
<td>2510</td>
<td>2732</td>
<td>2534</td>
<td>2621</td>
</tr>
<tr>
<td>S₂</td>
<td>2839</td>
<td>2872</td>
<td>2551</td>
<td>2814</td>
<td>2732</td>
<td>2732</td>
<td>2552</td>
<td>2733</td>
</tr>
<tr>
<td>Mean</td>
<td>2818</td>
<td>2810</td>
<td>2353</td>
<td>2773</td>
<td>2621</td>
<td>2732</td>
<td>2563</td>
<td>2677</td>
</tr>
</tbody>
</table>

S.E. of marginal mean of T = 73.2 lb./ac.
S.E. of marginal mean of S = 39.1 lb./ac.
S.E. of body of table = 103.5 lb./ac.

**Crop**: Paddy (*kharif*).
**Centre**: Cuttack (c.f.).

Object:—Type II—To study the effect of different sources of N applied at different times.

1. **BASAL CONDITIONS**:
   (i) (a) to (c) N.A.  (ii) Recent alluvium.  (iii) to (v) N.A.  (vi) June—July.  (vii) Irrigated.  (viii) N.A.
   (ix) N.A.  (x) Nov.—Dec.

2. **TREATMENTS** to 4. **GENERAL**:
   Same as in expt. no. 54 (TCM). Type II on page 69 conducted at Cuttack.

5. **RESULTS**:
   (i) 1667 lb./ac.  (ii) 189.4 lb./ac.  (iii) None of the effects is significant.  (iv) Av. yield of grain in lb./ac.
   Control=1563 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>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>1629</td>
<td>1728</td>
<td>1588</td>
<td>1728</td>
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<td>1662</td>
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<td>1659</td>
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<td>S₂</td>
<td>1769</td>
<td>1893</td>
<td>1572</td>
<td>1810</td>
<td>1802</td>
<td>1662</td>
<td>1317</td>
<td>1689</td>
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<tr>
<td>Mean</td>
<td>1669</td>
<td>1810</td>
<td>1580</td>
<td>1769</td>
<td>1724</td>
<td>1662</td>
<td>1473</td>
<td>1674</td>
</tr>
</tbody>
</table>

S.E. of marginal mean of T = 77.3 lb./ac.
S.E. of marginal mean of S = 41.3 lb./ac.
S.E. of body of table or control mean = 109.4 lb./ac.

---

**Crop**: Paddy (*kharif*).
**Centre**: Cuttack (c.f.).

Object:—Type IV—To study the effect of different doses and sources of P₂O₅ applied at different times.

1. **BASAL CONDITIONS**:
   (i) (a) to (c) N.A.  (ii) Sandy loam.  iii) (iv) N.A.  (v) A; N.A.  (vi) N.A.  (vii) Irrigated.  (viii) N.A.
   (ix) N.A.  (x) Nov.—Dec.
2. TREATMENTS:
All combinations of (1), (2) and (3)+2 control plots/replication.
(1) 2 doses of P\(_2\)O\(_5\): P\(_1\)=20 and P\(_2\)=40 lb./ac.
(2) 2 sources of P\(_2\)O\(_5\): S\(_1\)=Nitro. Phos. and S\(_2\)=Ammo. Phos.
(3) 4 methods of application of P\(_2\)O\(_5\): M\(_1\)=Broadcasting at puddling time, M\(_2\)=Drilling at puddling time, M\(_3\)=Dipping in mud slash and M\(_4\)=Application as pellets.
N to be equalised to 30 lb./ac. by the addition of A/S.

3. DESIGN:
(i) R.B.D. (ii) (a) 18. (b) N.A. (iii) 3. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) No. (iii) Yield of grain. (iv) (a) 1953—contd. (b) and (c) N.A. (v) (a) and (b) Nil. (vi) Nil. (vii) This expr. was conducted at Sahaspur. Results of experiment conducted during 1955 not available.

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

<table>
<thead>
<tr>
<th>M(_1)</th>
<th>M(_2)</th>
<th>M(_3)</th>
<th>M(_4)</th>
<th>Mean</th>
<th>S(_1)</th>
<th>S(_2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P(_1)</td>
<td>2735</td>
<td>2852</td>
<td>2749</td>
<td>2580</td>
<td>2729</td>
<td>2737</td>
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<tr>
<td>P(_2)</td>
<td>2850</td>
<td>2867</td>
<td>2950</td>
<td>2908</td>
<td>2894</td>
<td>2983</td>
</tr>
<tr>
<td>Mean</td>
<td>2792</td>
<td>2859</td>
<td>2850</td>
<td>2744</td>
<td>2811</td>
<td>2860</td>
</tr>
<tr>
<td>S(_1)</td>
<td>2817</td>
<td>2989</td>
<td>2876</td>
<td>2757</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S(_2)</td>
<td>2768</td>
<td>2729</td>
<td>2823</td>
<td>2731</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E.'s N.A.

Crop :- Paddy (Kharif).
Centre :- Cuttack (c.f.).
Object :- Type VI—To study the direct and residual effect of Phosphatic manure.

Ref :- Or. 54(TCM).
Type :- 'M'.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Sandy loam to clay loam. (iii) N applied to all plots except plot with treatment 1.
(iv) N.A. (v) (a) N.A. (b) Transplanted. (c)—. (d) and (e) N.A. (vi) 1st week of August. (vii) Irrigated. (viii) and (ix) N.A. (x) Nov.—Dec.

2. TREATMENTS:

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>C</td>
<td>C</td>
<td>P(_1)</td>
<td>P(_2)</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>P(_3)</td>
<td>P(_1)</td>
<td>P(_2)</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>C</td>
<td>C</td>
<td>P(_1)</td>
<td>P(_2)</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>P(_3)</td>
<td>P(_1)</td>
<td>P(_2)</td>
</tr>
<tr>
<td>3</td>
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<td>C</td>
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<td>C</td>
<td>P(_1)</td>
<td>P(_2)</td>
<td>P(_3)</td>
<td>P(_1)</td>
<td>P(_2)</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>C</td>
<td>C</td>
<td>P(_1)</td>
<td>P(_2)</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>P(_3)</td>
<td>P(_1)</td>
<td>P(_2)</td>
</tr>
</tbody>
</table>

P\(_1\)= 20 lb./ac. of P\(_2\)O\(_5\), P\(_2\)=10 lb./ac. of P\(_2\)O\(_5\) and P\(_3\)=40 lb./ac. of P\(_2\)O\(_5\). N applied to all plots except the plot with treatment 1.

3. DESIGN:
(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/59.82 ac. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1953—contd. (b) Yes. (c) No. (v) (a) and (b) No. (vi) Nil. (vii) Experiment was continued under model agronomy scheme at Kendrapara (name changed).
RESULTS:

(i) 2503 lb./ac.  (ii) 328.4 lb./ac.  (iii) Treatment 1 vs others is highly significant. Other treatments (viz 4 to 7 and 10 to 12) are highly significantly different. Treatment CC vs others is not significant. (iv) Av. yield of green fodder in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2 (3, 8 and 9)</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1658</td>
<td>2527</td>
<td>2591</td>
<td>2297</td>
<td>2418</td>
<td>2852</td>
<td>2503</td>
<td>2840</td>
<td>2768</td>
</tr>
</tbody>
</table>

S.E./mean (except treatments 2, 3, 8 and 9) = 164.2 lb./ac.
S.E./mean for treatments 2, 3, 8 and 9 = 82.1 lb./ac.

Crop -> Paddy (Kharif).
Centre -> Cuttack (c.f.).
Ref -> Or. 55(TCM).
Type -> 'M'.

Object -> To study the direct and residual effect of Phosphatic manure.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A.  (ii) Recent alluvium.  (iii) to (v) N.A.  (vi) June-July.  (vii) Irrigated.  (viii) N.A.  (ix) N.A.  (x) Nov.-Dec.

2. TREATMENTS to 4. GENERAL:

Same as in expt. no. 54(TCM) Type VI on page 71 conducted at Cuttack.

RESULTS:

(i) 2237 lb./ac.  (ii) 181.0 lb./ac.  (iii) Treatments 2 to 5 vs other treatments effect is highly significant. Treated 1 vs other treatments and other treatments are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2 to 5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2316</td>
<td>2088</td>
<td>2335</td>
<td>2354</td>
<td>2306</td>
<td>2253</td>
<td>2351</td>
<td>2262</td>
<td>2420</td>
</tr>
</tbody>
</table>

S.E./mean (other than treatments 2 to 5) = 90.5, S.E./mean (for treatment 2 to 5) = 45.2 lb./ac.

Crop -> Paddy (Kharif).
Centre -> Cuttack (c.f.).
Ref -> Or. 54(TCM).
Type -> 'M'.

Object -> To study the effect of different doses and sources of N on Paddy yield.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A.  (ii) Sandy loam to clay loam.  (iii) 20 lb./ac. of P_2O_5.  (iv) N.A  (v) N.A.  (vi) Transplanted.  (c) 9"x6"x.  (d) 6"x.  (e) N.A.  (vi) August.  (vii) Irrigated.  (viii) N.A.  (ix) N.A.  (x) N.A.

2. TREATMENTS:

All combinations of (1) and (2) + a control (no manure)

(i) 3 levels of N : N_1=20, N_2 = 40 and N_3 = 60 lb./ac.
(ii) 3 sources of N : S_1=A/S, S_2=A/S and S_3=Ammonium chloride.

3. DESIGN:

(i) R.W.D.  (ii) (a) 10.  (b) N.A.  (iii) 4.  (iv) (a) N.A.  (b) 27'x27'.  (v) N.A.  (vi) Yes.

4. GENERAL:

(i) Normal.  Lodging in some plots.  (ii) No.  (iii) Yield of grain.  (iv) Nil.  (v) 'a' 1953—1955.  (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:

(i) 2859 lb./ac.  (ii) 333.76 lb./ac.  (iii) Control vs others effect is significant. N effect is highly significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.
Control = 2458 lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>2938</td>
<td>3119</td>
<td>3225</td>
<td>3094</td>
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<tr>
<td>S₂</td>
<td>2376</td>
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<tr>
<td>S₃</td>
<td>2633</td>
<td>2831</td>
<td>3061</td>
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</tr>
<tr>
<td>Mean</td>
<td>2619</td>
<td>2862</td>
<td>3200</td>
<td>2904</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 96.34 lb./ac.
S.E. of body of table or control mean = 166.88 lb./ac.

Crop :- Paddy (Kharif).
Centre :- Cuttack (c.f.).

Object :- Type X—To study the effect of different doses and sources of N on Paddy yield.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Recent alluvium. (iii) to (v) N.A. (vi) June—July. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) Nov.—Dec.

2. TREATMENTS:
All combinations of (1) and (2) + a control (no manure)
(1) 3 levels of N : N₁ = 20, N₂ = 40 and N₃ = 60 lb./ac.
(2) 3 sources of N : S₁ = A/S, S₂ = Nitro chalk and S₃ = Ammonium chlorate.
N applied before transplanting.

3. DESIGN and 4. GENERAL:
Same as in expt. no. 54(TCM) Type X on page 72 conducted at Cuttack.

5. RESULTS:
(i) 2334 lb./ac. (ii) 189.26 lb./ac. (iii) Only control vs others effect is significant. (iv) Av. yield of grain in lb./ac.

Control = 2135 lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>2349</td>
<td>2413</td>
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<td>2375</td>
</tr>
<tr>
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<td>2426</td>
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<td>2337</td>
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<td>2376</td>
<td>2390</td>
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</tr>
<tr>
<td>Mean</td>
<td>2384</td>
<td>2367</td>
<td>2317</td>
<td>2356</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 54.64 lb./ac.
S.E. of body of table or control mean = 94.63 lb./ac.

Crop :- Paddy (Kharif).
Centre :- Kalahandi (c.f.).

Ref :- Or. 54(TCM).
Type :- 'M'.

Object :- Type I—To study the effect of different levels and sources of N.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Red loam. (iii) Nil. (iv) and (v) N.A. (vi) July—August. (vii) to (ix) N.A. (x) December.
2. TREATMENTS:

0 — Control.

N₁ = 20 lb./ac. of N as A/S.

N₂ = 40 lb./ac. of N as A/S.

N₁ = 20 lb./ac. of N as Urea.

N₂ = 40 lb./ac. of N as Urea.

3. DESIGN:

(i) and (ii): Eleven community project centres, representing the entire paddy-growing tract, 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 these lists, 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.

4. GENERAL:

(i) Normal.

(ii) Nil.


5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N₁</th>
<th>N₂</th>
<th>N₁'</th>
<th>N₂'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1554</td>
<td>2227</td>
<td>2701</td>
<td>2158</td>
<td>2105</td>
</tr>
</tbody>
</table>

G.M. = 2150 lb./ac.; S.E. mean = 78.2 lb./ac. and no. of trials = 74.

Crop — Paddy (Kharif).

Centre — Kalahandi (c.f.).

Ref: — Or. 55(TCM).

Type: — 'M'.
5. RESULTS

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>N₁</th>
<th>N₂</th>
<th>N₁⁺</th>
<th>N₂⁺</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av yield</td>
<td>1582</td>
<td>2009</td>
<td>2381</td>
<td>1837</td>
<td>2124</td>
</tr>
</tbody>
</table>

G.M. = 1987 lb./ac.; S.E./mean = 119.5 lb./ac. and no. of trials = 14

Crop: Paddy (Kharif).
Centre: Kalahandi (c.f.).
Ref: Or. 54(TCM).
Type: 'M'.

Object:—Type II—To study the effect of P alone and in combination with N on Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Red loam. (iii) to (v) N.A. (vi) July—August. (vii) to (ix) N.A. (x) Dec.

2. TREATMENTS:
   0 = Control (no manure).
   \[ P_1 = 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \]
   \[ N_1P_1 = 20 \text{ lb./ac. of } N \text{ as } A/S + 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \]
   \[ N_2P_1 = 40 \text{ lb./ac. of } N \text{ as } A/S + 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \]
   \[ N_1P_2 = 20 \text{ lb./ac. of } N \text{ as Urea} + 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \]
   \[ N_2P_2 = 40 \text{ lb./ac. of } N \text{ as Urea} + 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \]

3. DESIGN and 4. GENERAL:
   Same as in expt. no. 54(TCM) Type I on page 73 conducted at Kalahandi.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₁⁺P₁</th>
<th>N₂⁺P₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av yield</td>
<td>1808</td>
<td>2067</td>
<td>2492</td>
<td>2562</td>
<td>2058</td>
<td>2191</td>
</tr>
</tbody>
</table>

G.M. = 2197 lb./ac.; S.E./mean = 73.6 lb./ac. and no. of trials = 61.

Crop: Paddy (Kharif).
Centre: Kalahandi (c.f.).
Ref: Or. 55(TCM).
Type: 'M'.

Object:—Type II—To study the effect of P alone and in combination with N on Paddy crop.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Red loam. (iii) N.A. (iv) and (v) N.A. (vi) July—August. (vii) to (ix) N.A. (x) Dec.

2. TREATMENTS:
   0 = Control (no manure).
   \[ P_1 = 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \]
   \[ N_1P_1 = 20 \text{ lb./ac. of } N \text{ as } A/S + 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \]
   \[ N_2P_1 = 40 \text{ lb./ac. of } N \text{ as } A/S + 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \]
   \[ N_1P_2 = 40 \text{ lb./ac. of } N \text{ as Urea} + 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \]
   \[ N_2P_2 = 40 \text{ lb./ac. of } N \text{ as Urea} + 20 \text{ lb./ac. of } P_2O_5 \text{ as Super.} \]

3. DESIGN and 4. GENERAL:
   Same as in expt. no. 54(TCM) Type I on page 73 conducted at Kalahandi.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>P₁</th>
<th>N₁P₁</th>
<th>N₂P₁</th>
<th>N₁⁺P₁</th>
<th>N₂⁺P₁</th>
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</thead>
<tbody>
<tr>
<td>Av yield</td>
<td>1412</td>
<td>1730</td>
<td>2170</td>
<td>2390</td>
<td>2015</td>
<td>2006</td>
</tr>
</tbody>
</table>

G.M. = 1954 lb./ac.; S.E./mean = 44.0 lb./ac. and no. of trials = 67.
Crop :- Paddy (Kharij).
Centre :- Kalahandi (c.f.).
Object :- Type III—To study the effect of A:S along with different sources and levels of P₂O₅.

1. BASAL CONDITIONS:
   (i) to (c) N.A. (ii) Red loam. (iii) to (v) N.A. (vi) July—Aug. (vii) to (x) N.A. (xi) Dec.

2. TREATMENTS:
   0 = Control (no manure).
   N₁ = 20 lb/acre of N as A:S.
   N₁P₁ = 20 lb./acre of N as A:S + 20 lb./acre of P₂O₅ as Super.
   N₁P₂ = 20 lb./acre of N as A:S + 40 lb./acre of P₂O₅ as Super.
   N₁P₃ = 20 lb./acre of N as A:S + 20 lb./acre of P₂O₅ as Nitro-Phos.
   N₁P₄ = 40 lb./acre of N as A:S + 40 lb./acre of P₂O₅ as Nitro-Phos.

3. DESIGN and 4. GENERAL:
   Same as in exp. no. 54(TCM) Type I on page 73 conducted at Kalahandi.

5. RESULTS:
   Treatment | N₁ | N₁P₁ | N₁P₂ | N₁P₃ | N₁P₄
   Av. yield  | 1572 | 1992 | 2167 | 2476 | 2158
   G.M. = 2378 lb./acre; S.E./mean = 94.4 lb./acre and no. of trials = 25.

Crop :- Paddy (Kharij).
Centre :- Kalahandi (c.f.).
Object :- Type IV—To study the effect of N, P and K on the yield of Paddy.

1. BASAL CONDITIONS:
   (i) to (c) N.A. (ii) Red loam. (iii) to (v) N.A. (vi) July—Aug. (vii) to (x) N.A. (xi) Dec.
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.
N₁P₁K₁= 20 lb./ac. of N as A/S+20 lb./ac. of P₂O₅ as Super+ 20 lb./ac. of K₂O as Mur. of Potash.
N₁P₁K₂= 20 lb./ac. of N as A/S+20 lb./ac. of P₂O₅ as Super+ 40 lb./ac. of K₂O as Mur. of Potash.

3. DESIGN and 4. GENERAL:
Same as in expt. no. 54(TCM) Type I on page 73 conducted at Kalahandi.

5. RESULTS:
Treatment | 0 | N₁ | N₁P₁ | N₁P₂ | N₁P₁K₁ | N₁P₁K₂
--- | --- | --- | --- | --- | --- | ---
Av. yield | 1572 | 1992 | 2167 | 2476 | 2158 | 2105

G.M. = 2078 lb./ac.; S.E./mean = 98.7 lb./ac. and no. of trials = 25.

Crop: Paddy (Kharif).
Site: Rice Res. Sub-Stn., Berhampur.
Object: To find out a suitable dose of N for different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) 4.7.1956. (iv) (a) N.A. (b) Transplanting. (c) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) N.A. (ix) 41°. (x) N.A.

2. TREATMENTS:
Main-plot treatments:
4 levels of N: N₀ = 0, N₁ = 30, N₂ = 60 and N₃ = 90 lb./ac.
Sub-plot treatments:
2 varieties: V₁ = B.C.-3 (bulk) and V₂ = T-1145.

3. DESIGN:
(i) Split-plot. (ii) 4 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 15' x 10.5'. (b) 12' x 10.5'. (v) N.A. (vi) Yes.

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

5. RESULTS:
(i) 2188 lb./ac. (ii) (a) 532.4 lb./ac. (b) 234.4 lb./ac. (iii) Main effect of V alone 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>N₃</th>
<th>Mean</th>
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<td>V₂</td>
<td>1608</td>
<td>2247</td>
<td>2192</td>
<td>2057</td>
<td>2056</td>
</tr>
<tr>
<td>Mean</td>
<td>1746</td>
<td>2330</td>
<td>2340</td>
<td>2340</td>
<td>2188</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. N marginal means = 266.2 lb./ac.
2. V marginal means = 82.9 lb./ac.
3. V means at the same level of N = 165.7 lb./ac.
4. N means at the same level of V = 290.9 lb./ac.

Ref: Or. 56(2).
Type: 'MV'.
Crop: Paddy \{Kharif\},

Site: Rice Res. Sub-Stn., Berhampur.

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

1. BASAL CONDITIONS:
(i) Nil. (b) Paddy. (c) A/S at 40 lb./ac. (d) (a) Clay loam. (b) N.A. (ii) 4.7.1956. (iv) a to c) N.A. (d) 6 x 6. (e) 1 seedling/hole. (v) Diam. at 40 lb./ac. of N. Compost at 25 lb. plot and Super at 12 oz. plot. (vi) As per treatments. (vii) Irrigated. (viii) Weeding. (ix) 41. (x) 7-12.1956.

2. TREATMENTS:
Main-plot treatments:
4 levels of N: \(N_0 = 0\), \(N_1 = 30\), \(N_2 = 60\) and \(N_3 = 90\) lb./ac.

Sub-plot treatments:
4 varieties: \(V_1 = G\) 4 - 1 - 70 - 28, \(V_2 = G\) 4 - 1 - 70 - 21 and \(V_3 = T\) - 90 standard.

3. DESIGN:
(i) Split-plot. (ii) 3 main-plot blocks and 4 sub-plots in each. (b) N.A. (iii) 3. (i) a to i. (iv) 18 x 3. (v) 1' between plots and 1' between blocks. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Grain yield. (iv) 1956 N.A. (b) and c. (v) N.A. (vi) and (vii) N.A.

5. RESULTS:
(i) 2249 lb./ac. (ii) 4.7.1956. (b) 301.4 lb./ac. (iii) Main effect: \(N\) alone is highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
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<th>Mean</th>
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<tr>
<td>(N_0)</td>
<td>2171</td>
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<tr>
<td>(N_1)</td>
<td>2448</td>
<td></td>
</tr>
<tr>
<td>(N_2)</td>
<td>2553</td>
<td></td>
</tr>
<tr>
<td>(N_3)</td>
<td></td>
<td>2213</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. N marginal means = 48.8 lb./ac.
2. V marginal means = 133.0 lb./ac.
3. V means at the same level of N = 246.1 lb./ac.
4. N means at the same level of V = 218.7 lb./ac.
3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/block; 3 sub-plots/main-plot. (b) 19’ x 16’. (iii) 2. (iv) (a) 19’ x 5’. (b) 18’ x 5’. (v) 1’ between plots and 1’ between blocks. (vi) Yes.

4. GENERAL:

(i) Good. (ii) No. (iii) Yield of grain. (iv) (a) 1956—N.A. (b) and (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 1459 lb./ac. (ii) (a) 83.81 lb./ac. (b) 211.0 lb./ac. (iii) Main effect of N is highly significant while effect of V 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>N₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1573</td>
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</tr>
<tr>
<td>V₂</td>
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<td>1510</td>
<td>1332</td>
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<td>Mean</td>
<td>1439</td>
<td>1204</td>
<td>1591</td>
<td>1602</td>
<td>1459</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. N marginal means = 48.4 lb./ac.
2. V marginal means = 105.5 lb./ac.
3. V means at the same level of N = 211.0 lb./ac.
4. N means at the same level of V = 178.9 lb./ac.

---

Crop: Paddy (Kharif).
Site: Rice Res. Sub-Stn., Berhampur.

Object: To find out the response of segregating pure line cultures of Japonica × Indica crosses to different doses of N.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) Dhaincha as G.M. (ii) (a) Clay loam. (b) N.A. (iii) 25.6.1957/1.8.1957.
(iv) (a) 6 ploughings with country plough 4’ to 6’ deep. (b) Transplanted. (c) N.A. (d) 9’ x 6’. (e)
One seedling/hole. (v) Dhaincha puddled at the optimum stage. 450 lb./ac. of organic matter added on
14.7.1957 to the whole expt. excepting control. F.Y.M. at 10 C.L./ac. applied before sowing Dhaincha.
(vi) As per treatments. (vii) Irrigated. (viii) Thrice weeding and removal of rogue plants. (ix) 19.5’.
(x) 20.11.1957, flowering 28.9.1257 to 17.10.1957.

2. TREATMENTS:

Main plot treatments:
4 levels of N as A/S: N₀ = 0, N₁ = 20, N₂ = 40 and N₃ = 60 lb./ac.

Sub-plot treatments:
32 segregating cultures of Japonica × Indica crosses. Details N.A.
N applied on 1.8.1957.

3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/block; 32 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b)
14’ x 2’. (v) One row along length. (vi) Yes.

4. GENERAL:

(iii) Grain yield. (iv) (a) Nil. (b) and (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 2440 lb./ac. (ii) (a) 828.0 lb./ac. (b) 615.0 lb./ac. (iii) Main effects of N and V are highly significant.
(iv) Av. yield of grain in lb./ac.
Crop :- Paddy (Kharif).

Site :- Rice Res. Sub-Stn., Berhampur.

Type :- `MV'.

Object :- To find out the response of segregating pure line cultures of Japonica x Indica crosses to different doses of N.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) Dhaincha as G.M. (ii) (a) Clay loam. (b) N.A. (iii) 26.6.1957/29.7.1957. (iv) (a) 6 ploughings 4" to 6" deep with country plough. Puddling of dhaincha. (b) Transplanted. (c) N.A. (d) 9" x 6". (e) One seedling-hole. (v) 450 lbs. of organic matter applied on 14.7.1957 to the whole exp. except control plots. (vi) Japonica x Indica crosses (medium). (vii) Irrigated. (viii) Weeding thrice before flowering and removal of rogues. (ix) 19.5". (x) 2.12.1957.

2. TREATMENTS:
   Main-plot treatments:
   4 levels of N : N₀ = 0, N₁ = 20, N₂ = 40 and N₃ = 60 lb./ac.
   N applied on 29.7.1957.

   Sub-plot treatments:
   42 segregating cultures of Japonica x Indica crosses.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/block ; 42 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 7" x 3". (v) One row along length. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Grass-hopper and stem-borer attack. (iii) Grain yield. (iv) (a) N.A. (b) and (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.
5. RESULTS:
(i) 3230 lb./ac. (ii) (a) 2366 lb./ac. (b) 690 lb./ac. (iii) Main effect of N is significant and effect of V is highly significant. (iv) Av. yield of grain in lb./ac.

### RESULTS:

<table>
<thead>
<tr>
<th>Variety</th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>Mean</th>
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<tbody>
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<td>4234</td>
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<tr>
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<table>
<thead>
<tr>
<th>S.E. of difference of two</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. N marginal means</td>
</tr>
<tr>
<td>2. V marginal means</td>
</tr>
<tr>
<td>3. V means at the same level of N</td>
</tr>
<tr>
<td>4. N means at the same level of V</td>
</tr>
</tbody>
</table>

---

**Crop:** Paddy (Kharif).

**Site:** Rice Res. Sub-Stn, Berhampur.

**Object:** To find out the response of segregating pure line cultures of *Japonica x Indica* crosses (medium duration) to different doses of N.

**Ref:** Or. 57(30).

**Type:** ‘MV’.

---

1. **BASAL CONDITIONS:**

   (i) Nil. (ii) Paddy. (c) Dhaincha as G.M. (ii) Clay loam. (b) N.A. (iii) 25.6.57/27.7.1957. (iv) 6 ploughings with country plough to 4"—6" depth. (b) Transplanted. (c) N.A. (d) 9"x6". (e) One seedling/hoie. (v) Dhaincha was puddled. 450 lbs. of organic matter added to the whole expt. except in control plots on 14.7.1957. Spreading F.Y.M. at 10 C.L./ac. before dhaincha. (vi) *Japonica x Indica* pure segregating line cultures of medium duration. (vii) Irrigated. (viii) Three weedings before flowering (ix) 19.5". (x) 20.11.1957.

2. **TREATMENTS:**

   **Main-plot treatments:**
   4 levels of N: N0=0, N1=20, N2=40 and N3=60 lb./ac.

   **Sub-plot treatments:**
   45 cultures of *Japonica x Indica* crosses.
3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/block; 45 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 9' x 9'. (v) One row along length. (vi) Yes.

4. GENERAL:
   (i) No lodging. Condition good at flowering stage. (ii) Virulent attack of grass-hopper and stem-borer. Dusting with Gammexane and catching by light-trap. (iii) Grain yield. (b) N.A. (b) Nil. (c) Nil. (d) (a) and (b) Nil. (v) Due to continuous drought the crop condition was not satisfactory. (vi) Nil.

5. RESULTS:
   (i) 200 lb./ac. (a) 116 lb./ac. (b) 353 lb./ac. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in lb./ac.

<table>
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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

Crop := Paddy (Khñif).
Site := Rice Res. Sub-Stn., Berhampur.
Ref := Or. 58(27).
Type := 'MV'.

Object := To study the effect of N on segregating line cultures of Japonica × Indica crosses of early duration.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Clay loam. (b) N.A. (iii) 27.6.1958/3.8.1958. (iv) (a) 3 ploughings in summer, 2 ploughings at transplanting and 2 ploughings before final puddle 5' to 6' deep with country plough. (b) Transplanted. (c) N.A. (d) 9'x6'. (e) 1 to 2 seedlings/hole. (v) 3 C.L./ac. of F.Y.M. before G.M. crop and 30 lb./ac. of N as dhaincha G.M. excluding control plot. (vi) *Japonica x Indica* crosses of F.H. (early). (vii) Irrigated. (viii) 2 weedings. (ix) 15.11.1958.

2. TREATMENTS:
Main-plot treatments:
4 levels of N as A/S: N₀=0, N₁=20, N₂=40 and N₃=60 lb./ac.
Sub-plot treatments:

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block; 10 sub-plots/main-plot. (b) 66'x96'. (iii) 3. (iv) (a) and (b) 3'-9"x30'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) V₃₆ lodged at the time of flowering during 2nd week of Oct. (ii) Helminthosporium, grass-hopper and leaf-eating caterpillar attack. Dusting with Gammexane on 5.9.1958 and again on 15.9.1958. (iii) Grain yield. (iv) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1242 lb./ac. (ii) (a) 433.7 lb./ac. (b) 247.8 lb./ac. (iii) Main effect of V is highly significant. (iv) Av. yield of grain in lb./ac.

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S.E. of difference of two
1. marginal means of N =-112.0 lb./ac.
2. marginal means of V =-101.2 lb./ac.
3. V means at the same level of N =-202.3 lb./ac.
4. N means at the same level of V =-222.2 lb./ac.

Crop :- Paddy (*Kharif*).  
Site :- Rice Res. Sub-Stn., Berhampur.

Ref :- 58(28). Type :- 'MV'.

Object :- To study the effect of N on *Japonica x Indica* segregating cultures of medium duration.
Sub-plot treatments:

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block and 15 sub-plots, main-plot. (b) 9' x 10'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Heavy lodging due to heavy rains and winds. Most of the plots were spoiled as water was standing above the crop at time of flowering. (ii) Dusting on 4.9.1958 and 9.9.1958. (iii) Grain yield. (iv) (a) N.A. (b) Yes. (c) Nil. (v) and (vi) Nil.

5. RESULTS:
(i) 1099 lb./ac. (ii) (a) 716.5 lb./acre. (b) 233.0 lb./acre. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

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S.E. of difference of two
1. marginal mean of N = -150.1 lb./ac.
2. marginal mean of V = 95.1 lb./ac.
3. V means at the same level of N = 190.2 lb./ac.
4. N means at the same level of V = 237.9 lb./ac.

Crop: Paddy (\textit{Kharif}).
Ref: Or. 58(30).
Type: \textit{MV}.

Site: Rice Res. Sub-Stn., Berhampur.

Object: To study the effect of N on segregating line cultures of \textit{Japonica \times Indica} crosses of medium duration.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Clay loam. (b) N.A. (iii) 27.6.1958/1.8.1953.
(iv) (a) 3 ploughings in summer. 2 before transplanting and 2 before final puddle to 5' 6" depth. (b) Transplanted. (c) N.A. (d) 6' x 9'. (e) 1-2 seedlings hole. (v) Dhainaha to supply 30 lb./ac. of N and 2 C.l. ac. of F.Y.M. before dib. inch. (vi) \textit{Japonica \times Indica} crosses F.H. (medium) (vii) Irrigated. (viii) 2 weedings. (ix) 69.17°. (x) 12 12.1958.

2. TREATMENTS:
Main-plot treatments:
* levels of N as A/S: N_0 = 0, N_1 = 20, N_2 = 40 and N_3 = 60 lb./ac.

Sub-plot treatments:
3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block; 14 sub-plots/main-plot. (b) 30'x51'. (iii) 3. (iv) (a), (b) 1/431 ac. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Crop lodged due to heavy rains at the time of flowering. (ii) Slight attack of stem-borer. No control measure taken. (iii) Grass-hopper attack. Crop dusted twice. (iv) Grain yield. (v) (a) Not contd. (b) Nil. (vi) (a) and (b) Nil. (vii) Nil.

5. RESULTS:
(i) 1465 lb./ac. (ii) (a) 496.7 lb./ac. (b) 262.0 lb./ac. (iii) Mean Variety No N1 N2 Na

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S.E. of difference of two
1. N marginal means =108.4 lb./ac.
2. V marginal means =107.0 lb./ac.
3. V means at the same level of N =213.9 lb./ac.
4. N means at the same level of V =232.9 lb./ac.

Crop :- Paddy (Kharif).
Site :- Rice Res. Sub-Stn., Berhampur.
Ref :- Or. 57(27).
Type :- 'MV'.

Object :- To find out the effect of different doses of N to segregating pure line cultures of *Japonica* :*Indica* crosses of late duration.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy. (c) Dhaincha as G.M. (ii) (a) Clay loam. (b) N.A. (iii) 25.6.1957/28.7.1957. (iv) 3 summer ploughings, 3 at transplanting and 2 before final puddling 5" to 6" deep with country plough. (v) Transplanted. (c) (a) 6"x9". (c) 1 to 2 seedlings/hole. (v) 450 lb./ac. of organic matter added on 14.7.1957. Spreading of F.Y.M. at 10 C.L./jac. before dhaincha except for control plot. (vi) *Japonica* :*Indica* crosses (late). (vii) Irrigated. (viii) Weeding done thrice vigorously before flowering. Removal of rogues. (ix) 19.5". (x) 10.12.1957.

2. TREATMENTS:
Main-plot treatments:
4 levels of N as A/S: N0=0, N1=20, N2=40 and N3=60 lb./ac.
Sub-plot treatments:
6 varieties of segregating pure line cultures of *Japonica* :*Indica* crosses.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block; 6 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 15'x5'. (v) 9"x6'. (vi) Yes.

4. GENERAL:
(i) Good at flowering. (ii) Grass-hopper and stem-borer were virulent. Dusting with Gammexane and using light-trap. (iii) Grain yield. (iv) (a) 1957—1958. (b) N.A. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.
5. RESULTS:

(i) 973.5 lb./ac.  (ii) (a) 226.7 lb./ac.  (b) 215.8 lb./ac.  (iii) Main effect of V is highly significant.  (iv) Av. yield of grain in lb./ac.

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Mean 693 704 668 861 1449 1466 973

S.E. of difference of two

1. N marginal means = $75.6$ lb./ac.
2. V marginal means = $88.1$ lb./ac.
3. V means at the same level of N = $176.2$ lb./ac.
4. N means at the same level of V = $177.7$ lb./ac.

Crop :- Paddy (Kharif).

Site :- Rice Res. Sub-Stn., Berhampur.

Object :- To find out the effect of different doses of N to segregate pure line cultures of Japonica x Indica crosses of late duration.

1. BASAL CONDITIONS:

(i) (a) Nil.  (b) Paddy.  (c) As per treatments.  (ii) (a) Clay loam.  (b) N.A.  (iii) 27.6.1958/5.8.1958.  (iv) (a) 3 ploughings in summer, 2 at transplanting and 2 before final puddle 5" to 6" deep.  (b) Transplanted.  (c) N.A.  (d) 6' × 9'.  (e) 1 to 2 seedlings/hole.  (v) Dhaincha to give 30 lb./ac. of N and 1 C.L./ac. of F.Y.M. before dhaincha.  (vi) Japonica x Indica F.H. crosses (late).  (vii) Irrigated.  (viii) 2 weedings.  (ix) 69.17" (x) 24.12.1958.

2. TREATMENTS:

Same as in exp. no. 57(27) on page 85.

3. DESIGN:

(i) Split-plot.  (ii) (a) 4 main-plots/block ; 6 sub-plots/main-plot.  (b) 14' × 35'.  (iii) 3.  (iv) (a) N.A.  (b) 15' × 51'.  (v) N.I.  (vi) Yes.

4. GENERAL:


5. RESULTS:

(i) 754 lb./ac.  (ii) (a) 419.1 lb./ac.  (b) 217.1 lb./ac.  (iii) Effect of V is highly significant and interaction N x V is significant.  (iv) Av. yield of grain in lb./ac.

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Mean 712 503 602 649 1265 795 754
Crop: Paddy (*Kharif*).

Site: Rice Res. Sub-Stn., Berhampur.

Object: To find out the response of different doses of N to segregating line cultures of *Japonica x Indica* crosses of medium duration.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) Dhaincha as G.M. (ii) (a) Clay loam. (b) N.A. (iii) 25.6.1957/29.7.1957.
   (iv) (a) 3 ploughings in summer, 3 at transplanting and two at final puddle 5" to 6" deep with country plough. (b) Transplanted. (c) N.A. (d) 6"×9". (e) 1 to 2 seedlings/hole. (v) Good crop of *daaiacha* as G.M.+F.Y.M. at 10. C.L./ac. (except in control plot.) (vi) *Japonica x Indica* (medium). (vii) Irrigated. (viii) 3 weedings. (ix) 19.5". (x) 3.12.1957.

2. TREATMENTS:
   Main-plot treatments:
   4 levels of N as A/S: N0=0, N1=20, N2=40 and N3=60 lb./ac.
   Sub-plot treatments:
   7 *Japonica x Indica* segregating cultures of medium duration.
   N applied on 29.7.1957.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/block and 7 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) Main-plot: 33'×19'. Sub-plot: 19'×5'. (v) 9"×6". (vi) Yes.

4. GENERAL:
   (i) Good at flowering. (ii) Grass-hopper and stem-borer. Dusting with Gammexane. (iii) Grain yield. (iv) (a) No. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1877 lb./ac. (ii) 592.7 lb./ac. (b) 410.0 lb./ac. (iii) Main effect of V is highly significant. (iv) Av. yield of grain in lb./ac.

<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. N marginal means =182.9 lb./ac.
2. V marginal means =167.4 lb./ac.
3. V means at the same level of N =334.8 lb./ac.
4. N means at the same level of V =359.9 lb./ac.

Crop: Paddy (*Kharif*).

Site: Rice Res. Sub-Stn., Berhampur.

Object: To find out the effect of different doses of N to segregating pure line cultures of *Japonica x Indica* crosses of late duration.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) Dhaincha as G.M. (ii) (a) Clay loam. (b) N.A. (iii) 25.6.1957/28.7.1957.
   (iv) (a) 3 summer ploughings; 3 at transplanting and 2 final puddles with country plough 5\" to 6\" deep;
laddering and levelling. (b) Transplanted. (c) N.A. (d) 6\" x 6\". (e) 1 to 2 seedlings/hole. (v) 450 lb./ac. of
   organic matter and F.Y.M. at 10 C.L. (vi) 25.6.1957/28.7.1957. (vii) Irrigated. (viii) One weeding and
   roguing. (ix) 19.5\". (x) 18.12.1957.

2. TREATMENTS:
   Main-plot treatments:
   - 4 levels of N as A/S:
     - N 0 =0
     - N 1 =20
     - N 2 =40
     - N 3 =60

   Sub-plot treatments:
   - 1 to 16 segregating pure line cultures of *Japonica* x *Indica* crosses.

3. DESIGN:
   (i) Split-plot. (ii) (a) 4 main-plots/blok ; 16 sub-plots:main-plot. (b) N.A. (ii) 3. (iv) [N.A.] (b) Main-plot:
   26\" x 28\". Sub-plot: 13.5\" x 3\". (vi) Yes.

4. GENERAL:
   (iv) (a) and (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1996 lb./ac. (ii) (a) 480.6 lb./ac. (b) 440 lb./ac. (iii) Main effects of N and V are highly significant.
   (iv) Av. yield of grain in lb./ac.

<table>
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<tr>
<th>Variety</th>
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S.E. of difference of two
   1. N marginal means = 98.1 lb./ac.
   2. V marginal means = 179.6 lb./ac.
   3. V means at the same level of N = 359.3 lb./ac.
   4. N means at the same level of V = 361.4 lb./ac.

---

Crop :- Paddy (Kharif).
Object :- To study the effect of N and P on Paddy varieties.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 5.6.1957/5.7.1957. (iv) (a) 4 ploughings
to 4\" depth. (b) Transplanted. (c) 20 lb./ac. (d) 9\" x 9\". (e) 4 seedlings/hole. (x) 5000 lb./ac. of F.Y.M.
   (vi) As per treatments. (vii) Unirrigated. (viii) One weeding with Japanese weeder and one hand weeding.
   (ix) 53.72\". (x) 16.11.1959.
2. TREATMENTS:

Main-plot treatments:
5 varieties: \( V_1 = T-1145, V_2 = T-812, V_3 = T-58-1034, V_4 = T-58-904 \) and \( V_5 = T-58-860 \).

Sub-plot treatments:
All combinations of (1) and (2)
(1) 3 levels of N as A/S: \( N_0 = 0, N_1 = 20 \) and \( N_2 = 40 \) lb./ac.
(2) 3 levels of \( P_2O_5 \): \( P_0 = 0, P_1 = 20 \) and \( P_2 = 40 \) lb./ac.

3. DESIGN:
(i) Split-plot—confd. (ii) (a) 5 blocks/replication and 9 sub-plots/main-plot. (b) N.A. (iii) 2. \( (v) \) (a) \( 15' \times 29' \). (b) \( 13' \times 27' \). (v) One row all round. (vi) Yes.

4. GENERAL:
(i) Good. (ii) False smut was found in plots of \( T-812, T-1145 \) and \( T-58-860 \) attacked by cate-piller, gall-fly and grass-hopper. (iii) Tillers, height, grain and straw yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) (vii) Nil.

5. RESULTS:
(i) 1983 lb./ac. (ii) (a) 366.1 lb./ac. (b) 210.0 lb./ac. (iii) Main effect of V is confounded with blocks. Main effect of N is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>V_1</th>
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S.E. of difference of two
1. V marginal means = 122.0 lb./ac.
2. N or P marginal means = 54.2 lb./ac.
3. N or P means at the same level of V = 121.2 lb./ac.
4. V means at the same level of N or P = 157.1 lb./ac.

Crop :- Paddy (Kharif).
Object :- To study the effect of N and P on different varieties of Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Clay. (b) N.A. (iii) \( V_1 \) and \( V_2 = 8, 9.9.1954, V_3 \) and \( V_4 = 4, 5.9.1954. \) (iv) (a) 6 ploughings with country plough 4" to 6" deep and laddering. (b) Transplanted. (c) 20 lb./ac. (d) 9’x6’. (e) 2 seedlings/hole. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) One weeding. (ix) N.A. (x) \( V_1 = 3.1.1955, V_2 = 5.1.1955, V_3 = 16.12.1954, V_4 = 18.12.1954. \)

2. TREATMENTS:
Main-plot treatments:
4 varieties: \( V_1 = T-1242, V_2 = O b s - 7, V_3 = T-141 \) and \( V_4 = T-90. \)
Sub-plot treatments:

6 doses of manures: $M_1 = 20$ lb/ac. of $N + 40$ lb/ac. of $P_2O_5$, $M_2 = 20$ lb/ac. of $N + 40$ lb/ac. of $P_2O_5$, $M_3 = 40$ lb/ac. of $N + 40$ lb/ac. of $P_2O_5$, $M_4 = 60$ lb/ac. of $N + 40$ lb/ac. of $P_2O_5$.

N applied as A/S and $P_2O_5$ as Super.

3. **DESIGN:**

(i) Split-plot.

3. **GENERAL:**

(i) N.A. (ii) N.A. (iii) Paddy yield. (iv) (a) N.A. (b) Nil. (c) N.A. (d) N.A. (e) N.A. (f) N.A. (g) N.A.

4. **RESULTS:**

(i) 2147 lb/ac.

(ii) 1971

(iii) N effect is highly significant while interaction MV is significant.

(iv) Av. yield of paddy in lb/ac.

<table>
<thead>
<tr>
<th></th>
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<th>M3</th>
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Mean 1914 2194 2058 2223 2104 2296 2147

S.E. of difference of two

1. V marginal means = 130.7 lb/ac.
2. M marginal means = 100.8 lb/ac.
3. M means at the same level of V = 201.7 lb/ac.
4. V means at the same level of M = 225.8 lb/ac.

Crop: Paddy (Kharif).

Site: Cuttack (c.f).

Object: Type VIII - To study the effect of $N$ and $P$ on different varieties of Paddy.

1. **BASAL CONDITIONS:**

(i) (a) to (c) N.A. (ii) Sandy loam to clay loam. (iii) N.A. (iv) N.A. (v) N.A. (vi) N.A. (vii) N.A.

2. **TREATMENTS:**

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

(1) 3 levels of $N$ as A/S: $N_0 = 0$, $N_1 = 20$ and $N_2 = 40$ lb/ac.

(2) 3 levels of $P_2O_5$: $P_0 = 0$, $P_1 = 20$ and $P_2 = 40$ lb/ac.

