

# **NATIONAL INDEX**

**OF**

## **AGRICULTURAL**

## **FIELD**

## **EXPERIMENTS**

**VOL. 12 PART 3**

## **RAJASTHAN**

**1960—65**



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## FOREWORD

The I. C. A. R. has adopted the 'Co-ordinated approach' to crop improvement as its strategy in agricultural research. This approach is based on the principle of giving high priority to problem solving research and for the purpose an intimate knowledge of research in progress and trends of results is very essential. To give impetus to this approach, I. C. A. R. started a scheme for collecting data of all field experiments conducted in the country. It was aimed at compilation of agronomic experiments in the country, with a view to indicate the gaps in the knowledge and to avoid duplication. The scheme entitled: "National Index of Field Experiments" is running under the Institute of Agricultural Research Statistics which has rendered a very valuable service by preparing compendia of agricultural field experiments conducted in the country. Two series of the compendia containing results of about 7,200 and 12,000 experiments conducted during the periods 1948-53 and 1954-59 respectively have already been published by the Institute. The present is the third series of compendia and is expected to contain the results of about 18,000 experiments conducted during the period 1960-65.

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

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

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

NEW DELHI,  
January 1, 1973

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

time to time and provided guidance to the regional staff working in the scheme. The list of the names of the regional supervisors and regional staff of the project is given on the following pages.

M. N. DAS

*Director*

*Institute of Agricultural Research Statistics*

*( I. C. A. R. )*

NEW DELHI,  
January 1, 1973

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

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



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

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

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

Abbreviations adopted for States are as follows :

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

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

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

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

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

In case of the experiments conducted on cultivators' fields, whether under an Indian Council of Agricultural Research scheme or by the State Government, the abbreviation (c. f.) is given along with the site or centre as, for example, Cuttack (c. f.).

Type :—Abbreviations used against this item are one, or more than one, of the following :

C—Cultural ; D—Control of Diseases and Pests ; I—Irrigational ; M—Manurial ; R—Rotational ; V—Varietal and X—Mixed cropping. In factorial experiments, the treatments will be abbreviated as, for example. Cultural-cum-Manurial as CM.

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

Results :—Information under this heading should be read against the following items :

(i) General mean. (ii) S. E. per plot. (iii) Results of test of significance. (iv) Summary table(s), with critical differences for individual effect means which are significant.

#### Other abbreviations used in the Experimental Data

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

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

### PARTICULARS OF RESEARCH STATIONS

#### A. General Information :

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

#### B. Normal Rainfall :

Average fortnightly rainfall, specifying the period on which the figures are based.

#### C. Irrigation and Drainage facilities :

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

#### D. Soil type and Soil analysis :

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

#### F. No. of Experiments :

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

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

**BASAL CONDITIONS***A. For experiments on annual crops :*

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

*B. For experiments on perennial crops :*

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

*C. For experiments on cultivators' fields :*

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

**DESIGN***A. For experiments on annual crops :*

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

*B. For experiments on perennial crops :*

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

*C. For experiments on cultivators' fields :*

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

**BASAL CONDITIONS***A. For experiments on annual crops :*

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

*B. For experiments on perennial crops :*

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

*C. For experiments on cultivators' fields :*

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

**DESIGN***A. For experiments on annual crops :*

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

*B. For experiments on perennial crops :*

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

*C. For experiments on cultivators' fields :*

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

## GENERAL INFORMATION

### *A. For experiments on annual crops :*

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

### *B. For experiments on perennial crops :*

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

### *C. For experiments on cultivators' fields :*

(i) General crop condition during growth. (ii) Incidence of pests and diseases and control measures taken, if any. (iii) Type of quantitative observations taken. (iv) In case of repetition in successive years, (a) Year of commencement and termination. (b) Whether treatments assigned to the same plots every year. (c) Reference to combined analysis, if any. (v) In case of repetition at other places, give names with references, if any. (vi) Abnormal occurrences such as heavy rains, drought, etc. (viii) Any other important information.