(3) 3 varieties: $V_1 = $Local, $V_2 = $Improved variety and $V_3 = $Improved variety.

Nrogenous fertilisers applied before transplanting and phosphatic fertilisers before puddling.

3. **DESIGN:**

(i) 3$^2$ Fact. confd. (ii) 9 plots/block and 3 blocks replication. (b) N.A. (iii) 1. (iv) (a) N.A. (b) 27' x 27'. (v) N.A. (vi) Yes.

4. **GENERAL:**

(i) Normal. (ii) No. (iii) Yield of grain. (iv) (a) 1953 to 1955. (b) No. (c) N.A. (v) N.A. (c) and (b) Nil. (vii) Nil. (viii) Results as available are furnished. The expt. was conducted at Sahaspur.

5. **RESULTS:**

(i) 1596 lb/ac. (ii) 317.1 lb/ac. (iii) N effect is highly significant. (iv) Av. yield of grain in lb/ac.

Ref: Or. 54(TCM).

Type ≈ 'MV'.

Crop = Paddy (Kharif), Ref = Or. 54(TCM), Type ≈ 'MV'.

Object: Type VIII - To study the effect of $N$ and $P$ on different varieties of Paddy.
Crop :- Paddy (Kharif).

Site :- Cuttack (c.f.).

Object :- Type VIII—To study the effect of N and P on different varieties of Paddy.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A.  (ii) Recent alluvium. (iii) to (v) N.A.  (vi) June—July.  (vii) Irrigated. (viii) and (ix) N.A.  (x) Nov.—Dec.

2. TREATMENTS to 4. GENERAL :
   Same as in expt. no. 54(TCM) Type VIII on page 90 conducted at Cuttack.

5. RESULTS:
   (i) 1731 lb./ac.  (ii) 116.01 lb./ac.  (iii) N and V effects are highly significant.  (iv) Av. yield of grain in lb./ac.

Crop :- Paddy (Kharif).


Object :- To study the effect of ploughing with desi and iron ploughs at different intervals on the yield of Paddy.
I. BASAL CONDITIONS:
   (a) Paddy—Fallow—Paddy. (b) Paddy. (c) 10,000 lb. ac. of F.Y.M. and 50 lb. ac. of N as A.S.
   (ii) Sandy loam. (b) N.A. (iii) 6.7.1959. (iv) As per treatments. (b) Transplanting. (c) N.A. (d) 9"x9". (e) N.A. (v) 10,000 lb. ac. of F.Y.M. and 40 lb. ac. of N as A.S + 25 lb. ac. of P2O5 as Super.
   (vi) T-1242 (late). (vii) Unirrigated. (viii) Weeding. (ix) 30 lb. ac. of F.Y.M. and 10,000 lb. ac. of N as A/S.
   (x) 9"x9". (xi) N.A.

2. TREATMENTS:
   Main-plot treatments:
   2 kinds of ploughs: P1—Iron and P2—Desi plough.
   Sub-plot treatments:
   7 ploughings: T1—Control, T2—Once in alternate months, T3—Once in every third month, T4—Just after previous harvest and before broadcasting, T5—Fallow till July, puddling and transplanting and T6—Fallow till August, p.siding and transplanting.

3. DESIGN:
   (i) Split-plot. (ii) 4 main-plots replication, 7 sub-plots main-plot. (b) N.A. (iii) 3. (iv) (a) 24"x18', (b) 22"x16'. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Attack of smut; no control measure taken. (iii) Weight of grain and straw. (iv) (a) 1958—contd. (b) Yes. (c) Nil. (d) a and b. Nil. (e) Nil. (f) Nil.

5. RESULTS:
   (i) 154 lb. ac. (a) 301 lb. ac. (b) 408 lb. ac. (iii) None of the effects is significant. (iv) Ay. yield of grain in lb. ac.

<table>
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<tr>
<th></th>
<th>T1</th>
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</table>

S.E. of difference of two
1. P marginal means = 93 lb. ac
2. T marginal means = 236 lb. ac.
3. T means at the same level of P = 334 lb. ac.
4. P means at the same level of T = 322 lb. ac.

Crop — Paddy (Kharij).
Ref:— Or. 57(24).
Type:— 'C'.

Object:— To find out the optimum spacing for different varieties of Paddy.

1. BASAL CONDITIONS:
   (a) N.A. (b) Paddy. (c) N.A. (i) Clay loam. (b) N.A. (iii) Transplanted on 19 and 20.9.1957
   (iv) (a) 6 ploughings with country plough to 4"—6" depth. (b) Transplanted. (c) N.A. (d) As per treatments. (e) 2. (f) Nil. (g) As per treatments. (vii) Unirrigated. (viii) 40 lb. ac. of N as A/S and 30 lb. ac. of P2O5 as Super top dressed on 18.9.57. (ix) N.A. (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   4 varieties of Paddy: V1 = T—442 (early), V2 = T—141 (medium), V3 = T—50 (late) and V4 = T—1242 (late).
   Sub-plot treatments:
   3 spacing: S1 = 6"x6", S2 = 6"x9" and S3 = 9"x9".

3. DESIGN:
   (i) Split-plot. (ii) 4 main-plots replication; 3 sub-plots main-plot. (b) N.A. (iii) 3. (iv) (a) 18'x12'
   (b) N.A. (v) One row around. (vi) Yes.
4. GENERAL:
(i) Fair. (ii) Blast attack—Endrine sprayed. (iii) Height, tillers, length of earhead and grain yield. (iv) (a) No. (b) Nil. (c) Nil. (v) N.A. (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 2218 lb/ac. (ii) (a) 254 lb/ac. (b) 258 lb/ac. (iii) Only V effect is highly significant. (iv) Av. yield of grain in lb/ac.

<table>
<thead>
<tr>
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S.E. of difference of two
1. V marginal means = 120 lb/ac.
2. S marginal means = 105 lb/ac.
3. S means at the same level of V = 207 lb/ac.
4. V means at the same level of S = 210 lb/ac.

Crop :- Paddy (Kharif).

Object :- To find out the optimum spacing for Mal Paddy under intensive cultivation.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Mung. (c) Nil. (ii) (a) Clay loam. (b) N.A. (iii) 23.7.1958. (iv) (a) 6 plough nps with country plough to 4" to 6" deep, laddering—interculture at the time of puddling. (b) Transplanted in lines. (c) 20 lb/ac. (d) As per treatments. (e) 2. (v) 5 C.L/ac of F.Y.M. with 1 md of S. Speciosa plants incorporated into soil. (vi) T—442 (early). (vii) Unirrigated. (viii) Gap-filling, top-dressing and weeding. (ix) N.A. (x) 11.11.1958.

2. TREATMENTS:
4 spacings: S₁=6"×4", S₂=6"×6", S₃=6"×9" and S₄=9"×9".

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 18'×12'. (b) 11'×11' (S₁), 11'×17' (S₂), 11'×11' (S₃) and 10'×16' (S₄). (v) 1 row around. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Attack of case-worm and stem-borer. Endrine sprayed on 31.8.1958. (iii) Height, tiller count, length of earhead and grain yield. (iv) (a) No. (b) and (c) Nil. (v) (a) and (b) N.A. (vi) Nil. (vii) Figures based on gross plot size.

5. RESULTS:
(i) 1215 lb/ac. (ii) 234 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>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
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</tbody>
</table>

S.E./mean = 96 lb/ac.
Crop: Paddy (Kharij).

Ref.: Or. 58(6).
Type: 'C'.

Object: To find out the optimum spacing for Biali Paddy under intensive cultivation.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Mong. (c) Nil. (d) Clay loam. (b) N.A. (iii) 15.7.1958. (iv) 6 ploughings with country plough 4' to 6' deep, liming and interculture at the time of puddling. (b) Transplanted in lines. (c) 20 lb. ac. (d) As per treatments. 2. (v) 5 C.L. ac. of FYM with both of S. Species plans incorporated into the land at the time of puddling. (vi) N.-136 early. (vii) Not irrigated. (viii) Weeding. (ix) N.A. x 29.9.1958.

2. TREATMENTS:
   4 spacings: S₁=4' x 4', S₂=4' x 6', S₃=6' x 6' and S₄=6' x 9'.

3. DESIGN:
   (i) R.B.D. (ii) a. 4. (b) N.A. (iii) 6. (iv) a) 18' x 12', b) 11' x 17', c) 11' x 17', d) 11' x 17', e) 11' x 17', f) 10' x 17', g) 10' x 17' (h) 1 row around. (i) Yes.

4. GENERAL:

5. RESULTS:
   (i) 1154 lb. ac. (ii) 240 lb. ac. (iii) Treatment differences are significant. (iv) Av. yield of grain in lb. ac.

   Treatment
<table>
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<td>1311</td>
<td>1265</td>
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   | S.E. mean | 9.8 lb. ac.

Crop: Paddy (Kharij).

Ref.: Or. 58(12).
Type: 'C'.

Object: To find out the optimum spacing under intensive cultivation of medium and late varieties of Paddy.

1. BASAL CONDITIONS:
   (i) a) Nil. (b) Paddy. (c) N.A. (d) Clay loam. (b) N.A. (iii) Transplanting on 16.8.58. (iv) (a) 6 ploughings 4' to 6' deep with country plough. (b) Transplanting. (c) N.A. (d) As per treatments. (e) 2. (v) 32 lb. ac. of P₂O₅ at puddling. (vi) As per treatments. (vii) Unirrigated. (viii) Top-dressing of A/S on 6.9.58. (ix) N.A. (x) 6.12.58.

2. TREATMENTS:
   Main-plot treatments:
   2 varieties: V₁ = T.—141 medium and V₂ = T.—90 late.
   Sub-plot treatments:
   4 spacings: S₁=6' x 6', S₂=6' x 9', S₃=9' x 9' and S₄=12' x 9'.

3. DESIGN:
   (i) Split-plots. (ii) (a) 2 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) a) 18' x 12'. (b) N.A. (v) Yes, one row around. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) N.A. (iii) Weight of grain and straw, height, no. of tillers and length of earhead. (iv) N.A. (v) No (vi) Nil. (vii) a) and (b) N.A. (viii) and (vii) Nil.

5. RESULTS:
   (i) 2060 lb. ac. (ii) (a) 141 lb. ac. (b) 131 lb. ac. (iii) Main effects of S and interaction S x V₁x₂ highly significant. (iv) Av. yield of grain in lb. ac.
Crop: Paddy (Kharif).

Object: To study the effect of methods of planting on different varieties of Paddy.

1. BASAL CONDITIONS:

(i) (a) No. (b) Sesbania speciosa. (c) Nil. (ii) (a) Loam. (b) N.A. (iii) 18.5.59 to 26.9.59. (iv) (a) 5 ploughings and 3 ladderings. (b) As per treatments. (c) N.A. (d) 9' x 6'. (e) N.A. (v) 300 lb./ac. of B.M. applied after 1st ploughing, G.M. with dhaincha which was attacked by pest. 10 C.L./ac. of compost was applied and 20 lb./ac. of N as A/S, top dressed, G.L. manuring at 3000 lb./ac. and 30 lb./ac. of N as A/S top-dressed to late crop. (vii) As per treatments. (viii) 2 hand weedings to early paddy (line sown) and 2 weedings with Japanese weeder to all treatments. (ix) N.A. (x) 26.1.1959 and 12.1.1960

2. TREATMENTS:

Main-plot treatments: 2 methods of planting: M1=Transplanting and M2=Line sowing.
Sub-plot treatments: 4 combinations of early and late varieties: V1=N-136 (early) and T=90 (late), V2=N-36 (early) and GEB-24 (late), V3=PTB-10 (early) and T=90 (late) and V4=PTB-10 (early) and GEB-24 (late).

3. DESIGN:

(i) Split-plot. (ii) (a) 2 main-plots/replication; 4 sub-plots/main-plot. (b) 68' x 62'. (iii) Yes. (iv) (a) 28' x 15'. (b) 25' x 10' x 14' (M2: early paddy), 27' x 14' (M1: early and late paddy). (v) One row on each side. (vi) Yes.

4. GENERAL:

(i) Satisfactory. N=136 lodged slightly before harvesting. (ii) Attack of rice eise-worm. Endrine sprayed on 21.10.1959. (iii) Yield of grain, height and no. of effective tillers. (iv) (a) 19.57—contd, (modified every year) (b) No. (c) Nil. (v) (a) and (b) No. (vi) Drought conditions in late June and early July. (vi) Nil.

5. RESULTS:

(i) 3327 lb./ac. (ii) (a) 284 lb./ac. (b) 351 lb./ac. (iii) Main effects of M and V alone are highly significant. (iv) Av. yield of grain in lb./ac.

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<tr>
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</table>
Crop :- Paddy (Kônîfô).

Site :- Rice Res. Sub-Stn., Berhampur.

Ref :- Or. 54(1).

Type :- 'CM'.

Object :- To test the efficiency of Japanese method of Paddy cultivation.

1. BASAL CONDITIONS :

(i) paddy ; (ii) 40 lb. of N as A.S. ; (iii) a Clay loam ; (iv) N.A. ; (v) Transplanting on 29.7.1954. (vi) a) N.A. (b) As per treatments. (vii) and (viii) c) seedling site. (iii) Nil. (vii) 7-11. (viii) Irrigated. (ix) Weedings. (x) 58. (xi) N.A.

2. TREATMENTS :

T1:- Control ordinary seed bed, no manure and bulk planting.

T2:- Raised seed bed, line planting and no manuring.

T3:- Raised seed bed, bulk planting and Japanese method of manuring.

T4:- Ordinary seed bed, line planting and Japanese method of manuring.


Raised bed : Two beds of size 4' x 12' x 6' manured with 20 baskets of FYM, 1 lb. of A.S and 2 lb. of oil cake.

Seed treatment : The seeds treated with brine solution of 1%, concentration and prevalence. 2 lb. of seed were sown in each bed of 1'99 ac. Watering was done by soaking. Periodical weeding was done. Main field : Dhonicha was sown to supply about 6000 lb. ac. of G.M. and ploughed in. A day before ploughing, Super at 100 lb. ac. was applied. A.S and oilcake at 50 and 100 lb. ac. respectively were applied before planting.

Care of seedlings : The seedlings were pulled out carefully and transplanted. Another dose of A.S at 100 lb. ac. was applied about 52 days after planting.

Line planting : Spacing 12" to 9".

3. DESIGN :

(i) R.B.D. (ii) a) 5. (iii) 5. (iv) a) 13°45'. b) 11°45'. (v) 12°. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Weight of grain only. (iv) (a) 1953 - contd. b) N.A. (v) Nil. (vi) (a) and (b) N.A. (vii) and (viii) Nil.

5. RESULTS :

(i) 2163 lb. ac. (ii) 317 lb. ac. (iii) Treatment differences are highly significant. (i) Av. yield of grain in lb. ac.

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Crop :- Paddy (Kônîfô).

Site :- Rice Res. Sub-Stn., Berhampur.

Ref :- Or. 55(3).

Type :- 'CM'.

Object :- To test the efficiency of Japanese method of Paddy cultivation.

1. BASAL CONDITIONS :

2. TREATMENTS:

Main-plot treatments:
- 2 methods of manuring: M₀ = No manure and M₁ = Manuring as in Japanese method (G.M. with dhaincha at 40 lb./ac. of N during puddling and as top-dressing along with 100 lb./ac. of P₂O₅).

Sub-plot treatments:
- 2 methods of planting: S₁ = Bulk planting and S₂ = Line planting with 9' × 9' spacing and 2 to 3 seedlings/hole. Also weeding and hoeing.
- Sub-sub-plot treatments:
  - 2 seed beds: B₁ = Seedlings from raised seed bed of size 4' × 4', thin sowing, manuring and weeding and
  - B₂ = Ordinary seed bed.

3. DESIGN:
- (i) Split-plot. (ii) (a) 2 main-plots/replication; 2 sub-plots/main-plot and 2 sub-sub-plots/sub-plot. (b) N.A. (iii) N.A. (b) 35' × 24'. (v) 1 ½ around. (vi) Yes.

4. GENERAL:
- (i) to (iii) N.A. (iv) (a) 1953—1955. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
- (i) 2518 lb./ac. (ii) (a) 216 lb./ac. (b) 207 lb./ac. (c) 157 lb./ac. (iii) Only main effect of P is significant.
- (iv) Av. yield of grain in lb./ac.

<table>
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</table>

S.E. of difference of two
- 1. M marginal means = 88.18 lb./ac. 4. B means at the same level of M = 106.06 lb./ac.
- 2. S marginal means = 84.51 lb./ac. 5. M means at the same level of B = 119.51 lb./ac.
- 3. B marginal means = 64.09 lb./ac. 6. S means at the same level of B = 109.00 lb./ac.
- 4. B means at the same level of S = 90.65 lb./ac. 7. M means at the same level of M = 119.51 lb./ac.
- 5. B means at the same level of M = 90.65 lb./ac. 8. S means at the same level of M = 119.51 lb./ac.

Crop: Paddy (Kharif).
Ref: Or. 56(31).
Type: 'CM'.

Object: To determine the optimum spacing, suitable dates of transplanting and optimum no. of seedlings per hole with placement of manures for Paddy.

1. BASAL CONDITIONS:
- (i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 8.6.1956 Transplanting as per treatments. (iv) (a) N.A. (b) Transplanted. (c) —. (d) and (e) As per treatments. (v) 5000 lb./ac. of F.Y.M. (vi) T—1242 (late). (vii) Unirrigated. (viii) 2 weedings and roguing. (ix) and (x) N.A.

2. TREATMENTS:

Main-plot treatments:
- All combinations of (1), (2) and (3)
  - (1) 3 spacings: S₁ = 6' × 6', S₂ = 8' × 8' and S₃ = 10' × 10'.
  - (2) 3 dates of planting: D₁ = 1st July, D₂ = 15th July and D₃ = 30th July.
  - (3) No. of seedlings/hole: R₁ = 2, R₂ = 4 and R₃ = 6 seedlings/hole.
Sub-plot treatments:

All combinations of (1) and (2)
1. 2 levels of N as A:S : N₀ = 0 and N₁ = 40 lb./ac.
2. 2 levels of P₂O₅ as Super : P₀ = 0 and P₁ = 40 lb./ac.

3. DESIGN:

(i) 3⅓ × 4 split-plot. (ii) 3 blocks/replication ; 9 main-plots/block and 4 sub-plots/main-plot. (b) N.A.
(iii) 1. (iv) (a) 29' × 15'. (b) 11111.12 ac. (S₁) 1.115.20 ac. (S₂) 1.119.53 ac. (S₃) (v) One row around.
(vi) Yes.

4. GENERAL:

(i) Good. (ii) Stem-borer attack. Control measures taken—N.A. (vii) No. of tillers, height, grain and straw yield. (iv) 1956—N.A. (b) and (c) Nil. (v) (a) and (b) Nil. (vi, and vii) Nil.

5. RESULTS:

(i) 2197 lb./ac. (ii) (a) 294 lb./ac. (b) 195 lb./ac. (iii) Main effects of N and P are highly significant. Interactions N × P, D × N, S × N and R × N are significant. (iv) Av. yield of grain in lb./ac.

<table>
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<tr>
<th></th>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>R₁</th>
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<th>R₃</th>
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S.E. of difference of two
1. D, S or R marginal means = 69.3 lb./ac.
2. P or N marginal means = 37.5 lb./ac.
3. P or N means at the same level of D, S or R = 65.0 lb./ac.
4. D, S or R means at the same level of P or N = 83.1 lb./ac.
S.E. of body of D × S, D × R or S × R table = 46.0 lb./ac.
S.E. of body of P × N table = 48.0 lb./ac.

Crop :- Paddy (Kharif).

Object :- To determine the optimum spacing, suitable dates of transplanting and optimum no. of seedlings per hole with placement of manures for Paddy.

1. BASAL CONDITIONS:

(b) (a) Nil. (b) Paddy. (c) Basal dose of 5000 lb./ac. of F.Y.M. (ii) (a) Sandy loam. (b) N.A. (iii) 7,25,6.1957 and 6.7.1957. (iv) (a) ploughing and cross ploughing in summer followed by laddering. Puddling at the time of planting. (b) Transplanted. (c) N.A. (d) and (c) As per treatments (v) N.A. (vi) T = 1242 (late). (vii) Unirrigated. (viii) 2 weedings and roguing. (ix) N.A. (x) 21.12.1957.

2. TREATMENTS and 3. DESIGN:

Same as in exp. no. 56/31 on page 97.
4. GENERAL:
(i) Average.  (ii) Stem-borer attack.  (iii) Tiller count, height, grain and straw yield.  (iv)  (a) 1956—contd
(b) Yes.  (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
(i) 2263 lb./ac.  (ii) (a) 434 lb./ac.  (b) 511 lb./ac.  (iii) Main effect of N and interaction S x N are high y
significant.  Main effect of D and interaction D x N are significant.  (iv) Av. yield of grain in lb./ac.

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S.E. of difference of two
1. D, S or R marginal means = 102 lb./ac.
2. P or N marginal means = 60 lb./ac.
3. P or N means at the same level of D, S or R = 104 lb./ac.
4. D, S or R means at the same level of P or N = 126 lb./ac.
S.E. of body of D x S, D x R or S x R table = 125 lb./ac.
S.E. of body of P x N table = 73 lb./ac.

Object:—To determine the optimum spacing, suitable dates of transplanting and optimum no. of seedlings
per hole with placement of manures for Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil.  (b) Paddy.  (c) As per treatments.  (ii) (a) Sandy loam.  (b) N.A.  (iii) 1.6.1958, 15.6.1958,
30.6.1958.  (iv) (a) 4 ploughings with country plough 3”—4” deep followed by laddering.  (b) Transplanted.
(c) 20 lb./ac.  (d) and (e) As per treatments.  (v) 5000 lb./ac. of P.Y.M. before puddling.  (vi) T—1242

2. TREATMENTS:
Main-plot treatments: All combinations of (1), (2) and (3)
(1) 3 spacings:  S1 = 6” x 6”,  S2 = 8” x 8” and  S3 = 10” x 10”.
(2) 3 dates of planting:  D1 = 1st July,  D2 = 15th July and  D3 = 30th July.
(3) No. of seedlings/hole:  R1 = 2,  R2 = 4 and  R3 = 6 seedlings/hole.
Sub-plot treatments: All combinations of (1) and (2)
(1) 2 levels of N as A/S:  N0 = 0 and  N1 = 20 lb./ac.
(2) 2 levels of P2O5 as Super:  P0 = 0 and  P1 = 20 lb./ac.
3. DESIGN:
Same as in exp. no. 56(31) on page 97.

4. GENERAL:
(i) Average. (ii) Attack of stem-borer. No control manures taken. (iii) Height, tillers, weight of grain and straw. (iv) 1956—1958. (b) Yes. (c) Nil. (v) ‘a’ and ‘b’ Nil. ‘Ni’ and ‘ii’ Nil.

5. RESULTS:
(i) 2191 lb./ac. (ii) (a) 156 lb./ac. (b) 241 lb./ac. (iii) Only main effect of N and interaction D×N are highly significant. (iv) Av. yield of grain in lb./ac.

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<th>R2</th>
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S.E. of difference of two
1. D, S or R marginal means
2. P or N marginal means
3. P or N means at the same level of D, S or R
4. D, S or R means at the same level of P or N
S.E. of body of D×S, D×R or S×R table
S.E. of body of P×N table
=37 lb./ac.
=46 lb./ac.
=80 lb./ac.
=67 lb./ac.
=45 lb./ac.
=57 lb./ac.

---

Crop : Paddy (Kharij).

Ref: Or. 54(15).
Type : ‘CM’.

Object : To compare Japanese method of Paddy cultivation with local method.

1. BASAL CONDITIONS:
(i) (a) No. (b) and (c) N.A. (ii) a Clay. (b) N.A. (iii) 27.8.1954. (iv) ‘a’ to ‘c’ As per treatments. (v) As per treatments. (vi) T—141 (medium). (vii) Unirrigated. (viii) Weeding. (ix) 45.56’. (x) 3, 4 and 5.12.1954.

2. TREATMENTS:
1. Control 5 C.L./ac. of F.Y.M.
2. Local method of cultivation+manuring according to the departmental method.
3. Local method of cultivation+manuring according to Japanese method.
4. Manuring and cultivation according to Japanese method.

Japanese method of manuring : 15 to 20 C.L./ac. of compost + 100 lb. of A/S + 100 lb. of Super applied at the time of puddling.
3. DESIGN:
   (i) R.B.D. (ii) a) 5. (b) N.A. (iii) 5. (iv) (a) 22'x491'. (b) 22'x491'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) Attack of case-worm on 20.9.1954. Insecticide dusted on 28.9.1954. (iii) Grain yield. (iv) a) 1954—not contd. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 3054 lb./ac. (ii) 196 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb./ac.

<table>
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<tr>
<th>Treatment</th>
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<td>3017</td>
<td>3252</td>
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<td>S.E./mean</td>
<td>87.6 lb./ac.</td>
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**Crop :- Paddy (Kharif).**

**Site :- M.A.E. Farm, Kendrapara.**

**Ref :- Or. 56(MAE).**

**Type :- 'CM'.**

Object :- Type VII—To determine the optimum spacing, suitable dates of transplanting and the optimum no. of seedlings per hole, when fertilizers in the form of N and P are applied to Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) (a) Recent alluvium. (b) N.A. (iii) As per treatments. (iv) (a) N.A. (b) Transplanting. (c) — (d) and (e) As per treatments. (v) 5,000 lb./ac. of F.Y.M. applied at the time of preliminary cultivation. (vi) B.A.M.—9. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   All combinations of (1), (2) and (3) (normal date of transplanting)
   (2) No. of seedlings/hole : R₁=2, R₂=4 and R₃=6 seedlings/hole.
   (3) 3 spacings : S₁=6"x6", S₂=8"x8" and S₃=10"x10".

   Sub-plot treatments:
   All combinations of (1) and (2)
   (1) 2 levels of N as A/S : N₀=0 and N₁=40 lb./ac.
   (2) 2 levels of P₂O₅ as Super : P₀=0 and P₁=40 lb./ac.

   N applied at the time of planting and P₂O₅ applied at final puddling.

3. DESIGN:
   (i) Split-plot confd. (ii) a) 27 main-plots in 3 blocks of 9/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 33"x16.5". (b) 29"x15". (v) N.A. (vi) Yes.

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

5. RESULTS:
   (i) 2399 lb./ac. (ii) 278.7 lb./ac. (b) 188.5 lb./ac. (iii) N.A. (iv) Av. yield of grain in lb./ac.
Crop = Paddy (Kharif).
Site = M.A.E. Farm, Kendrapara.

Object: Type VII—To determine the optimum spacing, most suitable dates of transplanting and the optimum no. of seedlings/hole when fertilizers in the form of N and P are applied to Paddy.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) (a) Recent alluvium. (b) N.A. (iii) As per treatments. (v) 'a' N.A. (b) Transplanting (c) (iv) (d) and (e) As per treatments. (vi) 5,000 lb./ac. of F.Y.M. applied at the time of preliminary cultivation. (vii) B.A.M.—9 (late variety). (viii) Irrigated. (vii) (a) (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   All combinations of (1), (2) and (3)
   3 sowing dates: \( D_1 = 18.7.1957, D_2 = 2.8.1957 \) and \( D_3 = 17.8.1957 \).
   No. of seedlings/hole: \( R_1 = 2, R_2 = 4 \) and \( R_3 = 6 \). seedlings/hole.
   3 spacing: \( S_1 = 6'' \times 6'', S_2 = 8'' \times 8'' \) and \( S_3 = 10'' \times 10'' \).

   Sub-plot treatments:
   All combinations of (1) and (2):
   (1) 2 levels of N as A/S: \( N_0 = 0 \) and \( N_1 = 40 \) lb./ac.
   (2) 2 levels of \( P_2O_5 \) as Super P: \( P_0 = 0 \) and \( P_1 = 40 \) lb./ac.

3. DESIGN and 4. GENERAL:
   Same as in exp't no. 56 (MAE) on page 101.

5. RESULTS:
   (i) 3183 lb./ac. (ii) (a) 159.25 lb./ac. (b) 308.5 lb./ac. (iii) D effect and interaction D \( \times R \), N \( \times P \) are highly significant. R effect and interaction R \( \times S \) are significant. Others effects are not significant. (iv) Av. yield of grain in lb./ac.
Crop: Paddy (Kharif).
Site: M.A.E., Farm, Kendrapara.

Object: — Type VII—To determine the optimum spacing, most suitable dates of transplanting and the optimum no. of seedlings/hole when fertilizers in the form of N and P are applied to Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Paddy BAM. 9. (c) N.A.  
(ii) (a) Recent alluvium. (b) N.A.  
(iii) As per treatments.  
(iv) (a) Preliminary and final puddling. (b) Transplanted in lines. (c) About 500 bundles of seedlings/ac.  
(d) and (e) As per treatments. (v) 5,000 lb./ac. of F.Y.M. (vi) B.A.M. 9 (late sarda). (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1), (2) and (3).
(2) No. of seedlings/hole: R₁=2, R₂=4 and R₃=6 seedlings/hill.
(3) 3 spacings: S₁=6"×6", S₂=8"×8" and S₃=10"×10".

Sub-plot treatments:
All combinations of (1) and (2).
(1) 2 levels of N as A/S: N₀=0 and N₁=40 lb./ac.
(2) 2 levels of P₀: P₀=0 and P₁=40 lb./ac.

3. DESIGN and 4. GENERAL:
Same as in exp. no. 56 (MAE) on page 101.

5. RESULTS:
(i) 2417 lb./ac. (ii) 223.4 lb./ac. (b) 183.9 lb./ac. (iii) D effect is highly significant. S, N effects and interactions S×N and R×N×P are significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.
Crop :- Paddy (Kharif).
Site :- M.A.E., Farm, Kendrapara.

Object : Type VII—to determine the optimum spacing, most suitable dates of transplanting and optimum no. of seedlings per hole when fertilizers in the form of N and P are applied to Paddy.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A. (ii) (a) Recent alluvium. (b) N.A. (iii) As per treatments. (iv) (a) N.A. (b) Transplanting. (c) As per treatments. (d) 5000 lb./ac. of F.Y.M. (vi) B.A.M. 9 (late Sarada). (vi1) Irrigated. (viii) Weeding. (ix) N.A. (x) 9.12.1959.

2. TREATMENTS :
   Main-plot treatments:
   All combinations of (1), 2 and (3).
   (1) 3 sowing dates : D1=30.7.1959, D2=Normal (14.8.1959) and D3=29.8.1959.
   (2) 3 no. of seedlings/hole R1=2, R2=4 and R3=6.
   (3) 3 spacings : S1=6" × 6", S2=8" × 8" and S3=10" × 10".

   Sub-plot treatments:
   All combinations of (1) and (2).
   (1) 2 levels of N as A/S : N0=0 and N1=40 lb./ac.
   (2) 2 levels of P2O5 as Super : P0=0 and P1=40 lb./ac.

3. DESIGN and GENERAL:
   Same as in expt no. 56 (MAE) on page 101.

5. RESULTS :
   (i) 2645 lb./ac. (ii) (a) 397.2 lb./ac. (b) 284.6 lb./ac. (iii) Only S effect and interaction S × N are significant. (iv) Av. yield of grain in lb./ac.
Object: To study the response of Paddy to different phosphatic fertilizers under different water logging conditions.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 18.12.1957—16.1.1958. (iv) (a) N.A. (b) Transplanted. (c) N.A. (d) 9" x 6". (e) 3 seedlings/hole. (v) Nil. (vi) MTU—15. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 25.4.1958.

2. TREATMENTS:
   Main-plot treatments:
   3 sources of P<sub>2</sub>O<sub>5</sub>: S<sub>1</sub>=Super, S<sub>2</sub>=Bone meal and S<sub>3</sub>=Rock phosphate.
   Sub-plot treatments:
   5 water logging conditions: W<sub>1</sub>=Below 3" (normal), W<sub>2</sub>=3", W<sub>3</sub>=6", W<sub>4</sub>=9" and W<sub>5</sub>=1".
   P<sub>2</sub>O<sub>5</sub> applied at 20 lb./ac.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/block and 5 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 34' x 18'.2'. (b) 1/107.6 ac. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Average. (ii) Stem-borer. (iii) Height, tiller count, grain and straw yield. (iv) (a) 1957—N.A. (b) and (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.
5. RESULTS:
(i) 1421 lb./ac.  (ii) (a) 498 lb./ac.  (b) 202 lb./ac.  (iii) None of the effects is significant.  (iv) Av. yield of grain in lb./ac.

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S.E. of difference of two
1. S marginal means = 182 lb./ac.
2. W marginal means = 96 lb./ac.
3. W means at the same level of S = 168 lb./ac.
4. S means at the same level of W = 234 lb./ac.

Crop :- Paddy (Kharif).
Site :- M.A.E. Farm, Barpalli.
Ref :- Or. 56(MAE).
Type :- 'IM'.

Object :- To study the direct response of Paddy to N, P, irrigation and their interactions.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  (ii) (b) Red loam.  (b) N.A.  (iii) First week of August.  (iv) a) N.A. (v) Transplanting.
(c) --.  (d) 9' x 6'.  (e) N.A.  (v) 5000 lb./ac. of F.V.M.  (vii) N.A.  (viii) As per treatments.  (ix) N.A.  (x) End of December.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1) and (2)
(1) Total amount of irrigation: A1=72", A2=84" and A3=96".
(2) 3 intensities of irrigation: I3=2", I1=3" and I3=4".
Sub-plot treatments:
A1 combinations of (1) and (2):
3 levels of N of A/S: N0=0, N1=30 and N2=60 lb./ac.
3 levels of P2O5 as Super: P0=0, P1=30 and P2=60 lb./ac.

3. DESIGN:
(i) Split-plot.  (ii) 9 main-plots/replication ; 9 sub-plots/main-plot.  (b) N.A.  (iii) 2.  (iv) a N.A.
(b) 1/100 ac.  (v) N.A.  (vi) Yes.

4. GENERAL:
(a) to (c) N.A.  (v) 6.  (b) Nil.  (v) Nil.  (vi) Nil.

5. RESULTS:
(i) 1974 lb./ac.  (ii) (a) 191.5 lb./ac.  (b) 183.4 lb./ac.  (iii) Main effects of I, N and P and interaction N x P are highly significant. Main effect of A is significant. Other effects are not significant.  (iv) Av. yield of grain in lb./ac.
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<tr>
<td>Mean</td>
<td>1950</td>
<td>1920</td>
<td>2052</td>
<td>1660</td>
<td>1957</td>
<td>2305</td>
<td>1780</td>
<td>1971</td>
</tr>
<tr>
<td>P1</td>
<td>1778</td>
<td>1739</td>
<td>1822</td>
<td>1439</td>
<td>1917</td>
<td>1983</td>
<td>1711</td>
<td>2067</td>
</tr>
<tr>
<td>P2</td>
<td>1928</td>
<td>1933</td>
<td>2050</td>
<td>1723</td>
<td>1933</td>
<td>2256</td>
<td>1817</td>
<td>2022</td>
</tr>
<tr>
<td>N1</td>
<td>1617</td>
<td>1656</td>
<td>1706</td>
<td>1617</td>
<td>1706</td>
<td>1617</td>
<td>1617</td>
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<tr>
<td>N2</td>
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<td>2422</td>
<td>2311</td>
<td>2181</td>
<td>2422</td>
<td>2311</td>
<td>2181</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. A or I marginal means = 36.9 lb/ac.
2. N or P marginal means = 35.3 lb/ac.
3. N or P means at the same level of A or I = 61.1 lb/ac.
4. A or I means at the same level of N or P = 62.0 lb/ac.
5. means in the body of A×I table = 65.8 lb/ac.
6. means in the body of N×P table = 61.1 lb/ac.

Crop: Paddy (Kharif).
Ref: Or. 57(13).
Type: 'D'.

Object: To find out the efficiency of different insecticides for controlling Paddy gall-fly.

1. BASAL CONDITIONS:
(i) (a) Paddy—Fallow—Paddy. (b) Fallow. (c) Nil. (ii) (a) Sandy loam. (b) Nil. (iii) 26.7.1957.
(iv) (a) 2 ploughings. (b) Transplanted. (c) Nil. (d) 9"×9". (e) 2 seedlings/holes. (v) N.C.L.–ac. of cowdung. (vi) T—1242 (late). (vii) Unirrigated. (viii) 2 weedings and 2 manurings with 20 lb/ac. of N as A/S. (ix) Nil. (x) 9.12.1957.

2. TREATMENTS:
1. Control.
2. Folidol at 1 lb/ac.
3. Folidol at 0.5 lb/ac.
4. Endrine at 1 lb/ac.
5. Endrine at 0.5 lb/ac.
I spraying on 8.9.1957. II spraying on 27.9.1957.

3. DESIGN:
(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 33'×22'. (b) N.A. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Gall-fly. As per treatments. (iii) Count of galls from 3 sq. yds of each pot selected at random. 10 counts in all. Yield of grain and no. of tillers. (iv) (a) 1957—N.A. (b) No. (c) Nil. (v) (i) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1230 lb/ac. (ii) 133 lb/ac. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in lb/ac.
Crop :- Paddy (Rabi).
Object :- To find out the efficiency of different insecticides for controlling Paddy stem-borer.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 10 C.L./ac. of F.Y.M.  (ii) (a) Sandy loam. (b) N.A.  (iii) 11.12.1958, transplanting on 27.1.1959.  (iv) (a) 4 ploughings with country plough to 4" depth. (b) Transplanted.  (c) N.A.  (d) 6" × 6". (e) 2 seedlings/hole.  (v) 15 C.L./ac. of F.Y.M. and 40 lb./ac. of N as A.S.  (vi) N-130 (early) and PTB-10 (early).  (vii) Irrigated.  (viii) 1 weeding.  (ix) N.A.  (x) 11.4.1959.

2. TREATMENTS:
1. Control.
2. Endrine (0.05%).
3. Folidol (0.05%).
4. D.D.T. (0.25%).
5. Malathion (0.08%).

3. DESIGN:
   (i) R.B.D.  (ii) (a) 5.  (b) N.A.  (iii) 6.  (iv) (a) 17' × 17'. (b) 16' × 16'. (v) One row around. (vi, Yes.

4. GENERAL:
   (i) Normal.  (ii) Stem-borer, gall-fly, case-worm. Control measures as per treatments.  (iii) Count on dead hearts, empty panicles and yield of grain.  (iv) (a) 1958—contd.  (b) No. (c) Nil.  (v/a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 486 lb./ac.  (ii) 284 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>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>116</td>
<td>1149</td>
<td>677</td>
<td>286</td>
<td>204</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>116 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Paddy (Rabi).
Object :- To find out the efficiency of different insecticides for controlling Paddy stem-borer.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) 20 C.L./ac. of F.Y.M.  (ii) (a) Sandy loam. (b) N.A.  (iii) 15.12.1959, (iv) (a) 2 ploughings with country plough to 4" depth. (b) Transplanted.  (c) N.A.  (d) 9" × 9". (e) 2. (v) 20 C.L./ac. of F.Y.M. (vi) FTB-10 (early).  (vii) Irrigated.  (viii) 2 weedings.  (ix) N.A.  (x) 26.4.1960.

2. TREATMENTS:
1. Control.
2. Endrine (0.04%).
3. Folidol (0.08%).
4. Diazinon (0.04%).
5. Phosdrine (0.04%).
6. Roger (0.08%).
3. DESIGN:
(i) R.B.D. (ii) 6. (b) N.A. (iii) 5. (iv) (a) 17'×17'. (b) 16'×16'. (v) One row allround. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Gall-fly and stem-borer. Control measures as per treatments. (vi) % count of dead-hearts and empty panicles and yield of grain. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1450 lb./ac. (ii) 245 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>496</td>
<td>2938</td>
<td>1874</td>
<td>1714</td>
<td>931</td>
<td>748</td>
</tr>
<tr>
<td>S.E./mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>110</td>
</tr>
</tbody>
</table>

Object:—To study the effect of fungidal spray to control the incidence of blast on Paddy.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) 20.7.1954 to 15.8.1954. (iv) (a) 6 ploughings with country plough 4" to 6" deep. (b) Transplanted. (c) N.A. (d) 6'×6'. (e) 2 seedlings/hole.
(f) 5 C.L./ac. of F.Y.M. (vi) CO—13. (vii) N.A. (viii) 2 weedings. (ix) and (x) N.A.

2. TREATMENTS:
Main-plot treatments:
3 fungicides: F₁=Bordeaux mixture, F₂=Perenox and F₃=Copesan.

Sub-plot treatments:
4 toxicants: T₀=Control, T₁, T₂ and T₃ are different for different fungicides.

Quantity sprayed:
For F₁—T₁=2 : 5 : 50, T₂=5 : 5 : 50 and T₃=7 : 5 : 50; for F₂—T₁=4 ozs./10 gallons, T₂=5 ozs./10 gallons and T₃=6 ozs./10 gallons; and for F₃—T₁=4½ lbs./100 gallons, T₂=5 lbs./100 gallons and T₃=5½ lbs./100 gallons.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication and 4 sub-plots/main-plot. (b) N.A. (iii) 4 (iv) (a) 11'×5'. (b) 10'×4'. (v) 1' allround. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Blast attack. Control measures as per treatments. (iii) Neck infected earheads and total no. of earheads from small sample areas of 2'×2' yield in oz./plot. (iv) (a) 1954—N.A. (b) and (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2627 lb./ac. (ii) 111 lb./ac. (b) 103 lb./ac. (iii) Main effect of F and interaction are highly significant (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>F₁</td>
<td>1388</td>
<td>3116</td>
<td>2465</td>
<td>3146</td>
<td>2379</td>
</tr>
<tr>
<td>F₂</td>
<td>1286</td>
<td>3025</td>
<td>2662</td>
<td>3267</td>
<td>2560</td>
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<tr>
<td>F₃</td>
<td>1376</td>
<td>3222</td>
<td>2949</td>
<td>3418</td>
<td>2741</td>
</tr>
<tr>
<td>Mean</td>
<td>1417</td>
<td>3121</td>
<td>2692</td>
<td>3277</td>
<td>2627</td>
</tr>
</tbody>
</table>
S.E. of difference of two
1. F marginal means 39.2 lb. ac.
2. T marginal means 42.9 lb. ac.
3. T means at the same level of F 74.2 lb. ac.
4. F means at the same level of T 75.3 lb. ac.

Crop: Paddy (Kharif).

Object: To study the effect of fungicidal spray on the incidence of blast on Paddy.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) 14.7.1955-17.8.1955. (iv) (a) 6 ploughings with country plough 4" to 6" deep. (b) Transplanted. (c) N.A. (d) 6" x 6". (e) 2 seedlings hole. (v) 40 lb./ac. of N as A/S and 30 lb./ac. of P, O, as Super. (vi) CO-13 N.A. (vii) N.A. (viii) 2 weedicings. (ix) and (x) N.A.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 54(20) on page 109.

4. GENERAL:
   (i) N.A. (ii) Attack of blast : control measures as per treatments. (iii) Neck infected ear-heads. total no. of ear-heads and grain yield. (iv) 1954-1955. (b) Yes. (c) Nil. (a) and (b) Nil. (x) and (xi) Nil.

5 RESULTS:
   (i) 3074 lb. ac. (ii) (a) 454 lb. ac. (b) 234 lb. ac. (iii) Only interaction F x T is highly significant. (iv) Av. yield of grain in lb./ac.

   \[
   \begin{array}{cccc|c}
   & T_0 & T_1 & T_2 & T_3 & \text{Mean} \\
   F_1 & 2087 & 3660 & 2813 & 3388 & 2987 \\
   F_2 & 2148 & 3025 & 2889 & 3660 & 2390 \\
   F_3 & 2178 & 3660 & 3237 & 4144 & 3301 \\
   \hline
   \text{Mean} & 2138 & 3448 & 2980 & 3731 & 3074 \\
   \end{array}
   \]

S.E. of difference of two
1. F marginal means 160 lb. ac.
2. T marginal means 96 lb. ac.
3. T means at the same level of F 165 lb. ac.
4. F means at the same level of T 215 lb. ac.

Crop: Paddy (Rabi).

Object: To induce drought resistance in Paddy by plant extracts and hormones and test under different intervals of irrigation.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Sandy loam. (b) N.A. (iii) 20.1.1959-24.2.1959. (iv) a N.A. (b) Transplanted. (c) N.A. (d) 6" x 6". (e) N.A. (v) 5000 lb. ac. of F.Y.M. before puddling. (vi) N-136 (early). (vii) As per treatments. (viii) Hand weeding. (ix) 0.93". (x) 28.4.1959.
2. TREATMENTS:

Main-plot treatments:
3 irrigations: I1 = Irrigation every day, I2 = Irrigation at 7 days interval and I3 = Irrigation at 10 days interval.

Sub-plot treatments:
6 plant extracts: E0 = Control, E1 = Nicotinic acid 100 ppm, E2 = Riboflavin 100 ppm, E3 = Root of Ipomoea bilobata, E4 = Stem of Ipomoea bilobata and E5 = Leaf of Ipomoea bilobata.

3. DESIGN:
(i) Split-plot. (ii) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 11 X 11'. (b) 10' X 10'. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Not lodged. (ii) Attack of case-worm and stem-borer; Endrine sprayed. (iii) Tiller height, weight of grain and straw. (iv) (a) 1958—N.A. (b) and (c) Nil. (v) (a) and (b) Nil. (vi) Yes. (vii) Nil.