GLOSSARY OF VERNACULAR NAMES OF CROPS

Sl. No.	Name of Crop	Botanical Name	Assamese	Bengali	Oriya	Telugu	Tamil	Malayalam	Kannada	Marathi	Gujarati	Hindi	Punjabi
1	Paddy	<i>Oryza sativa</i> L.	Dhan	Dhan	Dhano	Vadlu, Biyyamu	Nel	Nellu	Bhatta	Bhat	Dangar	Dhan, Chawal	Chaul, Dhan
2	Wheat	<i>Triticum sativum</i> Lamk. <i>Triticum aestivum</i> L.	Gaum, Ghehu	Gam	Gaham	Godumalu	Kothumai	Gothambu	Godhi	Gahu	Ghahu	Gehon	Kanak
3	Barley	<i>Hordeum vulgare</i> L.	Ja'dhan	Joba	Jaba, Barhi or Jabadhana	Barley	Baarli arisi	Barley	Barley akki	Satu, Jav	Jav	Jau	Jaun
4	Jowar	<i>Andropogon sorghum</i> Brot., <i>Sorghum vulgare</i> Pers.	—	Jowar	Juara	Jonra	Cholam	Cholam	Jola	Jowari, Jondhla	Jowari, Juar	Jowar, Jaur	Jowar
5	Bajra	<i>Pennisetum typhoides</i> Stapf Es Hubbard; <i>Pennisetum typhoideum</i> L.	—	Bajra	Bajra	Sajja	Kambu	Kambu	Sajje	Bajri	Bajri	Bajra	Bajra
6	Maize	<i>Zea mays</i> L.	Gom dhan	Bhutta	Macca	Mokka-jonna	Makka-cholam	Cholam, Makka-cholam	Musukina jola	Makka	Makkai	Makka	Makki, Makayee
7	Gram	<i>Cicer arietinum</i> L.	Butmah	Chola	Boot	Sanagalu	Kadalai, Sundal, Kadalai	Kadala	Kadale	Harbara	Chana	Chana	Chhole, Chana
8	Moth	<i>Phaseolus aconitifolius</i> Jacq.	Urahi	Birimung	Methimuga	Ulavalu	Kalpayaru	Thulukka payaru	Thuruku Hesaru	Matki	Math	Moth	Moth
9	Moong	<i>Phaseolus aureus</i> Roxb.	Magum	Sonamug	Mung	Pachapesalu	Pachai-payaru, Pasipayaru	Cerupayaru, Payaru	Hesaru	Mug	Mag	Moong	Moong, Mug
10	Urd	<i>Phaseolus mungo</i> var. <i>radiatus</i> Linn.	Matimah	Mashkalai	Biri	Minumulu	Uzhundu	Uzhunnu	Uddu	Udid	Adad, Udad	Urd	Mash, Urd
11	Cowpea	<i>Vigna catjang</i> Walp.; <i>Vigna sinensis</i> Savi.	—	Barbati	—	—	Thata-payaru	Mambayar	Alasande	Chavli	Chola, Choli	Lobia	Lobia
12	Potato	<i>Solanum tuberosum</i> L.	Alooguti	Alu	Bilati Alu	Bangaladumpa, Uriagadda	Uruzhai kilangu	Urala kizangu	Alu gedde	Batata	Aloo, Batata	Aaloo	Alu
13	Carrot	<i>Daucus carota</i> L.	Gajor	Gajar	Gajar	Gajara-gadda	Kaaret	Carrot	Kempu mulangi	Gajar	Gajar	Gajar	Gajjar
14	Brinjal (Egg plant)	<i>Solanum melongena</i> L.	Bengena	Begun	Baigan	Vankaya	Kathari-kai	Vazhuthana	Badane kayi	Vange	Vengan	Baingan	Bengan, Bataun

Sl. No.	No. of crop.	Botanical Name	Assamese	Bengali	Oriya	Telugu	Tamil	Malayalam	Kannada	Marathi	Gujarati	Hindi	Punjabi
15	Pea	<i>Pisum arvense</i> L.	Motor	Chota, Pyramatar	Badachana	Desavali batani	Pattaani	—	Holada bataani	Vatana, Matar	Vatana	Muttar	Mattri
16	Sugarcane	<i>Saccharum officinarum</i> L.	Kuhiar	Akh	—	Cheruku	Karumbu	Karimbu	Kabpu	Oos	Sherdi	Ganna, Kamad, Naishakar	Kamad, Ganna, Eakh
17	Cotton	<i>Gossypium</i> spp.	Kapah	Karpas, Tula	Kapa	Pratti	Paruthi	Paruthi	Hatti	Kapus	Kapas	Kapas	Kapah
18	Tobacco	<i>Nicotiana tabacum</i> L.	Dhopat	Tamak	Uanpatra	Pogaku	Pugayilai	Pukayila	Hoge soppu	Tambaku	Tamaku	Tambaku	Tamaku, Tambaku
19	Groundnut	<i>Arachis hypogaea</i> L.	China badam	Cheena badam	China-badam	Nelashanga	Nilakadai	Nilakkadala	Kadale kayi	Bhuimug	Bhoising, Magafali	Mungphali	Mungfali
20	Mustard	<i>Brassica juncea</i> Coss.	Sariah	Rai Sarisha	Rai	Avalu	Kadugu	Kaduku	Kempu sasive	Mohri	Rai	Rai	Rai
21	Til	<i>Sesamum orientale</i> L. <i>Sesamum indicum</i> L.	Til	Til	Rasi	Nuvvulu	Ellu	Ellu	Yellu	Til, Tili	Tal	Til	Til
22	Castor	<i>Ricinus communis</i> L.	Eri	Rehri	Jada	Amudalu	Amanakku	Avanakku	Haralu	Erandi	Diveli, Erando	Rehri	Arind, Harind, Rind
23	Linseed	<i>Linum usitatissimum</i> L.	Tisi	Tishi	Peshi	Avise	Alivithai	Cheruchanavithu	Agase	Javas, Alsi	Alsi	Alsi	Alsi
24	Chillies	<i>Capsicum frutescens</i> L.	Jalakiya	Lanka, Marich	Lanka	Mirapakaya	Milakai	Mulaku	Menasina kaya	Mirchi	Marcha	Lal mirch	Lal mirch
25	Corriander	<i>Coriandrum sativum</i> L.	Dhania	Dhaniya	Dhania	Dhaniyalu, Kothimera	Kothamalli	Kothamalli	Kottambri	Kothimbir, Dhane	Kothmir, Dhana	Dhaniya	Dhania
26	Cumin	<i>Cuminum cyminum</i> L.	Jani	Jira	Jira	Jeelaakarra	Seeragam	Jeerakom	Jeerige	Jire	Jiru	Jeera	Jira
27	Guar	<i>Cyamopsis psoraloides</i> Dc. ; <i>Cyamopsis tetragonaloba</i> Taub	Thupi Urahi	Guar	Gunar chhuin	Goruchikkudu	Kothavarankai, Seeniavarikai	Kothavara	Gori kayi	Guwar	Gavar	Guar	Guara



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# RAJASTHAN

( Salient features of experimentation )

The general information regarding the agro-climatic regions, extent of irrigation, normal cropping pattern, etc. of the State of Rajasthan has been given in the first and second parts of the National Index of Agricultural Field Experiments already published for the periods 1948-53 and 1954-59 respectively.

This volume includes the results of 543 experiments conducted during the period 1960-65, besides experiments belonging to All-India Co-ordinated Agronomic Experiments scheme of I.C.A.R., as against 259 experiments for the period 1954-59 and 116 experiments for the period 1948-53. The consolidated results of experiments conducted for more than one year and concluded during the period 1960-65, numbering 279 and forming 119 groups, have been presented, the details of which are given in Table I below :

TABLE I.