5. RESULTS:
(i) 851 lb./ac. (ii) (a) 353 lb./ac. (b) 261 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>E0</th>
<th>E1</th>
<th>E2</th>
<th>E3</th>
<th>E4</th>
<th>E5</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>749</td>
<td>796</td>
<td>791</td>
<td>786</td>
<td>768</td>
<td>796</td>
<td>815</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. I marginal means = 137 lb./ac.
2. E marginal means = 151 lb./ac.
3. E means at the same level of I = 261 lb./ac.
4. I means at the same level of E = 275 lb./ac.

Crop :- Paddy (Rabi).  
Site :- Agri. Res. Sta., Bhubaneswar.  
Ref :- Or. 59(20).  
Type :- 'DI'.

Object :- To induce drought resistance in Paddy by plant extracts and harm ones and test under different intervals of irrigation.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Fallow. (c) Nil. (ii) (a) Sandy loam. (b) N.A. (iii) 20.12.1955/27.1.1960. (iv) (a) 4 ploughings with country plough. (b) Transplanted. (c) 20 lb./ac. (d) 9" X 9". (e) 4. (v) 5000 lb./ac. of F.Y.M. just before final puddling and 20 lb./ac. of P2O5 as Super. (vi) N—136 (early). (vii) As per treatments. (viii) 2 weedings by hand and 2 by Japanese weeder. (ix) N.A. (x) 15.4.1960.

2. TREATMENTS:
Main-plot treatments:
4 durations of irrigations: I1 = Every day, I2 = At 7 days, I3 = At 11 days and I4 = At 15 days interval.

Sub-plot treatments:
6 plants extracts: E0 = Control, E1 = Nicotinic acid, E2 = Riboflavin, E3 = Root of Ipomoea bilobata, E4 = Stem of Ipomoea bilobata and E5 = Leaf of Ipomoea bilobata.

3. DESIGN:
(i) Split-plot. (ii) 4 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 24' X 18'. (b) 22' X 16'. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Average. (ii) Attack of stem-borer; Endrine sprayed. (iii) Tiller height, weight of grain and straw. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.
5. **RESULTS:**

(i) 748 lb./ac. (ii) (a) 480 lb./ac. (b) 116 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>E₀</th>
<th>E₁</th>
<th>E₂</th>
<th>E₃</th>
<th>E₄</th>
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<td>659</td>
<td>733</td>
<td>645</td>
<td>711</td>
<td>594</td>
<td>666</td>
<td>668</td>
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<td>I₃</td>
<td>623</td>
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<td>499</td>
<td>733</td>
<td>499</td>
<td>440</td>
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<td>I₄</td>
<td>792</td>
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<td>645</td>
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<tr>
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<td>832</td>
<td>814</td>
<td>691</td>
<td>753</td>
<td>685</td>
<td>711</td>
<td>748</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. I marginal means = 196 lb./ac.
2. E marginal means = 58 lb./ac.
3. E means at the same level of I = 116 lb./ac.
4. I means at the same level of E = 223 lb./ac.

**Crop:** Wheat (*Rabi*).

**Site:** Agri. Res. Sta., Bhubaneswar.

**Ref:** Or. 56(32).

**Type:** 'M'.

Object: To find the effect of trace elements and potash on the yield of Wheat.

1. **BASAL CONDITIONS:**

(i) (a) Nil. (b) Fallow in *kharif*. (c) Nil. (ii) (a) Sandy loam. (b) N.A. (iii) 29.11.1956. (iv) (a) Three ploughings 1st with mould board plough and then with *dehi* plough to 3'-4' depth, twice laddering.

(b) Line sowing. (c) N.A. (d) 9' between rows. (e) Nil. (v) 20 lb./ac. of N as A/S, 20 lb./ac of P₂O₅ as Super. (vi) N.P.-710. (vii) Irrigated. (viii) Hoeing and weeding. (ix) 2.7Y. (x) 9.3.1957.

2. **TREATMENTS:**

1/8 of all combinations of (1) to (8) each at 2 levels.

(1) MgSO₄ at A₀ = 0 and A₁ = 224 lb./ac. (5) CuSO₄ at E₀ = 0 and E₁ = 20 lb./ac.

(2) FeSO₄ at B₀ = 0 and B₁ = 100 lb./ac. (6) Borax at F₀ = 0 and F₁ = 10 lb./ac. of borax.

(3) MnSO₄ at C₀ = 0 and C₁ = 80 lb./ac. (7) Sodium Molybdate at G₀ = 0 and G₁ = 2 oz./ac. of Molybdenum.

(4) ZnSO₄ at D₀ = 0 and D₁ = 25 lb./ac. (8) K₂SO₄ at K₀ = 0 and K₁ = 20 lb./ac. of K₂O.

3. **DESIGN:**

(i) 1/8 fractional replicate 2⁸ fact. confd. (ii) (a) 8. (b) N.A. (iii) 1/8 replicate. (iv) (a) 1/100 acre. (b) 1/105 acre. (v) One row around. (vi) Yes.

4. **GENERAL:**

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

5. **RESULTS:**

(i) 319.8 lb./ac. (ii) 96.64 lb./ac. (iii) None of the effects is significant. (iv) Mean response in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean resp.</td>
<td>6.61</td>
<td>82.13</td>
<td>58.72</td>
<td>20.44</td>
<td>-6.61</td>
<td>10.81</td>
<td>44.49</td>
<td>13.51</td>
</tr>
<tr>
<td>S.E. of mean resp.</td>
<td>-24.16 lb./ac.</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**Crop:** Wheat (*Rabi*).

**Site:** Agri. Res. Sta., Bhubaneswar.

**Ref:** Or. 57(33).

**Type:** 'M'.

Object: To find the effect of trace elements and potash on wheat crop.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy T—141 in kharif. (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 28.11.1957. (iv) (a) 3 ploughings first with mould board plough and subsequently with deshi plough to 3"-4" depth, twice laddering. (b) Sowing in lines. (c) N.A. (d) 9" spacing between lines. (e) Nil. (v) 20 lb./ac. of N as A/S and 20 lb./ac. of P2O5 as Super. (vi) N.P.—710. (vii) Irrigated. (viii) 2 weedings. (ix) 5.12'. (x) 17.2.1958.

2. TREATMENTS:
   Same as in expt. no. 56(31) on page 112.

3. DESIGN:
   (i) 1/8 fractional replicate of 2^8 fact. confd. (ii) (a) 8. (b) N.A. (iii) 1/8th replicate. (iv) (a) 29'x15'. (b) 27'x13'. (v) One row alround. (vi) Yes.

4. GENERAL:
   (i) Average. (ii) N.A. (iii) Yield of grain. (iv) (a) 1956—1957. (b) N.A. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 349.7 lb./ac. (ii) 144.9 lb./ac. (iii) None of the effects is significant. (iv) Mean response in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>K</th>
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<tbody>
<tr>
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<td>33.75</td>
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<td>8.77</td>
<td>-10.59</td>
<td>2.32</td>
<td>64.69</td>
<td>-58.33</td>
<td>61.91</td>
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<tr>
<td>S.E. of mean response</td>
<td>=36.2 lb./ac.</td>
<td></td>
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</tbody>
</table>

Crop: wheat (Rabi).

Ref: Or. 56(34).


Type: ‘M’.

Object:—To study the most suitable time of application of N obtained from different sources.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) Nil. (ii) (a) Sandy loam. (b) N.A. (iii) 20.21.11.1956. (iv) (a) 3 ploughings with mould board and deshi plough to 3"-4" depth and two laddering. (b) Line sowing. (c) N.A. ‘d’ 9" between lines (v) F.Y.M at 5000 lb./ac. and P2O5 at 20 lb./ac. as Super. (vi) N.P.—710. (vii) Irrigated (viii) Hoeing and weeding. (ix) 2.77'. (x) 7.8.3.1957.

2. TREATMENTS:
   All combinations of (1), (2) and (3) + 1 control in each block.
   (1) 2 levels of N : N1 =20 and N2 =40 lb./ac.
   (2) 3 sources of N : S1 =A/S, S2 =A/N and S3 =Urea.
   (3) 3 times of application of N : T1 =At sowing, T2 =At 1st irrigation and T3 =Half at sowing+half at 1st irrigation.

3. DESIGN:
   (i) 3^8 x 2^3 confd. (ii) (a) 3 blocks/replication ; 6 treatments+1 control/block. (b) N.A. (iii) 4. (iv) (a) 36'-6" x 13'. (b) 35' x 11'. (v) One row alround. (vi) Yes.

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

5. RESULTS:
   (i) 527.1 lb./ac. (ii) 125.8 lb./ac. (iii) Control vs others alone is significant. (iv) Av. yield of grain in lb./ac.
Control—456.2 lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>$S_1$</th>
<th>$S_2$</th>
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<td>509.8</td>
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<tr>
<td>$T_3$</td>
<td>545.5</td>
<td>573.2</td>
<td>602.2</td>
<td>568.3</td>
<td>555.9</td>
<td>618.0</td>
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</table>

Mean

S.E. of $S$ or $T$ marginal mean
S.E. of $N$ marginal mean
S.E. of body of $S \times T$ table
S.E. of body of $S \times N$ or $T \times N$ table

Crop—Wheat (Rabi).
Ref—Or. 54(16).
Type—‘M’.

Object—To study the effect of different sources of $P_{2}O_{5}$ on the yield of Wheat.

1. BASAL CONDITIONS:
   (i) a) No. (b) and (c) N.A. (d) Clay. (b) N.A. (e) 2.11.1954. (f) a) 6 ploughings with country plough to 4"-6" depth followed by laddering. (b) In furrows. (c) 70 lb./ac. (d) Between rows. (e) N.A. (f) Nil. (g) N.P.—775. (h) Irrigated. (i) Nil. (j) N.A. (k) 0.18. (l) Yes.

2. TREATMENTS:
   1. No $P_{2}O_{5}$.
   2. 40 lb./ac. of $P_{2}O_{5}$ as Super.
   3. 40 lb./ac. of $P_{2}O_{5}$ as raw bone meal.
   4. 40 lb./ac. of $P_{2}O_{5}$ as steamed bone meal.
   $P_{2}O_{5}$ applied on 2.11.1954.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 22’.X11’. (b) 20’X9’. (v) 1’X1’. (vi) Yes.

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

5. RESULTS:
   (i) 2391 lb./ac. (ii) 264.0 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in lb./ac.

   Treatment 1 2 3 4
   Av. yield 2284 2405 2594 2282
   S.E./mean — 118.0 lb./ac.

Crop—Wheat (Kharif).
Ref—Or. 55(10).
Type—‘M’.

Object—To find out the best combination of manures and fertilizers for Wheat crop.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) 3.11.1955. (iv) (a) 6 ploughings to 4"—6" depth with country plough followed by laddering. (b) In furrows. (c) 70 lb./ac. (d) Between rows 5'. (e) Nil. (v) Nil. (vi) N.P.—76L. (vii) Irrigated. (viii) Gap-filling on 14.11.1955. (ix) 67.97". (x) 23.2.1956.

2. TREATMENTS:
   Main-plot treatments:
   2 organic manures to supply 10 lb./ac. of N : M1=F.Y.M. and M2=Groundnut cake.

   Sub-plot treatments:
   All combinations of (1) and (2)
   (1) 3 levels of N as A/S : N0=0, N1=20 and N2=40 lb./ac.
   (2) 2 levels of P2O5 as Super : P0=0 and P1=40 lb./ac.
Manures applied on 3.11.1955.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/block ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 30'x7' ; (b) 30'x6'. (v) One row on either side. (vi) Yes.

4. GENERAL:
   (i) Crop in many plots lodged due to rain and wind. (ii) N.A. (iii) Height, no. of effective tillers per hill, length of earhead and grain yield. (iv) (a) 1955—not contd. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1491 lb./ac. (ii) (a) 704.5 lb./ac. (b) 315 lb./ac. (iii) Effect of N alone is highly significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>Mean</th>
<th>P0</th>
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<td>1554</td>
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<tr>
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<td>1728</td>
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<td>1568</td>
<td>1733</td>
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</table>

S.E. of difference of two
1. M marginal means =203.4 lb./ac. 5. M means at the same level of N=240.5 lb./ac.
2. N marginal means =111.4 lb./ac. 6. P means at the same level of M=128.6 lb./ac.
3. P marginal means =50.9 lb./ac. 7. M means at the same level of P =222.8 lb./ac.
4. N means at the same level of M =157.5 lb./ac. S.E. of body of N x P table =111 4 lb./ac.

Crop :—Wheat (Rabi).  
Ref :- Or. 56(22).  
Type :- ‘M’

Object :—To evolve a suitable manurial dose for Wheat.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Tomato. (c) Nil. (ii) (a) Clay. (b) N.A. (iii) 17.11.1956. (iv) (a) 6 ploughings to 4"—6" depth by country plough followed by laddering. (b) In furrows. (c) 84.6 lb./ac. (d) Between rows 9'. (e) Nil. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) 3 weedings. (ix) 4.88". (x) 24.3.1957.

2. TREATMENTS:
   Main-plot treatments:
   2 organic manures to supply 10 lb./ac. of N : M1=F.Y.M. and M2=G.N.C.+t control (M0).

   Sub-plot treatments:
   All combinations of (1) and (2)
   (1) 3 levels of N as A/S : N0=0, N1=20 and N2=40 lb./ac.
   (2) 2 levels of P2O5 as Super : P0=0 and P1=40 lb./ac.
Manures applied on 17.11.1956 and A/S applied on 17.12.1956.
3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/block; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 30'×7'1. (b) 29'×6'. (v) 6'×9'. (vi) Yes.

4. GENERAL:
(i) Rep. IV damaged by rats upto about 10%. (ii) Nil. (iii) Grain yield. (iv) (a) and (b) No. (c) Nil. (v) (a) and (b); Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 920 lb./ac. (ii) (a) 255.3 lb./ac. (b) 170.0 lb./ac. (iii) Main effect of M is significant. Effect of N is highly significant. Others are not 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>P0</th>
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<td>966</td>
<td>1207</td>
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</tr>
</tbody>
</table>

S.E. of difference of two
1. M marginal means =73.7 lb./ac. 5. M means at the same level of N =101.2 lb./ac.
2. N marginal means =49.1 lb./ac. 6. P means at the same level of M = 69.4 lb./ac.
3. P marginal means =40.1 lb./ac. 7. M means at the same level of P = 88.5 lb./ac.
4. N means at the same level of M =85.0 lb./ac. S.E. of body of N×P table = 49.1 lb./ac.

CROP: Wheat (Rabi).
Ref: Or. 58(8).
Type: 'M'.

Object: To study the suitable time of application of N to Wheat crop.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Fallow. (c) Nil. (i) (a) Clay loam. (b) N.A. (iii) 19.12.1958 (iv) (a) 6 ploughings by country plough to 4"—6" depth followed by laddering. (b) In furrows. (c) 70 lb/ac. (d) 9" between rows. (e) N.A. (v) 12 C.L./ac. of F.Y.M. (vi) N.P.—799. (vii) Irrigated. (viii) Flowering and weeding. (ix) N.A. (x) 23.3.1959.

2. TREATMENTS:
All combinations of (1) and (2) + a control.
(2): 3 times of application: T1—Full dose at planting. T2—Full dose 15 days after planting and T3—dose at planting + dose 15 days after planting.
Amount of dose is N.A.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 15'-9"×15'. (b) 14'×13'-5'. (v) 1 row around the net plot. (vi) Yes.

4. GENERAL:
(i) Nil. (ii) Brown rust attack. (iii) Height of plants, tillers/hill, length of earhead and grain yield. (iv) (a) 1958—contd. (b) and (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 1511 lb./ac. (ii) 254 lb./ac. (iii) Treatment vs. control is highly significant. (iv) Av. yield of grain in lb./ac.
Control = 825 lb./ac.

<table>
<thead>
<tr>
<th></th>
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<th>T₂</th>
<th>T₃</th>
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<td>Mean</td>
<td>1613</td>
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<td>1588</td>
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</table>

S.E. of marginal mean of S or T = 73.3 lb./ac.
S.E. of body of table = 127.0 lb./ac.

**Crop:** Wheat (Rabi).

**Site:** Agri. Res. Stn., Sambalpur.

**Object:** To find out a suitable source of N and its time of application to Wheat.

1. **BASAL CONDITIONS:**
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Clay. (b) N.A. (iii) 16.11.1959. (iv) (a) 6 ploughings, 4 ladders and breaking of clods. (b) Line sowing. (c) 35 sr./ac. (d) 9" between rows. (e) N.A. (v) 10 C.L./ac. of F.Y.M. (vi) N.P.—799. (vii) Irrigated. (viii) Hoeing on 11.12.1959 to 14.12.1959. (ix) 2.82". (x) 1.3.1960.

2. **TREATMENTS:**
   All combinations of (1) and (2)+a control.
   (1) 3 sources of 40 lb./ac. of N : S₁ = A/S, S₂ = C.A.N. and S₃ = Urea.
   (2) 3 times of application : T₁ = Full dose at sowing. T₂ = Full dose one month after sowing and T₃ = $\frac{1}{2}$ dose at sowing and $\frac{1}{2}$ dose one month after sowing.

Manures applied on 15.12.1959. Amount of N applied N.A.

3. **DESIGN:**
   (i) Fact. in R.B.D. (ii) (a) 10. (b) 79'×32'. (iii) 4. (iv) (a) 15"×9', (b) 14'×14', (v) 9"×6'. (vi) Yes.

4. **GENERAL:**
   (i) Good. (ii) Dusting with Gammexane against jassids. (ii) Yield of grain. (iv) (a) 1958—cond. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. **RESULTS:**
   (i) 1964 lb./ac. (ii) 277 lb./ac. (iii) Control vs others effect is highly 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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<tr>
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<td>1969</td>
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<td>2060</td>
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</table>

S.E. of marginal mean of S or T = 80.0 lb./ac.
S.E. of body of table = 138.5 lb./ac.

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**Ref.** Or. 59(15).

**Type:** ‘M’.
Crop: Wheat (Rabi).

Object: To find out suitable manurial doses for Wheat crop.

1. BASAL CONDITIONS:
(i) (a) Wheat—Paddy. (b) Paddy. (c) 5000 lb./ac. of F.Y.M., 20 lb./ac. of N as A/S and 20 lb./ac. of P\textsubscript{2}O\textsubscript{5} as Super. (ii) (a) Clay loam. (b) N.A. (iii) 9.12.1959. (iv) (a) 4 ploughings and 2 laddering. (b) Sown in lines. (c) 1 md./ac. (d) 9" between rows. (e) N.A. (v) Nil. (vi) N.P.—799. (vii) Irrigated. (viii) Hosing from 15 to 18.1.1960. (ix) 2.82". (x) 25.3.1960.

2. TREATMENTS:
All combinations of (1) and (2).
(1) 3 levels of N as A/S: N\textsubscript{0} = 0, N\textsubscript{1} = 20 and N\textsubscript{2} = 40 lb./ac.
(2) 2 levels of P\textsubscript{2}O\textsubscript{5} as Super: P\textsubscript{0} = 0 and P\textsubscript{1} = 30 lb./ac.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 6. (b) 67' X 60'. (iii) 4. (iv) (a) 28' X 21'. (b) 27' X 19'. (v) 6' X 9'. (vi) Yes.

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

5. RESULTS:
(i) 649 lb./ac. (ii) 182 lb./ac. (iii) Effect of P is significant and of N is highly significant. Interaction N\times P is not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
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<th>N\textsubscript{2}</th>
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<td>Mean</td>
<td>385</td>
<td>732</td>
<td>831</td>
<td>649</td>
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</table>

S.E. of marginal mean of N = 64.34 lb./ac.
S.E. of marginal mean of P = 52.53 lb./ac.
S.E. of body of table = 91.00 lb./ac.
3. DESIGN:
(i) R.B.D.  (ii) (a) 13. (b) N.A.  (iii) 3.  (iv) (a) N.A.  (b) 1/100 ac.  (v) N.A.  (vi) Yes.

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

5. RESULTS:
(i) 685 lb./ac.  (ii) 56.3 lb./ac.  (iii) Main effects of S, P and M, and control vs. others effects are highly significant. Interaction P x M is significant. All other effects are not significant.

<table>
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<tr>
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<th>M2</th>
<th>M3</th>
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<tr>
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<td>757</td>
<td>706</td>
<td>707</td>
<td>596</td>
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</table>

S.E. of M marginal mean = 16.3 lb./ac.
S.E. of P or S marginal mean = 13.3 lb./ac.
S.E. of body of M x P or M x S table = 23.0 lb./ac.
S.E. of body of S x P table = 18.8 lb./ac.
S.E. of control mean = 32.5 lb./ac.

Crop: Wheat (Rabi).
Centre: Bolangir (c.f).
Ref: Or. 58(SFT).
Type: 'M'.

Object: Type A—To study the response of Wheat to different levels of N, P2O5 and K2O applied individually and in combinations.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A.  (ii) Red soil.  (iii) Nil.  (iv) N.A.  (v) (a) to (c) N.A.  (vi) Nov.—Dec.  (vii) Irrigated.  (viii) N.A.  (ix) N.A.  (x) April.

2. TREATMENTS:
0 = Control (no manure).
N = 20 lb./ac. of N as A/S.
P = 20 lb./ac. of P2O5 as Super.
NP = 20 lb./ac. of N as A/S + 20 lb./ac. of P2O5 as Super.
K = 20 lb./ac. of K2O as Mur. of Potash.
NK = 20 lb./ac. of N as A/S + 20 lb./ac. of K2O as Mur. of Potash.
PK = 20 lb./ac. of P2O5 as Super + 20 lb./ac. of K2O as Mur. of Potash.
NPK = 20 lb./ac. of N as A/S + 20 lb./ac. of P2O5 as Super + 20 lb./ac. of K2O as Mur. of Potash.

3. DESIGN:
(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one Revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on kharif cereal, 8 on a rabi cereal, 8 on cash crops, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of Type A and the other half of Type B on crops other than the legumes. The three trials on legumes are of Type C. Residual effects of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The above experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) N.A.  (b) 1,50 ac. (iv) Yes.
4. GENERAL:
   (i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) (x) As per design. (b) No. (vi) and (vii) Nil.

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>1061</td>
<td>1753</td>
<td>1456</td>
<td>2065</td>
<td>1794</td>
<td>1794</td>
<td>17 2</td>
<td>2403</td>
</tr>
</tbody>
</table>

G.M. = 1755 lb./ac.; S.E. = 65.2 lb./ac. and no. of trials = 11.

---

Crop: Wheat (Rabi).
Centre: Balasore (c.f.).

Object:—Type A—To study the response of Wheat to different levels of N, P, O3, and K2O applied individually and in combinations.

1. BASAL CONDITIONS:

2. TREATMENTS and 3. DESIGN:
   Same as in expt. no. 58(SFT), Type A on page 119 conducted at Bolangir.

3. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—contd. (b) No. (c) N.A. (v) (x) As per design. (vi) and (vii) Nil.

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>864</td>
<td>1061</td>
<td>905</td>
<td>1193</td>
<td>839</td>
<td>1144</td>
<td>1061</td>
<td>1284</td>
</tr>
</tbody>
</table>

G.M. = 1044 lb./ac.; S.E. = 26.9 lb./ac. and no. of trials = 4.

---

Crop: Wheat (Rabi).
Centre: Kalahandi (c.f.).

Object:—Type A—To study the response of Wheat to different levels of N, P, O3, and K2O applied individually and in combinations.

1. BASAL CONDITIONS:
   Same as in expt. no. 58(SFT), Type A on page 119 conducted at Bolangir.

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

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>765</td>
<td>963</td>
<td>905</td>
<td>1037</td>
<td>1012</td>
<td>1136</td>
<td>1144</td>
<td>1193</td>
</tr>
</tbody>
</table>

G.M. = 1019 lb./ac.; S.E. = 51.2 lb./ac. and no. of trials = 4.

---

Crop: Wheat (Rabi).
Centre: Kalahandi (c.f.).

Object:—Type A—To study the response of wheat to different levels of N, P, O3, and K2O applied individually and in combinations:
1. **BASAL CONDITIONS** to 3. **DESIGN**:
Same as in expt. no. 58 (SFT) Type A on page 119 conducted at Bolangir.

4. **GENERAL**:
(i) Poor. (ii) N.A. (iii) Grain yield. (iv) (a) 1958—contd. (b) No. (c) N.A. (v) As per design. (vi) and (vii) Nil.

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>428</td>
<td>560</td>
<td>510</td>
<td>634</td>
<td>485</td>
<td>617</td>
<td>568</td>
<td>806</td>
</tr>
</tbody>
</table>

G.M. = 776 lb./ac.; S.E. = 192 lb./ac. and no. of trials = 3.

**Crop:** Wheat (Rabi).

**Centre:** Mayurbhanj (c.f.).

**Ref:** Or. 58 (SFT).

Type: 'M'.

Object:—Type A—To study the responses of Wheat to different levels of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O applied individually and in combinations.

1. **BASAL CONDITIONS**:
(i) (a) to (e) N.A. (ii) Red. (iii) Nil. (iv) N.A. (v) (a) to (c) N.A. (vi) Nov.—Dec. (vii) 7 trials irrigated while 2 unirrigated. (viii) N.A. (ix) N.A. (x) April.

2. **TREATMENTS** to 4. **GENERAL**:
Same as in expt. no. 58 (SFT) Type A on page 119 conducted at Bolangir.

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>2189</td>
<td>2757</td>
<td>2929</td>
<td>3604</td>
<td>2781</td>
<td>3275</td>
<td>3201</td>
<td>4328</td>
</tr>
</tbody>
</table>

G.M. = 3132 lb./ac.; S.E. = 101.8 lb./ac. and no. of trials = 9.

**Crop:** Wheat (Rabi).

**Centre:** Mayurbhanj (c.f.).

**Ref:** Or. 59 (SFT).

Type: 'M'.

Object:—Type A—To study the response of Wheat to levels of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O applied individually and in combinations.

1. **BASAL CONDITIONS** to 4. **GENERAL**:
Same as in expt. no. 58 (SFT) Type A on page 119 conducted at Bolangir.

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>1572</td>
<td>2543</td>
<td>2436</td>
<td>3752</td>
<td>2279</td>
<td>3423</td>
<td>3579</td>
<td>4345</td>
</tr>
</tbody>
</table>

G.M. = 2991 lb./ac.; S.E. = 64.4 lb./ac. and no. of trials = 7.

**Crop:** Wheat (Rabi).

**Centre:** Sambalpur (c.f.).

**Ref:** Or. 58 (SFT).

Type: 'M'.

Object:—Type A—To study the response of Wheat to different levels of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O applied individually and in combinations.
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Red and black.  (iii) Nil.  (iv) (a) to (e) N.A.  (v) Nov.—Dec.  (vi) 8 trials irrigated and 4 unirrigated.  (vii) N.A.  (ix) N.A.  (x) April.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 58 (SFT) Type A on page 119 conducted at Bolangir.

4. GENERAL:
   (i) Normal.  (ii) Nil.  (iii) Grain yield.  (iv) (a) 1958—contd.  (b) No.  (c) N.A.  (d) N.A.  (e) and (f) Nil.

5. RESULTS:

   Treatment 0 n p np k nk ps npk
   Av. yield 452.6 526.6 584.2 715.9 740.6 732.3 880.5
   G.M. = 656.2 lb./ac.; S.E. = 27.9 lb./ac. and no. of trials = 12.

---

Crop: Wheat (Rabi).
Centre: Bolangir (c.f.).
Ref: Or. 58 (SFT).
Type: 'M'.

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

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Red soil.  (iii) Nil.  (iv) (a) to (e) N.A.  (v) Nov.—Dec.  (vi) Irrigated.
   (vii) N.A.  (ix) N.A.  (x) April.

2. TREATMENTS:

   Treatment 0 20 lb./ac. of N as Urea.
   1 40 lb./ac. of N as AS.N.
   2 20 lb./ac. of N as AS.N.
   3 20 lb./ac. of N as C.A.N.

3. DESIGN and 4. GENERAL:
   Same as in exp. no. 58 (SFT). Type A on page 119 conducted at Bolangir.

5. RESULTS:

   Treatment 0 20 lb./ac. of N as Urea.
   1 40 lb./ac. of N as AS.N.
   2 20 lb./ac. of N as AS.N.
   3 20 lb./ac. of N as C.A.N.

   Av. yield 691 1119 1243 1243 1362 1275 15 lb.
   G.M. = 1200 lb./ac.; S.E. mean = 45.4 lb./ac. and no. of trials = 11.

---

Crop: Wheat (Rabi).
Centre: T'lasore (c.f.).
Ref: Or. 59 (SFT).
Type: 'M'.

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

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A.  (ii) Saltine.  (iii) Nil.  (iv) (a) to (e) N.A.  (v) Nov.—Dec.  (vi) Irrigated.
   (vii) N.A.  (ix) N.A.  (x) April.

2. TREATMENTS:

   Treatment 0 Control (no manure).
   1 20 lb./ac. of N as AS.N.
   2 20 lb./ac. of N as C.A.N.
n' = 40 lb./ac. of N as Urea.
n'' = 20 lb./ac. of N as C.A.N.
n''' = 40 lb./ac. of N as C.A.N.

3. DESIGN and 4. GENERAL:
Same as in expt. no. 58 (SFT) Type A on page 119 conducted at Bolangir.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n'</th>
<th>n''</th>
<th>n'''</th>
<th>n'’’</th>
<th>n’’’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>823</td>
<td>963</td>
<td>1259</td>
<td>1037</td>
<td>1193</td>
<td>913</td>
</tr>
</tbody>
</table>

G.M. = 1039 lb./ac.; S.E./mean = N.A. and no. of trials = 4.

Crop : Wheat (Rabi).
Centre : Kalahandi (c.f.).
Ref : Or. 58(SFT).
Type : ‘M’.

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

1. BASAL CONDITIONS to 4. GENERAL:
Same as in expt. no. 58(SFT) Type B on page 122 conducted at Bolangir.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n'</th>
<th>n''</th>
<th>n'''</th>
<th>n'’’</th>
<th>n’’’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>510.1</td>
<td>938.1</td>
<td>789.9</td>
<td>872.2</td>
<td>757.0</td>
<td>896.9</td>
</tr>
</tbody>
</table>

G.M. = 802.9 lb./ac.; S.E./mean = 27.3 lb./ac. and no. of trials = 4.

Crop : Wheat.
Centre : Mayurbhanj (c.f.).
Ref : Or. 58(SFT).
Type : ‘M’.

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

1. BASAL CONDITIONS to 4. GENERAL:
Same as in expt. no. 58(SFT) Type B on page 122 conducted at Bolangir.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n'</th>
<th>n''</th>
<th>n'''</th>
<th>n'’’</th>
<th>n’’’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1506</td>
<td>1802</td>
<td>2181</td>
<td>2378</td>
<td>2576</td>
<td>2172</td>
</tr>
</tbody>
</table>

G.M. = 2194 lb./ac.; S.E./mean = 225.8 lb./ac. and no. of trials = 6.

Crop : Wheat.
Centre : Mayurbhanj (c.f.).
Ref : Or. 59(SFT).
Type : ‘M’.

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

1. BASAL CONDITIONS to 4. GENERAL:
Same as in expt. no. 58(SFT) Type B on page 122 conducted at Bolangir.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n'</th>
<th>n''</th>
<th>n'''</th>
<th>n'’’</th>
<th>n’’’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1769</td>
<td>2222</td>
<td>2699</td>
<td>2312</td>
<td>2337</td>
<td>2427</td>
</tr>
</tbody>
</table>

G.M. = 2339 lb./ac.; S.E./mean = N.A. and no. of trials = 4.
Crop: Wheat.  
Centre: Sambalpur (c.f.).

Object: Type B—To investigate the relative efficiency of different nitrogen fertilizers at different doses on Wheat.

1. **BASAL CONDITIONS**:

2. **TREATMENTS to 4. GENERAL**:
   Same as in exp. no. 58(SFT): Type B on page 122 conducted at Bolangir.

5 **RESULTS**:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>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>477.2</td>
<td>567.8</td>
<td>533.6</td>
<td>748.8</td>
<td>641.8</td>
<td>701.7</td>
</tr>
</tbody>
</table>

G.M. = 653.1 lb./ac.; S.E. = 70.85 lb./ac. and no. of trials = 3.

Crop: Wheat.  
Centre: Kalahandi (c.f.).

Object: Type I—To study the effect of different levels and sources of N on Wheat.

1. **BASAL CONDITIONS**:
   (i) (a) to (c): N.A. (ii) Red loam—clay to clay loam, pH 7.0. (iii) Nil. (iv) N.A. (v) to (c): N.A. (vi) Nov.—Dec. (vii) Irrigated and unirrigated conditions. (viii) to (c): N.A. (ix) Apr.

2. **TREATMENTS**:
   0 Control no manure.
   N<sub>1</sub> = 20 lb./ac. of N as A.S.
   N<sub>2</sub> = 40 lb./ac. of N as A.S.
   N<sub>3</sub> = 20 lb./ac. of N as Urea.
   N<sub>4</sub> = 40 lb./ac. of N as Urea.

3. **DESIGN**:
   (i) and (ii): Eleven community project centres, representing the entire wheat 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 wheat 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) and (c): N.A. (iv) Yes,

4. **GENERAL**:
   (i) Satisfactory. (ii) Nil. (iii) Nil. (iv) Nil. (v) to (c): N.A. (vi) and (vii) Nil.

5. **RESULTS**:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>351</td>
<td>658</td>
<td>846</td>
<td>710</td>
</tr>
</tbody>
</table>

G.M. = 640 lb./ac.; S.E. = 70.85 lb./ac. and no. of trials = 5.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;2&lt;/sub&gt;</th>
<th>N&lt;sub&gt;3&lt;/sub&gt;</th>
<th>N&lt;sub&gt;4&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>343.1</td>
<td>664.9</td>
<td>827.8</td>
<td>678.9</td>
</tr>
</tbody>
</table>

G.M. = 637.7 lb./ac.; S.E. = 58.34 lb./ac. and no. of trials = 3.
1. **BASAL CONDITIONS**:
   (i) to (c) N.A.  (ii) Red loam—clay to clay loam; pH 7.0. (iii) Nil. (iv) N.A.  (v) Nov.—Dec. (vi) (a) to (e) N.A.  (vii) Irrigated and unirrigated conditions. (viii) and (ix) N.A.  (x) April.

2. **TREATMENTS**:
   0 = Control (no manure).
   P1 = 20 lb. fac. 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 Urea.
   P1N2' = 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 Urea.

3. **DESIGN and GENERAL** :
   Same as in expt. no. 54(TCM) Type I on page 124 conducted at Kalahandi.

5. **RESULTS**:
   Irrigated
<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>P1</th>
<th>P1N1</th>
<th>P1N2</th>
<th>P1N1'</th>
<th>P1N2'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td></td>
<td>372.8</td>
<td>529.9</td>
<td>845.9</td>
<td>843.4</td>
<td>623.7</td>
</tr>
</tbody>
</table>
   | G.M. = 648.7 lb. ac. | S.E. = 45.67 lb. ac. and no. of trials = 4.

   Unirrigated
<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>P1</th>
<th>P1N1</th>
<th>P1N2</th>
<th>P1N1'</th>
<th>P1N2'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td></td>
<td>353.8</td>
<td>596.6</td>
<td>794.9</td>
<td>831.1</td>
<td>683.8</td>
</tr>
</tbody>
</table>
   | G.M. = 662.4 lb. ac. | S.E. = 45.50 lb. ac. and no. of trials = 5.

---

**Crop :- Wheat (Rabi).**

**Ref :- Or. 58(9).**

**Site :- Agri. Res. Stn., Sambalpur.**

**Type :- 'G'.**

Object :- To determine the optimum spacing and seed rate for Wheat crop.

1. **BASAL CONDITIONS**:
   (i) (a) Nil. (b) Dhaincha. (c) Nil. (ii) (a) Clay loam. (b) N.A.  (iii) 1.12.1958. (iv) (a) 6 p'oughings by country plough to 4"—6" depth each time followed by laddering. (b) In furrows. (c) and (d) As per treatments. (e) Nil. (v) 6 C.L.ac. of F.Y.M., 20 lb. ac. of N as C.A.N. and 32 lb. ac. of P2O5 as Super. (vi) N.P.—797. (vii) Irrigated. (viii) Weeding and top-dressing. (ix) N.A.  (x) 9.3.1959.

2. **TREATMENTS**:
   All combinations of (1) and (2)
   (1) 3 spacings: S1=4", S2=6" and S3=9".
   (2) 3 seed rates: R1=50, R2=70 and R3=90 lb. ac.

3. **DESIGN**:
   (i) Fact. in R.B.D. (ii) (a) 9. (b) N.A.  (iii) 4. (iv) (a) 18' x 9'. (b) 16' x 8', 16' x 8' and 16' x 7' for spacings S1, S2 and S3 respectively. (v) 1 row around the net plot. (vi) Yes.

4. **GENERAL**:
   (i) Lodged. (ii) N.A.  (iii) Height, tillers/hill, length of earhead and grain yield. (iv) (a) 1358—N.A. (b) and (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. **RESULTS**:
   (i) 1190 lb. ac. (ii) 220 lb. ac.  (iii) None of the effects is significant. (iv) Av. yield of grain in lb. ac.
Object: Type VIII—To study the effect of N and P2O5 along with different seed rates and sowing dates on Wheat.

1. BASAL CONDITIONS:
   (a) to (c) N.A. (ii) Red loam. (b) N.A. (iii) As per treatments. (iv) a and b N.A. (v) As per treatments. (d) and (e) N.A. (v) N.A. (vi) N.A. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   (1) 3 seed rates: R1 50, R2 70 and R3 90 lb. ac.

   Sub-plot treatments:
   (1) 3 levels of N as A/S: N0 0, N1 20 and N2 40 lb. ac.
   (2) 3 levels of P2O5 as Super: P0 0, P1 20 and P2 40 lb. ac.

3. DESIGN:
   (i) Split-plot. (ii) (a) 9 main-plots/block: 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) A N.A. (b) 32 × 15.5". (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Below normal. (ii) N.A. (iii) Grain yield. (iv) a to c No. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 378 lb. ac. (ii) (a) 203.4 lb./ac. (b) 83.5 lb./ac. (iii) Main effects of D, N and P and interaction N×P are highly significant. Interactions D×N and D×P are significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>P0</th>
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<th>P2</th>
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<td>237</td>
<td>278</td>
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</tbody>
</table>
S.E. of difference of two
1. D or S marginal means = -39.1 lb./ac.
2. N or P marginal means = 16.1 lb./ac.
3. N or P means at the same level of D or S = 27.8 lb./ac.
4. D or S means at the same level of N or P = 45.2 lb./ac.
5. means in the body of D x S table = 67.8 lb./ac.
6. means in the body of N x P table = 27.8 lb./ac.

Crop :- Wheat (Rabi).
Site :- M.A.E. Farm, Barpalli.
Ref :- Or. 57(MAE).
Type :- 'IM'.
Object :- Type I—To study the direct response of nitrogen, phosphate and irrigation on Wheat.

1. BASAL CONDITIONS :
(iv) (a) 3 ploughings after rain. (b) N.A. (c) 60 lb./ac. (d) and (e) N.A. (v) 5,000 lb./ac. of F.Y.M.
(vi) N.A. (vii) As per treatments. (viii) 3 weedings and 3 hoeings. (ix) and (x) N.A.

2. TREATMENTS :
All combinations of (1), (2), (3) and (4)
(1) 3 frequencies of irrigation: L1 = 3, L2 = 4 and L3 = 5.
(2) 3 intensities of irrigation: I1 = 2", I2 = 3" and I3 = 4" per irrigation.
(3) 3 levels of N as A/S : N0 = 0, N1 = 30 and N2 = 60 lb./ac.
(4) 3 levels of P2O5 as Super: P0 = 0, P1 = 30 and P2 = 60 lb./ac.
Fertilizers applied at the time of sowing by broadcasting.

3. DESIGN :
(i) 34 Fact. confid. (ii) (a) 9 plots/block; 9 blocks/replication. (b) N.A. (iii) I. (iv) (a) N.A. (b) 1/100 ac. (v) N.A. (vi) Yes.

4. GENERAL :
(i) Satisfactory. (ii) Mild attack of loose smut and rust. (iii) Grain yield. (iv) (a) 1957—co-std. (b) and (c) N.A. (v) N.A. (vi) Nil. (vii) Slight damage by stray cattle.

5. RESULTS :
(i) 651 lb./ac. (ii) 120.0 lb./ac. (iii) Main effect of L is significant, main effect of N is highly significant. Other effects are not significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>I1</th>
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<td>642</td>
<td>650</td>
<td>597</td>
<td>675</td>
<td>650</td>
<td>672</td>
<td>586</td>
<td>664</td>
<td>641</td>
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<tr>
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<td>742</td>
<td>672</td>
<td>744</td>
<td>822</td>
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<td>659</td>
<td>603</td>
<td>664</td>
<td>693</td>
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<tr>
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<td>653</td>
<td>686</td>
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<tr>
<td>N2</td>
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<tr>
<td>N1</td>
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</table>

S.E. of any marginal mean = 23.1 lb./ac.
S.E. of body of any table = 40.0 lb./ac.
Crop :- Wheat (Rabi).
Site :- M.A.E. Farm, Barpalli.

Object :- Type I—To study the direct response of nitrogen, phosphate and irrigation on Wheat.

1. BASAL CONDITIONS:
   (i) (a) Wheat - Potato – Cotton. (b) Cotton. (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) 2nd week of Dec. (iv) (a) 3 ploughings, 3 harrowing, 3 bakharings. (b) N.A. (c) 50 lb./ac. (d) 9’ x 6’. (e) N.A. (v) 5,000 lb./ac. of F.Y.M. (vi) N.P.=718. (vii) As per treatments. (viii) 3 weedings. (ix) N.A. (x) 2nd week of April.

2. TREATMENTS:
   All combinations of (1), (2), (3) and (4).
   (1) 3 frequencies of irrigation : L1 = 5, L2 = 7 and L3 = 9 irrigations.
   (2) 3 intensities of irrigation : I1 = 2”, I2 = 3” and I3 = 4” per irrigation.
   (3) 3 levels of N as A/S: N0 = 0, N1 = 30 lb./ac. and N2 = 60 lb./ac.
   (4) 3 levels of P2O5 as Super : P0 = 0, P1 = 30 lb./ac. and P2 = 60 lb./ac.

3. DESIGN:
   (i) 3 x 4 fact. confd. (ii) 9 plots/block; 9 blocks; replication. (iii) 1. (iv) N.A. (v) 1/00 ac. (vi) N.A. (vii) Yes.

4. GENERAL:
   (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) a. 1957—contd. (b) and c. N.A. (v) a. and (b) Nil. (vi) Crop suffered due to heavy hail-storm. Damaged by wild rats and animals.

5. RESULTS:
   (i) 517 lb./ac. (ii) 242.9 lb./ac. (iii) None of the effects is significant. (iv) A., yield of grain in lb./ac-

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>I1</th>
<th>I2</th>
<th>I3</th>
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<td>N1</td>
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<td>539</td>
<td>528</td>
<td>556</td>
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<td>498</td>
<td>550</td>
<td>480</td>
<td>517</td>
<td>555</td>
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</tr>
</tbody>
</table>

   Mean: 559
   S.E. of any marginal mean: 46.7 lb./ac.
   S.E. of body of any table: 81.0 lb./ac.

Crop :- Wheat (Rabi).
Site :- M.A.E. Farm, Barpalli.

Object :- Type I—To study the direct response of nitrogen, phosphate and irrigation on Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) Nov.—Dec. (iv) (a) to (c) N.A. (v) 5,000 lb./ac. of F.Y.M. (vi) N.A. (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) Apr. 1; 16.0.

2. TREATMENTS and 3. DESIGN:
   Same as in experiment no. 58(MAE) above.

Crop :- Wheat (Rabi).
Site :- M.A.E. Farm, Barpalli.

Object :- Type I—To study the direct response of nitrogen, phosphate and irrigation on Wheat.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) Nov.—Dec. (iv) (a) to (c) N.A. (v) 5,000 lb./ac. of F.Y.M. (vi) N.A. (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) Apr. 1; 16.0.

2. TREATMENTS and 3. DESIGN:
   Same as in experiment no. 58(MAE) above.
4. GENERAL:
(i) Below normal. (ii) N.A. (iii) Grain and straw yield. (iv) (a) 1957—contd. (b) and (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 308.4 lb./ac. (ii) 146.5 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain n lb./acre.