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

Crop	M	MV	C	CV	CM	CMV	I	IM	IMV	ICV	D	X	Total
Paddy	1(3)	—	2(6)	1(2)	—	—	—	—	—	1(3)	—	—	5(14)
Wheat	19(42)	2(5)	8(22)	—	—	1(2)	1(2)	—	—	—	5(10)	—	36(83)
Barley	2(5)	2(5)	1(2)	—	—	—	—	—	—	—	1(2)	—	6(14)
Jowar	—	—	1(2)	—	—	—	—	—	—	—	—	—	1(2)
Bajra	7(19)	1(3)	2(4)	—	2(4)	—	—	—	—	—	6(14)	—	18(44)
Maize	5(13)	—	—	—	—	—	—	—	—	—	4(11)	—	9(24)
Gram	—	1(2)	—	—	1(2)	1(2)	—	1(2)	—	—	—	—	4(8)
Moong	—	—	—	—	—	—	—	—	—	—	3(6)	—	3(6)
Potato	2(4)	—	—	—	—	—	—	—	—	—	1(2)	—	3(6)
Pea	1(3)	—	—	—	1(3)	—	—	—	1(3)	—	—	—	3(9)
Sugarcane	1(2)	—	—	—	2(4)	—	—	3(6)	—	—	1(3)	—	7(15)
Cotton	3(8)	1(2)	—	1(2)	—	—	—	—	—	—	—	—	5(12)
Groundnut	2(4)	—	1(2)	—	—	—	—	—	—	—	—	—	3(6)
Mustard	3(6)	—	—	—	—	—	—	1(2)	—	—	—	—	4(8)
Linseed	2(4)	—	1(2)	—	—	—	—	—	1(3)	—	—	—	4(9)
Rai	—	1(2)	—	—	—	—	—	—	—	—	—	—	1(2)
Cumin	—	—	1(3)	—	—	—	—	—	—	—	—	—	1(3)
Fodder crops	1(3)	—	—	—	1(3)	—	—	—	—	—	—	—	2(6)
Opium	1(2)	—	1(2)	—	—	—	—	—	—	—	—	—	2(4)
Mixed cropping	—	—	—	—	—	—	—	—	—	—	—	2(4)	2(4)
<b>Total</b>	<b>50(118)</b>	<b>8(19)</b>	<b>18(45)</b>	<b>2(4)</b>	<b>7(16)</b>	<b>2(4)</b>	<b>1(2)</b>	<b>5(10)</b>	<b>2(6)</b>	<b>1(3)</b>	<b>21(48)</b>	<b>2(4)</b>	<b>119(279)</b>

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

The results of experiments conducted for only one year during the period under report and also those of the experiments which are continued beyond 1965, numbering 264, have been presented. The distribution of all experiments, according to crop and type of treatments, is furnished in Table 2 below :

TABLE 2.

Number of experiments (Crop-wise and Type-wise).

Crop	M	MV	C	CV	CM	CMV	I	IM	IMV	IC	ICV	ICM	D	X	Total
Paddy	8	1	6	3	3	—	—	—	—	1	3	1	—	—	26
Wheat	71	8	30	—	—	3	2	3	2	—	—	1	39	—	159
Barley	8	5	3	2	—	—	—	1	—	—	—	—	8	—	27
Jowar	5	—	2	—	—	1	—	—	—	—	—	—	4	—	12
Bajra	24	4	4	—	4	—	—	—	—	—	—	—	22	—	58
Maize	24	—	1	—	2	—	—	—	—	—	—	—	17	—	44
Gram	7	3	1	1	2	3	—	3	—	—	—	—	—	—	20
Moth	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
Moong	—	1	—	—	1	—	—	—	—	—	—	—	13	—	15
Urd	1	—	—	—	—	—	—	—	—	—	—	—	6	—	7
Cowpea	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Potato	7	—	—	—	—	—	—	—	—	—	—	—	2	—	9
Carrot	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Brinjal	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Pea	3	—	4	—	3	—	—	4	3	—	—	—	6	—	23
Sugarcane	2	1	—	1	6	—	—	8	1	1	—	1	3	—	24
Cotton	9	2	—	2	—	—	—	—	—	—	—	—	—	—	13
Tobacco	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Groundnut	7	—	3	—	1	—	—	—	—	—	—	2	13	—	26
Mustard	11	1	1	—	1	—	—	4	—	—	—	—	1	—	19
Til	—	—	—	1	—	—	—	—	—	—	—	—	1	—	2
Castor	—	—	—	—	1	—	—	—	—	—	—	—	1	—	2
Linseed	7	—	3	—	—	—	—	—	3	—	—	—	—	—	13
Rai	—	2	—	—	—	—	—	—	—	—	—	—	—	—	2
Chillies	1	—	—	—	—	—	—	—	—	—	—	—	1	—	2
Corriander	—	—	—	—	3	—	—	—	—	—	—	1	—	—	4
Cumin	1	—	4	—	—	—	—	—	—	—	—	—	—	—	5
Guar	1	—	—	—	—	—	—	—	—	—	—	—	3	—	4
Jowar (fodder)	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Fodder crops	3	—	—	—	3	—	—	—	—	—	—	—	—	—	6
Opium	2	—	2	—	—	—	—	—	—	—	—	—	3	—	7
Mixed Cropping (X)	—	—	—	—	—	—	—	—	—	—	—	—	—	8	8
<b>Total</b>	<b>203</b>	<b>28</b>	<b>64</b>	<b>10</b>	<b>32</b>	<b>8</b>	<b>2</b>	<b>23</b>	<b>9</b>	<b>2</b>	<b>3</b>	<b>6</b>	<b>145</b>	<b>8</b>	<b>543</b>