<table>
<thead>
<tr>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>I1</th>
<th>I2</th>
<th>I3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N&lt;sub&gt;A&lt;/sub&gt;</td>
<td>204.7</td>
<td>360.6</td>
<td>224.5</td>
<td>283.0</td>
<td>248.8</td>
<td>263.4</td>
<td>278.2</td>
<td>312.1</td>
<td>204.8</td>
</tr>
<tr>
<td>N&lt;sub&gt;B&lt;/sub&gt;</td>
<td>346.2</td>
<td>273.2</td>
<td>273.3</td>
<td>273.2</td>
<td>317.0</td>
<td>302.5</td>
<td>297.5</td>
<td>258.6</td>
<td>336.6</td>
</tr>
<tr>
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<td>326.9</td>
<td>365.9</td>
<td>317.2</td>
<td>341.7</td>
<td>429.3</td>
<td>321.9</td>
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<td>341.7</td>
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<tr>
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<td>322.0</td>
<td>287.9</td>
<td>291.1</td>
<td>302.5</td>
<td>331.7</td>
<td>299.2</td>
<td>331.7</td>
<td>294.4</td>
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</table>

<table>
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<th>L2</th>
<th>L3</th>
<th>I1</th>
<th>I2</th>
<th>I3</th>
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<td>356.1</td>
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<td>278.0</td>
<td>297.7</td>
<td>321.9</td>
</tr>
<tr>
<td>I&lt;sub&gt;B&lt;/sub&gt;</td>
<td>346.2</td>
<td>351.4</td>
<td>297.6</td>
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<td>258.7</td>
<td>297.6</td>
<td>278.1</td>
<td>282.9</td>
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</table>

S.E. of any marginal mean = 28.2 lb./ac.
S.E. of body of any table = 48.8 lb./ac.

Crop :- Ragi.
Centre :- Bolangir (c.f.).
Object :- Type A—To study the response of Ragi to levels of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O applied individually and in combinations.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Red soil. (iii) Nil. (iv) to (x) N.A.

2. TREATMENTS and 3. DESIGN:
Same as in exp. no. 58 (SFT) type A on page 119 conducted at Bolangir on wheat crop.

4. GENERAL:
(i) Poor. (ii) N.A. (iii) Grain yield. (iv) (a) 1958—contd. (b) No. (c) N.A. (v) As per treatments. (vi) and (vii) Nil.

5. RESULTS:
Treatment 0 n p np k nk pk npk
Av. yield 255.1 526.6 501.9 551.3 362.1 584.2 493.7 938.1
G.M. = 526.6 lb./ac.; S.E./mean = 23.09 lb./ac. and no. of trials = 2.
2. TREATMENTS and 3. DESIGN:
Same as in expt. no. 58(SFT); Type B on page 122 conducted at Bolangir on wheat crop.

4. GENERAL:

5. RESULTS:

<table>
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<th>Av. yield</th>
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<tr>
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<tr>
<td>n5</td>
<td>839</td>
</tr>
<tr>
<td>n6</td>
<td>1053</td>
</tr>
</tbody>
</table>

G.M. = 649 lb./ac.; S.E. mean = 72.73 lb./ac. and no. of trials = 2.

---

**Crop :— Ragi.**

**Centre :— Ganjam (c.f.).**

Ref :- Or. 58 and 59(SFT).

**Type :— 'M'.**

Object :— Type A—To study the response of Ragi to levels of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O applied individually and in combinations.

1. BASAL CONDITIONS:

(i) to (ii) N.A. (iii) Laterite. (iv) to (v) N.A.

2. TREATMENTS and 3. DESIGN:
Same as in expt. no. 58(SFT); Type A on page 119 conducted at Bolangir on wheat crop.

4. GENERAL:


5. RESULTS:

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<thead>
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<th>Treatment</th>
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<tr>
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<td>n6</td>
<td>1481</td>
</tr>
<tr>
<td>n7</td>
<td>1712</td>
</tr>
</tbody>
</table>

G.M. = 1368 lb./ac.; S.E. mean = 47.74 lb./ac. and no. of trials = 9.

---

**Crop :— Ragi.**

**Centre :— Ganjam (c.f.).**

Ref :- Or. 58 and 59(SFT).

**Type :— 'M'.**

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

1. BASAL CONDITIONS:

(i) to (c) N.A. (ii) Laterite. (iii) Nil. (iv) to (v) N.A.

2. TREATMENTS:

0 = Control (no manure).

n1 = 20 lb./ac. of N as A/S.
n2 = 40 lb./ac. of N as A/S.
n3 = 20 lb./ac. of N as Urea.
n4 = 40 lb./ac. of N as Urea.
n5 = 20 lb./ac. of N as A/S.N.
n6 = 40 lb./ac. of N as A/S.N.
3. DESIGN:
Same as in expt. no. 58(SFT) Type A on page 119 conducted at Bolangir on wheat crop.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Grain yield. (iv) (a) 1958—contd. (b) No. (c) N.A. (v) As per desgr. (vi) and (vii) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment</th>
<th>0</th>
<th>nt</th>
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<th>n2'</th>
<th>n3</th>
<th>n3'</th>
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<tr>
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<td>922</td>
<td>996</td>
<td>823</td>
<td>987</td>
<td>889</td>
</tr>
<tr>
<td></td>
<td>G.M. =505 lb./ac. ; S.E./mean =27.9 lb./ac. and no. of trials=9.</td>
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<tr>
<td>1959</td>
<td>Av. yield</td>
<td>872</td>
<td>1144</td>
<td>1136</td>
<td>1325</td>
<td>1489</td>
<td>1506</td>
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<tr>
<td></td>
<td>G.M. =1312 lb./ac. ; S.E./mean =39.57 lb./ac and no. of trials=7.</td>
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</table>

Crop :- Maize (Rabi).
Object :- To find out the optimum period of sowing for Maize crop.

1. BASAL CONDITIONS:
(i) Nil. (b) Paddy. (c) 5 C.L./ac. of F.Y.M. (ii) (a) Loamy. (b) N.A. (iii) As per treatments (iv) (a) 6 ploughings and 2 ladders. (b) Sown in lines. (c) 1.12 lb./ac. (d) 2" x 2". (e) 2 seeds/acre. (v) 10 C.L./ac. of compost, 20 lb./ac. of P.O. and 32 lb./ac. of P.O.S/A applied at sowing. (vi) V.L—21 (hybrid). (vii) Irrigated. (viii) 1 hoeing and 2 weedings. (ix) N.A. (x) 23.12.15-59, 20.1.1960, 7.3.1960, 21.3.1960 and 26.3.1960.

2. TREATMENTS:
Top-dressing with 20 lb./ac. of N as A/S.

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 18' x 18'. (b) 14' x 14'. (v) One row on all sides. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) N.A. (iii) No. of cobs/plot. (iv) (a) 1959—N.A. (b) No. (c) Nil. (v) Nil; and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 9316 cobs/acre. (ii) 540 cobs/acre. (iii) Treatments differences are highly significant. (iv) Av. number of cobs/acre.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>D6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>10056</td>
<td>9334</td>
<td>9723</td>
<td>9667</td>
<td>8612</td>
<td>8501</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>270 cobs/acre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Bhindi (Kharif).
Object :- To study the effect of insecticidal dustings in order to control Bhindi jassids.

Ref :- Or. 59(46).
Type :- 'C'.

Ref :- Or. 59(17).
Type :- 'D'.
1. BASAL CONDITIONS:
   (i) Nil.  (b) and (c) N.A.
   (ii) a) Sandy loam.  (b) N.A.  (iii) Transplanted on 25.6.1959.
   (iv) a) 2 ploughings with country plough to 3’ depth followed by levelling and laddering.
   (v) Transplanted.  (vi) N.A.  (d) 1’ x 1’.
   (vii) 15 C.L/ac of F.Y.M.  (viii) Red.  (ix) Irrigated.  (x) 2 weedings, 2 hoeings and earthing up.
   (x) N.A.  (x) 15.8.1959 to 15.11.1959.

2. TREATMENTS:
   5 dustings: D0 = Control, D1 = Parathion 0.025%, D2 = Endrine 0.02%, D3 = Pyrethroid 1 : 400.

3. DESIGN:
   (i) R.B.D.  (ii) 4 (b) N.A.  (iii) 5.  (iv) a, N.A.  (v) 16’ x 11’.  (vi) N.A.  (vii) Yes.

4. GENERAL:
   (i) Good.  (ii) Fruit borer; control measures as per treatments.  (iii) Population count of fruit borer and yield.
   (iv) (a) 1959 — N.A.  (b) and (c) N.A.  (v) a and (b) N.A.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 5993 lb./ac.  (ii) 719 lb./ac.  (iii) Treatment differences are highly significant.  (iv) Av. yield of brinjal in lb./ac.
   Treatment
<table>
<thead>
<tr>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>D0</td>
</tr>
<tr>
<td>4686</td>
</tr>
<tr>
<td>S.E. (mean)</td>
</tr>
</tbody>
</table>

Crop := Brinjal \((Kharif)\)
Ref := Or. 57(12).
Type := 'D'.

Object := To study the effect of different insecticidal dustings in order to control Brinjal \(Epilachna\).
1. BASAL CONDITIONS:
(i) (a) Nil. (b) Brinjal. (c) 10 C.L./ac. of F.Y.M. (ii) (a) Sandy loam. (b) N.A. (iii) 15.7.1958. (iv) (a) 2 ploughings with country plough to 3' depth and laddering. (b) Transplanted in lines. (c) N.A. (d) 2' x 2'. (e) N.A. (v) 10 C.L./ac. of F.Y.M. (vi) Local (black, round). (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 30.10.1958 to 15.2.1959.

2. TREATMENTS:
4 dustings: D0 = Control, D1 = B.H.C. (5%), D2 = Toxaphene (5%) and D3 = Dieldrin (1%).

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 19' x 7'. (b) 7' x 16'. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Epilachna ; control measures as per treatments. (iii) Population count on Epilachna auct. brinjal yield. (iv) (a) 1957—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 2233 lb./ac. (ii) 1157 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of brinjal in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1994</td>
<td>1770</td>
<td>3376</td>
<td>1770</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>517 lb./ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Brinjal (Kharif).
Ref :- Or. 58(25).
Type :- 'D'.

Object :-To study the effect of different insecticidal dusting in order to control Brinjal Epilachna.

1. BASAL CONDITIONS:
(i) (a) N.A. (b) Brinjal. (c) 10 C.L./ac. of F.Y.M. (ii) (a) Sandy loam. (b) N.A. (iii) 15.7.1958. (iv) (a) 2 ploughings with country plough to 3' depth. (b) Transplanted. (c) N.A. (d) 2' x 2'. (e) 1. (v) 10 C.L./ac. of F.Y.M. (vi) Local (medium). (vii) Irrigated. (viii) 2 weedings, 2 hoeings and twice earthing up. (ix) N.A. (x) 30.10.1958 to 15.2.1959.

2. TREATMENTS:
4 Dusting: D0 = Control, D1 = B.H.C. (0.125%), D2 = Toxaphene (0.125%) and D3 = Malathion (0.125%)

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 17' x 16'. (v) N.A. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) Epilachna ; control measures as per treatments. (iii) Population on Epilachna and yield. (iv) (a) N.A. (b) and (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 1903 lb./ac. (ii) 953 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of brinjal in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>1743</td>
<td>1294</td>
<td>2557</td>
<td>2018</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>426 lb./ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Brinjal (Kharif).
Ref :- Or. 59(22).
Type :- 'D'.

Object :-To study the effect of different insecticidal dustings in order to control Brinjal Epilachna.
1. BASAL CONDITIONS:
   (i) a N.A. (b) Brinjal. (c) 10. C.L. ac. of F.Y.M. (d) a Sandy loam. b) N.A. (e) 22.6.1959.
   (iv) (a) 2 ploughings with country plough to 3' depth. (b) Transplanted. c) N.A. d) 2' x 2'. e) 1. (v) 0
c.L. ac. of F.Y.M. (vi) Local. (vii) Irrigated. (viii) 2 weedings and 2 hoeings. (ix) N.A. (x) 25.1.1959
to 22.2.1960.

2. TREATMENTS:
   ~
   6 dustings: D0-Control, D1-Parathion 0.025", D2-Malathion 0.2", D3 Endrine 0.04", D4-B.H.C.
   (0.25") and D5-Toxaphene 0.25".

3. DESIGN:
   (i) R.B.D. (ii) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 28' x 18'. (v) N.A. vi, Yes.

4. GENERAL:
   (i) Normal. (ii) Epilachna beetle; control measures as per treatments. (iii) Population of Epilachna and
   yield. (iv) (a) 1957—contd. (b) No. (c) Nil. (v) a, and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 6289 lb./ac. (ii) 1230 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of brinjal
   in lb./ac.

   Treatment | D0 | D1 | D2 | D3 | D4 | D5 | Av. yield | S.E./mean
   5687 | 7008 | 7708 | 7359 | 6470 | 3303 | = 550 lb./ac.

---

Crop: Brinjal (Ráñi),
Object: To study the effect of insecticidal dustings in order to control Brinjal fruit borer.

1. BASAL CONDITIONS:
   (i) a N.A. (b) Sann hemp. (c) Nil. (ii) a Clay loam. b) N.A. (iii) 16.11.1958. (iv) (a) 3 ploughings
   with country plough 4' to 6' deep. (b) Planted in rows and ridges. (c) 16 plants./plot. (d) 2' x 2'. (e) 1
   (v) 200 lb./ac. of A/S+200 lb./ac. of Super. (vi) Black beauty. (vii) Irrigated. (viii) Earthing and hoeing.
   (ix) N.A. (x) Pickings on 10, 19 and 26.3.1959; 9, 17 and 24.4.1959; 5 and 15.5.1955.

2. TREATMENTS:
   5 dustings: D0 Control, D1-Folidol e.c. 0.04", D2-Endrine e.c. 0.04", D3 Basudin e.c. 0.04% and
   D4 Dieldrine e.c. 0.125%.
   Each dusting was performed at 60 gallons/.ac.

3. DESIGN:
   (i) R.B.D. (ii) 5. (b) N.A. (iii) 6. (iv) (a) 10' x 10'. (b) 6' x 6', (v) 2' x 2'. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Brinjal wilt; control measures as per treatments. (iii) Weight of pickings and percentage
   of affected fruit. (iv) (a) to N.A. (v) a and (b) Nil. vi and (vii) Nil.

5. RESULTS:
   (i) 8742 lb./ac. (ii) 2525 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of brinjal
   in lb./ac.

   Treatment | D0 | D1 | D2 | D3 | D4 | Av. yield | S.E./mean
   9472 | 7884 | 7336 | 9538 | 9661 | = 1262 lb./ac.
Object: To study the effect of N, P, K applied with lime and molybdenum on the yield of Potato.

1. BASAL CONDITIONS:
(i) (i) Nil. (b) Paddy. (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) 14.11.1959. (iv) (a) 6 p.oughings (b) Line sowing on flat beds. (c) 346 lb./ac. (d) 24"x9". (e) One seed/bole. (v) 5000 lb./ac. cf F.Y.M. (vi) Patna—red. (vii) Irrigated. (viii) One weeding. (ix) 0.51". (x) 7.2.1960.

2. TREATMENTS:
Main-plot treatments:
6 manurial treatments: T₀=Control, T₁=112 lb./ac. of lime, T₂=T₁+1 lb./ac. of sodium molybdate, T₃=112 lb./ac. of A/S, T₄=56 lb./ac. of A/S+56 lb./ac. of Mur. of Pot. and T₅=T₃+112 lb./ac. of Mur. of Potash.
Sub-plot treatments:
5 levels of Super: P₀=Control, P₁=168, P₂=336, P₃=504 and P₄=672 lb./ac.

3. DESIGN:
(i) Split-plot. (ii) (a) 6 main-plots/block; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 14"x13" (v) Nil. (vi) Yes.

4. GENERAL:

5. RESULTS:
(i) 4313 lb./ac. (ii) (a) 3064 lb./ac. (b) 953 lb./ac. (iii) Main effect of T alone is significant. (iv) Av. yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>T₀</th>
<th>T₁</th>
<th>T₂</th>
<th>T₃</th>
<th>T₄</th>
<th>T₅</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>P₀</td>
<td>3051</td>
<td>4132</td>
<td>3261</td>
<td>5654</td>
<td>4143</td>
<td>5257</td>
<td>4250</td>
</tr>
<tr>
<td>P₁</td>
<td>2893</td>
<td>3447</td>
<td>3437</td>
<td>5811</td>
<td>3447</td>
<td>5998</td>
<td>4172</td>
</tr>
<tr>
<td>P₂</td>
<td>2198</td>
<td>3694</td>
<td>2528</td>
<td>5332</td>
<td>5130</td>
<td>6103</td>
<td>4164</td>
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<tr>
<td>P₃</td>
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<td>3979</td>
<td>3604</td>
<td>6446</td>
<td>4404</td>
<td>6301</td>
<td>4625</td>
</tr>
<tr>
<td>P₄</td>
<td>3021</td>
<td>3193</td>
<td>3365</td>
<td>6042</td>
<td>4842</td>
<td>5661</td>
<td>4354</td>
</tr>
<tr>
<td>Mean</td>
<td>2835</td>
<td>3689</td>
<td>3239</td>
<td>5857</td>
<td>4393</td>
<td>5864</td>
<td>4313</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. T marginal means = 969 lb./ac.
2. P marginal means = 275 lb./ac.
3. P means at the same level of T = 674 lb./ac.
4. T means at the same level of P = 1139 lb./ac.

Object: To study the effect of organic and inorganic manures on Potato.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Paddy. (b) N.A. (iii) 7.11.1955. (iv) (a) 6 ploughings 4" to 6" deep and 2 ploughings followed by laddering. (b) Sown in flat beds. (c) N.A. (d) 24"x9". (e) 1. (v) Nil. (vi) Patna—red. (vii) Irrigated. (viii) 2 manurings and 2 earthings. (ix) 67.97". (x) 18.2.1955.
2. **TREATMENTS**:

**Main-plot treatments**:  
3 organic manures:  
- T<sub>0</sub> = Control, T<sub>1</sub> = 40 lb/ac of N as F.Y.M. and T<sub>2</sub> = 40 lb/ac of N as G.N.C.

**Sub-plot treatments**:  
5 inorganic manures:  
- M<sub>0</sub> = Control, M<sub>1</sub> = 40 lb/ac of P<sub>2</sub>O<sub>5</sub> as Super, M<sub>2</sub> = 50 lb/ac of K<sub>2</sub>O as Mur. of Pot.

3. **DESIGN**:  
(i) Split-plot. (ii) (a) 3 main-plots/block; 5 sub-plots/main-plot. (b) N.A. - (c) 36' x 9'. (d) N.A.  
(iii) 1 row either side. (iv) Yes.

4. **GENERAL**:  
(i) N.A.  
(iii) Tuber yield.  
(iv) (a) Nil. (b) and (c) Nil.  
(v) (a) and (b) Nil. (vi) and (vii) Nil.

5. **RESULTS**:  
(i) 1953 lb/ac.  
(ii) 991 lb/ac.  
(iii) Main effect of M and interaction M x T are highly significant.  
(iv) Av. yield of tuber in lb/ac.

<table>
<thead>
<tr>
<th>T&lt;sub&gt;0&lt;/sub&gt;</th>
<th>T&lt;sub&gt;1&lt;/sub&gt;</th>
<th>T&lt;sub&gt;2&lt;/sub&gt;</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M&lt;sub&gt;0&lt;/sub&gt;</td>
<td>2534</td>
<td>3779</td>
<td>5503</td>
</tr>
<tr>
<td>M&lt;sub&gt;1&lt;/sub&gt;</td>
<td>3071</td>
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<td>3597</td>
</tr>
<tr>
<td>Mean</td>
<td>3565</td>
<td>3250</td>
<td>4954</td>
</tr>
</tbody>
</table>

S.E. of difference of two  
1. T marginal means = 713 lb/ac.  
2. M marginal means = 46 lb/ac.  
3. M means at the same level of T = 809 lb/ac.  
4. T means at the same level of M = 1015 lb/ac.

---

**Crop**: Potato (*Rabi*).  
**Site**: Agri. Res. Stn., Sambalpur.  
**Ref**: Or. 56(29).  
**Type**: 'M'.

**Object**: To study the effect of organic and inorganic manures on Potato.

1. **BASEL CONDITIONS**:  
- (a) Nil.  
- (b) Cotton (*kharif* in 1956 failed; and in winter 1955 vegetables and wheat. (c) N.A.  
- (d) N.A.  
- (e) N.A.  
- (f) 6 ploughings with country plough 4' to 6 deep.  
- (g) Line planting.  
- (h) N.A.  
- (i) 21" x 9".  
- (j) One tuber/hole.  
- (k) N.A.  
- (l) Irrigated.  
- (m) Heating and earth ng  
- (n) N.A.  
- (o) 21 to 24.2.1957.

2. **TREATMENTS**:  
**Main-plot treatments**:  
3 organic manures:  
- T<sub>0</sub> = Control, T<sub>1</sub> = 40 lb/ac of N as F.Y.M. and T<sub>2</sub> = 40 lb/ac of N as G.N.C.

**Sub-plot treatments**:  
4 inorganic manures:  
- M<sub>0</sub> = Control, M<sub>1</sub> = 40 lb/ac of P<sub>2</sub>O<sub>5</sub> + 40 lb/ac of K<sub>2</sub>O, M<sub>2</sub> = 80 lb/ac of N + 80 lb/ac of P<sub>2</sub>O<sub>5</sub> + 40 lb/ac of K<sub>2</sub>O and M<sub>3</sub> = 120 lb/ac of N + 80 lb/ac of P<sub>2</sub>O<sub>5</sub> + 40 lb/ac of K<sub>2</sub>O.  
N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Pot. Sd.

3. **DESIGN**:  
(i) Split-plot. (ii) (a) 3 main-plots/block; 4 sub-plots/main-plot. (b) N.A. - (c) 36' x 9'. (d) N.A.  
(iii) 1 row a round the net plot. (iv) Yes.

4. **GENERAL**:  
(i) N.A.  
(iii) Tuber yield.  
(iv) (a) Nil. (b) and (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.
5. RESULTS:

(i) 3560 lb./ac.  (ii) (a) 1576 lb./ac.  (iii) Only main effect of M is highly significant.  (iv) Av. yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>M₀</th>
<th>M₁</th>
<th>M₂</th>
<th>M₃</th>
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<td>1955</td>
<td>3557</td>
<td>3988</td>
<td>4426</td>
<td>3481</td>
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<tr>
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<td>2178</td>
<td>4112</td>
<td>3946</td>
<td>5242</td>
<td>3869</td>
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<tr>
<td>Mean</td>
<td>1979</td>
<td>3630</td>
<td>4091</td>
<td>4541</td>
<td>3560</td>
</tr>
</tbody>
</table>

S.E. of difference of two.
1. T marginal means = 642 lb./ac.
2. M marginal means = 249 lb. ac.
3. M means at the same level of T = 431 lb./ac.
4. T means at the same level of M = 744 lb./ac.

Crop :- Potato (Kharif).

Object :- To study the response of Potato to manuring with N, P and K.

1. BASAL CONDITIONS:

(i) (a) Nil.  (b) Paddy.  (c) 5 C.L/ac. of F.Y.M.  (ii) (a) Clay loam.  (b) N 266 lb./ac. and P₂O₅ 16.3 lb./ac.  
\% T.S.S. 0.035 ; pH 6.4 and \% of organic carbon 0.75.  (iii) 21.11.1958.  (iv) (a) 6 ploughings 4' to 6' deep.
(b) Sowing in flat beds.  (c) N.A.  (d) 18'x9'.  (e) 1 tuber/bole.  (v) 12 C.L./ac. of F.Y.M.,  23 lb./ac. of N as C.A.N.
before dibbling, 40 lb./ac. of P₂O₅ as Super and 40 lb./ac. of K₂O.  (vi) Patna—red.  (vii) Irrigated.  (viii) 2 earthing.  (ix) N.A.  (x) 13.2.1959.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 2 levels of N as A/S : N₀ = 0 and N₁ = 50 lb./ac.
(2) 2 levels of P₂O₅ as Super : P₀ = 0 and P₁ = 40 lb./ac.
(3) 2 levels of K₂O as Mur. of Pot. : K₀ = 0 and K₁ = 40 lb./ac.

3. DESIGN:

(i) Fact. in R.B.D.  (ii) (a) 8.  (b) N.A.  (iii) 4.  (iv) (a) 22'x10'.  (b) 20'x6'.  (v) One row around
the net plot.  (vi) Yes.

4. GENERAL:

(i) Good.  (ii) Attack of late blight ; Shell's copper fungicide sprayed.  (iii) Tuberc yield.  (iv) (a) No.
(b) and (c) No.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:

(i) 7004 lb./ac.  (ii) 1935 lb./ac.  (iii) Main effect of N alone is highly significant.  (iv) Av. yie.d of tuber
in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>K₀</th>
<th>K₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₀</td>
<td>4691</td>
<td>8366</td>
<td>5988</td>
<td>7070</td>
<td>6729</td>
</tr>
<tr>
<td>P₁</td>
<td>5778</td>
<td>9182</td>
<td>8 62</td>
<td>8988</td>
<td>7680</td>
</tr>
<tr>
<td>Mean</td>
<td>5234</td>
<td>8774</td>
<td>7025</td>
<td>6984</td>
<td>7004</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 463.8 lb./ac.
S.E. of body of any table = 967.5 lb./ac.
Object: Type A - To study the response of Potato to levels of N, P₂O₅, and K₂O applied individually and in combinations.

1. BASAL CONDITIONS:
   (i) A to c) N.A.
   (ii) Red and black.
   (iii) to (v) N.A.
   (vi) Oct.–Nov.
   (vii) Irrigated.
   (viii) and
   (ix) N.A.
   (x) Feb.–March.

2. TREATMENTS:
   0 = Control (no manure).
   n = 50 lb./ac. of N as A/S.
   p = 25 lb./ac. of P₂O₅ as Super.
   np = 50 lb./ac. of N as A/S + 25 lb./ac. of P₂O₅ as Super.
   k = 50 lb./ac. of K₂O as Mur. of Potash.
   nk = 50 lb./ac. of N as A/S + 50 lb./ac. of K₂O as Mur. of Potash.
   pk = 25 lb./ac. of P₂O₅ as Super + 50 lb./ac. of K₂O as Mur. of Potash.
   npk = 50 lb./ac. of N as A/S + 25 lb./ac. of P₂O₅ as Super + 50 lb./ac. of K₂O as Mur. of Potash.

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 kharif cereal, 8 on rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of Type A and the other half of Type B on crops other than the legumes. The three trials on legumes are of Type C. Residual effects of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The above experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village.

4. GENERAL:
   (i) Normal.
   (ii) N.A.
   (iii) Tuber yield.
   (iv) 1958–contd.
   (v) No.
   (vi) A/S.
   (vii) As per design.
   (viii) and (ix) Nil.

5. RESULTS:
   Treatment:
   G.M. = 12553 lb./ac.; S.F. = 1022 lb. ac. and no. of trials = 5.

---

Object: Type A - To study the response of Potato to levels of N, P₂O₅, and K₂O applied individually and in combinations.

1. BASAL CONDITIONS to 4.

2. GENERAL:
   Same as in expt. no 58 (SFT); Type A above.

5. RESULTS:
   Treatment:
   G.M. = 10496 lb./ac.; S.F. = 1505 lb./ac. and no. of trials = 2.
Crop: Potato (Rabi).
Centre: Ganjam (c.f.).

Object:—Type A—To study the response of Potato to levels of N, P\textsubscript{2}O\textsubscript{5} and K\textsubscript{2}O applied individually and in combinations.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Laterite. (iii) to (v) N.A. (vi) Oct.—Nov. (vii) Irrigated. (viii) and (ix) N.A. (x) Feb.—March.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 58(SFT) Type A on page 138 conducted at Dhenkanal.

4. GENERAL:
   (i) Below normal. (ii) N.A. (iii) Tuber yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) As per design. (vi) and (vii) Nil.

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>4279</td>
<td>5620</td>
<td>4600</td>
<td>5538</td>
<td>5093</td>
<td>6106</td>
<td>5497</td>
<td>7167</td>
</tr>
</tbody>
</table>

G.M. = 5487.5 lb./ac.; S.E. = 1119.1 lb./ac. and no. of trials = 4.

Crop: Potato (Rabi).
Centre: Kalahandi (c.f.).

Object:—Type A—To study the response of Potato to levels of N, P\textsubscript{2}O\textsubscript{5} and K\textsubscript{2}O applied individually and in combinations.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Red loam. (iii) to (v) N.A. (vi) Oct.—Nov. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) Feb.—March.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 58(SFT) Type A on page 138 conducted at Dhenkanal.

4. GENERAL:
   (i) Below normal. (ii) N.A. (iii) Tuber yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) As per design. (vi) and (vii) Nil.

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>4682</td>
<td>6270</td>
<td>5595</td>
<td>6385</td>
<td>5176</td>
<td>7480</td>
<td>6558</td>
<td>7694</td>
</tr>
</tbody>
</table>

G.M. = 6230 lb./ac.; S.E. = 769.6 lb./ac. and no. of trials = 6.

Crop: Potato (Rabi).
Centre: Kalahandi (c.f.).

Object:—Type A—To study the response of Potato to levels of N, P\textsubscript{2}O\textsubscript{5} and K\textsubscript{2}O applied individually and in combinations.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Red loam. (iii) to (v) N.A. (vi) Oct.—Nov. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) Feb.—March.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 58(SFT) Type A on page 138 conducted at Dhenkanal.

4. GENERAL:
   (i) Below normal. (ii) N.A. (iii) Tuber yield. (iv) (a) 1958—contd. (b) No. (c) Nil. (v) As per design. (vi) and (vii) Nil.

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>1893</td>
<td>5513</td>
<td>5019</td>
<td>9134</td>
<td>3127</td>
<td>6501</td>
<td>6254</td>
<td>12754</td>
</tr>
</tbody>
</table>

G.M. = 6274 lb./ac.; S.E. = 155.4 lb./ac. and no. of trials = 2.
Crop: Potato (Rabi).
Centre: Mayurbhanj (c.f.).
Object: Type A—To study the response of Potato to levels of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O applied individually and in combinations.

1. BASAL CONDITIONS to 4. GENERAL:
   Same as in exp't no. 58(SFT). Type A on page 138 conducted at Dhenkanal.

5. RESULTS:
   Treatment | 0 | n | p | np | k | nk | pk | npk
---|---|---|---|---|---|---|---|---
Av. yield | 7899 | 9529 | 8033 | 11561 | 8253 | 10903 | 11141 | 13495

G.M. = 10107 lb./ac.; S.E./mean = 37.03 lb./ac. and no. of trials = 8.

Crop: Potato.
Centre: Puri (c.f.).
Object: Type A—To study the response of Potato to levels of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O applied individually and in combinations.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Red alluvial. (iii) to (v) N.A. (vi) Oct.-Nov. (vii) Irrigated (viii) N.A. (ix) N.A. (x) Feb.—March.

2. TREATMENTS and 3. DESIGN:
   Same as in exp't no. 58(SFT). Type A on page 138 conducted at Dhenkanal.

4. GENERAL:

5. RESULTS:
   Treatment | 0 | n | p | np | k | nk | pk | npk
---|---|---|---|---|---|---|---|---
Av. yield | 3374 | 5044 | 4633 | 5678 | 4304 | 5842 | 841 | 6887

G.M. = 5526.6 lb./ac.; S.E. = 562.8 lb./ac. and no. of trials = 7.

Crop: Potato.
Centre: Puri (c.f.).
Object: Type A—To study the response of Potato to levels of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O applied individually and in combinations.

1. BASAL CONDITIONS to 4. GENERAL:
   Same as in exp't no. 58(SFT). Type A above.

5. RESULTS:
   Treatment | 0 | n | p | np | k | nk | pk | npk
---|---|---|---|---|---|---|---|---
Av. yield | 5974 | 8171 | 7258 | 8656 | 6682 | 8574 | 7792 | 10030

G.M. = 7592 lb./ac.; S.F. = 336.1 lb./ac. and no. of trials = 7.
Object: Type B—To investigate the relative efficiency of different nitrogenous fertilizers applied at different levels for Potato.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Saline. (iii) to (v) N.A. (vi) Oct.—Nov. (vii) Irrigated. (viii) end (ix) N.A. (x) Feb.—March.

2. TREATMENTS:
   0 = Control (no manure).
   n₁ = 50 lb./ac. of N as A/S.
   n₂ = 100 lb./ac. of N as A/S.
   n₁' = 50 lb./ac. of N as Urea.
   n₂' = 100 lb. ac. of N as Urea.
   n₁'' = 50 lb./ac. of N as A/S/N.
   n₂'' = 100 lb./ac. of N as A/S/N.

3. DESIGN:
   (i, 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 kharif cereal, 8 on rabi cereal, 8 on cash crop, 3 on oilseed crop and 3 on leguminous crops. The number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of Type C. Residual effects of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The above experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) N.A. (b) 1/80 ac. (iv) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Tuber yield. (iv) (a) 1958—contd. (b) No. (c) N.A. (v) As per design. (vi) and (vii) Nil.

5. RESULTS:
   Treatment 0 n₁ n₂ n₁' n₂' n₁'' n₂''
   Av. yield 5925 6583 9216 9710 6089 7159
   G.M. = 7300 lb./ac.; S.E. = 298.5 lb./ac. and no. of trials = 2.
Crop: Potato (Rabi).
Centre: Dhenkanal (c.f.).
Object: Type B—To investigate the relative efficiency of different nitrogenous fertilizers applied at different levels for Potato.

1. BASAL CONDITIONS to 4. GENERAL:
   Same as in exp. no. 58(SFT); Type B on page 141 conducted at Dhenkanal.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>$n_1$</th>
<th>$n_2$</th>
<th>$n_3$</th>
<th>$n_4$</th>
<th>$n_5$</th>
<th>$n_6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>9463</td>
<td>11849</td>
<td>14400</td>
<td>11150</td>
<td>14729</td>
<td>15799</td>
<td>15482</td>
</tr>
<tr>
<td>G.M.</td>
<td>13225 lb./ac.</td>
<td>S.E.</td>
<td>2400 lb./ac. and no. of trials 3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Potato.
Centre: Ganjam (c.f.).
Object: Type B—To investigate the relative efficiency of different nitrogenous fertilizers applied at different levels for Potato.

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Laterite. (iii) to (v) N.A. (vi) Oct—Nov. (vii) Irrigated. (viii) and (ix) N.A. (x) Feb.—Mar.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 58(SFT); Type B on page 141 conducted at Dhenkanal.

4. GENERAL:
   (i) Below normal. (ii) N.A. (iii) Tuber yield. (iv) 'A', 1958—contd. b. No. v N.A. (v) As per design. (vi) and (vii) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>$n_1$</th>
<th>$n_2$</th>
<th>$n_3$</th>
<th>$n_4$</th>
<th>$n_5$</th>
<th>$n_6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>5085</td>
<td>7620</td>
<td>8039</td>
<td>6311</td>
<td>7307</td>
<td>7027</td>
<td>7603</td>
</tr>
<tr>
<td>G.M.</td>
<td>6999 lb./ac.</td>
<td>S.E.</td>
<td>520.8 lb./ac. and no. of trials 4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop: Potato (Rabi).
Centre: Ganjam (c.f.).
Object: Type B—To investigate the relative efficiency of different nitrogenous fertilizers applied at different levels for Potato.

1. BASAL CONDITIONS:
   Same as in exp. no. 58(SFT); Type B above.

2. TREATMENTS to 4. GENERAL:
   Same as in exp. no. 58(SFT); Type B on page 141 conducted at Dhenkanal.

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>$n_1$</th>
<th>$n_2$</th>
<th>$n_3$</th>
<th>$n_4$</th>
<th>$n_5$</th>
<th>$n_6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>4830</td>
<td>7620</td>
<td>8039</td>
<td>6311</td>
<td>7307</td>
<td>7027</td>
<td>7603</td>
</tr>
<tr>
<td>G.M.</td>
<td>7897 lb./ac.</td>
<td>S.E.</td>
<td>744.7 lb./ac. for treatments with 6 trials and no. of trials 6 for 0, $n_1$, $n_2$, $n_3$, $n_4$, $n_5$ and 2 for $n_6$ and $n_7$.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Crop : Potato.
Centre : Kalahandi (c.f.).

Object : Type B—To investigate the relative efficiency of different nitrogenous fertilizers applied at different levels for Potato.

1. BASAL CONDITIONS
(i) (a) to (c) N.A. (ii) Red loam. (iii) to (v) N.A. (vi) Oct.—Nov. (vii) Irrigated. (viii) and (ix) N.A. (x) Feb.—March.

2. TREATMENTS to 4. GENERAL:
Same as in expst. no. 58(SFT) Type B on page 141 conducted at Dhenkanal.

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>
<th>n6''</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2469</td>
<td>9627</td>
<td>10615</td>
<td>6171</td>
<td>11520</td>
<td>11191</td>
<td>6234</td>
</tr>
</tbody>
</table>

G.M.=8264 lb./ac.; S.E.=N.A. and no. of trials=2.

Crop : Potato.
Centre : Mayurbhanj (c.f.).

Ref : Or. 58(SFT).
Type : 'M'.

Object : Type B—To investigate the relative efficiency of different nitrogenous fertilizers applied at different levels for Potato.

1. BASAL CONDITIONS to 4. GENERAL:
Same as in expst. no. 58(SFT) Type B on page 141 conducted at Dhenkanal.

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>
<th>n6''</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3703</td>
<td>4773</td>
<td>7323</td>
<td>5760</td>
<td>6830</td>
<td>5143</td>
<td>9792</td>
</tr>
</tbody>
</table>

G.M.=6189 lb./ac.; S.E.=884.4 lb./ac. and no. of trials=4.

Crop : Potato.
Centre : Mayurbhanj (c.f.).

Ref : Or. 59(SFT).
Type : 'M'.

Object : Type B—To investigate the relative efficiency of different nitrogenous fertilizers applied at different levels for Potato.

1. BASAL CONDITIONS to 4. GENERAL:
Same as in expst. no. 58(SFT) Type B on page 141 conducted at Dhenkanal.

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>
<th>n6''</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>11026</td>
<td>12096</td>
<td>14318</td>
<td>14647</td>
<td>15963</td>
<td>15470</td>
<td>17445</td>
</tr>
</tbody>
</table>

G.M.=14424 lb./ac.; S.E.=441.0 lb./ac. and no. of trials=2.

Crop : Potato (Rabi).
Centre : Puri (c.f.).

Ref : Or. 58(SFT).
Type : 'M'.

Object : Type B—To investigate the relative efficiency of different nitrogenous fertilizers applied at different levels for Potato.
1. **BASAL CONDITIONS**:
   i) (a) to (c) N.A. (ii) Red alluvial. (iii) to (v) N.A. (vi) A. — Nov. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) Feb.—March.

2. **TREATMENTS** and 3. **DESIGN**:
   Same as in expn. no. 58 (SFT). Type B on page 141 conducted at Bhubaneshwar.

4. **GENERAL**:

5. **RESULTS**:
   Treatment 0 1 2 3 4 5 6
   Av. yield 3728 7159 7620 6608 7134 6114 6608
   G.M. = 6424 lb./ac.; S.E. = 512.0 lb./ac. and no. of trials 4.

---

**Crop :- Potato (Rabi).**
**Centre :- Puri (c.f.).**

Object — Type B — To investigate the relative efficiency of different nitrogenous fertilizers applied at different levels for Potato.

1. **BASAL CONDITIONS**:
   i) (a) to (c) N.A. (ii) Red alluvial. (iii) to (v) N.A. (vi) A. — Nov. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) Feb.—March.

2. **TREATMENTS** to 4. **GENERAL**:
   Same as in expn. no. 59 (SFT). Type B on page 141 conducted at Balasore.

5. **RESULTS**:
   Treatment 0 1 2 3 4 5 6
   Av. yield 5620 8130 7801 8582 7603 9164
   G.M. = 7811 lb./ac.; S.E. = 674.9 lb./ac. and no. of trials 6.

---

**Crop :- Potato (Rabi).**
**Site :- Agri. Res. Stn., Sambalpur.**

Object — To find out the proper size of Potato seeds.

1. **BASAL CONDITIONS**:
   i) (a) N.A. (b) Dhaincha. (c) Nil. (ii) (a) Clay loam. (b) N and K.O : Esanurs N.A. : pH 6.1 : % organic carbon : 0.75; P₂O₅ 9.2 lb./ac. and %, T.S.S. 0.3. (iii) 29, 30.10.1954. (iv) a: 6 ploughings with country plough to 4"—6" depth. (b) Sown in flat beds. c. N.A. (c) 18" x 9". (d) One tuber hole. (e) 1 s. plot of A/S sr. plot of Super at the time of sowing 30.10.1954 and 1.11.1954. and 1 s. plot of A/S sn 28.30.11.1954. (vi) N.A. (vii) Irrigated. (viii) 2 earthing. (ix) 0 18". (x) N.A.

2. **TREATMENTS**:
   5 suth size: of seed: S₁ = 4, S₂ = 5, S₃ = 6, S₄ = 7 and S₅ = 8 suth.

3. **DESIGN**:
   i) R.B.D. (ii) a, 5. (b) N.A. (iii) 4. (iv) a) N.A. (b) 55' x 9'. (v) One row around the net plot. (vi) Yes.

4. **GENERAL**:
   i) Germination good; growth better. (ii) Affected by virus. Measures taken—N.A. (iii) Tuberc yield. (iv) to (c) No. (v) (a) and (b) N.A. (vi) 4 suth size is approximately 2" in diameter. (vii) Nil.
5. RESULTS:
(i) 1223 lb./ac.  (ii) 190 lb./ac.  (iii) Treatment differences are highly significant.  (iv) Av. yield of tuber 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>2208</td>
<td>1213</td>
<td>956</td>
<td>1252</td>
<td>487</td>
</tr>
<tr>
<td>S.E./mean = 95 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Object :– To find out the suitable dates of sowing for Potato.

1. BASAL CONDITIONS:
(i) (a) Nil.  (b) Sannhemp.  (c) Nil.  (ii) (a) Sandy loam.  (b) N.A.  (iii) As per treatments.  (iv) (a) 5 ploughings and cramping.  (b) Sowing in lines.  (c) N.A.  (d) 18" x 9".  (e) 1 tuber/hole.  (f) 80 lb./ac. of N as A/S+ 60 lb./ac. of P2O5 as Super+ 48 lb./ac. of K2O and green manuring with sannhemp one month after sowing.  (g) Patna—red.  (h) Irrigated.  (i) (vii) 2 hoeings and 1 earthing.  (ii) (a) N.A. (x) 17, 24.2.1959; 3, 24.3.1959; 4.4.1959.

2. TREATMENTS:

3. DESIGN:
(i) R.B.D.  (ii) (a) 5.  (b) N.A.  (i) 4.  (iv) (a) 28' x 16'.  (b) 26' x 15'.  (v) One row around the lot.  (vi) Yes.

4. GENERAL:
(i) Satisfactory.  (ii) _Epilachna_ beetle—Gammexane sprayed.  Early and late blight of potato; _Shell_ copper fungicide sprayed.  (iii) Tuber yield.  (iv) (a) to (c) N.A.  (v) (a) and (b) N.A.  (vi) and (vii) Nil.

5. RESULTS:
(i) 1223 lb./ac.  (ii) 190 lb./ac.  (iii) Treatment differences are highly significant.  (iv) Av. yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>2208</td>
<td>1213</td>
<td>956</td>
<td>1252</td>
<td>487</td>
</tr>
<tr>
<td>S.E./mean = 95 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Object :– To find out suitable spacing and best method of planting for Potato.

1. BASAL CONDITIONS:
(i) (a) Nil.  (b) Sannhemp for seed.  (c) Nil.  (ii) (a) Clay loam.  (b) N.A.  (iii) 16.11.1959.  (iv) 6 ploughings, 3 ladderings, 1 hoeing and 1 earthing with deshi plough.  (b) As per treatments  (c) N.A.  (d) As per treatments.  (e) 1.  (f) Y.M. at 181 mds/ac., 80 lb./ac. of N as A/S, 60 lb./ac. of P2O5 as Super and 40 lb./ac. of K2O as K2SO4.  (vi) Patna—red.  (vii) Irrigated.  (viii) One hoeing and earthing up.  (ix) N.A. (x) 19.2.1960.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 2 spacings : S1 = 18" x 6" and S2 = 24" x 6".
(2) 3 methods of planting : M1 = In flat beds, M2 = On ridges and M3 = In furrows.
3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 6. (b) 80’x16’. (iii) 4. (iv) (a) 16’x12’. b) N.A. (v) 2 lines and 2 plants of each line 6” apart. (vi) Yes.

4. GENERAL:
(i) Satisfactory. (ii) Shell copper fungicide sprayed to prevent early blight. (iii) Tuber yield. (iv) (a) to (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 11622 lb./ac. (ii) 1875 lb./ac. (iii) None of the effects 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>S1</td>
<td>12282</td>
<td>11989</td>
<td>10632</td>
</tr>
<tr>
<td>S2</td>
<td>10750</td>
<td>12094</td>
<td>11988</td>
</tr>
<tr>
<td>Mean</td>
<td>11516</td>
<td>12042</td>
<td>11310</td>
</tr>
</tbody>
</table>

S.E. of S marginal mean = 663 lb./ac.
S.E. of M marginal mean = 541 lb./ac.
S.E. of body of table = 938 lb./ac.

---

**Crop :- Tomato (Rabi).**  
**Site :- Agri. Res. Stn., Bhubaneswar.**  
**Ref :- Or. 59(18).**  
**Type :- 'D'.**

Object :- To find out the relative toxicities of insecticides to control Nematode wilt of Tomato.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Bhindi. (c) 20 C.L./ac. of F.Y.M. (ii) (a) Sandy loam. (b) N.A. (iii) 25.11.1959. (iv) (a) 2 ploughings with country plough 3’ deep. (b) Transplanted. c) N.A. d) 1’ between rows. (e) N.A. (f) 20 lb./ac. of N as A:S. & 20 lb./ac. of N as G.N.C. (vi) Local (late). (vii) Irrigated. (viii) One weeding. (ix) N.A. (x) 15 pickings at intervals of 3 days.

2. TREATMENTS:
3 dustings : D0 = Control, D1 = Nimagon (0.04%) and D2 = Diazinon (0.04%).

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 5. (iv) (a) 16’x16’. (b) 14’x14’. (v) 1 row cn either side. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nematode wilt—control measures as per treatments. Phoma-rot fungus—Copper sulphate sprayed. (iii) Percentage plants affected by wilt and yield. (iv) (a) 1959—Nil. (b) Nil. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 19.01% (ii) 9.84% (iii) Treatment differences are not significant. (iv) Percentage number of plants affected by wilt.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
<th>Mean Percentage</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>24.24</td>
<td>16.88</td>
<td>15.90</td>
<td>S.E./mean = 4.40%</td>
</tr>
</tbody>
</table>

---

**Crop :- Sweet Potato (Kharif).**  
**Site :- Agri. Res. Stn., Bhubaneswar.**  
**Ref :- Or. 54(9).**  
**Type :- 'M'.**

Object :- To study the effect of N, P and K along with bulky organic manures on Sweet Potato.
1. BASAL CONDITIONS:

(i) (a) Nil. (b) Sweet Potato. (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) 27.6.1954; 29 to 31.7.1954; 25 to 27.8.1954 and 11 to 14.9.1954. (iv) (a) 4 ploughings. (b) Planting on ridges. (c) N.A. (d) 3’x1’. (e) N.A. (f) As per treatments. (vi) N.A. (vii) Irrigated. (viii) Earthing and training of vines. (ix) N.A. (x) 24 to 26, 30, 31.12.1954; 1 to 4, 8 to 9, 16 to 18, 28 to 31.1.1955; 1, 2.2.1955.

2. TREATMENTS:

Main-plot 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 K₂O as K₂SO₄: K₀ =0, K₁ =80 and K₂ =160 lb./ac.

Sub-plot treatments:
2 levels of P₂O₅ as Super: P₀ =0 and P₁ =80 lb./ac.
1000 lb./ac. of compost and 2000 lb./ac. of green leaf each was applied to 2 pairs of replications, the third pair was not treated with any manure in basal dressing. Super was applied during 29.7.1954 to 5.8.1954, A/S during 25 to 27.8.1954, K₂SO₄ during 11 to 14.9.1954 and compost and green leaf on 27.6.1954.

3. DESIGN:
(i) Split-plot. (ii) (a) 9 main-plots/block; 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 42’x5’. (b) 40’x9’. (v) 1’x3’. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Sweet potato weevil. (iii) Tuber yield. (iv) (a) 1952—contd. (b) Yes. (c) N.A. (v) (a) and (b) Nil. (vi) Nil. (vii) Replications were treated in pairs with bulky manures and analysis was done accordingly.

5. RESULTS:
(i) 3237 lb./ac. (ii) (a) 1556 lb./ac. (b) 1240 lb./ac. (iii) Main effect of organic manures is highly significant. Main effect of P and K are significant. (iv) Av. yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
</tr>
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<td>3332</td>
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</tr>
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</tr>
<tr>
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<td>3569</td>
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<td>P₁</td>
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<td>3533</td>
<td>4082</td>
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<tr>
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<td>3070</td>
</tr>
<tr>
<td>Mean</td>
<td>3178</td>
<td>3482</td>
<td></td>
</tr>
</tbody>
</table>

S.E. of difference of two

1. N or K marginal means = 367 lb./ac.
2. P marginal means = 239 lb./ac.
3. P means at the same level of N of K = 413 lb./ac.
4. N or K means at the same level of P = 469 lb./ac.
5. means of organic manures = 367 lb./ac.
S.E. of body of N×K table = 449 lb./ac.

Object:—To study the effect of N, P and K along with bulky organic manures on Sweet Potato.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sweet potato. (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) N.A. (iv) (a) 6 ploughings and laddering. (b) Planting on ridges. (c) N.A. (d) 3 × 1'. (e) N.A. (v) As per treatments. (vi) N.A. (vii) Unirrigated. (viii) Gap-filling and earthing up. (ix) N.A. (x) N.A.

2. TREATMENTS and 3. DESIGN:
Same as in exp. no. 54(9) on page 146.

4. GENERAL:
(i) Poor. (ii) Sweet potato weevil. (iii) Tuber yield. (iv) (a) 1952—contd. (b) Yes. (c) N.A. (v) (a) and (b) Nil. (vi) Nil. (vii) Replications were treated in pairs with bulky manures and the analysis was done accordingly.

5. RESULTS:
(i) 3352 lb/acre. (ii) (a) 546 lb/acre. (b) 207 lb/acre. (iii) All the effects except interaction P × K are highly significant. (iv) Av. yield of tuber in lb/acre.

<table>
<thead>
<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
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<tr>
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<td>2279</td>
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<tr>
<td>P₁</td>
<td>3774</td>
<td>3104</td>
<td>4024</td>
<td>3300</td>
</tr>
</tbody>
</table>

Mean:
- 666 lb/acre
- 459 lb/acre
- 335 lb/acre

Crop: Sweet Potato.
Ref: Or. 56(14).
Type: 'M'.

Object: To study the effect of N, P and K along with bulky organic manures on Sweet Potato.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sweet potato. (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) N.A. (iv) (a) 6 ploughings and laddering. (b) Planting on ridges. (c) N.A. (d) 3 × 1'. (c) N.A. (y) As per treatments. (vi) N.A. (vii) Unirrigated. (viii) Gap-filling and earthing up. (ix) and (x) N.A.

2. TREATMENTS and 3. DESIGN:
Same as in exp. no. 54(9) on page 146.

4. GENERAL:
(i) N.A. (ii) N.A. (iii) Tuber yield. (iv) (a) 1952—contd. (b) Yes. (c) N.A. (v) (a) and (b) Nil. (vi) Nil. (vii) Replications were treated in pairs with bulky manures and the analysis was done accordingly.

5. RESULTS:
(i) 616 lb/acre. (ii) (a) 459 lb/acre. (b) 335 lb/acre. (iii) Main effects of N, K and organic manures are highly significant. No other effect is significant. (iv) Av. yield of tuber in lb/acre.
No. Compost = 489 lb./ac.; Compost = 634 lb./ac. and G.M. = 877 lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
<th>P₀</th>
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<td>843</td>
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<td>404</td>
<td>662</td>
<td>1087</td>
<td>718</td>
<td>712</td>
<td>723</td>
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<tr>
<td>N₂</td>
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<td>509</td>
<td>559</td>
<td>438</td>
<td>400</td>
<td>477</td>
</tr>
<tr>
<td>Mean</td>
<td>382</td>
<td>697</td>
<td>920</td>
<td>666</td>
<td>650</td>
<td>683</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. N or K marginal means = 108 lb./ac.
2. P marginal means = 64 lb./ac.
3. P means at the same level of N of K = 112 lb./ac.
4. N or K means at the same level of P = 134 lb./ac.
5. means of organic manures = 108 lb./ac.
6. S.E. of body of N x K table = 132 lb./ac.

---

Crop > Sweet Potato (Kharif).
Site > Agri. Res. Stn., Bhubaneswar.
Ref > Or. 54(12).
Type > ‘C’

Object:—To study the effect of spacings and method of planting on Sweet Potato.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 5 to 7.7.1954. Gap-filling on 14.8.1954.
(iv) (a) N.A. (b) As per treatments. (c) N.A. (d) As per treatments. (e) N.A. (v) 50 lb./ac. of N as A/S and F.Y.M. were applied. (vi) N.A. (vii) Unirrigated. (viii) Weeding and hoeing. (x) N.A.

(i) 2231 lb.ac. (ii) (a) 1770 lb./ac. (b) 483 lb./ac. (iii) None of the effects is significant. (iv) Av yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>M₁S₁</th>
<th>M₂S₂</th>
<th>M₃S₃</th>
<th>M₁R₁</th>
<th>M₂R₂</th>
<th>M₃R₃</th>
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<tr>
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<td>1511</td>
<td>2685</td>
<td>1564</td>
<td>1870</td>
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<tr>
<td>D₂</td>
<td>2550</td>
<td>1403</td>
<td>2382</td>
<td>1845</td>
<td>2069</td>
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<td>2186</td>
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<tr>
<td>D₃</td>
<td>3140</td>
<td>1583</td>
<td>1795</td>
<td>1796</td>
<td>1937</td>
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<tr>
<td>Mean</td>
<td>2989</td>
<td>1499</td>
<td>2287</td>
<td>1735</td>
<td>1959</td>
<td>2923</td>
<td>2231</td>
</tr>
</tbody>
</table>
S.E. of difference of two:
1. MS or MR marginal means = 723 lb./ac.
2. D marginal means = 139 lb./ac.
3. D means at the same level of MS or MR = 342 lb./ac.
4. MS or MR means at the same level of D = 775 lb./ac.

Crop :- Sweet Potato.
Site :- Agri. Res. Sta., Bhubaneswar.
Ref :- Or. 55(6).
Type :- 'C'.

Object :- To study the effect of spacing and methods of planting on Sweet Potato.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) N.A. (iv) (a) Ploughings, levelling and laddering. (b) As per treatments. (c) N.A. (d) As per treatments. (e) N.A. (f) 40 lb. ac. of N as A/S-1 cattle dun. (g) N.A. (h) Irrigated. (v) Weeding and hoeing. (vi) and (x) N.A.

2. TREATMENTS and 3. DESIGN:
   Same as in expt. no. 54(12) on page 149.

4. GENERAL:
   (i) Normal. (ii) Weevil—reduced to 50% compared to previous year by treating the vines with Dieldrine before planting. (iii) Tubers yield. (iv) (a) 1952—contd. (b) and (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 3951 lb./ac. (ii) (a) 3639 lb./ac. (b) 1387 lb./ac. (iii) Only main effect of D is highly significant. (iv) Av. yield of tuber in lb./ac.

   \[
   \begin{array}{ccccccc}
   & M_1S_1 & M_1S_2 & M_2S_2 & M_1R_1 & M_2R_2 & M_1R_3 \\
   D_1 & 7525 & 6635 & 5450 & 5958 & 6829 & 6936 \\
   D_2 & 7625 & 4965 & 4220 & 5203 & 5.07 & 7269 \\
   D_3 & 5542 & 5124 & 4613 & 5340 & 5337 & 6939 \\
   \hline
   \text{Mean} & 6897 & 5575 & 4761 & 5500 & 5924 & 7048 \\
   \end{array}
   \]

   Mean = 5951

   S.E. of difference of two
   1. MS or MR marginal means = 1486 lb./ac.
   2. D marginal means = 400 lb./ac.
   3. D means at the same level of MS or MR = 981 lb./ac.
   4. MS or MR means at the same level of D = 1686 lb./ac.
4. GENERAL:
(i) and (ii) N.A. (iii) Tuber yield. (iv) (a) 1952—1956. (b) and (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1376 lb./ac. (ii) (a) 933 lb./ac. (b) 387 lb./ac. (iii) Main effects of MS and MR are highly significant. (iv) Av. yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>M1S1</th>
<th>M1S2</th>
<th>M1S3</th>
<th>M2R1</th>
<th>M2R2</th>
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<td>413</td>
<td>1545</td>
<td>1972</td>
<td>3028</td>
<td>1365</td>
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<tr>
<td>D3</td>
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<td>254</td>
<td>1201</td>
<td>2323</td>
<td>2709</td>
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<td>194</td>
<td>362</td>
<td>1568</td>
<td>2110</td>
<td>2938</td>
<td>1376</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. MS or MR marginal means = 381 lb./ac.
2. D marginal means = 112 lb./ac.
3. D means at the same level of MS or MR = 274 lb./ac.
4. MS or MR means at the same level of D = 442 lb./ac.

Crop :- Sweet Potato (Kharif).
Object :- To study the effect of different insecticides in order to control Sweet Potato weevil.

1. BASAL CONDITIONS :
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 20.9.1957. (iv) (a) to (c) N.A. (d) 4' between ridges. (e) N.A. (v) 20 C.L./ac. of F.Y.M. (vi) Local. (vii) Unirrigated. (viii) 2 weedings and earthing up. (ix) N.A. (x) 25.1.1958.

2. TREATMENTS:
Main-plot treatments : 2 treatments of insecticide : T1 = spraying and T2 = dipping the seeds and spraying.
Sub-plot treatments : 4 insecticides : D0 = Control, D1 = Aldrine (0.3%), D2 = Endrine (0.08%) and D3 = D.D.T (0.28%).

3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/block ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 16'x15'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) Average. (ii) Weevil attack. Control measures as per treatments. (iii) Count of infested tuber and yield. (iv) (a) 1957—Nil. (b) and (c) N.A. (v) (a) and (b) Nil. (vi) and Nil.

5. RESULTS:
(i) 282 lb./ac. (ii) (a) 341 lb./ac. (b) 173 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of tuber in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
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<td>312</td>
<td>150</td>
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<tr>
<td>T2</td>
<td>261</td>
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<td>173</td>
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<td>268</td>
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<tr>
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<td>344</td>
<td>242</td>
<td>234</td>
<td>282</td>
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</tbody>
</table>
Crop :- Sweet Potato (Rabi).

Object :- To study the effect of different insecticides in order to control Sweet Potato weevil.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) 5.10.1956. (iv) (a) N.A. (b) Planted in ridges. (c) 65 cuttings/plot. (d) 2 × 1'. (e) I. (v) Nil. (vi) Local. (vii) Irrigated. (viii) Hoeing and earthing. (ix) N.A. (x) 25.4.1957.

2. TREATMENTS :
   1. Control.
   2. Parathion 0.04%.
   3. Dieldrine e.c. 0.15%.
   4. Chlorodine 0.15%.

   Insecticides were applied in 2 sprays at 40-60 gallons/ac.

3. DESIGN :
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 15' × 10'. (v) 1' around the net plot. (vi) Yes

4. GENERAL :
   (i) Good. (ii) Sweet potato weevil; control measures as per treatments. (iii) No. of effected tubers, no. of healthy tubers and yield. (iv) (a) to (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS :
   (i) 5853 lb./ac. (ii) 1326 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of tuber in lb./ac.

   Treatment
   1 2 3 4
   Av. yield 6973 5298 5602 5538

   S.E./mean = 663 lb./ac.

---

Crop :- Yam (Kharif).

Ref :- Or. 54(14).
Type :- 'M'.

Object :- To find out the effect of N, P and K with and without compost as basal dressing on Yam.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 21 and 22.6.1954. (iv) (a) Summer ploughing. (b) In pits of 1' diameter and 1' depth. (c) N.A. (d) 3' × 3'. (e) N.A. (v) A: per treatments. (vi) N.A. (vii) Irrigated. (viii) Single stalks were given to individual plots after a fortnight then pendals were erected. (ix) N.A. (x) 30 and 31.12.1954 to 24.1.1955.

2. TREATMENTS :
   All combinations of (1), (2) and (3)
   (1) 2 levels of N of A/S: N_0 =0 and N_1 =50 lb./ac.
   (2) 2 levels of P of Super: P_0 =0 and P_1 =50 lb./ac.
   (3) 2 levels of K of K_2 O: K_0 =0 and K_1 =80 lb./ac.

   Compost was applied at 4000 lb./ac. in a pair of replications while in the other pairs no compost was given Super. A/S, and K_2 O were applied on 24.7.1954, 24.8.1954 and 27.8.1954 respectively.
3. DESIGN:
   (i) Fact. in R.B.D. (ii) 8. (b) N.A. (iii) 4. (iv) (a) $12' \times 12'$. (b) $6' \times 6'$. (v) 3' around the net plot. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) N.A. (iii) Tuber yield. (iv) (a) 1954—1956. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 11336 lb./ac. (ii) 401 lb./ac. (iii) Treatment differences are highly significant. Effect of N is highly significant. (iv) Av. yield of yam in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>$P_0$</th>
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</table>

S.E. of any marginal mean = 100.3 lb./ac.
S.E. of body of any table = 141.7 lb./ac.

Crop :— Yam.
Site :— Agri. Res. Sta., Bhubaneswar.
Ref :— Or. 56(11).
Type :— 'M'.
Object :— To find out the effect of N, P and K with and without compost as basal dressing on Yam.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) N.A. (iv) (a) Summer ploughing (b) In pits of $11'$ diameter and $11'$ depth. (c) N.A. (d) $3' \times 3'$. (e) —. (v) As per treatments. (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 2 levels of N : $N_0=0$ and $N_1=50$ lb./ac.
   (2) 2 levels of P : $P_0=0$ and $P_1=50$ lb./ac.
   (3) 2 levels of K : $K_0=0$ and $K_1=80$ lb./ac.
Compost was applied at 4,000 lb./ac. in a pair of replications while for the other pair no compost was given.

3. DESIGN:
   (i) Fact. in R.B.D. (ii) 8. (b) N.A. (iii) 4. (iv) (a) $12' \times 12'$. (b) $6' \times 6'$. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) N.A. (iii) Yield of tuber. (iv) (a) 1954—1956. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 13237 lb./ac. (ii) 4295 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of tuber in lb./ac.
Object:—To study the effect of N, P and K with and without basal dose of compost on Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 24-6-1954. (iv) (a) 3 ploughings and 3 ploughings and
   (b) Planting on ridges. (c) N.A. (d) 3 ploughing and 3 ploughing and

2. TREATMENTS:
   Main-plot treatments:
   All combination of (1) and (2):
   (1) 3 levels of N: N₀=0, N₁=50 and N₂=100 lb./ac.
   (2) 3 levels of K₂O: K₀=0, K₁=80 and K₂=160 lb./ac.

   Sub-plot treatments:
   2 levels of P₂O₅: P₀=0 and P₁=50 lb./ac.

   A/S applied on 23.8.1954, Super on 17.8.1954 and K₂S₅O₇ on 10.9.1954. Compost was applied at 4000 lb./ac.
   in a pair of replications while for the other pair no compost was given.

3. DESIGN:
   (i) Split-plot. (ii) 9 main-plots/block : 2 sub-plots/main-plot. (b) N.A. (iii) t. (iv) (a) 15'×9'. (b) 9'×3'. (v) Double guard rows were left between adjoining plots. (vi) Yes.

4. GENERAL:
   (i) Poor. (ii) N.A. (iii) Yield of tapioca. (iv) (a) 1954—contd. (b) No. (c) Nil. (v) (a) and (b) Nil.
   (vi) and (vii) Nil.

5. RESULTS:
   (i) 9891 lb./ac. (ii) a) 5485 lb./ac. (b) 3211 lb./ac. (iii) Only N and K effects are highly significant. iv.
   Av. yield of tapioca in lb./ac.

   Compost = 10448 lb./ac. and no compost = 9335 lb./ac.
Crop: Tapioca.  
Ref: Or. 56(2).  
Type: ‘M’.

Object: To find out the effect of N, P and K with and without basal dose of compost on Tapioca.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) N.A. (iv) (a) 4 ploughings and laddering. (b) Planting on ridges. (c) to (e) N.A. (v) As per treatments. (vi) N.A. (vii) Irrigated. (viii) Weeding, hoeing and gap-filling. (ix) N.A. (x) N.A.

2. TREATMENTS:
   Main-plot treatments:
   All combinations of (1) and (2)
   (1) 3 levels of N: N₀ = 0, N₁ = 50 and N₂ = 100 lb./ac.
   (2) 3 levels of K₂O: K₀ = 0, K₁ = 80 and K₂ = 160 lb./ac.
   Sub-plot treatments:
   2 levels of P₂O₅: P₀ = 0 and P₁ = 50 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) 15' x 9'. (b) 9' x 3'. (v) N.A. (vi) Yes.

4. GENERAL:
   (i) Poor. (ii) N.A. (iii) Yield of tapioca. (iv) (a) 1954—condit. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 14663 lb./ac. (ii) (a) 6986 lb./ac. (b) 7163 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of tapioca in lb./ac.

<table>
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<tr>
<th></th>
<th>K₀</th>
<th>K₁</th>
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<td>15432</td>
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S.E. of difference of two
1. N or K marginal means = 1293 lb./ac.
2. P marginal means = 618 lb./ac.
3. P means at the same level of N or K = 1070 lb./ac.
4. N or K means at the same level of P = 1498 lb./ac.
S.E. of body of N x K table = 1583 lb./ac.
Crop :- Tapioca.

Object :- To study the effect of different spacings and methods of planting on Tapioca.

1. BASAL CONDITIONS:
   (i) Nil.
   (ii) Sandy loam.
   (iii) N.A.
   (iv) Sandy loam. (a) 4 ploughings and laddering. Ridging sets were cut and coal tar applied to both the ends.
   (b) As per treatments.
   (c) N.A.
   (d) As per treatments. (e) F.Y.M. applied
   (f) N.A.
   (g) Irrigated.
   (h) Gap-filling, weeding and earthing up.

2. TREATMENTS:
   All combinations of (i) and (2)
   (i) 2 methods of planting: M1 - In ridges and M2 - On mounds.
   (ii) 3 spacings: S1 = 30'' × 12'', for S2: 30'' × 24'', and for S3: 30'' × 36''.
   (iii) On either side along breadth and 1 row of plants on either side along length.

3. DESIGN:
   (i) Fact. in R.B.D.
   (ii) a 6.
   (iii) a 4.
   (iv) a For S1: 30'' × 12'', for S2: 30'' × 24'', and for S3: 30'' × 36''.
   (v) On either side along breadth and 1 row of plants on either side along length.

4. GENERAL:
   (i) Normal growth.
   (ii) Damage due to rats.
   (iii) Yield of tapioca.
   (iv) a, 1952 - 1954.
   (v) Y.A.
   (vi) Nil.
   (vii) Nil.
   (viii) Nil.
   (ix) Nil.
   (x) Nil.

5. RESULTS:
   (i) 10227 lb. ac.
   (ii) 2533 lb. ac.
   (iii) None of the effects is significant.
   (iv) As yield of tapioca in lb. ac.

<table>
<thead>
<tr>
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<th>S2</th>
<th>S3</th>
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<td>956</td>
<td>9566</td>
</tr>
<tr>
<td>M2</td>
<td>1149</td>
<td>1207</td>
<td>834</td>
<td>10588</td>
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</tbody>
</table>

S.E. of marginal mean of S
S.E. of marginal mean of M
S.E. of body of table

Crop :- Tapioca.

Object :- To find out the effect of spacing and methods of planting on Tapioca.

1. BASAL CONDITIONS:
   (i) Nil.
   (ii) Sandy loam.
   (iii) N.A.
   (iv) a 4 ploughings, laddering, ridging sets were cut and coal tar applied to both the ends.
   (b) As per treatments.
   (c) N.A.
   (d) As per treatments.
   (e) F.Y.M. applied
   (f) N.A.
   (g) Irrigated.
   (h) Gap-filling, weeding and earthing up.

2. TREATMENTS:
   Same as in exp. no. 54.10 above.

3. DESIGN:
   (i) Fact. in R.B.D.
   (ii) a 6.
   (iii) a 4.
   (iv) a N.A.
   (v) b 24'' × 12''.
   (vi) N.A.
   (vii) Yes.

4. GENERAL:
   (i) To (iii) N.A.
   (iv) a 1952 - 1956.
   (v) Yes.
   (vi) Nil.
   (vii) Nil.
   (viii) Nil.
5. RESULTS:

(i) 6479 lb./ac. (ii) 2210 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of tapioca in lb./ac.

<table>
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<tr>
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<th>S_3</th>
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<td>5971</td>
<td>6934</td>
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<tr>
<td>M_2</td>
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<td>6560</td>
<td>5530</td>
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<tr>
<td>Mean</td>
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<td>5835</td>
<td>5751</td>
<td>6479</td>
</tr>
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</table>

S.E. of marginal mean of S = 781 lb./ac.
S.E. of marginal mean of M = 638 lb./ac.
S.E. of body of table = 1105 lb./ac.

Crop :- Colocasia. Ref :- Or. 54(13).
Site :- Agri. Res. Stn., Bhubaneswar. Type :- 'M'.

Object :- To study the effect of N, P, K along with organic manures on Colocasia.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) and (c) N.A. (ii) Sandy loam. (b) N.A. (iii) 28.6.1954. (iv) (a) Ploughing and laddering. (b) N.A. (c) N.A. (d) 2'×1'. (e) N.A. (v) As per treatments. (vi) N.A. (vii) Irrigated. (viii) Hoeing, weeding and earthing up; gap-filling on 23.7.1954. (ix) N.A. (x) 11, 19, 25 and 29. 11.1955.

2. TREATMENTS:

Main-plot treatments:
All combinations of (1) and (2)
(1) 3 levels of N as A/S: N_0 =0, N_1 =50 and N_2 =100 lb./ac.
(2) 3 levels of K_0 as Pot. Sul.: K_0 =0, K_1 =80, and K_2 =160 lb./ac.

Sub-plot treatments:
2 levels of P_0 as Super: P_0 =0 and P_1 =50 lb./ac.
4000 lb. ac. of compost was applied to a pair of replications and no compost to the other pair. A, S, Super and Pot. Sul. were applied on 23.8.1954, 26.7.1954 and 7.9.1954 respectively.

3. DESIGN:

(i) Split-plot. (ii) (a) 9 main-plots/block ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) 'a 16'×12' (main-plot) 12'×9' (sub-plot). (b) 8'×7'. (v) Double guard rows left. (vi) Yer.

4. GENERAL:

(i) Good. (ii) Nil. (iii) Tuber yield. (iv) (a) 1953—contd. (b) and (c) No. (v) (a) and (b) Nil. (vi) Nil. (vii) Replications were treated with bulky manures in pairs and the analysis was done accordingly.

5. RESULTS:

(i) 4372 lb./ac. (ii) (a) 1799 lb./ac. (b) 3985 lb./ac. (iii) Main effect of N is highly significant. Other effects are not significant. (iv) Av. yield of tuber in lb./ac.

No compost = 4312 and compost = 4433 lb./ac.

<table>
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<tr>
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<td>4834</td>
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</table>
Crop: Colocasia. 


Ref: Or. 55(5). Type: 'M'.

Object: To study the effect of N, P, K along with organic manures on Colocasia.

1. BASAL CONDITIONS:
   (i) (a) N.A. (b) and (c) N.A. (ii) Sandy loam. (b) N.A. (iii) N.A. (c) Ploughing and laddering (b) and (c) N.A. (d) 2' x 1'. (c) N.A. (x) As per treatments. (x) N.A. (w) Unirrigated. (v) Earthing up. (ix) N.A. (x) N.A.

2. TREATMENTS:
   Same as in exp. no 54 (13) on page 157.

3. DESIGN:
   (i) Split-plot. (ii) 9 main-plots block, 2 sub-plots main-plot. b N.A. 4. iv. 12' x 9'. (b) 8' x 7'. (v) Double guard rows left. (vi) Yes.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Tuber yield. (iv) (a) 1953—cond. (b) and (c) N.A. (x) (a) and (b) Nil. (y) Nil. (vii) Replications were treated with bulky manures in pairs and the analysis was done accordingly.

5. RESULTS:
   (i) 5490 lb./ac. (ii) (a) 2489 lb./ac. (b) 723 lb./ac. (vii) Only interactions N<P and K<P are significant. (iv) Av. yield of tuber in lb./ac.

\[ \text{Total compost} = 5028 \text{ and compost} = 5952 \text{ lb./ac.} \]

\[
\begin{array}{c|c|c|c|c|c|c}
K_0 & K_1 & K_2 & \text{Mean} & P_0 & P_1 \\
\hline
N_0 & 4345 & 5985 & 6659 & 5663 & 5242 & 6085 \\
N_1 & 6058 & 5171 & 5001 & 5410 & 5514 & 5305 \\
N_2 & 5930 & 4545 & 5717 & 5397 & 5237 & 5558 \\
\hline
\text{Mean} & 5444 & 5234 & 5792 & 5490 & 5331 & 5650 \\
\hline
P_0 & 5055 & 5307 & 5630 & & & \\
P_1 & 5834 & 5160 & 5954 & & & \\
\end{array}
\]

S.E. of difference of two

1. N or K marginal means = 513 lb. ac.
2. P marginal means = 939 lb. ac.
3. P means at the same level of N or K = 1627 lb. ac.
4. N or K means at the same level of P = 1262 lb. ac.
5. organic manures means = 424 lb. ac.
6. S.E. of body of N x K table = 635 lb. ac.
1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) N.A. (iv) (a) Ploughing and laddering. (b) N.A. ‘(v) As per treatments. (vi) N.A. (vii) Unirrigated. (viii) Earthing up. (ix) and (x) N.A.

2. TREATMENTS:
Same as in expt. no. 54(13) on page 157.

3. DESIGN:
(i) Split-plot. (ii) (a) 9 main-plots/block ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) N.A. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Tuber yield. (iv) (a) 1953—contd. (b) and (c) No. (v) (a) and (b) Nil. (vi) Nil. (vii) Replications were treated in pairs with bulky manures and the analysis was done accordingly. As the plot size is not available, means etc. in the results are given in lb./plot.

5. RESULTS:
(i) 7.17 lb./plot. (ii) (a) 2.64 lb./plot. (b) 2.20 lb./plot. (iii) Main effects of N, K and interaction N×K are highly significant. Interaction N×P is significant. (iv) Av. yield of tuber in lb./plot.

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<td>6.19</td>
</tr>
<tr>
<td>8.32</td>
<td>8.22</td>
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</table>

S.E. of difference of two
1. N or K marginal means = 0.76 lb./plot.
2. P marginal means = 0.52 lb./plot.
3. P means at the same level of N or K = 0.90 lb./plot.
4. N or K means at the same level of P = 0.99 lb./plot.
5. means of organic manure = 0.62 lb./plot.
S.E. of body of N×K table = 0.93 lb./plot.

Crop :- Arrow-root (Kharif).
Object :- To study the effect of N, P and K manuring on Arrowroot.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Arrow-root. (c) As per treatments. (ii) (a) Sandy loam. (b) N.A. (iii) 13.7.1958. (iv) (a) 3 ploughings with country plough to 3" depth followed by laddering. (b) In flat beds and ridges. (c) N.A. (d) 2"x1". (e) 1. (v) 5 to 6 C.L.fac. of F.Y.M. (vi) Local. (vii) Irrigated. (viii) 4 hoeings and weeding. (ix) N.A. (x) 18.4.1959.

2. TREATMENTS:
All combinations of (1), (2) and (3)
(1) 2 levels of N as A/S : N_1=20 and N_2=60 lb./ac.
(2) 2 levels of P_0 as Super : P_1=20 and P_2=80 lb./ac.
(3) 2 levels of K_2 as Pot. Sul. : K_1=20 and K_2=60 lb./ac.

3. DESIGN:
(i) Fact. in R.B.D. (ii) (a) 8. (b) 96’x17’. (iii) 4. (iv) (a) 9’5”x13’. (b) 7’9”x9’. (v) 1’x2’ around. (vi) Yes.
4. GENERAL:
   (i) Good.  (ii) Nil.  (iii) Tuber yield.  iv. a. 1957-1958.  b) Yes.  c) Nil.  (d) a) and b) Nil.  (vii) and (vii) Nil.

5. RESULTS:
   (i) 4719 lb ac.  (ii) 1340 lb/ac.  (iii) None of the effects is significant.  (iv) Av. yield of tuber in lb/ac.

<table>
<thead>
<tr>
<th>P1</th>
<th>P2</th>
<th>Mean</th>
<th>K1</th>
<th>K2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>4206</td>
<td>4694</td>
<td>4450</td>
<td>4001</td>
</tr>
<tr>
<td>N2</td>
<td>4894</td>
<td>5080</td>
<td>4987</td>
<td>4894</td>
</tr>
<tr>
<td>Mean</td>
<td>4550</td>
<td>4987</td>
<td>4719</td>
<td>4448</td>
</tr>
<tr>
<td>K1</td>
<td>4226</td>
<td>46.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K2</td>
<td>4875</td>
<td>5104</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 3.5 lb/ac.
S.E. of any particular mean = 4.4 lb/ac.

Crop: Ginger.
Object: To determine the optimum spacing and methods of planting for Ginger.

1. BASAL CONDITIONS:
   (i) (a) Nil.  (b) and (c) N.A.  (ii) (a) Sandy loam. (b) N.A.  12/5/1956.  (iii) a) N.A.  b) As per treatments. (c) N.A.  (d) As per treatments. (e) N.A.  (f) N at 30 lb/ac.  (g) P2O5 at 60 lb/ac.  (h) K2O at 60 lb/ac.  12/5/1956.  (i) N.A.  (j) Irrigated. (vii) N.A.  1.  (viii) N.A.

2. TREATMENTS:
   Main-plot treatments:
   3 methods of planting: M1—Flat beds. M2—Ridges and M3—Flat beds converted into ridges.
   Sub-plot treatments:
   3 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.  (c) N.  (d) a) 3"x3".  b) 2"x3" for 6" spacing, 1"x3" for 9" spacing and 1"x3" for 12" spacing.  (v) N.A.  (vi) Yes.

4. GENERAL:
   (i) N.A.  (ii) N.A.  (iii) Yield of rhizomes.  (iv) a) 1956—N.A.  (b) and (c) N.A.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS:
   (i) 4647 lb ac.  (ii) 3474 lb/ac.  (iii) 1653 lb/ac.  (iv) Main effects of M and S and interaction M x S are significant.  (v) Av. yield of ginger in lb/ac.

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>2779</td>
<td>2067</td>
<td>2533</td>
<td>2460</td>
</tr>
<tr>
<td>M2</td>
<td>6069</td>
<td>4563</td>
<td>5634</td>
<td>5422</td>
</tr>
<tr>
<td>M3</td>
<td>4386</td>
<td>5243</td>
<td>8545</td>
<td>6055</td>
</tr>
<tr>
<td>Mean</td>
<td>4411</td>
<td>3958</td>
<td>5571</td>
<td>4647</td>
</tr>
</tbody>
</table>
S.E. of difference of two
1. $M$ marginal means $= 1158$ lb./ac.
2. $S$ marginal means $= 551$ lb./ac.
3. $S$ means at the same level of $M$ $= 954$ lb./ac.
4. $M$ means at the same level of $S$ $= 1396$ lb./ac.

Crop :- Arhar (Kharif).

Ref :- Or. 55(13).
Type :- 'M'.

Object :- To find the suitable dose and method of application of phosphatic manures to Arhar.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Fallow. (c) Nil. (ii) (a) Clay. (b) N.A. (iii) 11 and 12.7.1955. (iv) (a) 4 ploughings and 2 ladderings to 4′ depth by country plough. (b) Sowing in lines. (c) 4 srs/ac. (d) 2′ ×1′. (e) 2. (v) Nil. (vi) A—64 (spreading type). (vii) Unirrigated. (viii) 2 weedings, hoeing and earthing. (ix) 57.97. (x) 28.1.1956.

2. TREATMENTS:
   Main-plot treatments : $M_1=$Applied in ring around the seed and $M_2=$Placing the fertilizers 3″ below the soil surface.
   Sub-plot treatments : 4 levels of $P_2O_5$: $P_0=0$, $P_1=20$, $P_2=40$ and $P_3=60$ lb./ac.

3. DESIGN:
   (i) Split-plot. (ii) (a) 2 main-plots/block ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 4′ ×33′, 11′ ×33′. (b) 8′ ×29′. (v) One row around the net plot. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) N.A. (iii) Height, spread and yield of grain. (iv) (a) 1955—contd. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 727 lb./ac. (ii) (a) 369.9 lb./ac. (b) 124.37 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>$P_0$</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$P_3$</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M_1$</td>
<td>689</td>
<td>666</td>
<td>804</td>
<td>713</td>
<td>718</td>
</tr>
<tr>
<td>$M_2$</td>
<td>789</td>
<td>613</td>
<td>822</td>
<td>716</td>
<td>727</td>
</tr>
<tr>
<td>Mean</td>
<td>739</td>
<td>640</td>
<td>813</td>
<td>715</td>
<td>727</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. $M$ marginal means $= 62.14$ lb./ac.
2. $P$ marginal means $= 184.9$ lb./ac.
3. $P$ means at the same level of $M$ $= 76.13$ lb./ac.
4. $M$ means at the same level of $P$ $= 151.3$ lb./ac.

Crop :- Biri and Mung (Rabi).

Ref :- Or. 58(49).
Type :- 'M'.

Object :- To study the direct application of phosphate on legume and the effect of N to the succeeding cereal crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Sandy loam. (b) N.A. (iii) 25.12.1958. (iv) (a) 2 ploughings to 4″ depth by iron plough followed by levelling. (b) Broadcasting. (c) 15 lb./ac. (d) and (e) Nil. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) Nil. (ix) 3.09″. (x) 5.4.1956.
2. TREATMENTS:

Main-plot treatments:
All combinations of (1) and (2) + a fallow.

(1) 2 legumes: \( L_1 = Biri \) and \( L_2 = Mung \).

(2) 3 levels of phosphate: \( P_0 = 0 \), \( P_1 = 40 \) and \( P_2 = 80 \) lb./ac.

Sub-plot treatments:
3 levels of N as A/S: \( N_0 = 0 \), \( N_1 = 15 \) and \( N_2 = 30 \) lb./ac.

The succeeding cereal crop was not grown in the same plot, and so the N-treatments were not applied. Hence the expt. is analysed as R.B.D.

3. DESIGN:

(i) Split-plot. (ii) 7 min-plots/block; 3 sub-plots, main-plot.

(iii) 20' \( \times \) 21'. (b) 18'9" x 20'.

4. GENERAL:

(i) Poor. (ii) N.A. (iii) Yield of grain. (iv) 'a' 1956—contd. (v) Yes. (vi) 'a' and 'b'. Nill. (vii) Nil.

5. RESULTS:

(i) 260.8 lb./ac. (ii) 3.3 lb./ac. (iii) Effect is highly significant. (iv) Av. yield in lb./ac.

<table>
<thead>
<tr>
<th>P_0</th>
<th>P_1</th>
<th>P_2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>L_1</td>
<td>614.5</td>
<td>612.2</td>
<td>390.3</td>
</tr>
<tr>
<td>L_2</td>
<td>13.9</td>
<td>38.3</td>
<td>46.5</td>
</tr>
<tr>
<td>Mean</td>
<td>314.2</td>
<td>249.7</td>
<td>218.4</td>
</tr>
</tbody>
</table>

S.E.,mean = 1.9 lb./ac.

Crop: Mung (Kharif).
Centre: Balasore (c.f.).
Ref: Or. 59(SFT).
Type: 'M'.

Object: Type C. To compare the response of leguminous crops to alternative sources and levels of phosphate.

1. BASAL CONDITIONS:

(i) to (c) N.A. (ii) Saline. (iii) Nil. (iv) and (v) N.A. (vi) June-July. (vii) 'a' and (viii) N.A. (x) September.

2. TREATMENTS:

0 = Control 'no manure'.
\( P_1 = 30 \text{ lb.} \text{ac. of } P_2O_5 \text{ as Super.} \)
\( P_2 = 60 \text{ lb.} \text{ac. of } P_2O_5 \text{ as Super.} \)
\( P_1' = 30 \text{ lb.} \text{ac. of } P_2O_5 \text{ as Dicalcium Phos.} \)
\( P_2' = 60 \text{ lb.} \text{ac. of } P_2O_5 \text{ as Dicalcium Phos.} \)

3. DESIGN:

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 recipe 1 circle or thana in the zone and the circle thana is changed every two years within the same zone. Each field assistant is required to conduct 31 trials in a year. 8 on kharif cereal, 8 on a rabi cereal. 8 on each crop, 4 on an oilseed crop and 1 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the four zones in each district every year. These experiments are laid out in randomly located field in randomly selected villages in each of the 4 zones at the rate of one experiment per village.
4. GENERAL:
(i) Normal. (ii) N.A. (iii) Grain yield. (iv) (a) 1959—contd. (b) No. (c) N.A. (v) As R design. (vi) and (vii) Nil.

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>823</td>
<td>913</td>
<td>1029</td>
<td>1004</td>
<td>1218</td>
</tr>
</tbody>
</table>

G.M.=997 lb./ac.; S.E.=56.4 lb./ac. and no. of trials=2.

---

Crop : Mung (Kharij).
Centre : Bolangir (c.f).
Object : Type C—To compare the response of leguminous crops to alternative sources and levels of phosphate.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Red. (iii) Nil. (iv) and (v) N.A. (vi) June—July. (vii) to (ix) N.A. (x) September.

2. TREATMENTS to 4. GENERAL:
Same as in expt. no. 59(SFT) type C on page 162 conducted at Balasore.

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>831</td>
<td>1317</td>
<td>1522</td>
</tr>
</tbody>
</table>

G.M.=1223 lb./ac.; S.E./mean=N.A. and no. of trials=2.

---

Crop : Mung (Kharij).
Centre : Dhenkanal (c.f).
Object : Type C—To compare the response of leguminous crops to alternative sources and levels of phosphate.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) Red and black. (iii) Nil. (iv) and (v) N.A. (vi) June—July. (vii) to (ix) N.A. (x) September.

2. TREATMENTS to 4. GENERAL:
Same as in expt. no. 59(SFT) type C on page 162 conducted at Dhenkanal.

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>329.1</td>
<td>436.1</td>
<td>534.9</td>
<td>452.6</td>
<td>501.9</td>
</tr>
</tbody>
</table>

G.M.=450.9 lb./ac.; S.E.=34.91 lb./ac. and no. of trials=5.

---

Crop : Mung (Kharij).
Centre : Dhenkanal (c.f).
Object : Type C—To compare the response of leguminous crops to alternative sources and levels of phosphate.

1. BASAL CONDITIONS to 4. GENERAL:
Same as in expt. no. 58(SFT) type C above conducted at Dhenkanal.
## RESULTS

### Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>872</td>
</tr>
<tr>
<td>$p_1$</td>
<td>946</td>
</tr>
<tr>
<td>$p_2$</td>
<td>922</td>
</tr>
<tr>
<td>$p_1'$</td>
<td>905</td>
</tr>
<tr>
<td>$p_2'$</td>
<td>996</td>
</tr>
</tbody>
</table>

G.M. = 928 lb./ac.; S.E. = 40.1 lb./ac. and no. of trials = 3.

### Crop: Mung (Kharif)

**Centre:** Ganjam (c.f.)

Object:—Type C—To compare the response of leguminous crops to alternative sources and levels of phosphate.

1. **BASAL CONDITIONS**:

   (i) (a) to (c) N.A.  (ii) Red and laterite.  (iii) Nil.  (iv) and (v) N.A.  (vi) June—July  (vii) to (ix) N.A.  (x) September.

2. **TREATMENTS to 4. GENERAL**:

   Same as in exp. no. 58 (SFT) type C on page 162 conducted at Balasore.

### RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>246.9</td>
</tr>
<tr>
<td>$p_1$</td>
<td>362.1</td>
</tr>
<tr>
<td>$p_2$</td>
<td>469.0</td>
</tr>
<tr>
<td>$p_1'$</td>
<td>395.0</td>
</tr>
<tr>
<td>$p_2'$</td>
<td>427.9</td>
</tr>
</tbody>
</table>

G.M. = 380.2 lb./ac.; S.E. = N.A. and no. of trials = 3.

### Crop: Mung (Kharif)

**Centre:** Mayurbhanj (c.f.)

Object:—Type C—To compare the response of leguminous crops to alternative sources and levels of phosphate.

1. **BASAL CONDITIONS**:

   (i) (a) to (c) N.A.  (ii) Red.  (iii) Nil.  (iv) and (v) N.A.  (vi) June—July  (vii) to (ix) N.A.  (x) September.

2. **TREATMENTS to 4. GENERAL**:

   Same as in exp. no. 59 (SFT) type C on page 162 conducted at Balasore.
### Results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$P'_1$</th>
<th>$P'_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0</td>
<td>1555</td>
<td>2452</td>
<td>1506</td>
<td>2576</td>
</tr>
</tbody>
</table>

G.M. = 1777 lb./ac.; S.E. = N.A. and no. of trials = 3.

---

**Crop:** Mung (*Kharif*).  
**Centre:** Sambalpur (c.f.).  
**Object:** Type C—To compare the response of leguminous crops to alternative sources and levels of phosphate.

1. **Basal Conditions:**  
   (i) (a) to (c) N.A.  
   (ii) Red and black.  
   (iii) Nil.  
   (iv) and (v) N.A.  
   (vi) June—July.  
   (vii) to (ix) N.A.  
   (x) September.

2. **Treatments to 4. General:**  
   Same as in expt. no. 59(SFT) type C on page 162 conducted at Balasore.

5. **Results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$P'_1$</th>
<th>$P'_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>296.2</td>
<td>378.5</td>
<td>452.6</td>
<td>386.7</td>
</tr>
</tbody>
</table>

G.M. = 403.2 lb./ac.; S.E. = 93.7 lb./ac. and no. of trials = 7.

---

**Crop:** Bengal gram (*Rabi*).  
**Centre:** Mayurbhanj (c.f.).  
**Object:** Type C—To compare the response of leguminous crops to alternative sources and levels of phosphate.

1. **Basal Conditions:**  
   (i) (a) to (c) N.A.  
   (ii) Red soil.  
   (iii) Nil.  
   (iv) and (v) N.A.  
   (vi) October—November.  
   (vii) to (ix) N.A.  
   (x) March—April.

2. **Treatments to 4. General:**  
   Same as in expt. no. 59(SFT) type C on page 162 conducted at Balasore.

5. **Results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$P'_1$</th>
<th>$P'_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1810</td>
<td>2436</td>
<td>2757</td>
<td>296</td>
</tr>
</tbody>
</table>

G.M. = 2480 lb./ac.; S.E. = 151.9 lb./ac. and no. of trials = 8.

---

**Crop:** Sugarcane.  
**Site:** Agri. Res. Sta., Bhubaneswar.  
**Object:** To study the effect of organic and inorganic manures applied alone and in combination on Sugarcane yield.

1. **Basal Conditions:**  
   (i) (a) Sugarcane—raatoon—paddy.  
   (b) and (c) N.A.  
   (ii) (a) Loam soil.  
   (b) N.A.  
   (iii) 29.3.1954.  
   (iv) (a) to (c) N.A.  
   (d) 5 to 10 ploughings.  
   (b) Planting in Furrows of 6" depth.  
   (c) N.A.  
   (d) Rows 3' apart.  
   (e) 20 C.L./ac of F.Y.M.  
   (v) CO—490.  
   (vi) Hoeing and weeding.  
   (ix) N.A.  
   (x) March 1955.
2. TREATMENTS:
All combinations of (1) and (2) + a control (no manure).
(1) 2 levels of N: N\(_1=80\) and N\(_2=160\) lb./ac.
(2) 3 sources of N: S\(_1=Urea\) and S\(_2=A/S\) in 1:1 ratio of N.

3. DESIGN:
(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 6. (iv) (a) 33'\(\times\)40'. (b) 30'\(\times\)37'. (v) 15' around. (vi) Yes.

4. GENERAL:
(i) Good. (ii) N.A. (iii) Yield of sugarcane. (iv) (a) 1952-1954. (b) and (c) N.C. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 8.95 tons/ac. (ii) 4.27 tons/ac. (iii) Only control vs. others is highly significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th></th>
<th>S(_1)</th>
<th>S(_2)</th>
<th>S(_3)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N(_1)</td>
<td>9.06</td>
<td>10.91</td>
<td>10.16</td>
<td>10.04</td>
</tr>
<tr>
<td>N(_2)</td>
<td>8.63</td>
<td>11.30</td>
<td>8.92</td>
<td>9.62</td>
</tr>
<tr>
<td>Mean</td>
<td>8.84</td>
<td>11.10</td>
<td>9.54</td>
<td>9.83</td>
</tr>
</tbody>
</table>

S.E. of marginal mean of S → 1.23 tons/ac.
S.E. of marginal mean of N → 1.01 tons/ac.
S.E. of body of table → 1.74 tons/ac.

---

**Crop:** Sugarcane.  
**Site:** Agri. Res. Stn., Bhubaneswar.  
**Ref:** Or. 59(16).  
**Type:** 'M'.

Object: To study the effect of different types of Nitrogenous fertilizers on the yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Dhaincha. (c) Nil. (ii) (a) Sandy loam. (b) N.A. (iii) 10.3.1959 to 12.3.1959. (iv) a, 10 ploughings first with mould board plough and then with country plough. b. Line planting. (c) 40, 3-budded setts/row. (d) Rows 2' apart. (e) - (f) 20 C.L./ac. of F.Y.M. (g) CO-881 (early). (h) Irrigated. (i) to (k) N.A.

2. TREATMENTS:
All combinations of (1) and (2) + a control (no manure).
(1) 3 doses of N: N\(_1=80\), N\(_2=120\) and N\(_3=160\) lb./ac.
(2) 3 sources of N: S\(_1=A/S\), S\(_2=Urea\) and S\(_3=C.A.N.\) in 1:1 ratio of N.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) 75'\(\times\)93'. (iii) 4. (iv) (a) 36'\(\times\)171'. (b) 36'\(\times\)121'. (v) One row on either side of length. (vi) Yes.

4. GENERAL:
(i) to (iii) N.A. (iv) (a) to (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 16.32 tons/ac. (ii) 5.08 tons/ac. (iii) Only control vs. others is significant. (iv) Av. yield of sugarcane in tons/ac.
Control = 11.30 tons/ac.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>15.0</td>
<td>18.2</td>
<td>20.7</td>
<td>17.97</td>
</tr>
<tr>
<td>S2</td>
<td>18.1</td>
<td>17.2</td>
<td>18.4</td>
<td>17.90</td>
</tr>
<tr>
<td>S3</td>
<td>12.5</td>
<td>17.3</td>
<td>14.5</td>
<td>14.77</td>
</tr>
<tr>
<td>Mean</td>
<td>15.20</td>
<td>17.57</td>
<td>17.87</td>
<td>16.88</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 1.47 tons/ac.
S.E. of body of table or control mean = 2.54 tons/ac.

Object: To study the response of CO-881 variety to high doses of N.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Laterite (sandy). (b) N.A. (iii) 16.12.1956. (iv) (a) 10 ploughings first with mould board plough and later with country plough. (b) 4000 setts/ac. (c) Flint seedbed. (d) 3' row to row. (e) = 20 C.L. of F.Y.M. (vi) CO—881 (early). (vii) Irrigated. (viii) Earthing and 3 hoeings by bullock driven hoe. (ix) N.A. (x) 4, 5.12.1957.

2. TREATMENTS:
   4 doses of N as A/S: N1=80, N2=160, N3=240 and N4=320 lb/ac. N applied in split doses of 80 lb/ac. only.

3. DESIGN:
   (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 3. (iv) (a) 24'X20', (b) 20'X18'. (v) 3' border. (vi) Yes.

4. GENERAL:
   (i) Lodged heavily due to wind on 23.7.1957. (ii) Early shoot-borer. Minimised by earthing and irrigation. (iii) Tiller count, sugarcane yield and analysis of juice. (iv) (a) to (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 36.89 tons/ac. (ii) 3.47 tons/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in lb/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>33.06</td>
<td>38.19</td>
<td>37.56</td>
<td>38.73</td>
<td>38.73</td>
<td>2.00</td>
</tr>
</tbody>
</table>

Object: To find out the suitable dose of N for getting the maximum yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 12. 13.10.1956. (iv) (a) Ploughing, levelling and opening up furrows. (b) 17,200, 3-budded setts/ac. (c) Line planting. (d) 3' row to row close planting within lines. (e) Nil. (f) N.A. (vi) CO—421. (vii) Unirrigated. (viii) 6 interculturings, 3 weedings. (ix) N.A. (x) 15.2.1958 to 18.2 1958.
2. TREATMENTS:
5 doses of N: $N_0 = 0, N_1 = 80, N_2 = 120, N_3 = 160$ and $N_4 = 200$ lb/ac.
N applied as A/S and G.N.C. in the ratio of 1:2 on 27.6.1957.

3. DESIGN:
(i) L. Sq. (ii) 5. (b) N.A. (iii) 5. (iv) a) $39' \times 39'$. (b) $33' \times 33'$. (v) 1 row alround. (vi) Yes.

4. GENERAL:
(i) Normal. (ii) N.A. (iii) Germination count, tillering count, yield data. (iv) a) 1956—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 21.73 tons/ac. (ii) 1.60 tons/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_0$</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$N_3$</th>
<th>$N_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>22.45</td>
<td>22.53</td>
<td>20.89</td>
<td>21.86</td>
<td>20.91</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Crop: Sugarcane.
Site: Sugarcane Res. Sub-Stn., Rayagada.

Object—To find out suitable dose of N for sugarcane crop.

1. BASAL CONDITIONS:
(i) (a) Sugarcane—G.M. (b) Fallow. (c) Nil. (ii) (a) Loam soil. (b) N.A. (iii) 23.6.1955. (iv) (a) 5 to 10 ploughings, levelling. (b) Planting in furrows of 6" depth. (c) N.A. (d) 3 rows apart. (e) Nil. (f) Nil. (g) CO—421 (medium). (h) Unirrigated. (i) 4 weedings and 2 intercultures. (k) N.A. (x) 12.2.1957 to 18.2.1957.

2. TREATMENTS:
4 doses of N: $N_0 = 0, N_1 = 80, N_2 = 120$ and $N_3 = 160$ lb/ac.

3. DESIGN:
(i) L. Sq. (ii) 4. (b) N.A. (iii) 4. (iv) a) $39' \times 39'$. (b) $33' \times 33'$. (v) 3' alround. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) % germination, tiller-height, yield/plot and juice analysis. (iv) (a) 1955—1957. (b) and (c) Yes. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 28.6 tons/ac. (ii) 1.96 tons/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$N_0$</th>
<th>$N_1$</th>
<th>$N_2$</th>
<th>$N_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>27.9</td>
<td>29.5</td>
<td>28.0</td>
<td>29.0</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.98</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Crop: Sugarcane (Ratoon).
Site: Sugarcane Res. Sub-Stn., Rayagada.

Object—To find out suitable doses of N for sugarcane crop.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sugarcane. (c) As per treatments. (ii) (a) Loam. (b) N.A. (iii) 12 to 16.2.1957 (harvesting of 1st crop). (iv) (a) 10 ploughings with mould board plough and later with country plough. (b) 20,000, 3-budded setts/ac. (c) Line planting. (d) 3' row to row. (e) — . (f) 120 lb/ac of N as G.N.C. and A/S in 2:1 ratio. (g) CO—421 (medium). (h) Unirrigated. (i) 2 weedings. (k) N.A. (x) 1/1.1958. to 19.1.1958.
2. TREATMENTS and 3. DESIGN:
Same as in expt. no. 55(9a) on page 168.

4. GENERAL:
(i) Normal. (ii) Nil. (iii) Germination %, count of tillers, height and sugarcane yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 9.41 tons/ac. (ii) 1.92 tons/ac. (iii) Treatment differences are significant. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

Crop :- Sugarcane (Ratoon).
Site :- Sugarcane Res. Sub-Stn., Rayagada.
Object :- To find out suitable dose of N for getting the maximum yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 12, 13.10.1956. Date: of harvest of 1st crop is N.A. (iv) (a) ploughing levelling and opening up furrows (b) line planting (c) 17,200 3-budded setts/ac. (d) 3' row to row, close planting within lines. (e) —. (v) Nil. (vi) CO—421. (vii) Unirrigated. (viii) 3 weedings and intercultures during 3 to 30.7.1958. (ix) N.A. (x) 29 and 31.1.1959.

2. TREATMENTS:
5 levels of N: N0 =0, N1 =80, N2 =120, N3 =160 and N4 =200 lb./ac. N applied as A/S and G.N.C in 2:1 ratio on 11.7.1958 by pocket method.

3. DESIGN:
(i) (a) L. Sq. (ii) 5. (b) N.A. (iii) 5. (iv) (a) 39'x39'. (b) 33'x33'. (v) One row around. vi) Yes.

4. GENERAL:
(i) N.A. (ii) N.A. (iii) Tillers count and sugarcane yield. (iv) (a) 1956—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 7.76 tons/ac. (ii) 1.97 tons/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in tons/ac.

Crop :- Sugarcane.
Site :- Sugarcane Res. Sub-Stn., Rayagada.
Object :- To study the effect of phosphate in Sugarcane yield.

1. BASAL CONDITIONS:

2. TREATMENTS:
4 doses of P2O5 as B.M. : P1 =40, P2 =80, P3 =120 and P4 =160 lb./ac.
3. DESIGN:
(i) L. Sq. (ii) 4. (b) N.A. (iii) 4. (iv) (a) 39' x 39', (b) 33' x 33'. (v) 3' around. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Sugarcane yield. (iv) (a) 1955—contd. (b) Yes. (c) N.A. (v) a, and (b) Nil.
(vi) and (vii) Nil.

5. RESULTS:
(i) 26.0 tons/acre. (ii) 2.93 tons/acre. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in tons/acre.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>P₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>25.8</td>
<td>27.0</td>
<td>26.2</td>
<td>25.0</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1.46 tons/acre.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Crop:** Sugarcane (Ratoon).  
**Site:** Sugarcane Res. Sub-Stn., Rayagada.  
**Ref:** Or. 57(16).  
**Type:** 'M'.

Object:—To study the effect of phosphate on Sugarcane yield.

1. BASAL CONDITIONS:
(i) (a) Sugarcane—G.M. (b) Sanadhamp. (c) Nil. (ii) 'a'. Loam. (b) N.A. (iii) 6.10.1955 28.3.1957 to 7.4.1957 (harvest of first crop). (iv) a) 10 ploughings with mould board plough. (b) Line planting. (c) N.A. (d) 3 between lines. (e) —. (v) 120 lb./ac of N as A.S and G.N.C. in the ratio 2 : 1 of N. (vi) CO—421 (medium). (vii) Unirrigated. (viii) Weeding twice. ix N.A. x 25.1.1958 to 28.1.1958.

2. TREATMENTS and 3. DESIGN:
Same as in expl. no. 55 (8a) on page 169.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Yield of sugarcane. (iv) (a) 1955—contd. (b) Yes. (c) Nil. (v) (a) and (b) Nil.
(vi) and (vii) Nil.

5. RESULTS:
(i) 6.51 tons/acre. (ii) 0.91 tons/acre. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in tons/acre.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>P₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>6.47</td>
<td>6.79</td>
<td>7.56</td>
<td>5.19</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.45 tons/acre.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Crop:** Sugarcane.  
**Site:** Sugarcane Res. Sub-Stn., Rayagada.  
**Ref:** Or. 56(21a).  
**Type:** 'M'.

Object:—To find out the optimum dose of phosphate for the maximum yield of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) 'a'. Loam. (b) N.A. (iii) 5. 6.10.1956. (iv) (a) 10 ploughings, first with mould board plough and then with country plough. (b) Line planting. (c) 1'000, 3-budded setts/acre.
(d) 3 row to row. (e) —. (v) 120 lb./ac of N as G.N.C. and A.S in the ratio 2 : 1 of N. (vi) CO—421. (vii) Unirrigated. (viii) 7 interculturings and 4 weedings. (ix) N.A. x 19.2.1958 to 20.2.1958.

2. TREATMENTS:
5 doses of P₂O₅ as Super : P₀ = 0, P₁ = 40, P₂ = 80, P₃ = 120 and P₄ = 160 lb./acre.

3. DESIGN:
(i) L. Sq. (ii) 5. (b) N.A. (iii) 5. (iv) (a) 39' x 39', (b) 33' x 33'. (v) One row. (vi) Yes.
4. GENERAL:
(i) Normal. (ii) N.A. (iii) Germination count, no. of tillers and sugarcane yield. (iv) (a) 1956—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 18.53 tons/ac. (ii) 1.90 tons/ac. (iii) Treatment differences are significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P_0</th>
<th>P_1</th>
<th>P_2</th>
<th>P_3</th>
<th>P_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>16.16</td>
<td>20.44</td>
<td>17.72</td>
<td>19.52</td>
<td>18.84</td>
</tr>
</tbody>
</table>

S.E./mean = 0.85 ton/ac.

---

**Crop : Sugarcane (Ratoon).**

**Site : Sugarcane Res. Sub-Stn., Rayagada.**

**Ref : Or. 58(33).**

**Type : 'M'.**

Object :- To find out the optimum dose of phosphate for getting the maximum yield of Sugarcane.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 5, 6.10.1956/date of harvest of first crop is 19, 20.2 1958. (iv) (a) 10 ploughings, 1st with mould board plough and then with country plough. (b) Line planting. (c) 17,000 3-budded setts/ac. (d) 3' row to row; close planting within lines. (e) —. (v) 120 lb./ac. of N as G.N.C. and A/S in the ratio of 2 : 1 on N basis. (vi) CO—421. (vii) Unirrigated. (viii) 3 weedings and 2 intercultures. (ix) N.A. (x) 31.1.1959.

2. TREATMENTS and 3. DESIGN:

Same as in exp. no. 56(21a) on page 170.

Super applied at planting in the furrows on 11.7.1958.

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Tillers and sugarcane yield. (iv) (a) 1956—contd. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 8.01 tons/ac. (ii) 1.71 tons/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>P_0</th>
<th>P_1</th>
<th>P_2</th>
<th>P_3</th>
<th>P_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>8.00</td>
<td>8.48</td>
<td>7.53</td>
<td>7.30</td>
<td>8.76</td>
</tr>
</tbody>
</table>

S.E./mean = 0.76 ton/ac.

---

**Crop : Sugarcane.**

**Site : Sugarcane Res. Sub-Stn., Rayagada.**

**Ref : Or. 58(38a).**

**Type : 'M'.**

Object :- To find out suitable time of application of N.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 14.10.1958. (iv) (a) N.A. (b) Line planting. (c) 17800 3-budded setts/ac. (d) 3' between lines, close planting within lines. (e) —. (v) N.A. (vi) CO—37. (vii) Unirrigated. (viii) 3 weedings and 3 intercultures with country plough. (ix) N.A. (x) 19.2.1960 to 23.2.1960.

2. TREATMENTS:

120 lb./ac. of N as A/S and G.N.C. in the ratio of 1 : 2 applied by pocket method at 6 different timings:

T_1 = All at planting, T_2 = G.N.C. at planting and A/S at monsoon, T_3 = \( \frac{1}{2} \) G.N.C. at planting and balance at monsoon, T_4 = All at monsoon, T_5 = A/S at 30 days after monsoon and G.N.C. at monsoon and T_6 = \( \frac{1}{2} \) G.N.C. at monsoon and balance 30 days after.
3. DESIGN:
   (i) L. Sq. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 39'×39'. (b) 33'×33'. (v) 3' alround. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) N.A. (iii) Germination count, tiller count, no. of millable cane and yield. (iv) 'a' 1958—
   N.A. (b) N.A. (c) Nil. (v) 'a' and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 24.21 tons/acre. (ii) 2.87 tons/acre. (iii) Treatment differences are not significant. (iv) Av. yield of sugar-
   cane in tons/acre.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>23.63</td>
<td>23.29</td>
<td>23.61</td>
<td>25.62</td>
<td>24.31</td>
<td>24.82</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1.17 tons/acre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Crop:** Sugarcane.  
**Site:** Sugarcane Res. Sub-Stn., Rayagada.  
**Ref:** Or. 58(37a).  
**Type:** 'M'.

Object: To find out suitable combination of fertilizers for Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 4.10.1958. (iv) (a) Ploughing, levelling and
   opening furrows. (b) Planting in rows. (c) 18,000, 3-budded sets acd 3' between rows. (v) N.A. (vi) CO—617. (vii)

2. TREATMENTS:
   1. Control (no manure).
   2. 120 lb./acre of N as A/S and G.N.C. in the ratio of 1:2 on N basis.
   3. 40 lb./acre of P.O. as triple Saper.
   4. Treatment 2 + treatment 3.
   5. Parry's P.K. mixture + treatment 2.
   Manurial doses as per schedule applied by pocket, method.

3. DESIGN:
   (i) L. Sq. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 39'×39'. (b) 33'×33'. (v) 3' alround. (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A. (iii) Germination counts, tiller counts, no. of millable cane and yield of sugarcane. (iv) 'a'
   1958—N.A. (b) No. (c) Nil. (v) 'a' and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 25.78 tons/acre. (ii) 2.22 tons/acre. (iii) Treatment differences are highly significant. (iv) Av. yield of sugar-
   cane in tons/acre.

<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>22.67</td>
<td>27.44</td>
<td>22.47</td>
<td>26.85</td>
<td>27.42</td>
<td>27.84</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.91 tons/acre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Crop:** Sugarcane.  
**Site:** Sugarcane Res. Sub-Stn., Rayagada.  
**Ref:** Or. 55(7a).  
**Type:** 'M'.

Object: To study the effect of lime on yield and quality of Sugarcane under the conditions of Rayagada.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 13.10.1955. (iv) (a) 5 to 10 ploughings and levelling. (b) Planting in furrows. (c) N.A. (d) 3' between rows. (e)—. (v) N.A. (vi) CO.—421 (medium). (vii) Unirrigated. (viii) 2 weedings and 2 interculterings. (ix) N.A. (x) 8.4.1957 to 16.4.1957

2. TREATMENTS:
4 doses of lime : L1 =1/3, L2 =2/3, L3 =1 and L4 =4/3 ton/jac.

3. DESIGN:
(i) L. Sq. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 39' x 39'. (b) 35' x 33'. (v) 3' around. (vi) Yes.

4. GENERAL:
(i) Good. (ii) N.A. (iii) % germination, tiller, height, yield/plot and juice analysis. (iv) (a) 1955—contd. (b) and (c) Yes. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 24.09 tons/jac. (ii) 2.72 tons/jac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in tons/jac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av yield</td>
<td>24.82</td>
<td>23.10</td>
<td>24.36</td>
<td>24.09</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1.36 tons/jac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Sugarcane (Ratoon).
Site :- Sugarcane Res. Sub-Stn., Rayagada.
Object :- To find the effect of lime on yield and quality of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Sugarcane. (c) As per treatments. (ii) (a) Loam. (b) N.A. (iii) 13.10.1955; 8 to 16.4.1957, harvest of first crop. (iv) (a) 5 to 10 ploughings with mould board plough. (b) Planting in furrows. (c) N.A. (d) 3' between furrows. (e)—. (v) N.A. (vi) CO.—421. (medium). (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 28.1.1958 to 29.1.1958.

2. TREATMENTS and DESIGN:
Same as in exp. no. 55 (7a) on page 172.

4. GENERAL:
(i) Good. (ii) N.A. (iii) Yield of sugarcane. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) (a) zac (v) C, Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 5.96 tons/jac. (ii) 2.01 tons/jac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in tons/jac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av yield</td>
<td>5.85</td>
<td>7.15</td>
<td>5.20</td>
<td>5.64</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1.00 tons/jac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Sugarcane.
Site :- Sugarcane Res. Sub-Stn., Rayagada.
Object :- To find out the effect of application of lime on the yield and quality of Sugarcane.

1. BASAL CONDITIONS:
(i) a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 22.10.1956. (iv) (a) Ploughing, levelling and opening of furrows. (b) Line planting. (c) 46,3-budded setts/row. (d) 3' from row to row. (e)—. (v) 120 lb./ac. of N as G.N.C. and A/S in the ratio 2 : 1. (vi) CO.—421 (medium). (vii) Unirrigated. (viii) 5 interculterings and 2 weedings. (ix) N.A. (x) 21,22.2.1958.
2. TREATMENTS

4 doses of lime as Cal. carbide : L_0, L_1, L_2, L_3 and L_4 = 0, 1, 2, 3, and 4 ton/ha.

3. DESIGN:

(i) L_0, (ii) 1, (iii) 2, (iv) (a) 39\' x 39\', (b) 31\' x 33\', (c) 3 almost round, (d) Yes.

4. GENERAL:

(i) Below normal. (ii) Eriton 1\(^{st}\) applied to sets; Gamma x 21, 5 lb./ac. and (b) Monthly germination count, tilling counts and yield of cane. (iv) (a) 1956 - contd. (b) N, (c) N, (d) N, and (e) N, and (f) N, and (g) N, and (h) N.

5. RESULTS:

(i) 12.66 tons/ha. (ii) 3.87 tons/ha. (a) Treatment differences are not significant. (b) Av. yield of sugarcane in tons/ha.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L_0</th>
<th>L_1</th>
<th>L_2</th>
<th>L_3</th>
<th>L_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>12.26</td>
<td>11.71</td>
<td>14.76</td>
<td>11.88</td>
<td></td>
</tr>
<tr>
<td>S.E./mean</td>
<td>1.91</td>
<td>1.92</td>
<td>1.93</td>
<td>1.94</td>
<td></td>
</tr>
</tbody>
</table>

---

**Crop**: Sugarcane (Solenostachys saccharata).  
**Site**: Sugarcane Res., Sub-Stn., Rayagada.  
**Type**: Or. 58(32).

Object: To study the effect of application of lime on the yield and quality of Sugarcane.

1. BASAL CONDITIONS:

(a) Nil, (b) N.A. (b) Loom. (c) N.A. (b) 22.10.1956, 22.11.1956, harvesting of first crop. (a) Ploughings, levelling and opening up furrows. (b) Line planting. (c) 46, 3-budded sets per row. (d) 3 rows to row. (e) (f) 120 lb./ac. of N as G.N.C. and (g) A.S. in the ratio of 2 : 1 applied on 20.7.1956, by potted method. (h) CO_4 = 221. (i) Unirrigated. (j) (k) 3 weeding's and 2 interculturings. (l) N.A. 2.3.1959.

2. TREATMENTS and 3. DESIGN:

Same as in exp. nos. 56-58, on page 173.

4. GENERAL:

(i) and (a) N.A. (b) Yields, yield of sugarcane. (c) 1956 N.A. (d) N.A. (e) N. (f) 11 and (g) N, (h) and (i) N.

5. RESULTS:

(i) 1.69 tons/ac. (ii) 4.34 tons/ac. (iii) Treatment differences are not significant. (iv) Av. yield of grain in tons/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L_0</th>
<th>L_1</th>
<th>L_2</th>
<th>L_3</th>
<th>L_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>3.55</td>
<td>5.33</td>
<td>4.95</td>
<td>5.13</td>
<td></td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.85</td>
<td>0.85</td>
<td>0.85</td>
<td>0.85</td>
<td></td>
</tr>
</tbody>
</table>

---

**Crop**: Sugarcane.  
**Site**: Sugarcane Res., Sub-Stn., Rayagada.  
**Type**: Or. 57(31).

Object: To investigate the effect of application of lime on the yield and quality of Sugarcane.

1. BASAL CONDITIONS:

(a) Nil, (b) Loom. (c) N.A. (d) Loom. (e) N.A. (f) 10.10.1957. (g) (a) Ploughed twice with wooden plough, levelled and furrows opened with country plough. (b) Line planting. (c) N.A. (d) 3 rows to row. (e) — 120 lb./ac. of N as A.S. and G.N.C. in the ratio of 2 : 1 applied by potted method or 9.7.1958. (f) CO_4 = 227. (g) Unirrigated. (h) 5 weeding's and 3 interculturings with country plough. (i) and (k) N.A.
2. TREATMENTS and DESIGN:
Same as in expt. no. 59(20 a) on page 173. Treatments applied just before final preparation of the land (9.10.1957.) and afterwards field was ploughed twice with wooden plough.

4. GENERAL:
(i) and (ii) N.A. (iii) Germination count, tillers and yield. (iv) (a) 1956—N.A. (b) and (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 24.00 tons/ac. (ii) 0.70 tons/ac. (iii) Treatment differences are highly significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>20.79</td>
<td>27.16</td>
<td>25.20</td>
<td>22.84</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.35 ton/ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop : Sugarcane (Ratoon).
Site : Sugarcane Res. Sub-Stn., Rayagada.
Ref : Or. 58(30).
Type : 'M'.

Object :—To investigate the effect of application of lime on the yield and quality of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 10.10.1957; harvest ng dates of 1st crop—N.A. (iv) (a) Ploughed twice with wooden plough, levelled and furrows opened with country plough. (b) Planted in furrows. (c) N.A. (d) 3 row to row. (e) —. (v) 120 lb./ac. of N as G.N.C. and C.A.N. in the ratio of 2 : 1 applied by pocket method. (vi) CO.—421. (vii) Unirrigated. (viii) 2 weedings. ix. N.A. x) 21.12.1959 to 23.12.1959.

2. TREATMENTS and DESIGN:
Same as in expt. no. 56(20 a) on page 173.

4. GENERAL:
(i) N.A. (ii) N.A. (iii) Tiller count, yield of sugarcane. (iv) (a) 1956—N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) Nil. (vii) Nil.

5. RESULTS:
(i) 19.05 ton/ac. (ii) 1.39 tons/ac. (iii) Treatment differences are significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>L₀</th>
<th>L₁</th>
<th>L₂</th>
<th>L₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>16.39</td>
<td>19.15</td>
<td>20.59</td>
<td>20.10</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>0.70 ton/ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop : Sugarcane.
Ref : Or. 57(2).
Type : 'M'.

Object :—To study the Nitrogen requirement of Sugarcane crop for maximum production.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) Groundnut. (c) N.A. (ii) (a) Loam. (b) pH 7.5; TSS 0.2 millimhos/cm. (iii) 5.3.1957. (iv) (a) 5 ploughings. (b) Planted in furrows. (c) to (e) N.A. (f) F.Y.M. at 10 tons/ac., Super at 40 lb./ac. and Pot. Sul. at 30 lb./ac. (v) Kola Bungla (Local). (vi) Irrigated. (vii) Weeding, hozing, gap-filling, earthing up, propping and wrapping. (ix) N.A. (x) 10.3.1958.

2. TREATMENTS:
5 doses of N as A/S : N₀=0, N₁=50, N₂=100, N₃=150 and N₄=200 lb./ac.
3. DESIGN:

(i) L. Sq. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a) 24'x22' (b) 18'x20' (v) 2'x1'. (vi) Yes.

4. GENERAL:

(i) Very good. (ii) White ant attack was checked by spraying Dieldrine. (iii) Height of the millable cane of 10 plants from each plot, girth at the middle of the cane and sugarcane yield. (iv) (a) No. (b) and (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 27.89 tons/ac. (ii) 12.54 tons/ac. (iii) Treatment-different are not significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>27.21</td>
<td>27.14</td>
<td>28.92</td>
<td>29.27</td>
</tr>
<tr>
<td>S.E./mean</td>
<td>5.61 tons/ac.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Sugarcane.

Ref :- Or. 57(22).

Site :- Agri. Demonstration Farm, Barpalli.

Type :- ‘MV’.

Object :- To study the response of different levels of nitrogen to different varieties of Sugarcane.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 26 to 28.1.1957. (iv) (a) 10 ploughings. (b) Line planting. (c) N.A. (d) 3 between rows. (e) - (f) 10 C.L./ac. of P.Y.M., 40 lb/ac. of P.O. as Super applied at planting and gamma cyanuric acid at 20 lb/ac. (vi) As per treatments. (vii) N.A (viii) 3 hoeings and earthing up, wrappings and propplings. (ix) N.A. (x) 13 to 17.4.1958.

2. TREATMENTS:

Main-plot treatments :


Sub-plot treatments :

3 levels of N as A/S : N1 = 40, N2 = 80 and N3 = 120 lb/ac.

3. DESIGN:

(i) Split-plot. (ii) (a) 12 main-plots block; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) Main-plot: 45'x22'. Sub-plot: 15'x22' (b) 12'x22'. (v) N.A. (vi) Yes.

4. GENERAL:

(i) Good. (ii) N.A. (iii) Yield of sugarcane. (iv) (a) No. (b) and (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 29.81 tons/ac. (ii) (a) 9.65 tons/ac. (b) 5.13 tons/ac. (iii) Only N effect is highly significant. (iv) Av. yield of sugarcane in tons/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>V11</th>
<th>V12</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.99</td>
<td>36.68</td>
<td>37.07</td>
<td>28.21</td>
<td>38.13</td>
<td>25.58</td>
<td>42.75</td>
<td>29.51</td>
<td>31.45</td>
<td>33.15</td>
<td>33.52</td>
<td>24.19</td>
<td>32.18</td>
</tr>
<tr>
<td>25.03</td>
<td>37.37</td>
<td>29.12</td>
<td>26.37</td>
<td>29.66</td>
<td>21.34</td>
<td>41.00</td>
<td>26.32</td>
<td>31.23</td>
<td>33.39</td>
<td>27.60</td>
<td>28.51</td>
<td>29.82</td>
</tr>
<tr>
<td>18.22</td>
<td>27.94</td>
<td>25.88</td>
<td>26.69</td>
<td>30.10</td>
<td>20.43</td>
<td>32.68</td>
<td>28.44</td>
<td>27.35</td>
<td>32.53</td>
<td>29.02</td>
<td>25.83</td>
<td>27.43</td>
</tr>
</tbody>
</table>

Mean | 25.04 | 34.00 | 29.02 | 27.09 | 32.63 | 22.45 | 38.81 | 29.43 | 30.01 | 32.03 | 30.03 | 26.17 | 29.81 |

S.E. of difference of two

2. N marginal means = 1.21 tons/ac.
3. N means at the same level of V = 4.19 tons/ac.
4. V means at the same level of N = 5.69 tons/ac.
Crop :- Sugarcane.

Object:-To study the response of three varieties of Sugarcane to application of N.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. 
(ii) (a) Sandy loam. (b) N.A. 
(iii) 4, 5.2.1958. 
(iv) (a) to (c) N.A. 
(v) 20 C.L. of F.Y M. applied. 
(vi) As per treatments. 
(vii) Irrigated. 
(viii) 1 weeding and 2 hoeings. 
(ix) N.A. 
(x) 14.1.1959.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 varieties : V1 = CO 872, V2 = CO—881 and V3 = CO—897.
(2) 3 levels of N : N1 = 80, N2 = 160 and N3 = 240 lb./ac. 

3. DESIGN:
(i) Fact. in R.B.D. 
(ii) (a) 9. (b) N.A. 
(iii) 4. 
(iv) (a) N.A. (b) 30'X22'. 
(v) One row around. 
(vi) Yes.

4. GENERAL:
(i) Normal. 
(ii) Attack of borer. 
(iii) Germination %, tillering, sugarcane yield, height and % borer attack. 
(iv) (a) 1958—N.A. 
(b) N.A. 
(c) No. 
(v) (a) and (b) N.A. 
(vi) and (vii) Nil.

5. RESULTS:
(i) 18.51 tons/ac. 
(ii) 10.31 tons/ac. 
(iii) Only V effect is highly significant. 
(iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>11.30</td>
<td>9.31</td>
<td>12.88</td>
<td>11.16</td>
</tr>
<tr>
<td>V2</td>
<td>22.27</td>
<td>24.15</td>
<td>23.94</td>
<td>23.45</td>
</tr>
<tr>
<td>V3</td>
<td>18.20</td>
<td>23.14</td>
<td>21.44</td>
<td>20.93</td>
</tr>
<tr>
<td>Mean</td>
<td>17.26</td>
<td>18.87</td>
<td>19.42</td>
<td>18.51</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 2.98 tons/ac.
S.E. of body of table = 5.15 tons/ac.

Crop :- Sugarcane.

Object:-To find out the optimum dose of N for the recommended red-rot resistant varieties of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) Nil. 
(b) Dhainchha. 
(c) Nil. 
(ii) (a) Sandy loam. 
(b) N.A. 
(iii) 18 and 19.5.1959. 
(iv) Ploughing, levelling and opening up furrows. 
(b) 25, 3-budded sets/row. 
(c) Line planting. 
(d) Row to row 3'.
(e) N.A. 
(v) 20 C.L./ac. of F.Y.M. 
(vi) As per treatments. 
(vii) Irrigated. 
(viii) 3 weedings, 3 hoeings and earthing up. 
(ix) N.A. 
(x) N.A.

2. TREATMENTS:
All combinations of (1) and (2)
(1) 3 varieties : V1 = CO—872, V2 = CO—881 and V3 = CO—897.
(2) 3 levels of N as A/S: N1 = 80, N2 = 160 and N3 = 240 lb./ac.

3. DESIGN:
(i) Fact. in R.B.D. 
(ii) (a) 9. 
(b) 72'X108'. 
(iii) 3. 
(iv) (a) 36'X22'. 
(b) 30'X22'. 
(v) Two rows one each on either side of length. 
(vi) Yes.

GENERAL:
(i) Satisfactory. 
(ii) N.A. 
(iii) Tillers, yield of cane, juice quality and germination count. 
(iv) (a) 1958—contd. 
(b) No. 
(c) Nil. 
(v) (a) and (b) Nil. 
(vi) and (vii) Nil.
5. RESULTS:

(i) 16.73 tons/ac.  
(ii) 0.75 ton/ac. 
(iii) All the effects are highly significant. 
(iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>12.04</td>
<td>12.54</td>
<td>16.64</td>
<td>13.74</td>
</tr>
<tr>
<td>V2</td>
<td>14.71</td>
<td>12.68</td>
<td>15.00</td>
<td>14.13</td>
</tr>
<tr>
<td>V3</td>
<td>20.79</td>
<td>23.71</td>
<td>22.46</td>
<td>22.32</td>
</tr>
<tr>
<td>Mean</td>
<td>15.85</td>
<td>16.31</td>
<td>18.03</td>
<td>16.73</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 0.25 tons/ac.  
S.E. of body of table = 0.43 tons/ac.

Crop: - Sugarcane.  
Object: - To find out the effect of quality of seeds taken from plots manured with different doses of N.

1. BASAL CONDITIONS:

(i) Nil. (b) and (c) N.A. (ii) Sandy loam. (b) N.A. (iii) 6.12 lb/ac. of N as A/S applied on 27.5.1958. (iv) CO-88. (v) 40 lb/ac. of N as A/S applied on 27.5.1958. (vi) Irrigated. (vii) One weeding. 2 hoeings and 1 earthing up. 

2. TREATMENTS:

4 kinds of sets taken from plots manured with: S1 = 80, S2 = 160, S3 = 240 and S4 = 3/0 lb/ac. of N as A/S.

3. DESIGN:

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 39\times39\times39\times39. (iv) C. (v) Row around. 

4. GENERAL:

(i) Normal. (ii) N.A. (iii) Germination\%, tiller count and yield of sugarcane. (iv) A/1 1958—N.A. (b) No. (c) Nil. (v) A/1 and (b) Nil. (vi) Nil. (vii) Raw data N.A.

5. RESULTS:

(i) 23.54 tons/ac. (ii) 2.68 tons/ac. (iii) Treatment differences are highly significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>Av. yield</th>
<th>S.E./mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18.05</td>
<td>22.01</td>
<td>24.65</td>
<td>29.44</td>
<td>1.34 tons/ac.</td>
<td></td>
</tr>
</tbody>
</table>

Crop: - Sugarcane.  
Site: - Sugarcane Res. Sub-Stn., Rayagada.  
Object: - To test the effect of different spacings and different seed rates on the yield of Sugarcane.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) and (c) N.A. (ii) Loam. (b) N.A. (iii) 30.10.1958 and 1.11.1958. (iv) (a) N.A. (b) Planting in furrows. (c) and (d) As per treatments. (e) —. (v) 120 lb/ac. of N as G.N.C. and C/A/N in ratio of 2:1 by pocket method. (vi) CO—617. (vii) Unirrigated. (viii) 5 weedings and 4 interculturing with country plough. 

Crop: - Sugarcane.  
Object: - To find out the effect of quality of seeds taken from plots manured with different doses of N.
2. TREATMENTS:

Main-plot treatments:
3 spacings between rows: \( S_1 = 2', S_2 = 2.5' \) and \( S_3 = 3' \).

Sub-plot treatments:
3 seed rates: \( R_1 = 16,000 \), \( R_2 = 20,000 \) and \( R_3 = 24,000 \) three-budded setts/ac.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) \( 30' \times 30' \). (v) N.A. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) N.A. (iii) Germination count, tiller count, no. of millable cane and sugarcane yield. (iv) (a) 1959—N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

<table>
<thead>
<tr>
<th></th>
<th>( R_1 )</th>
<th>( R_2 )</th>
<th>( R_3 )</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>( S_1 )</td>
<td>28.40</td>
<td>27.57</td>
<td>27.29</td>
<td>27.75</td>
</tr>
<tr>
<td>( S_2 )</td>
<td>27.48</td>
<td>27.90</td>
<td>28.00</td>
<td>27.79</td>
</tr>
<tr>
<td>( S_3 )</td>
<td>26.86</td>
<td>28.78</td>
<td>27.85</td>
<td>27.83</td>
</tr>
</tbody>
</table>

Mean 27.58 28.08 27.71 27.79

S.E. of difference of two
1. S marginal means
2. R marginal means
3. R means at the same level of S
4. S means at the same level of R

Crop: Sugarcane.
Site: Sugarcane Res. Sub-Stn., Rayagada.
Object: To find out the effect of cutting sugarcane stalks on the yield and growth of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 24.9.1955 and 28.9.1955. (iv) (a) N.A. b' Planting in furrows. (c) to (e) N.A. (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) 3 weedings and 1 interculturing. (ix) N.A. (x) 20.2.1957 to 7.3.1957.

2. TREATMENTS:
Main-plot treatments:
2 cultural practices: \( C_0 \) = No cutting of the stalk and \( C_1 \) = Cutting the stalk.

Sub-plot treatments:
4 varieties: \( V_1 \) = CO—419 (late), \( V_2 \) = CO—421 (medium), \( V_3 \) = CO—449 (medium) and \( V_4 \) = CO—527 (early).

3. DESIGN:
(i) Split-plot. (ii) (a) 2 main-plots/replication and 4 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) \( 39' \times 39' \). (b) \( 33' \times 33' \). (v) 3' around. (vi) Yes.

4. GENERAL:
(i) Good. (ii) N.A. (iii) Raw cane weight and juice analysis. (iv) (a) 1955—contd. (b) and (c) Yes. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 24.6 tons/ac. (ii) (a) 2.09 tons/ac. (b) 2.43 tons/ac. (iii) Only V effect is highly significant. (iv) Av. yield of sugarcane in tons/ac.
Crop : Sugarcane (Ratoon).
Site : Sugarcane Res. Sub-Stn., Rayagada.
Object : To find out the effect of cutting sugarcane stalks on the yield of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Sugarcane. (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 24.9.1955 to 2.1.1957
   (date of harvest of first crop). (iv) (a) 10 ploughings with mould board plough. (b) Line planting. (c) N.A.
   (d) 3' between rows. (e) —. (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) 3 weedings.
   (ix) N.A. (x) 31.1.1958 to 5.2.1958.

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no. 55(10) on page 179.

4. GENERAL:
   (i) Good. (ii) N.A. (iii) Sugarcane yield and juice analysis. (iv) (a) 1955—contd. (v) Yes. (vi) Nil. (vii) and (viii) Nil.

5. RESULTS:
   (i) 9.01 tons/ac. (ii) (a) 1.73 tons/ac. (b) 2.50 tons/ac. (iii) Only V effect is highly significant. (iv) Av.
   yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th></th>
<th>V₁</th>
<th>V₂</th>
<th>V₃</th>
<th>V₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C₀</td>
<td>13.94</td>
<td>4.98</td>
<td>9.30</td>
<td>8.38</td>
<td>9.15</td>
</tr>
<tr>
<td>C₁</td>
<td>13.39</td>
<td>5.64</td>
<td>8.06</td>
<td>8.38</td>
<td>8.87</td>
</tr>
<tr>
<td>Mean</td>
<td>13.66</td>
<td>5.31</td>
<td>8.68</td>
<td>8.38</td>
<td>9.01</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. C marginal means = 0.55 tons/ac.
2. V marginal means = 1.12 tons/ac.
3. V means at the same level of C = 1.58 tons/ac.
4. C means at the same level of V = 1.47 tons/ac.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 12.10.1957. (iv) (a) Ploughing, levelling and opening of furrows. (b) Planting in lines. (c) N.A. (d) 3' between rows. (e) —. (v) 120 lb/ac. of N as A/S and powdered oil cake in the ratio 2 : 1 on N basis by pocket method on 9.7.1958. (vi) As per treatments. (vii) Unirrigated. (viii) 4 weedings and 2 interculturings with country plough. (ix) N.A. (x) 19 to 22.2.1959.

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

(1) 2 cultural practices: C_0 = No cutting of the stalk and C_1 = Cutting of stalk.

(2) 4 varieties: V_1 = C0-419, V_2 = C0-421, V_3 = C0-449 and V_4 = C0-527.

3 DESIGN:
(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) 39' x 39'. (b) 33' x 33'. (v) One row around. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) N.A. (iii) Germination count, tiller count and yield. (iv) (a) 1955—N.A. (v) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 22.84 tons/ac. (ii) 3.79 tons/ac. (iii) Both C and V effects are significant. Interaction is not significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th></th>
<th>V_1</th>
<th>V_2</th>
<th>V_3</th>
<th>V_4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_0</td>
<td>19.40</td>
<td>22.62</td>
<td>25.44</td>
<td>19.25</td>
<td>21.68</td>
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<tr>
<td>C_1</td>
<td>25.13</td>
<td>27.12</td>
<td>25.97</td>
<td>17.79</td>
<td>24.00</td>
</tr>
<tr>
<td>Mean</td>
<td>22.26</td>
<td>24.87</td>
<td>25.70</td>
<td>18.52</td>
<td>22.84</td>
</tr>
</tbody>
</table>

S.E. of marginal mean of C = 1.09 tons/ac.
S.E. of marginal mean of V = 1.55 tons/ac.
S.E. of body of table = 2.19 tons/ac.

Crop :- Sugarcane (Ratoon).
Site :- Sugarcane Res. Sub-Stn., Rayagada.

Ref :- Or. 59(35).
Type :- 'CV'.

Object :- To test the effect of cutting cane stalks on the yield of different varieties of Sugarcane.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 12.10.1957/19 to 22.2.1959 (date of harvest of first crop). (iv) (a) Ploughing, levelling and opening of furrows. (b) Line planting. (c) N.A. (d) Rows 3' apart. (e) —. (v) 120 lb/ac. of N as mixture of A/S and G.N.C. in the ratio 1 : 2 by pocket method on 9.7.1958. (vi) As per treatments. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 24.12.1959 to 27.12.1959.

2. TREATMENTS and 3. DESIGN:
Same as in expt. no. 57(34) on page 180.

4. GENERAL:
(i) and (ii) N.A. (iii) Tilling, germination and yield of cane. (iv) (a) 1955—N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 19.48 tons/ac. (ii) 3.10 tons/ac. (iii) Only V effect is significant. (iv) Av. yield of sugarcane in tons/ac.
Crop :- Sugarcane.  
Site :- Sugarcane Res. Sub-Stn., Rayagada.  
Ref :- Or. 58(40 a).  
Type :- 'CV'.

Object :- To test the effect of cutting cane stalks on the yield of different varieties of Sugarcane.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A.  
   (ii) (a) Loam. (b) N.A.  
   (iii) 25.10.1958 to 27.10.1958.  
   (iv) (a) N.A.  
   Planted in rows.  
   (v) N.A.  
   (vi) 3' between rows.  
   (c) N.A.  
   (d) 120 lb. ac. of N is G.N.C. and C/A/N in the ratio of 2:1 applied by pocket method on 25, 26,6.1959.  
   (e) As per treatments.  
   (f) Unirrigated.  
   (g) 5 weedings and 4 intercultures with country plough.  
   (h) N.A.  

2. TREATMENTS:
   All combinations of (1) and (2):
   (1) 2 cultural practices: C0 = No cutting of the stalk and C1 = Cutting of the stalk.  
   (2) 4 varieties: V1 = C0-617, V2 = C0-605, V3 = C0-449 and V4 = C0-451.

3. DESIGN:
   (i) Fact. in R.B.D.  
   (ii) (a) 8. (b) N.A.  
   (iii) 5.  
   (iv) (a) 3939 = 39.  
   (b) 3333 = 33.  
   (v) 3' around.  
   (vi) Yes.

4. GENERAL:
   (i) and (ii) N.A.  
   (iii) Germination count, tiller count, no. of millable cane and yield.  
   (iv) (a) 1956 - N.A.  
   (b) No.  
   (c) Nil.  
   (v) (a) and (b) Nil.  
   (vi) and (vii) Nil.

5. RESULTS:
   (i) 31.80 tons/ac.  
   (ii) 3.04 tons/ac.  
   (iii) Only V effect is highly significant.  
   (iv) Av yield of cane in tons/ac.

Crop :- Sugarcane.  
Site :- Sugarcane Res. Sub-Stn., Rayagada.  
Ref :- Or. 58(39).  
Type :- 'D'.

Object :- To study the effect of pre-treatment of seed sets for resistance to attack of pests on Sugarcane.
1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Loam. (b) N.A. (iii) 211.5.1958. (iv) (a) N.A. (b) Lime planting. (c) 17000, 3-hulled setts. (d) 3' between lines. (e)---. (v) 120 lb.ac. of N as G.N.C. and C/A/N in the ratio 2:1 applied by pocket method on 26, 27.6.1959. (vi) CO-617. (vii) Unirrigated. (viii) 5 weedings and 2 intercultures with country plough. (ix) and (x) N.A.

2. TREATMENTS:
5 soaking treatments for setts: T1=soaking in cold water for 15 hrs., T2=in Aretan 25% for 12 hrs., T3=in lime 1% for 12 hrs., T4=in trace elements 20 ppm for 20 hrs mi, T5=in hot water of 52°C for 1 hr.

3. DESIGN:
(i) L. Sq. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a) 39°×39°. (b) 33°×33°. (v) 3' around. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Attacked by white ants. (iii) Germination count, tiller count, no. of millable cane and yield. (iv) (a) 1958—N.A. (b) No. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 25.73 tons/ac. (ii) 2.19 tons/ac. (iii) Treatment differences are not significant. (iv) Av. yield of sugarcane in tons/ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>25.56</td>
</tr>
<tr>
<td>T2</td>
<td>26.50</td>
</tr>
<tr>
<td>T3</td>
<td>25.28</td>
</tr>
<tr>
<td>T4</td>
<td>25.17</td>
</tr>
<tr>
<td>T5</td>
<td>26.12</td>
</tr>
</tbody>
</table>

S.E./mean = 2.19 tons/ac.

Crop : Cotton (Kharif).
Ref :- Or. 55(9).
Type :- 'M'.

Object :-To find out the economic dose of fertilizer for maximum production of Cotton.

1. BASAL CONDITIONS:
(i) (a) Cotton—Fallow. (b) and (c) Nil. (ii) (a) Clay loam. (b) N.A. (iii) 26.7.1955. (iv) (a) 6 ploughings by country plough and 3 ladderings. (b) Line sowing. (c) 5 srs/ac. (d) 2' x 14. (e) 2 seeds/line. (f) Nil. (g) Lxemt (late). (h) Irrigated. (i) Weeding, 3 hoeings and earthings. (j) 67.97'. (k) Nil. 6 pickings from 5.3.1956 to 10.5.1956.

2. TREATMENTS:
All combinations of (1) and (2) + an extra treatment.
(1) 3 levels of N as A/S: N0=0, N1=20 and N2=40 lb/ac.
(2) 3 levels P2O5 as Super: P0=0, P1=50 and P2=100 lb/ac.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) 36°×16'. (b) 32°×13°'. (v) One row around. (vi) Yes.

4. GENERAL:
(i) Lodging due to heavy rainfall and wind. (ii) Nil. (iii) No. of bolls/plant and no. of bolls dropped/plant. (iv) (a) 1955—contd. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 1832 lb/ac. (ii) 334.0 lb/ac. (iii) No effect is significant. (iv) Av. yield of kapas n lb/ac.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>N0</td>
<td>1708</td>
<td>1952</td>
<td>1720</td>
<td>1793</td>
</tr>
<tr>
<td>N1</td>
<td>1916</td>
<td>1618</td>
<td>1648</td>
<td>1727</td>
</tr>
<tr>
<td>N2</td>
<td>2142</td>
<td>1956</td>
<td>1770</td>
<td>1956</td>
</tr>
<tr>
<td>Mean</td>
<td>1922</td>
<td>1842</td>
<td>1713</td>
<td>1826</td>
</tr>
</tbody>
</table>

T = 1882 lb/ac.
Crop : Cotton (Rabi).


Object : To find out suitable manurial dose for Cotton.

1. BASAL CONDITIONS :

(i) (a) Cotton—Fallow. (b) Fallow. (c) Nil. (ii) (a) Clay. (b) N.A. (iii) 2, 3.11.1956. (iv) (a) 6 ploughings with country plough and 3 ladderings. (b) Line sowing. (c) 5 yrs.; c. d. 2'×1' ; (e) 2 seed/hole. (vi) Nil. (vii) Laxmi (late). (viii) 6 irrigations. (ix) 2 weedings and one hoeing. (x) 4.88'. (xi) 9 and 23.5.1957.

2. TREATMENTS :

Same as in expt. no. 55(9) on page 183. Super and K2O applied on 2.11.1956 and A'S on 7.1.1957.

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) 13'. (v) 60′×30′. (vi) 1 row a'round the net plot. (vii) Yes.

4. GENERAL :

(i) N.A. (ii) Nil. (iii) Kapas yield. (iv) a 1955—1956. (b) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS :

(i) 797 lb./ac. (ii) 180 lb./ac. (iii) Main effect of N and T vs. others are highly significant. (iv) Av. yield of kapas in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>478</td>
<td>603</td>
<td>511</td>
<td>531</td>
</tr>
<tr>
<td>N₁</td>
<td>710</td>
<td>730</td>
<td>774</td>
<td>738</td>
</tr>
<tr>
<td>N₂</td>
<td>1009</td>
<td>948</td>
<td>982</td>
<td>980</td>
</tr>
<tr>
<td>Mean</td>
<td>732</td>
<td>760</td>
<td>756</td>
<td>749</td>
</tr>
</tbody>
</table>

S.E. of N or P marginal mean = 60.0 lb./ac.
S.E. of body of table = 103.9 lb./ac.

Crop : Cotton.

Site : Cotton Res. and Development Stn., Chakuli.

Ref : Or. 59(33).

Type : 'M'.

Object : To study the effect of lime in combination with N, P and K on Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 25.11.1959. (iv) (a) 3 ploughings by desi plough. (b) Dibbling. (c) 15 yrs.; (d) and (e) N.A. (v) 3 tons/ac of compost by broadcasting and green manuring of Dhaincha. (vi) N.A. (vii) Irrigated. (viii) 1 weeding, 2 hoeings and earthing. (ix) and (x) N.A.

2. TREATMENTS :

Main-plot treatments :

3 levels of lime : L₀ = 0, L₁ = 500 and L₂ = 750 lb./ac.
Sub-plot treatments:

All combinations of (1), (2) and (3)
(1) 2 levels of N : N₀=0 and N₁=40 lb./ac.
(2) 2 levels of P₂O₅ : P₀=0 and P₁=20 lb./ac.
(3) 2 levels of K₂O : K₀=0 and K₁=20 lb./ac.
Sources of N, P and K are N.A.

3. DESIGN:
(i) Split-plot. (ii) (a) 3 main-plots/block and 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 26'x16'. (v) One row around. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Attack of jassids, aphids, thrips and red cotton bugs. 10 oz./ac. of Para in 55 gallons of water sprayed thrice. (iii) Yield of cotton, no. of bolls and height of plants. (iv) (a) 1959—N.A. (b) and (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 673.8 lb./ac. (ii) (a) 573.8 lb./ac. (b) 206.3 lb./ac. (iii) Main effect of N and interaction P×K are significant. (iv) Av. yield of kapas in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₀</td>
<td>627.5</td>
<td>778.9</td>
<td>725.7</td>
</tr>
<tr>
<td>L₁</td>
<td>604.5</td>
<td>620.1</td>
<td>612.3</td>
</tr>
<tr>
<td>L₂</td>
<td>652.8</td>
<td>694.8</td>
<td>673.8</td>
</tr>
</tbody>
</table>

Mean
652.8 694.8 673.8 710.0 637.7 652.8 737.4 682.6 568.2 707.1

S.E. of difference of two
1. L marginal means = 143.4 lb./ac.
2. N, P or K marginal means = 42.1 lb./ac.
3. N, P or K means at the same level of L = 73.9 lb./ac.
4. L means at the same level of N, P or K = 152.4 lb./ac.

Crop :- Cotton.
Site :- M.A.E. Farm, Barpalli.

Ref :- Or. 56(MAE).
Type :- 'M'.

Object :- Type V—To study the most suitable time of application of Urea and A/S to Cotton crop.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) 1st and 19th Dec. 1956. (iv) (a) 4 to 5 ploughings. (b) N.A. (c) 25 to 50 lb./ac. (d) 24"x12" to 18". (e) N.A. (v) 5000 lb./ac. of F.Y M. (vi) N.A. (vii) Irrigated. (viii) 4 to 6 weeding and 5 to 6 hoeings. (ix) N.A. (x) 8,10.4.1957 and 1.5.1957.

2. TREATMENTS:
All combinations of (1) and (2)+control.
(1) 2 sources of 50 lb./ac. of N : S₁=Urea and S₂=A/S.
(2) 6 times of application of N : T₁=Full at sowing, T₂=Full at trimming, T₃=Full at flowering, T₄=½ at sowing and ½ at flowering, T₅=½ at sowing, ½ at thinning and ½ at flowering and T₆=½ at flowering and ½ one month after flowering.

3. DESIGN:
(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) (a) 33'x16.5'. (b) 1/100 ac. (v) N.A. (vi) Yes.
4. GENERAL:
   (v) Nil. (vi) Experiment was not conducted during 1957. Experiment conducted during 1959 completely destroyed on account of acute water-logging caused by continuous rainfall in Sept. 1959.

5. RESULTS:
   (i) 314.2 lb. ac. (ii) 77.59 lb. ac. (iii) None of the effects is significant. Av. yield of cotton in lb. ac.

<table>
<thead>
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<th>T1</th>
<th>T2</th>
<th>T3</th>
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<th>T5</th>
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<td>362.1</td>
<td>340.9</td>
<td>304.5</td>
<td>346.2</td>
<td>346.8</td>
</tr>
</tbody>
</table>

S.E. of T marginal mean = 21.63 lb. ac.
S.E. of S marginal mean = 18.29 lb. ac.
S.E. of body of table in control mean = 44.80 lb. ac.

Crop: Cotton (Kharif)
Site: M.A.E. Farm, Barpalli.
Ref: Or. 59(MAE).
Type: 'CM'.
Object: Type V—To study the most suitable time of application of Urea and A/S to Cotton crop.

1. BASAL CONDITIONS:
   (i) 25-50 lb. ac. (ii) 20-120 lb. ac. (iii) Dec. 1958. (iv) 4 to 5 ploughings. (v) 5000 lb. ac. of F.Y.M. (vi) Irrigated.
   (vii) April, 1959.

2. TREATMENTS to 4. GENERAL:
   Same as in exp. no. 56 (MAE). Type V on page 185.

5. RESULTS:
   (i) 186.1 lb. ac. (ii) 53.47 lb. ac. (iii) None of the effects is significant. Av. yield of cotton in lb. ac.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
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<th>T6</th>
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<tr>
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<td>213.9</td>
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<tr>
<td>Mean</td>
<td>193.4</td>
<td>168.6</td>
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<td>156.3</td>
<td>238.6</td>
<td>189.2</td>
<td>185.2</td>
</tr>
</tbody>
</table>

S.E. of T marginal mean = 21.83 lb. ac.
S.E. of S marginal mean = 12.60 lb. ac.
S.E. of body of table or control mean = 39.87 lb. ac.

Crop: Cotton (Kharif)
Site: M.A.E. Farm, Barpalli.
Ref: Or. 57(MAE).
Type: 'CM'.
Object: Type VIII—To determine the optimum spacings and dates of sowing for Cotton when different doses of N and P<sub>2</sub>O<sub>5</sub> are applied.
1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) As per treatments. (iv) (a) 3 ploughings after rain. (b) N.A. (c) 12 lb./ac. (d) As per treatments. (e) N.A. (v) 5000 lb./ac. of F.Y.M. (vi) N.A. (vii) Irrigated. (viii) N.A. (ix) As per treatments. (x) N.A.

2. TREATMENTS:
Main-plot treatments:
All combinations of (1) and (2)
(1) 3 sowing dates: D 1 =21.10.1957, D 2 =10.11.1957 and D 3 =20.11.1957.
(2) 3 spacings: S 1 =2' X 1.5', S 2 =2' X 2' and S 3 =2' X 2.5'.

Sub-plot treatments:
All combinations of (1) and (2)
(1) 3 levels of N as A/S: N 0 =0, N 1 =50 and N 2 =100 lb./ac.
(2) 3 levels of P 2 O 5 as Super: P 0 =0, P 1 =50 and P 2 =100 lb./ac.
Fertilizers applied at the time of sowing by broadcasting.

3. DESIGN:
(i) Split-plot. (ii) (a) 9 main-plots/block; 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 1/100 ac. (v) N.A. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Mild attack of loose smut and rust. (iii) Cotton yield. (iv) (a) 1957—contd. (b) and (c) N.A. (v) (a) and (b) No. (vi) and (vii) Nil.

5. RESULTS:
(i) 225 lb./ac. (ii) (a) 24.52 lb./ac. (b) 19.62 lb./ac. (iii) Main effects of S, D, N, P and interaction D X N are highly significant. Other effects are not significant. (iv) Av. yield of cotton in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>D 1</th>
<th>D 2</th>
<th>D 3</th>
<th>N 0</th>
<th>N 1</th>
<th>N 2</th>
<th>P 0</th>
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<td>227</td>
<td>237</td>
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<td>S 2</td>
<td>248</td>
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<td>209</td>
<td>205</td>
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<td>S 3</td>
<td>224</td>
<td>223</td>
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<td>182</td>
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<td>196</td>
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<td>218</td>
<td>224</td>
<td>234</td>
<td>225</td>
</tr>
<tr>
<td>P 0</td>
<td>233</td>
<td>234</td>
<td>186</td>
<td>190</td>
<td>220</td>
<td>243</td>
<td>220</td>
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<td>237</td>
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<tr>
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<td>196</td>
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</tbody>
</table>

S.E. of the difference of two
1. D or S marginal means = 4.72 lb./ac.
2. N or P marginal means = 3.78 lb./ac.
3. N or P means at the same levels of D or S = 6.54 lb./ac.
4. D or S means at the same levels of N or P = 7.13 lb./ac.
5. means in the body of D X S table = 6.54 lb./ac.
6. means in the body of N X P table = 8.17 lb./ac.

Crop :- Cotton (Rabi).
Site :- M.A.E. Farm, Barpalli.

Object :- Type VIII.—To determine the optimum spacing and date of sowing for Cotton when different doses of N and P 2 O 5 are applied.

Ref :- Or. 58(MAE).
Type :- 'CM'.
1. ** BASAL CONDITIONS:**
   (i) (a) to (c) N.A. (ii) (a) Red loam. (b) N.A. (iii) As per treatments. (iv) (a) to (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. **TREATMENTS:**

   **Main-plot treatments:**
   All combinations of (1) and (2)
   (2) 3 spacings: S1 = 2’x1.5’, S2 = 2’x2’ and S3 = 2’x2.5’.

   **Sub-plot 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 = 50 and P2 = 100 lb./ac.

3. **DESIGN:**
   Same as in exp. no. 57(MAE) on page 187.

4. **GENERAL:**
   (i) N.A. (ii) N.A. (iii) Cotton yield. (iv) (a) 1957—contd. (b) and (c) N.A. (v) N.A. (vi) and (vii) Nil.

5. **RESULTS:**
   (i) 137.9 lb./ac. (ii) (a) 63.2 lb./ac. (b) 63.1 lb./ac. (iii) Only S x N interaction is highly significant. (iv) Av. yield of cotton in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
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<td>127</td>
<td>133</td>
<td>126.8</td>
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<td>143</td>
<td>143</td>
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</table>

S.1: of the difference of two
1. D or S marginal means = 12.16 lb./ac.
2. N or P marginal means = 12.14 lb./ac.
3. N or P means at the same level of D or S = 21.03 lb./ac.
4. S or D means at the same level of N or P = 21.04 lb./ac.
5. means in the body of D x S table = 21.03 lb./ac.
6. means in the body of N x P table = 21.07 lb./ac.

**Crop:** Cotton.  
**Site:** Cotton Res. and Development Stn., Chakuli.  
**Ref:** Or. 59(32).  
**Type:** ‘CMV’.  

Object: — To find out the effect of different spacings and doses of N on different varieties of Cotton.
1. **BASAL CONDITIONS**:  
(i) (a) Nil. (b) G.M. (c) Nil.  
(ii) (a) Sandy loam. (b) N.A.  
(iii) 23.11.1959.  
(iv) (a) 4 ploughings with desi plough to 4" - 5" depth and laddering. (b) Dibbling. (c) 15 yrs/acre. (d) As per treatments.  
(v) 3 tons/acre of compost, 40 lb./acre of P<sub>2</sub>O<sub>5</sub> Green manuring by dhaincha.  
(vi) As per treatment.  
(vii) Irrigated.  
(viii) 3 hoeings and 2 earthing.  
(ix) N.A.  
(x) 1st picking-10.5.1960; 2nd picking-29.5.1960.  

2. **TREATMENTS**:  
All combinations of (1), (2) and (3)  
(1) 3 spacings: D<sub>1</sub>=2'x2', D<sub>2</sub>=1'x1' and D<sub>3</sub>=1'x1'.  
(2) 2 levels of N as C/A/N: N<sub>0</sub>=0 and N<sub>1</sub>=40 lb./acre.  
(3) 2 varieties: V<sub>1</sub>=P 216.F (late) and V<sub>2</sub>=Laxmi (medium).  

3. **DESIGN**:  
(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 6.  
(iv) (a) 37'x21'. (b) N.A. (v) 1 row on all sides.  
(vi) Yes.  

4. **GENERAL**:  
(i) Good. (ii) Jassids and aphids attack; Paramar sprayed twice. (iii) Cotton yield-no of bolls and height.  
(iv) (a) 1959—contd. (b) No.  
(c) Nil.  
(v) (a) and (b) N.A.  
(vi) and (vii) Nil.  

5. **RESULTS**:  
(i) 667.7 lb./acre.  
(ii) 201.8 lb./acre.  
(iii) Effect of N alone is highly significant.  
(iv) Av. yield of kapas in lb./acre.  

<table>
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<tr>
<th></th>
<th>N&lt;sub&gt;0&lt;/sub&gt;</th>
<th>N&lt;sub&gt;1&lt;/sub&gt;</th>
<th>Mean</th>
<th>V&lt;sub&gt;0&lt;/sub&gt;</th>
<th>V&lt;sub&gt;1&lt;/sub&gt;</th>
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<td>633.3</td>
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<td>864.4</td>
<td>727.4</td>
<td>735.5</td>
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<td>737.6</td>
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<td>676.3</td>
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<td>599.9</td>
<td>752.8</td>
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</table>

S.E. of D marginal mean = 41.19 lb./acre.  
S.E. of N or V marginal mean = 33.64 lb./acre.  
S.E. of body of D x N or D x V table = 58.26 lb./acre.  
S.E. of body of N x V table = 47.57 lb./acre.  

**Crop**: Cotton.  
**Site**: Cotton Res. and Development Stn., Chakuli.  
**Ref**: Or. 59(34).  
**Type**: 'D'.  

Object:—To find out a suitable insecticide to control attack of jassids on Cotton.  

1. **BASAL CONDITIONS**:  
(i) (a) Nil. (b) G.M. (c) Nil. (d) (a) Sandy loam. (b) N.A.  
(ii) (a) 14.11.1959. (b) Line sowing by dibbling. (c) 12 yrs/acre. (d) 2'x1'. (e) N.A.  
(v) 3 tons/acre of compost and Super at 40 lb./acre of P<sub>2</sub>O<sub>5</sub> broadcast at the time of field preparation. Top dressing C/A/N at 40 lb./acre.  

2. **TREATMENTS**:  
10 insecticial treatments: D<sub>1</sub>=Control, D<sub>2</sub>=Water sprayed, D<sub>3</sub>=Endrine 0.04 %, D<sub>4</sub>=Endrine 0.08 %, D<sub>5</sub>=Paramar 0.025 %, D<sub>6</sub>=Paramar 0.05 %, D<sub>7</sub>=Malathion 0.1 %, D<sub>8</sub>=DDT+BHC 0.1 % and D<sub>9</sub>=DDT+BHC 0.25%.
3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 45'x18'. (b) 41'x14'. (v) 1 row on all sides. (vi) Y.S.C.

4. GENERAL:
(i) Satisfactory. (ii) Attack of red cotton bugs and aphids—control measures as per treatments. (iii) Yield of cotton, 50% count of jassids population before and after spraying. (iv) (a) Nil. (b) Nil. (c) Nil. (d) Nil. (e) Nil. (f) Nil. (v) Nil. (vi) Nil.

5. RESULTS:
(i) 249.6 lb./ac. (ii) 90.78 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of cotton in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>D6</th>
<th>D7</th>
<th>D8</th>
<th>D9</th>
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<tr>
<td>Av. yield</td>
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<td>254.7</td>
<td>285.9</td>
<td>289.3</td>
<td>276.4</td>
<td>156.6</td>
<td>205.7</td>
<td></td>
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<tr>
<td>S.E./mean</td>
<td>45.39 lb./ac.</td>
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</table>

Object:—To find out the optimum period of sowing Jute under irrigated conditions.

1. BASAL CONDITIONS:
(i) Nil. (b) Paddy. (c) 5 C.L./ac. of F.Y.M. (ii) (a) Clay. b N.A. (iii) As per treatments. (iv) (a) 6 ploughings, 2 ladders and breaking of clods. (b) Line sowing. (c) 10 lb./ac. (d) 9' apart. (e) 15 C.L./ac. of compost mixed in the soil before sowing seeds, 20 lb./ac. of N as S and 24 lb./ac. of P2O5 applied in the line. (vi) C—442, K1—321. (vii) Irrigated. (viii) 6 hoeings and weedings. (ix) 24.4' (till Aug.). (x) 7, 17 and 19.8.1959.

2. TREATMENTS:

3. DESIGN:
(i) R.B.D. (ii) (a) 6. (b) 5'x25'. (iii) 4. (iv) (a) 16'x12'. (b) 14'x10'. (c) 12'x9'. (v) Y.S.C.

4. GENERAL:
(i) Good. (ii) Mild attack of semi-keeper and Endrinn was sprayed. (iii) Yield of fibre. (iv) a. 1959—N.A. (b) No. (c) Nil. (d) Nil. (e) Nil. (f) Nil.

5. RESULTS:
(i) 1108 lb./ac. (ii) 178 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of fibre in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
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<td>1280</td>
<td>1221</td>
<td>1129</td>
</tr>
<tr>
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<td>664</td>
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<tr>
<td>S.E./mean</td>
<td>89 lb./ac.</td>
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</table>

Object:—To find out the optimum dose of N and K2O for bidi Tobacco.

1. BASAL CONDITIONS:
(i) Nil. (b) and (c) N.A. (ii) (a) Clay loam. (b) N.A. (iii) 9.12.1955. (iv) 10.12.1955. (v) (a) 6 ploughings with country plough. (b) Line planting. (c) One seedling hole. (d) 3' x 2'. (e) N.A. (f) Nil. (g) K—4 and K—20. (h) Irrigated. (i) Two hoeings and 1 earthing. (j) 0.15'. (k) N.A.
2. TREATMENTS:
All combinations of (1) and (2) + a control (no manure)
(1) 3 levels of N as A/S: N1 = 40, N2 = 60 and N3 = 80 lb./ac.
(2) 3 levels of K2O as Pot. Sul.: K1 = 0, K2 = 100 and K3 = 150 lb./ac.

3. DESIGN:
(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) 18'×10'. (b) 15'×7'. (v) One row around. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Nil. (iii) Weight of dry leaf. (iv) (a) 1955—1956. (b) No. (c) Nil. (v) (a) and (b) Nil.
(vi) and (vii) Nil.

5. RESULTS:
(i) 274.2 lb./ac. (ii) 77.4 lb./ac. (iii) Control vs others is significant. Other effects are not significant.
(iv) Av. yield of tobacco in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>K0</th>
<th>K1</th>
<th>K2</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>294.3</td>
<td>313.6</td>
<td>255.6</td>
<td>287.8</td>
</tr>
<tr>
<td>N2</td>
<td>259.4</td>
<td>329.1</td>
<td>228.4</td>
<td>272.3</td>
</tr>
<tr>
<td>N3</td>
<td>232.3</td>
<td>266.5</td>
<td>282.7</td>
<td>267.2</td>
</tr>
</tbody>
</table>

Mean = 262.0
S.E. of N or K marginal means = 25.8 lb./ac.
S.E. of body of table = 44.7 lb./ac.

Object:—To find out the optimum dose of N and K2O for bidi Tobacco.

Ref.:—Or. 56(24).
Type:—'M'.
Control = 508.2 lb./ac.

<table>
<thead>
<tr>
<th>K₀</th>
<th>K₁</th>
<th>K₄</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₁</td>
<td>662.5</td>
<td>1143.4</td>
<td>912.0</td>
</tr>
<tr>
<td>N₂</td>
<td>1125.3</td>
<td>921.1</td>
<td>930.2</td>
</tr>
<tr>
<td>N₃</td>
<td>1148.0</td>
<td>735.1</td>
<td>1061.8</td>
</tr>
</tbody>
</table>

Mean = 978.6

S.E. of N or K marginal mean = 98.23 lb./ac.

S.E. of body of table = 154.6 lb./ac.

**Crop**: Turmeric (*Kharif*).

**Site**: Turmeric Res. Stn., G. Udaygiri.

**Object**: To find out a substitute for leaf mulch among other kinds of organic manures for Turmeric.

1. **BASAL CONDITIONS**:
   (i) to (c) N.A.
   (ii) (a) Laterite.
   (b) N.A.
   (c) N.A.
   (d) 9° × 9°.
   (e) N.A.
   (f) Nil.
   (g) Local.
   (h) Unirrigated.
   (i) 3 weedings.
   (j) 47.35".

2. **TREATMENTS**:
   7 sources to give 112 lb./ac. of N: S₁ = F.Y.M., S₂ = Fresh cattledung, S₃ = Compost, S₄ = Castorcake, S₅ = Niger cake, S₆ = Soil dust mulch and S₇ = Saw leaf mulch (control).

3. **DESIGN**:
   (i) R.B.D. (ii) 7.
   (b) N.A.
   (c) 64' × 6'.
   (d) 62' × 4'.
   (e) 9° × 9°.
   (f) Yes.

4. **GENERAL**:
   (i) and (ii) N.A.
   (iii) Yield of raw turmeric.
   (iv) (a) 1952–1954.
   (b) N.A.
   (c) Nil.
   (d) Nil.
   (e) and (f) Nil.
   (g) and (h) Nil.

5. **RESULTS**:
   (i) 9914 lb./ac.
   (ii) 840 lb./ac.
   (iii) Treatment differences are highly significant.
   (iv) A- yield of raw turmeric in lb./ac.
   Treatment
<table>
<thead>
<tr>
<th>S₁</th>
<th>S₂</th>
<th>S₃</th>
<th>S₄</th>
<th>S₅</th>
<th>S₆</th>
<th>S₇</th>
</tr>
</thead>
</table>
   Av. yield
   | 11749| 10617| 9797| 8860| 9797| 8431| 10148|
   S.E., mean = 420 lb./ac.

**Crop**: Turmeric.

**Site**: Turmeric Res. Stn., G. Udaygiri.

**Object**: To study the effect of different doses and sources of N and their residual effect onaddy.

1. **BASAL CONDITIONS**:
   (i) to (c) N.A.
   (ii) (a) Laterite.
   (b) N.A.
   (c) 27, 28.5.1954.
   (d) 9° × 12°.
   (e) N.A.
   (f) N.A.
   (g) N.A.
   (h) Unirrigated.
   (i) 2 weedings.
   (j) 47.35°.
   (k) N.A.

2. **TREATMENTS**:
   All combinations of (1) and (2) + a control
   (1) 2 sources of N: S₁ = A/S and S₇ = Niger oil cake.
   (2) 3 levels of N: N₁ = 60, N₂ = 90 and N₃ = 120 lb./ac.
3. DESIGN:
(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 5. (iv) (a) 64'x74'. (b) 62'x54'. (v) 9''x12''. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1952—1954. (b) N.A. (c) Nil. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 8745 lb./ac. (ii) 1979 lb./ac. (iii) Treatment differences are highly significant. Control vs. others is significant. (iv) Av. yield of raw turmeric in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>10883</td>
<td>11369</td>
<td>12314</td>
<td>11522</td>
</tr>
<tr>
<td>S2</td>
<td>6949</td>
<td>6310</td>
<td>6566</td>
<td>6608</td>
</tr>
<tr>
<td>Mean</td>
<td>8916</td>
<td>8839</td>
<td>9440</td>
<td>9065</td>
</tr>
</tbody>
</table>

S.E. of S marginal mean = 511 lb./ac.
S.E. of N marginal mean = 626 lb./ac.
S.E. of body of table or control mean = 885 lb./ac.

Crop :- Turmeric.
Site :- Turmeric Res. Sta., G. Udaygiri.
Object :- To study the optimum depth and time of planting for Turmeric.

1. BASAL CONDITIONS:
(i) (a) to (c) N.A. (ii) (a) Laterite. (b) N.A. (iii) As per treatments. (iv) (a) N.A. (b) Planted in furrows. (c) to (e) N.A. (v) N.A. (vi) Local. (vii) Unirrigated. (viii) Weeding on 15, 16.7.1954. (ix) 47.35°. (x) N.A.

2. TREATMENTS:
Main-plot treatments:
Sub-plot treatments:
4 depths of sowing: S1 =1", S2 =2", S3 =4", and S4 =6".

3. DESIGN:
(i) Split-plot. (ii) (a) 6 main-plots/block; 4 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) and (3) N.A (v) N.A. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) N.A. (iii) Weight of raw turmeric. (iv) (a) 1952—1954. (b) N.A. (c) No. (v) (a) and (b) Nil. (vi) One of the replications was discarded. (vii) Nil.

5. RESULTS:
(i) 66.18 lb./plot. (ii) (a) 15.25 lb./plot. (b) 10.66 lb./plot. (iii) Only D effect is significant. (iv) Av. yield of raw turmeric in lb./plot.

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>D6</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>81.25</td>
<td>76.00</td>
<td>89.25</td>
<td>74.50</td>
<td>48.25</td>
<td>35.25</td>
<td>67.12</td>
</tr>
<tr>
<td>S2</td>
<td>86.00</td>
<td>69.50</td>
<td>82.25</td>
<td>66.75</td>
<td>48.00</td>
<td>31.50</td>
<td>64.00</td>
</tr>
<tr>
<td>S3</td>
<td>83.00</td>
<td>72.25</td>
<td>78.25</td>
<td>80.80</td>
<td>54.75</td>
<td>37.00</td>
<td>67.38</td>
</tr>
<tr>
<td>S4</td>
<td>78.75</td>
<td>81.00</td>
<td>77.50</td>
<td>77.75</td>
<td>45.50</td>
<td>33.50</td>
<td>65.67</td>
</tr>
<tr>
<td>Mean</td>
<td>82.25</td>
<td>74.69</td>
<td>81.81</td>
<td>74.90</td>
<td>49.12</td>
<td>54.31</td>
<td>66.18</td>
</tr>
</tbody>
</table>
Crop :- Turmeric (Kharif).

Site :- Turmeric Res. Stn., G. Udaygiri.

Ref :- Or. 54(7).

Type :- 'C'.

Object :- To study the merits of planting mother rhizomes vs daughter rhizomes with different spacings for Turmeric.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A.  (ii) (a) Laterite. (b) N.A.  (iii) 6.5.1954.  (iv) (a) N.A. (b) Sowing in furrows. (c) N.A.  (d) As per treatments.  (e) 1 rhizome/hole. (v) N.A.  (vi) Local. (vii) Unirrigated. (viii) Weeding.  (ix) 47.35° x 13 to 16.2.1955.

2. TREATMENTS :
   Main-plot treatments :
   6 spacings:  $S_1 = 6' \times 6'$, $S_2 = 9' \times 6'$, $S_3 = 9' \times 9'$, $S_4 = 12' \times 9'$, $S_5 = 12' \times 12'$ and $S_6 = 12' \times 12'$.
   Sub-plot treatments :
   2 types of seed material : $T_1 =$ Daughter rhizomes and $T_2 =$ Mother rhizomes.

3. DESIGN :
   (i) Split-plot.  (ii) 6 main-plots/block and 2 sub-plots/main-plot.  (b) N.A.  (iii) 4.  (iv) (a) $S_1$ and $S_2 = 15' \times 9'$; $S_3 = 15' \times 9'$; $S_4$ and $S_5 = 15' \times 7'$ and $S_6 = 15' \times 7'$.  (b) N.A.  (v) N.A.  (vi) Yes.

4. GENERAL :
   (i) N.A.  (ii) N.A.  (iii) Yield of raw turmeric.  (iv) 1945–1954 (with modifications).  (b) No.  (c) Nil.  (d) (a) and (b) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

5. RESULTS :
   (i) 48.35 lb./plot.  (ii) (a) 9.53 lb./plot.  (b) 8.67 lb./plot.  (iii) Only $T$ effect is highly significant.  (iv) Ave. yield of raw turmeric in lb./plot.

<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>
</tr>
</thead>
<tbody>
<tr>
<td>$T_1$</td>
<td>30.00</td>
<td>37.25</td>
<td>38.75</td>
<td>35.25</td>
<td>33.50</td>
<td>31.75</td>
<td>34.42</td>
</tr>
<tr>
<td>$T_2$</td>
<td>55.25</td>
<td>53.00</td>
<td>53.50</td>
<td>63.25</td>
<td>67.00</td>
<td>81.75</td>
<td>62.29</td>
</tr>
<tr>
<td>Mean</td>
<td>42.63</td>
<td>45.13</td>
<td>46.13</td>
<td>49.25</td>
<td>50.25</td>
<td>56.75</td>
<td>48.35</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. $S$ marginal means = 4.76 lb./plot.
2. $T$ marginal means = 2.51 lb./plot.
3. $T$ means at the same level of $S$ = 6.14 lb./plot.
4. $S$ means at the same level of $T$ = 9.11 lb./plot.

Crop :- Turmeric.

Site :- Turmeric Res. Stn., G. Udaygiri.

Ref :- Or. 55(2).

Type :- 'C'.

Object :- To find out the effect of mixed cropping of Turmeric with castor and jannhemp.

1. BASAL CONDITIONS :
   (i) (a) Nil. (b) Jowar. (c) Nil. (ii) (a) Laterite. (b) N.A. (iii) 30.5.1955.  (iv) (a) to (c) N.A. (v) N.A. (vi) Local. (vii) Unirrigated. (viii) Weeding and hoeing.  (ix) 68.53°. (x) N.A.
2. TREATMENTS:
1. Turmeric alone.
2. Turmeric+castor.
3. Turmeric+shannemp.

3. DESIGN:
(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 30'×12'. (b) 27½'×10½'. (v) 1½'×1½'. (vi) Yes.

4. GENERAL:
(i) Good. (ii) Nil. (iii) Weight of shannemp seed and raw turmeric. (iv) (a) No. (b) Nil. (c) No.
(v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 6402 lb./a. (ii) 1435 lb./a. (iii) Treatment differences are significant. (iv) Av. yield of raw turmeric in lb./a.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>5733</td>
<td>5632</td>
<td>7845</td>
</tr>
</tbody>
</table>

S.E./mean = 585.8 lb./a.

Object :- To study the effect of mixed cropping of Turmeric with ragi, dhaincha and shannemp.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) (a) Laterite. (b) N.A. (iii) 8.6.1954. (iv) (a) N.A. (b) Sowing in furrows.
(c) N.A. (d) 9'×9'. (e) N.A. (v) N.A. (vi) Local. (vii) Unirrigated. (viii) Weeding. (ix) 47.35°.

2. TREATMENTS:
1. Turmeric alone.
2. Turmeric+Ragi.
3. Turmeric+Dhaincha.
4. Turmeric+Shannemp.

3. DESIGN:
(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 32'×15'. (v) N.A. (vi) Yes.

4. GENERAL:
(i) and (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1952—1954. (b) N.A. (c) No. (v) (a) and (b) Nil.
(vi) and (vii) Nil.

5. RESULTS:
(i) 5880 lb./a. (ii) 801 lb./a. (iii) Treatment differences are highly significant. (iv) Av. yield of raw turmeric in lb./a.

<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>7562</td>
<td>2904</td>
<td>8410</td>
<td>4644</td>
</tr>
</tbody>
</table>

S.E./mean = 327 lb./a.

Object :- To study the effect of mixed cropping of Turmeric with ragi, dhaincha and shannemp.
1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Niger. (c) N.A. (ii) (a) Nil. (b) Laterite. (c) N.A. (iii) 12.7.1956. (iv) [a] N.A. (b) Sown behind the plough. (c) and (d) N.A. (e) One finger/hole. (v) 3 C.L. Jac. of F.Y.M. at the time of ploughing. (vi) Guttama (local). (vii) Unirrigated. (viii) Weeding. (ix) 90.00°. (x) 3.1.1957.

2. TREATMENTS:
   1. Guar+ Turmeric.
   2. Teosinte + Turmeric.
   3. Cow-pea+ Turmeric.
   4. Turmeric alone.

3. DESIGN:
   (i) L. Sq. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 15'x15'. (v) No border left. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) N.A. (iii) Yield of raw turmeric. (iv) a, to © N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS:
   (i) 12814 lb./ac. (iij Treatment differences are significant. (iv) Av. yield of raw turmeric in lb./ac.

   Treatment | 1 | 2 | 3 | 4
   Av yield   | 15101 | 9970 | 10938 | 15246
   S E./mean  = 947.5 lb./ac.

---

**Crop:** Groundnut (Rabi).
**Site:** Agri. Res. Stn., Sambalpur.
**Ref:** Or. 59(48).
**Type:** ‘M’.

Object: To study the response of Groundnut to lime with different combinations of N, P and K.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Fallow in kharif. (c) Nil. (ii) (a) Sandy soil. (b) pH 5.9, organic carbon 0.27%, Tss 0.49, available P 132 lb./ac., available K 54 lb./ac. and available N 210 lb. ac. (iii) 12.12.1959. (iv) (a) N.A. (b) Line sowing. (c) 1 m/1.ac. (d) 6 x 6'. (e) Two. (f) Nil. (g) T.M.V 2. (h) Irrigated. (vii) Hoeing and weeding. (ix) N.A. (x) 7.5 lbs.

2. TREATMENTS:
   Main-plot treatments:
   - 3 levels of lime: L2=0, L1=500 and L2=750 lb./ac.
   Sub-plot treatments:
   - All combinations of (1), (2) and (3)
   - (1) 2 levels of N as A/S: N2=0 and N1=20 lb./ac.
   - (2) 2 levels of P2O5 as Super: P2=0 and P1=30 lb./ac.
   - (3) 2 levels of K2O as Pot. Sul.: K3=0 and K1=30 lb./ac.

3. DESIGN:
   (i) Split-plot. (ii) (a) 3 main-plots/block ; 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6’x6’.
   (b) 5’3’x5’3’. (v) One row around. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Yield of pod. (iv) (a) 1959—N.A. (b) and (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 1883 lb./ac. (ii) (a) 696 lb./ac. (b) 623 lb./ac. (iii) None of the effects is significant. (iv) Av. yield of pod in lb./ac.
S.E. of difference of two
1. L marginal means = 174 lb./ac.
2. N, P or K marginal means = 127 lb./ac.
3. N, P or K means at the same level of L = 220 lb./ac.
4. L means at the same level of N, P or K = 447 lb./ac.
5. means in the body of N × P, N × K or P × K tables = 180 lb./ac.

Crop :- Groundnut.
Centre :- Mayurbhanj (c.f.).
Ref :- Or. 59(SFT).
Type :- ‘M’.

Object :- Type A—To study the response of oilseeds to levels of N, P₂O₅ and K₂O applied individually and in combinations.

1. BASAL CONDITIONS :
   (i) (a) to (c) N.A. (ii) Red. (iii) Nil. (iv) and (v) N.A. (vi) July 1959. (vii) to (ix) N.A. (x) November, 1959.

2. TREATMENTS :
   0 = Control (no manure).
   n = 20 lb./ac. of N as A/S.
   p = 30 lb./ac. of P₂O₅ as Super.
   np = 20 lb./ac. of N as A/S + 30 lb./ac. of P₂O₅ as Super.
   k = 30 lb./ac. of K₂O as Muriate of Potash.
   nk = 20 lb./ac. of N as A/S + 30 lb./ac. of K₂O as Muriate of Potash.
   pk = 30 lb./ac. of P₂O₅ as Super + 30 lb./ac. of K₂O as Muriate of Potash.
   npk = 20 lb./ac. of N as A/S + 30 lb./ac. of P₂O₅ as Super + 30 lb./ac. of K₂O as Muriate of Potash.

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 zone. Each field assistant is required to conduct 31 trials in a year 8 on a Kharif cereal, 8 on a cash crop, 4 on an oilseed crop and 3 on a legumeous 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 selected fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) and (b) N.A. (iv) Yes.

4. GENERAL :
   (i) Good. (ii) N.A. (iii) Pod yield. (iv) (a) 1959—contd. (b) No. (c) N.A. (v) As per design. (vi) and (vii) N.A.

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>2172</td>
<td>2633</td>
<td>2831</td>
<td>3621</td>
<td>2773</td>
<td>3489</td>
<td>3851</td>
<td>4641</td>
</tr>
</tbody>
</table>

G.M. = 325 lb./ac.; S.E. = 100.9 lb./ac. and no. of trials = 6.
**Crop :- Groundnut.**

**Centre :- Sambalpur (c.f.).**

Object :- Type A—To study the response of oilseeds to levels of N, P₂O₅ and K₂O applied individually and in combinations.

1. **BASAL CONDITIONS :**
   (i) (a) to (c) N.A. (ii) Red and black. (iii) Nil. (iv) and (v) N.A. (vi) July 1959. (vii) to (ix) N.A. (x) November 1959.

2. **TREATMENTS and 3. DESIGN :**
   Same as in expt. no. 59(SFT) Type A on page 197 conducted at Mayurbhanj.

4. **GENERAL :**
   (i) Normal. (ii) N.A. (iii) Pod yield. (iv) (a) 1959—contd. (b) No. (c) N.A. (v) As per design. (vi) and (vii) Nil.

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>667</td>
<td>889</td>
<td>1226</td>
<td>1234</td>
<td>757</td>
<td>1070</td>
<td>1152</td>
<td>1695</td>
</tr>
</tbody>
</table>

G.M.=1086 lb./ac.; S.E./mean=177.0 lb./ac. and no. of trials=2.

---

**Crop :- Groundnut.**

**Centre :- Dhenkanal (c.f.).**

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

1. **BASAL CONDITIONS :**
   (i) (a) to (c) N.A. (ii) Red and black. (iii) to (v) N.A. (vi) July 1959. (vii) to (ix) N.A. (x) November 1959.

2. **TREATMENTS :**
   0 =Control
   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 A/S/N.
   n₁'" =20 lb./ac. of N as C/A/N.
   n₂'" =40 lb./ac. of N as C/A/N.

3. **DESIGN :**
   Same as in expt. no. 59(SFT) Type A on page 197 conducted at Mayurbhanj.

4. **GENERAL :**
   (i) and (iii) N.A. (iii) Pod yield. (iv) (a) 1959—contd. (b) No. (c) N.A. (v) As per design. (vi) and (vii) N.A.

5. **RESULTS :**
<table>
<thead>
<tr>
<th>Treatment</th>
<th>n₁'</th>
<th>n₂'</th>
<th>n₁&quot;</th>
<th>n₂&quot;</th>
<th>n₁'&quot;</th>
<th>n₂&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>592</td>
<td>856</td>
<td>675</td>
<td>642</td>
<td>938</td>
<td>880</td>
</tr>
</tbody>
</table>

G.M.=800 lb./ac.; S.E.=N.A. and no. of trials=3.

---

**Crop :- Groundnut.**

**Centre :- Mayurbhanj (c.f.).**

Object :- Type B—To investigate the relative efficiency of different nitrogenous fertilizers at different levels.
1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Red. (iii) to (v) N.A. (vi) July 1959. (vii) to (ix) N.A. (x) November 1959

2. TREATMENTS and 3. DESIGN:
   Same as in exp. no 59(SFT) Type B on page 198 conducted at Dhenkanal.

4. GENERAL:
   (i) Good. (ii) N.A. (iii) Pod yield. (iv) (a) 1959—contd. (b) No. (c) N.A. (v) As per design. (vi) and (vii) Nil.

5. RESULTS:
   Treatment
   \[
   \begin{array}{cccccccc}
   0 & n_1' & n_2' & n_1'' & n_2'' & n_3'' & n_4'' \\
   \text{Av. yield} & 2107 & 2666 & 3415 & 2419 & 3390 & 2913 & 4016 \\
   \end{array}
   \]
   G.M.=2989 lb./ac.; S.E=165.2 lb./ac. and no. of trials=4.

---

**Crop :- Groundnut.**

**Centre :- Sambalpur (c.f.).**

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

1. BASAL CONDITIONS:
   (i) (a) to (c) N.A. (ii) Red and black. (iii) to (v) N.A. (vi) July 1959. (vii) to (ix) N.A. (x) Nov. 1959.

2. TREATMENTS to 4. GENERAL:
   Same as in exp. no. 59(SFT) Type B on page 198 conducted at Dhenkanal.

5. RESULTS:
   Treatment
   \[
   \begin{array}{cccccccc}
   0 & n_1' & n_2' & n_1'' & n_2'' & n_3'' & n_4'' \\
   \text{Av. yield} & 848 & 971 & 1210 & 1251 & 1415 & 1152 & 1160 \\
   \end{array}
   \]
   G.M.=1144 lb./ac. S.E./plot=51.8 lb./ac. and no. of trials=4.

---

**Crop :- Groundnut (Kharif).**

**Site :- Agri. Res. Stn., Sambalpur.**

Object :- To find out the optimum spacing for Groundnut.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy soil. (b) N.A. (iii) 14.7.1959. (iv) (a) 4 ploughings and 2 ladderng. (b) Line sowing. (c) 30 hrs/ac. (d) As per treatments. (e) 2. (v) Top-dressing with 32 lb./ac. of P_2O_5 as Super and 20 lb./ac. of N as A/S. (vi) Baripada (local). (vii) Unirrigated. (viii) Hoeing and manuring on 16.8.1959. (ix) 37.9°. (x) 29.10.1959.

2. TREATMENTS:
   5 spacings: \( S_1=18'\times9' \), \( S_2=15'\times9' \), \( S_3=12'\times9' \), \( S_4=9'\times9' \) and \( S_5=6'\times9' \).

3. DESIGN:
   (i) L. Sq. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a) 18'x10\,\text{ft}'. (b) 18'x10\,\text{ft}'. (v) Nil. (vi) Yes.

4. GENERAL:
   (i) Good. (ii) Nil. (iii) Yield of groundnut. (iv) (a) 1959—N.A. (b) and (c) Nil. (v) (a) and (b) Nil. (vi) Trial conducted at Paramanpur sub-station. (vii) Nil.

5. RESULTS:
   (i) 992 lb./ac. (ii) 184 lb./ac. (iii) Treatment differences are highly significant. (iv) Av. yield of pod in lb./ac.
Crop :- Groundnut ( 
Rabi

Object :- To find out the optimum period of sowing for Groundnut.

1. BASAL CONDITIONS :

(i) [a] Nil. (b) Sannhemp. (c) Nil. (ii) a Sandy loam. (b) N.A. (iii) As per treatments. (iv) [a] 5 ploughings with country plough, laddering in between two ploughings. (b) Line sowing. (c) N.A. (d) 1' x 6'. (e) 2. (v) Green manuring with sannhemp, 25 lb./ac. of P2O5 as Super and 40 lb. ac. of K2O as Pot. Sul. (vi) T.M.V. - 2. (vii) Irrigated. (viii) and(ix) N.A. (x) 7, 25.3.1960, 7, 24.4.1960, and 1, 4.5.1960.

2. TREATMENTS:


3. DESIGN:

(i) R.B.D. (ii) 6. (b) N.A. (iii) 4. (iv) [a] 28' x 14'. b) 26' x 13'. (v) One line on each side. (vi) Yes.

4. GENERAL:

(i) Satisfactory. (ii) Nil. (iii) Yeld of pod. (iv) [a] 1951. (b) and (c) Nil. (v) a and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 623 lb./ac. (ii) 410 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of pod 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>786</td>
<td>800</td>
<td>1051</td>
<td>1076</td>
<td>1249</td>
</tr>
<tr>
<td>S.E./mean = 82.3 lb./ac.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop :- Groundnut ( 
Kharif

Object :- To find out suitable method of planting different varieties of Groundnut.

1. BASAL CONDITIONS :

(i) [a] Nil. (b) and (c) N.A. (ii) a Sandy loam. (b) N.A. (iii) 4.7.1958. (iv) [a] 3 ploughings with country plough to 3' depth. (b) As per treatments. (c) N.A. (d) 2' x 1'. (e) One. (v) 5 C.L./ac. of F.Y.M, 20 lb./ac. of N as A/S and 30 lb. ac. of P2O5 as Super. (vi) As per treatments. (vii) Irrigated. (viii) 4 to 5 weedings and hoeing. (ix) N.A. (x) 30.11.1958.

2. TREATMENTS:

Main-plot treatments:

3 varieties: V1 = A.H. 477, V2 = Pb. erecta and V3 = Pb. 648.4.

Sub-plot treatments:

4 methods of planting: M1 = Sowing in flat beds, M2 = Sowing in flat beds and ridging, M3 = Sowing in ridges and M4 = Sowing in ridges and ridging once again.

3. DESIGN:

(i) Split-plot. (ii) [a] 3 main-plots/block ; 4 sub-plot/main-plot. (b) 43' x 92'. (iii) 3. (iv) [a] 43' x 27', (main-plot) ; 10' x 27' (sub-plot). (b) 25' x 6'. (v) One guard row around the net-plot. (vi) Yes.
4. GENERAL:
(i) Good. (ii) Nil. (iii) % Germination, height, population count of plants, no. of branches, and pods, no. of root nodules and yield in ozs/plot. (iv) (a) 1957—1959. (b) N.A. (c) Nil. (v) (a) and (v) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 153 lb./ac. (ii) (a) 205.5 lb./ac. (b) 114.7 lb./ac. (iii) None of the effects is significant. (v) Av. yield of pod in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V1</td>
<td>43.02</td>
<td>139.21</td>
<td>193.66</td>
<td>108.90</td>
<td>121.50</td>
</tr>
<tr>
<td>V2</td>
<td>205.64</td>
<td>142.11</td>
<td>96.74</td>
<td>123.96</td>
<td>142.11</td>
</tr>
<tr>
<td>V3</td>
<td>139.21</td>
<td>272.25</td>
<td>197.83</td>
<td>173.70</td>
<td>195.75</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. V marginal means = 83.89 lb./ac.
2. M marginal means = 54.08 lb./ac.
3. M means at the same level of V = 93.71 lb./ac.
4. V means at the same level of M = 116.68 lb./ac.

Crop :- Groundnut (Kharif).

Object :- To study the effect of fungicidal spray on the incidence of cercospora leaf-spot and stem-rot diseases.

1. BASAL CONDITIONS:
(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (b) N.A. (iii) 15.7.1956. (iv) (a) to (c) N.A. (v) 20 lb./ac. of N as A/S and 40 lb./ac. of P<sub>2</sub>O<sub>5</sub> as SQS. (vi) Lccs. (vii) N.A. (viii) 3 weedicings, hoeing and gap-filling. (ix) N.A. (x) 26.12.1956.

2. TREATMENTS:
8 fungicides: F<sub>0</sub> = Control, F<sub>1</sub> = Formalin at 1 oz./sq. yard, F<sub>2</sub> = Crag potato fungicide (0.3%), F<sub>3</sub> = Perenox (0.4%), F<sub>4</sub> = Cupravit (0.4%), F<sub>5</sub> = Wattle sulphur (0.5%), F<sub>6</sub> = Cupranex (0.35%) and F<sub>7</sub> = Copper Sandoz (0.35%).

3. DESIGN:
(i) R.B.D. (ii) 8. (b) N.A. (iii) 4. (iv) (a) 20' X 7½'. (b) 20' X 7½'. (v) Nil. (vi) Yes.

4. GENERAL:
(i) N.A. (ii) Stem-rot and tikka disease. (iii) Yield of pod. (iv) (a), (b) and (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
(i) 1331 lb./ac. (ii) 259 lb./ac. (iii) Treatment differences are not significant. (iv) Av. yield of pod in lb./ac.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Av. yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>F&lt;sub&gt;0&lt;/sub&gt;</td>
<td>1285</td>
</tr>
<tr>
<td>F&lt;sub&gt;1&lt;/sub&gt;</td>
<td>1466</td>
</tr>
<tr>
<td>F&lt;sub&gt;2&lt;/sub&gt;</td>
<td>1194</td>
</tr>
<tr>
<td>F&lt;sub&gt;3&lt;/sub&gt;</td>
<td>1607</td>
</tr>
<tr>
<td>F&lt;sub&gt;4&lt;/sub&gt;</td>
<td>1439</td>
</tr>
<tr>
<td>F&lt;sub&gt;5&lt;/sub&gt;</td>
<td>1171</td>
</tr>
<tr>
<td>F&lt;sub&gt;6&lt;/sub&gt;</td>
<td>1212</td>
</tr>
<tr>
<td>F&lt;sub&gt;7&lt;/sub&gt;</td>
<td>1276</td>
</tr>
</tbody>
</table>

S.E./mean = 149 lb./ac.
Crop: Mustard.  
Centre: Dhenkanal (c.f.).  
Ref.: Or. 59(SFT).  
Type: ‘M’.

Object:—Type A—To study the response of oilseeds to levels of N, P₂O₅ and K₂O, applied individually and in combinations.

1. BASAL CONDITIONS:  
   (i) (a) to (c) N.A. (ii) Red and black. (iii) Nil. (iv) and (v) N.A. (vi) Oct. (vii) to (ix) N.A. (x) Feb.—March.

2. TREATMENTS:  
   0 = Control: no manure.  
   n = 20 lb./ac. of N as A/S.  
   p = 20 lb./ac. of P₂O₅ as Super.  
   np = 20 lb./ac. of N as A/S + 20 lb./ac. of P₂O₅ as Super.  
   k = 20 lb./ac. of K₂O as Muriate of Potash.  
   nk = 20 lb./ac. of N as A/S + 20 lb./ac. of K₂O as muriate of Potash.  
   pk = 20 lb./ac. of P as Super + 20 lb./ac. of K₂O as Muriate of Potash.  
   npk = 20 lb./ac. of N as A/S + 20 lb./ac. of P₂O₅ as Super + 20 lb./ac. of K₂O as Muriate of Potash.

3. DESIGN:  
   (i) to (vi) 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.  
   4 on a kharif cereal, 8 on a rabi cereal, 1 on a leguminous 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 per village.

4. GENERAL:  
   (i) and (ii) N.A. (iii) Grain yield. (iv) a) 1958—cond. b) No. ‘c’ N.A. (v) As per design. (vi) and (vii) Nil.

5. RESULTS:  
   Treatment 0 n p np k nk p rpk
   Av. yield 773 971 773 971 683 955 1045 1218
   G.M. = 924 lb./ac.; S.E. = 39.28 lb./ac. and no. of trials = 4.

Crop: Linseed (Rabi).  
Ref.: Or. 57(36).  
Type: ‘IM’.

Object:—To study the response to manuring with N and P irrigation.

1. BASAL CONDITIONS:  
   (i) (a) Nil. (b) Fallow. (c) Nil. (ii) (a) Sandy loam. (b) N.A. (iii) 17.11.1957. (iv) a) 3 ploughings, harrowing and levelling. (b) N.A. (c) 5 srs. ac. (d) 9” between lines. (e) N.A. (v) Nil. (vi) N.A. (vii) As per treatments. (viii) Weeding and hoeing. (ix) 6.04’. (x) 9.3.1958.

2. TREATMENTS:  
   All combinations of {1, 2} and {3}  
   (1) 3 levels of N as A/S : N₀=0, N₁=30 and N₂=60 lb./ac.  
   (2) 3 levels of P₂O₅ as Super : P₀=0, P₁=25 and P₂=50 lb. ac.  
   (3) 3 levels of irrigation : I₀=No irrigation, I₁=One irrigation after hoeing and application of A/S and I₂=Two irrigations—once as in I₂ and the other before flowering.

3. DESIGN:  
   (i) 3² confd. (ii) (a) 9. (b) N.A. (iii) 1. (iv) (a) 22’ × 9’, (b) 20’ × 7’. (v) One row around. (vi) Yes.
4. GENERAL:

(i) Average. (ii) N.A. (iii) Height, tiller count and yield of grain. (iv) (a) No. (b) and (c) N.o. (v) (a) and (b) N nil. (vi) and (vii) Nil.

5. RESULTS:

(i) 177.7 lb./ac. (ii) 78.4 lb./ac. (iii) No effect is significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
<th>I₀</th>
<th>I₁</th>
<th>I₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>123.9</td>
<td>141.6</td>
<td>165.2</td>
<td>143.6</td>
<td>123.9</td>
<td>188.8</td>
<td>118.0</td>
</tr>
<tr>
<td>N₁</td>
<td>165.2</td>
<td>159.3</td>
<td>177.0</td>
<td>167.2</td>
<td>206.5</td>
<td>197.5</td>
<td>147.5</td>
</tr>
<tr>
<td>N₂</td>
<td>182.9</td>
<td>236.0</td>
<td>247.8</td>
<td>222.2</td>
<td>182.9</td>
<td>253.7</td>
<td>230.1</td>
</tr>
</tbody>
</table>

Mean 157.3 179.0 196.7 177.7 171.1 196.7 165.2

S.E. of any marginal mean = 26.14 lb./ac.
S.E. of body of any table = 45.28 lb./ac.

Crop :- Gingelly.
Centre :- Ganjam (c.f.).

Ref :- Or. 59(SFT).
Type :- 'M'.

Object :- Type A—To study the response of oilseeds to levels of N, P₂O₅ and K₂O applied individually and in combinations.

1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Red and laterite. (iii) to (x) N.A.

2. TREATMENTS to 4. GENERAL:

Same as in expt. no. 59(SFT) Type A on page 202 conducted at Dhenkanal.

5. RESULTS:

Treatment 0 n p np k nk pk npk
Av. yield 255.1 345.6 279.8 362.1 312.7 345.6 312.7 403.2

G.M. = 327.1 lb./ac.; S.E. = 38.21 lb./ac. and no. of trials = 2.

Crop :- Gingelly.
Centre :- Kalahandi (c.f.).

Ref :- Or. 59(SFT).
Type :- 'M'.

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

1. BASAL CONDITIONS:

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

2. TREATMENTS to 4. GENERAL:

Same as in expt. no. 59(SFT) Type A on page 202 conducted at Dhenkanal.
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>205.7</td>
<td>617.1</td>
<td>543.1</td>
<td>1201.4</td>
<td>543.9</td>
<td>1045.0</td>
<td>637.6</td>
<td>979.2</td>
</tr>
</tbody>
</table>

G.M. = 721.1 lb./ac.; S.E. = 106.5 lb./ac. and no. of trials = 2.

Crop: Gingelly.
Centre: Puri (c.f.).

Object: Type A – To study the response of oilseeds to levels of N, P, K, and no. of trials = 2.

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

2. TREATMENTS to 4. GENERAL:
Same as in exp. no. 59(SFT).

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>172.8</td>
<td>246.9</td>
<td>189.3</td>
<td>263.3</td>
<td>181.0</td>
<td>222.2</td>
<td>205.7</td>
<td>219.7</td>
</tr>
</tbody>
</table>

G.M. = 220.1 lb./ac.; S.E. (mean) = 37.65 lb./ac. and no. of trials = 2.

Crop: Gingelly.
Centre: Ganjam (c.f.).

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

1. BASAL CONDITIONS:
(i) to (c) N.A.
(ii) Red and laterite. (iii) to (x) N.A.

2. TREATMENTS:

<table>
<thead>
<tr>
<th>n</th>
<th>0</th>
<th>20 lb./ac. of N as A:S.</th>
<th>40 lb./ac. of N as A:S.</th>
<th>20 lb./ac. of N as Urea.</th>
<th>40 lb./ac. of N as Urea.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Control</td>
<td>no manure</td>
<td>n1</td>
<td>n2</td>
<td>n1'</td>
</tr>
</tbody>
</table>

3 DESIGN and 4. GENERAL:
Same as in exp. no. 59(SFT).

5. RESULTS:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>n1</th>
<th>n2</th>
<th>n1'</th>
<th>n2'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. yield</td>
<td>251.3</td>
<td>362.1</td>
<td>419.7</td>
<td>315.6</td>
<td>417.9</td>
</tr>
</tbody>
</table>

G.M. = 356.2 lb./ac.; S.E. = 19.20 lb./ac. and no. of trials = 2.

Crop: Gingelly.
Centre: Puri (c.f.).

Object: Type B – To investigate the relative efficiency of different nitrogenous fertilizers at different doses.
1. **BASAL CONDITIONS**:
   (i) (a) to (c) N.A.  (ii) Coastal.  (iii) to (x) N.A.

2. **TREATMENTS**:
   
   0 = Control (no manure)  \( n_0' = 20 \text{ lb./ac. of N as A/S.} \)

   \( n_1 = 20 \text{ lb./ac. of N as A/S.} \)

   \( n_2 = 40 \text{ lb./ac. of N as A/S.} \)

   \( n_3 = 20 \text{ lb./ac. of N as Urea.} \)

   \( n_4 = 40 \text{ lb./ac. of N as C/A/N.} \)

3. **DESIGN and 4. GENERAL**:
   
   Same as in exp. no. 59(SFT) Type B on page 202 conducted at Dhenkanal.

5. **RESULTS**:
   
   Treatment 0  \( n_1 \)  \( n_2 \)  \( n_3 \)  \( n_4 \)  \( n_1' \)  \( n_2' \)  \( n_3' \)  \( n_4' \)  \( n_1'' \)  \( n_2'' \)  \( n_3'' \)  \( n_4'' \)

   Av. yield 172.8 98.7 90.5 213.9 238.6 98.7 98.7 213.9 235.1

   G.M.=164.5 lb./ac., S.E.=N.A. and no. of trials=2.

   **Crop** :- Gingelly (*Kharif*).

   **Site** :- Agri. Res. Stn., Bhubaneswar.

   Object :- To study the effect of N and P\(_{2}\)O\(_{5}\) with different irrigation levels on Gingelly crop.

   **BASAL CONDITIONS**:
   (i) (a) Nil.  (b) *Rauwolfia Serpentina*.  (c) N.A.  (ii) (a) Sandy loam.  (b) N.A.  (iii) 27.9.1957.  (iv) (a) 2 ploughings with *deshi* plough.  (b) Line sowing.  (c) 4 sm/ac.  (d) 9\(''\) between rows.  (c) N.A.  (v) Nil.  (vi) N.A.  (vii) As per treatments.  (viii) Hoeing and weeding.  (ix) 4.C''.  (x) About 1.1.1958.

   **TREATMENTS**:
   
   Same as in exp. no. 57(36) on page 202.

   **DESIGN**:
   
   (i) 3\(^3\) confd.  (ii) (a) 9.  (b) N.A.  (iii) 1.  (iv) (a) 21\(''\)×9\(''\).  (b) 20\(''\)×7\(''\).  (v) One row either side and 9\(''\) across rows.  (vi) Yes.

   **GENERAL**:
   
   (i) Poor.  (ii) Attack of mildew disease, leaf-webbers *leaf-spot* (*cercospora* and sooty-mould disease. Dusting of Gammaxane.  (iii) Yield of gingelly.  (iv) (a) 1957—contd.  (b) No.  (c) Nil.  (v) (a) and (b) Nil.  (vi) and (vii) Nil.

   **RESULTS**:
   
   (i) 320.4 lb./ac.  (ii) 43.9 lb./ac.  (iii) No effect is significant.  (iv) Av. yield of gingelly in lb./ac.

<table>
<thead>
<tr>
<th>P(_0)</th>
<th>P(_1)</th>
<th>P(_2)</th>
<th>Mean</th>
<th>I(_0)</th>
<th>I(_1)</th>
<th>I(_2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N_0)</td>
<td>310.6</td>
<td>316.5</td>
<td>310.6</td>
<td>312.6</td>
<td>323.6</td>
<td>287.1</td>
</tr>
<tr>
<td>(N_1)</td>
<td>318.1</td>
<td>340.1</td>
<td>309.2</td>
<td>322.4</td>
<td>294.5</td>
<td>327.1</td>
</tr>
<tr>
<td>(N_2)</td>
<td>360.4</td>
<td>301.9</td>
<td>316.3</td>
<td>326.2</td>
<td>316.3</td>
<td>287.2</td>
</tr>
<tr>
<td>Mean</td>
<td>329.7</td>
<td>319.5</td>
<td>312.1</td>
<td>320.4</td>
<td>311.4</td>
<td>300.5</td>
</tr>
<tr>
<td>I(_0)</td>
<td>201.6</td>
<td>345.7</td>
<td>287.1</td>
<td>354.8</td>
<td>345.7</td>
<td>347.5</td>
</tr>
<tr>
<td>I(_1)</td>
<td>322.8</td>
<td>267.1</td>
<td>301.6</td>
<td>354.8</td>
<td>345.7</td>
<td>347.5</td>
</tr>
<tr>
<td>I(_2)</td>
<td>354.8</td>
<td>345.7</td>
<td>347.5</td>
<td>354.8</td>
<td>345.7</td>
<td>347.5</td>
</tr>
</tbody>
</table>

   S.E. of any marginal mean = 14.63 lb./ac.

   S.E. of body of any table = 25.34 lb./ac.
Crop: Gingelly (Rabi).  
Object: To study the effect of different levels of N and \( \text{P}_2\text{O}_5 \) against different levels of irrigation on Gingelly.

1. BASAL CONDITIONS:
   (i) (a) Nil.  
   (b) and (c) N.A.  
   (ii) (a) Sandy loam.  
   (b) N.A.  
   (iii) 12.2.1959.  
   (iv) (a) 2 ploughings by desi plough.  
   (b) Broadcasting.  
   (c) N.A.  
   (d) 6' between lines.  
   (e) N.A.  
   (f) Nil.  
   (g) Local.  
   (h) As per treatments.  
   (i) Weeding and gap-filling.  
   (j) 25, 26.4.1959.

2. TREATMENTS:
   All combinations of (1), (2) and (3):
   (1) 3 levels of N as A.S.: \( N_0 = 0 \), \( N_1 = 30 \) and \( N_2 = 60 \) lb./ac.
   (2) 3 levels of \( \text{P}_2\text{O}_5 \) as Super: \( P_0 = 0 \), \( P_1 = 25 \) and \( P_2 = 50 \) lb./ac.
   (3) 3 levels of irrigation: \( I_1 = \) irrigation 1 week after germination, \( I_2 = I_1 \) and one more irrigation 3 weeks afterwards, \( I_3 = I_2 \) and one irrigation just after flowering.

3. DESIGN:
   (i) 3\(^2\) confd.  
   (ii) 9 plots/block; 3 blocks/replication.  
   (iii) 21' × 9'.  
   (iv) 2 lines on either side and 6' across.  
   (v) Yes.

4. GENERAL:
   (i) and (ii) N.A.  
   (iii) Yield of gingelly.  
   (iv) (a) 1955—contd.  
   (v) No. c N.A. (vi) 'a' and 'b' Nil.  
   (vii) and (viii) Nil.

5. RESULTS:
   (i) 349.2 lb./ac.  
   (ii) 150.1 lb./ac.  
   (iii) No effect is significant.  
   (iv) *Av. yield of gingelly in lb./ac.*

<table>
<thead>
<tr>
<th>( P_0 )</th>
<th>( P_1 )</th>
<th>( P_2 )</th>
<th>Mean</th>
<th>( I_1 )</th>
<th>( I_2 )</th>
<th>( I_3 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( N_0 )</td>
<td>274.2</td>
<td>283.4</td>
<td>294.6</td>
<td>284.1</td>
<td>283.0</td>
<td>271.4</td>
</tr>
<tr>
<td>( N_1 )</td>
<td>497.0</td>
<td>346.4</td>
<td>370.5</td>
<td>404.6</td>
<td>392.8</td>
<td>416.4</td>
</tr>
<tr>
<td>( N_2 )</td>
<td>309.4</td>
<td>350.1</td>
<td>416.8</td>
<td>358.8</td>
<td>332.5</td>
<td>364.5</td>
</tr>
</tbody>
</table>

Mean
| \( I_1 \) | 338.1 | 346.4 | 323.7 |
| \( I_2 \) | 326.5 | 373.3 | 382.1 |
| \( I_3 \) | 415.9 | 260.3 | 376.1 |

S.E. of any marginal mean — 50.0 lb. ac.  
S.E. of body of any table — 86.6 lb. ac.

Crop: Gingelly (Rabi).  
Object: To study the effect of different levels of N and \( \text{P}_2\text{O}_5 \) against different levels of irrigation on Gingelly.

1. BASAL CONDITIONS:
   (i) (a) Nil.  
   (b) Gingelly.  
   (c) N.A.  
   (ii) (a) Sandy loam.  
   (b) N.A.  
   (iv) (a) 3.5 to 'c' N.A.  
   (v) F.Y.M. at 10,000 lb. ac.  
   (vi) Local.  
   (vii) As per treatments.  
   (viii) One hoeing with weeding after 1st irrigation.  
   (ix) 177.  
   (x) 21.3.1960.

2. TREATMENTS:
   Same as in exp. no. 59: 31 above.
3. DESIGN:

(i) 3^2 partially confounding.
(ii) 9 plots/blocks; 3 blocks/replication.
(iii) N.A.
(iv) (a) 22' × 9'.
(v) One row around.
(vi) Yes.

4. GENERAL:

(i) Poor.
(ii) Attack of antic diseases. Endrex sprayed.
(iii) Height and yield of gingelly.
(iv) (a) 1958—contd.
(v) (a) and (b) Yes.
(vi) Nil.

5. RESULTS:

(i) 122.8 lb./ac.
(ii) 61.95 lb./ac.
(iii) No effect is significant.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₀</td>
<td>123.0</td>
<td>120.8</td>
<td>129.4</td>
<td>124.3</td>
<td>159.0</td>
<td>86.0</td>
<td>123.3</td>
</tr>
<tr>
<td>N₁</td>
<td>108.9</td>
<td>114.4</td>
<td>175.7</td>
<td>132.9</td>
<td>115.5</td>
<td>138.5</td>
<td>144.8</td>
</tr>
<tr>
<td>N₂</td>
<td>104.7</td>
<td>133.4</td>
<td>95.2</td>
<td>111.1</td>
<td>135.4</td>
<td>103.2</td>
<td>54.6</td>
</tr>
</tbody>
</table>

| Mean  | 112.2 | 122.8 | 133.4 | 122.8 | 136.7 | 109.1 | 127.6 |

S.E. of any marginal mean = 20.65 lb./ac.
S.E. of body of any table = 35.76 lb./ac.

Crop: Niger.
Site: Agri. Farm, Barpalli.

Object: To study the effect of N and P along with different levels of irrigation on Niger crop.

1. BASAL CONDITIONS:

(i) (a) Nil. (b) Fallow. (c) Nil.
(ii) (a) and (b) N.A.
(iii) 4.11.1957.
(iv) (a) Two ploughings and levelling, desit ploughing to 4' depth.
(b) Dibbling.
(c) 4 srs/ac.
(d) Lines 9' apart.
(e) N.A.
(f) Nil.
(vi) Nil.
(vii) As per treatments.
(viii) Weeding and hoeing.
(ix) and (x) N.A.

2. TREATMENTS:

All combinations of (1), (2) and (3)
(1) 3 levels of N as A/S: N₀ = 0, N₁ = 30 and N₂ = 60 lb./ac.
(2) 3 levels of P₂O₅ as Super: P₀ = 0, P₁ = 25 and P₂ = 50 lb./ac.
(3) 2 levels of irrigation: I₁ = One irrigation 3 weeks after planting and I₂ = I₁ + one irrigation before flowering.

3. DESIGN:

(i) 3^2 × 2 fact. confounding.
(ii) 6.
(iii) 4.
(iv) (a) 18' × 11'. (b) 16' × 9'. (v) One row on either side and 9' across either side.
(vi) Yes.

4. GENERAL:

(i) and (ii) N.A.
(iii) Niger yield.
(iv) (a) to (c) Nil.
(v) (a) Bhubaneswar.
(b) N.A.
(vi) and (vii) Nil.

5. RESULTS:

(i) 662.5 lb./ac.
(ii) 190.5 lb./ac.
(iii) Effect of I and interaction NPI are highly significant. P effects significant. Other effects not significant.
(iv) Av. yield of niger in lb./ac.
Crop: **Niger (Kharif)**

Site: **Agri. Res. Stn., Bhubaneswar.**

Object: To study the effect of N and P along with different levels of irrigation on Niger crop.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>Mean</th>
<th>I₁</th>
<th>I₂</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N₀</strong></td>
<td>566.1</td>
<td>686.7</td>
<td>651.7</td>
<td>634.8</td>
<td>558.3</td>
<td>737.4</td>
</tr>
<tr>
<td><strong>N₁</strong></td>
<td>739.2</td>
<td>651.7</td>
<td>581.3</td>
<td>657.4</td>
<td>494.4</td>
<td>829.3</td>
</tr>
<tr>
<td><strong>N₂</strong></td>
<td>741.1</td>
<td>731.4</td>
<td>613.9</td>
<td>695.4</td>
<td>552.3</td>
<td>792.3</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>682.1</td>
<td>689.9</td>
<td>615.6</td>
<td></td>
<td>662.5</td>
<td>535.0</td>
</tr>
<tr>
<td><strong>I₁</strong></td>
<td>540.7</td>
<td>584.0</td>
<td>480.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>I₂</strong></td>
<td>849.7</td>
<td>833.0</td>
<td>676.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.E. of N or P marginal mean = 38.89 lb./ac.
S.E. of I marginal mean = 31.75 lb./ac.
S.E. of body of N x P table = 72.00 lb./ac.
S.E. of body of N x I or P x I table = 54.99 lb./ac.

---

**Crop** > **Niger (Kharif)**

**Site** > **Agri. Res. Stn., Bhubaneswar.**

**Object** — To study the effect of N and P along with different levels of irrigation on Niger crop.

1. **BASAL CONDITIONS:**
   1. (a) Nil. (b) Paddy seed beds. (c) A/S applied. Quantity N.A. (i) a Sandy loam. (b) N.A. (iii) 5.11.1957.
   2. (a) Ploughing and levelling. (b) Dibbling. (c) 4 m/s. of Lines 9" apart. (e) N.A. (v) Nil. (vi) N.A.

2. **TREATMENTS and DESIGN:**
   Same as in expt. no. 57/38. on page 2.7.

4. **GENERAL:**
   1. (i) and (ii) N.A. (iii) Niger yield. (iv) (a) 1957—1958. (b) and (c) No. (v) a, Barpal. (b) N.A.
   5. **RESULTS:**
   1. 186.4 lb./ac. (ii) 61.97 lb./ac. (iii) N effect alone is highly significant. (iv) Av. yield of rain in lb./ac.
Crop : Niger.

Object—To study the effect of N and P along with different levels of irrigation on Niger crop.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) and (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) 20.1,' 66. (iv) (a) 2 ploughings by desi plough to 4" depth and levelling. (b) Sowing in lines. (c) 15 lb./ac. 6" between lines. (e) N.A. (v) Nil. (vi) Local. (vii) As per treatments. (viii) 2 weedings. (ix) 21-4-1959.

2. TREATMENTS:
   All combinations of (1), (2) and (3)
   (1) 3 levels of N : N0 =0, N1 =30 and N2 =60 lb./ac.
   (2) 3 levels of P : P0 =0, P1 =25 and P2 =50 lb./ac.
   (3) 3 irrigations : I1 =One irrigation 21 days after germination, I2 =Two irrigations first as in I1 and second 42 days after germination and I3 =Twice as in I2 and 3rd just after flowering.

3. DESIGN:
   (i) 33 confd. (ii) (a) 9. (b) N.A. (iii) 2. (iv) (a) 20'X9'. (b) 19'X8'. (v) One row on either side and 6" across either side. (vi) Yes.

4. GENERAL:
   (i) N.A. (ii) N.A. (iii) Yield of grain. (iv) (a) 1957—1959. (b) and (c) No. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS:
   (i) 62.95 lb./ac. (ii) 20.53 lb./ac. (iii) Effect of N is highly significant and effects of I and P are significant. (iv) Av. yield of grain in lb./ac.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>Mean</th>
<th>I0</th>
<th>I1</th>
<th>I2</th>
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<td>49.22</td>
<td>55.81</td>
<td>49.74</td>
<td>38.83</td>
<td>58.82</td>
<td>51.68</td>
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<tr>
<td>N1</td>
<td>60.33</td>
<td>72.50</td>
<td>85.97</td>
<td>72.93</td>
<td>61.76</td>
<td>79.38</td>
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<tr>
<td>N2</td>
<td>54.02</td>
<td>73.44</td>
<td>71.07</td>
<td>66.18</td>
<td>54.02</td>
<td>82.11</td>
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<tr>
<td>Mean</td>
<td>52.85</td>
<td>65.05</td>
<td>70.95</td>
<td>62.95</td>
<td>51.54</td>
<td>73.44</td>
<td>63.88</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 4.84 lb./ac.
S.E. of body of any table = 8.38 lb./ac.

---

Crop : Berseem (Rabi).

Object—To find out the effect of minor elements on the growth and yield of Berseem.

1. BASAL CONDITIONS:
   (i) (a) Nil. (b) Jute. (c) N.A. (ii) (a) Sandy loam. (b) pH 5.6. (iii) 17.12.1959. (iv) (a) 5 ploughings with desi plough to 6" depth. (b) Broadcasting. (c) 16 lb./ac. (d) and (e) N.A. (v) 10 C.L./ac. of F.Y.M. and 32 lb./ac. of P0O4 as Super applied at broadcasting. (vi) N.A. (vii) Irrigated. (viii) 2 weedings and 1 hoeing. (ix) Nil. (x) 2 cuttings on 19.2.1960 and 4.3.1960.

2. TREATMENTS:
   1. Molybdenum as Sodium molybate at 2 lb./ac.+Inoculum. 7. Calcium+Boron+Inoculum.
   2. Boron as Boric acid at 20 lb./ac.+Inoculum. 8. Calcium+Magnesium+Inoculum.
   4. Zinc as Zinc Sulphate at 20 lb./ac.+Inoculum. 10. Inoculum
   5. Calcium as Cal. Hydroxide at 500 lb./ac.+Inoculum. 11. Control.
   6. Calcium+Molybdenum+Inoculum.
3. DESIGN:
   (i) R.B.D.  (ii) (a) 11.  (b) N.A.  (iii) 4.  (iv) (a) 12' x 8'.  (b) 12' x 8'.  (v) Nil.  (vi) Yes.

4. GENERAL:
   (i) Not good.  (ii) Nil.  (iii) Yield of green fodder.  (iv) (a) 1959—N.A.  (b) No.  (v) Nil.  (vi) (a) and (b) Nil.  (vii) and (vii) Nil.

5. RESULTS:
   (i) 573 lb./ac.  (ii) 513 lb./ac.  (iii) Treatment differences are highly significant.  (iv) Av. yield of fodder 12'.

   Treatment  
   Av. yield 469 2492 4179 5969 7500 10195 8819 8705 6877 2155 1460

   S.E./mean = 256.5 lb./ac.

---

Crop :- Nagpur Orange.  
Site :- Citrus Fruit Res. Sta., Angul.  
Type :- 'M'.

Reference :- Or. 54(2).

Object :- To study the response of Nagpur Orange to manuring with N. P and K.

1. BASAL CONDITIONS:
   (i) Fallow  (ii) (a) Black cotton.  (b) N.A.  (iii) Budding.  (iv) Nagpur orange.  (v) July 1950, 20' x 20' spacing.  (vi) One year.  (vii) G.M. with dhaincha at 30 lb./ac. applied before rains.  (viii) 3 cultivations.  (ix) Nil.  (x) Irrigated.  (xi) 4.36'.  (xii) Nil.

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 = 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) (a) 3 partially confd.  (ii) (a) 9 plots/block ; 3 blocks/replication.  (b) N.A.  (iii) 2.  (iv) 4.  (v) One tree on all sides.  (vi) Yes.

4. GENERAL:
   (i) N.A.  (ii) Nematodes and fusariums inside the roots. Plants replaced after fumigation.  (iii) Diameter of stock. scion and height.  (iv) (a) and (b) 1953—contd.  (v) and (vi) Nil.

5. RESULTS:
   (i) 14.79 inches.  (ii) 1.37' inches.  (iii) None of the effects is significant.  (iv) Mean girth in inches.

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>K₀</th>
<th>K₁</th>
<th>K₂</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>N₀</td>
<td>14.32</td>
<td>14.44</td>
<td>15.41</td>
<td>14.59</td>
<td>15.26</td>
<td>14.32</td>
<td></td>
</tr>
<tr>
<td>N₁</td>
<td>14.81</td>
<td>15.41</td>
<td>14.55</td>
<td>14.73</td>
<td>15.04</td>
<td>15.01</td>
<td>14.92</td>
</tr>
<tr>
<td>K₀</td>
<td>14.54</td>
<td>14.94</td>
<td>14.46</td>
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<td>K₁</td>
<td>15.00</td>
<td>15.02</td>
<td>14.95</td>
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<tr>
<td>K₂</td>
<td>14.85</td>
<td>14.53</td>
<td>14.82</td>
<td></td>
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</tbody>
</table>

S.E. of any marginal mean = 0.32 inches.
S.E. of body of any table = 0.56 inches.
Crop :- Nagpur Orange.
Site :- Citrus Fruit Res. Stn., Angul.

Object :- To study the response of Nagpur Orange to manuring with N, P and K.

1. BASAL CONDITIONS:

2. TREATMENTS and 3. DESIGN:
Same as in expt. no. 54(2) on page 210.

4. GENERAL:
(i) N.A. (ii) Nil. (iii) Diameter and height of stock and scion and yield of fruit. (iv) (a) 1953—contd. (b) Nil. (v) and (vi) N.A.

5. RESULTS:
(i) 213 fruit/tree. (ii) 74 fruit/tree. (iii) Effect of K is highly significant. Effect of N and interaction N x P and N x K are significant. (iv) Av. no. of fruit/tree

<table>
<thead>
<tr>
<th></th>
<th>P₀</th>
<th>P₁</th>
<th>P₂</th>
<th>K₀</th>
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<th>K₂</th>
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<td>79</td>
<td>163</td>
<td>279</td>
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<td>178</td>
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<td>N₁</td>
<td>115</td>
<td>228</td>
<td>326</td>
<td>232</td>
<td>196</td>
<td>240</td>
<td>223</td>
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<td>N₂</td>
<td>137</td>
<td>176</td>
<td>415</td>
<td>236</td>
<td>296</td>
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<td>243</td>
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<tr>
<td>Mean</td>
<td>111</td>
<td>189</td>
<td>340</td>
<td>212</td>
<td>223</td>
<td>204</td>
<td>213</td>
</tr>
</tbody>
</table>

S.E. of any marginal mean = 17 fruit/tree.
S.E. of body of any table = 30 fruit/tree.

Crop :- Nagpur Orange.
Site :- Citrus Fruit Res. Stn., Angul.

Object :- To find out the effect of different doses of organic manures and methods of irrigation on Nagpur Orange.

1. BASAL CONDITIONS:
(i) Fallow. (ii) (a) Black cotton (b) N.A. (iii) Budding. (iv) Nagpur santra on kharga khatta. (v) June, 1950 at a spacing of 20' both ways. (vi) One year. (vii) Dhaincha as G.M. at 30 lb./ac. (viii) 3 ploughings. (ix) Nil. (x) Irrigated. (xi) and (xii) N.A.

2. TREATMENTS:
Main-plot treatments:
4 levels of N: N₀=0, N₁=40, N₂=60 and N₃=80 lb./ac.
Sub-plot treatments:
2 methods of irrigation: M₁=Ring irrigation and M₂=Furrow irrigation.

3. DESIGN:
(i) Split-plot. (ii) (a) 4 main-plots/block; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) 3. (v) One tree around the plot. (vi) Yes.
4. GENERAL:
(i) Good. (ii) N.A. (iii) Diameter and height of stalk and scion and fruit yield. (iv) (a) 1952—contd. (b) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS:
(i) 195 fruit/tree. (ii) (a) 120 fruit/tree. (b) 139 fruit/tree. (iii) Only N effect is highly significant. (iv) Av. no. of fruit/tree.

<table>
<thead>
<tr>
<th></th>
<th>N₀</th>
<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>M₁</td>
<td>84</td>
<td>113</td>
<td>290</td>
<td>347</td>
<td>209</td>
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<tr>
<td>M₂</td>
<td>62</td>
<td>180</td>
<td>204</td>
<td>275</td>
<td>180</td>
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<tr>
<td>Mean</td>
<td>73</td>
<td>147</td>
<td>247</td>
<td>311</td>
<td>195</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. N marginal means = 60 fruit/tree.
2. M marginal means = 49 fruit/tree.
3. M means at the same level of N = 98 fruit/tree.
4. N means at the same level of M = 92 fruit/tree.

Crop :- Nagpur Orange.  
Site :- Citrus Fruit Res. Stn., Angul.  
Ref :- Or. 57(1).  
Type :- 'IM'.

Object :- To find out the effect of different doses of organic manures and methods of irrigation on Nagpur Orange.

1. BASAL CONDITIONS:
(i) Fallow. (ii) (a) Clay soil (b) N.A. (iii) Budding. (iv) Nagpur orange (medium). (v) Jun. 1930; at a spacing of 20' both sides. (vi) 1½ years. (vii) Nil. (viii) Green manured with 15 ses. of diaincha seed and turning it under soil before maturity. (ix) Nil. (x) Irrigated. (xi) 8.95°. (xii) N.A.

2. TREATMENTS and 3. DESIGN:
Same as in expt. no. 55 (2) on page 211.

4. GENERAL:
(i) Normal. (ii) Nil. (i) Diameter of stock, diameter of scion, circumference of spread, height of plants and yield of fruit. (iv) (a) 1952—contd. (b) Nil. (v) and (vi) Date for 1955 N.A.

5. RESULTS:
(i) 88 fruit/tree. (ii) (a) 104 fruit/tree. (b) 36 fruit/tree. (iii) Only M effect is highly significant. (iv) Av. no. of fruit/tree.

<table>
<thead>
<tr>
<th></th>
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<th>N₁</th>
<th>N₂</th>
<th>N₃</th>
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</thead>
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<td>64</td>
<td>54</td>
<td>67</td>
<td>55</td>
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</tr>
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<td>132</td>
<td>96</td>
<td>113</td>
<td>123</td>
<td>116</td>
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<tr>
<td>Mean</td>
<td>98</td>
<td>75</td>
<td>90</td>
<td>89</td>
<td>88</td>
</tr>
</tbody>
</table>

S.E. of difference of two
1. N marginal means = 52 fruit/tree.
3. M means at the same level of N = 25 fruit/tree.
4. N means at the same level of M = 56 fruit/tree.
Crop :- Nagpur Orange.

Site :- Citrus Fruit Res. Stn., Angul.

Object :- To find out the effect of different doses of organic manures and methods of irrigation on Nagpur Orange.

1. BASAL CONDITIONS:
   (i) Fallow. (ii) (a) Clay soil. (b) N.A. (iii) Budding. (iv) Nagpur Orange. (v) June 1950 at 20' x 20' spacing. (vi) 1½ years. (vii) to (ix) Nil. (x) Irrigated. (xi) and (xii) N.A.

2. TREATMENTS and 3. DESIGN:
   Same as in expt. no. 55 (2) on page 211.

4. GENERAL:
   (i) Normal. (ii) N.A. (iii) Diameter of stock, diameter of scion, circumference of spread, height of plants and yield. (iv) (a) 1952—contd. (b) Nil. (v) and (vi) Yield data for 1958—N.A.

5. RESULTS:
   (i) 832 fruit/tree. (ii) (a) 411 fruit/tree. (b) 229 fruit/tree. (iii) None of the effects is significant. (iv) Av. no. of fruit/tree.

<table>
<thead>
<tr>
<th></th>
<th>N0</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
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</thead>
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<tr>
<td>M1</td>
<td>849</td>
<td>829</td>
<td>694</td>
<td>882</td>
<td>814</td>
</tr>
<tr>
<td>M2</td>
<td>750</td>
<td>1020</td>
<td>655</td>
<td>975</td>
<td>850</td>
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<tr>
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<td>800</td>
<td>925</td>
<td>675</td>
<td>929</td>
<td>832</td>
</tr>
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</table>

S.E. of difference of two
1. N marginal means = 206 fruit/tree.
2. M marginal means = 81 fruit/tree.
3. M means at the same level of N = 162 fruit/tree.
4. N means at the same level of M = 235 fruit/tree.