The principal crops of the State are Bajra, Gram and other pulses. Jowar, Wheat, Maize and Barley are the other important cereal crops. Among the oilseed crops, Sesamum, Rape and Mustard, Groundnut, Linseed and Castor are grown. Cotton, Paddy, Sugarcane, Tobacco and Potato are also grown in some parts of the State, but these occupy relatively small areas. The salient features of experimentation on different crops are given below :

*Paddy* :-Paddy covers 106.1\* thousand hectares i.e. 0.68% of the total cropped area. 26 experiments were reported on this crop, of which 24 were conducted under irrigated conditions. 14 experiments forming 5 groups were concluded during the period under report. M and C types of experiments accounted for 8 and 6 experiments respectively while 3 experiments each were of CV, CM and ICV types and 1 experiment each was of MV, IC and ICM types. In the manurial experiments, the levels of Nitrogen, Phosphate and Potash ranged between 0 and 90 Kg/ha. Different forms of Nitrogen and times of application of Nitrogen as a factor were also tried in these experiments. In cultural experiments, dates of transplanting, spacings, age of seedlings, number of seedlings per hole, methods of sowing and seed-rates were tried as factors. 18 experiments were laid out in Split-plot Design, 6 in Confounded Factorial Designs and the remaining 2 in Randomised Block Design. In Split-plot Design, 3 and 4 replications were used in 9 experiments each. The Confounded Factorial Designs and Randomised Block Design experiments were laid out with 2 and 4 replications respectively. In the M, C, CM, IC and ICM types of experiments N.P.-130 and T.-21 varieties were mainly used.

*Wheat* :-Wheat occupies 1183.4\* thousand hectares i.e. 7.63% of the total cropped area. 159 experiments were reported on Wheat crop, of which 142 experiments were conducted under irrigated conditions. 83 experiments forming 36 groups were concluded during the period under report. M, D, C and MV types accounted for 71, 39, 30 and 8 experiments respectively. 3 experiments each of CMV and IM, 2 experiments each of I and IMV and one experiment of ICM types were also conducted. In the manurial types of experiments, levels of Nitrogen ranged between 0 and 200 Kg/ha. and that of Phosphate and Potash between 0 and 148 Kg/ha. Sources of Nitrogen, time and methods of application of Nitrogen and Phosphate, different doses of trace-elements, Gypsum, F.Y.M., Spartin and green manures were the other factors tried in these experiments. In C, CMV and ICM types of experiments, seed-rates were tried in the majority of experiments followed by sowing dates and row-spacings. Numbers and stages of weeding, various types of mulch, methods of cultivation and direction of rows were the other factors tried in these experiments. Efficiency of seed-dressing by different fungicides, economics of controlling weeds by weedicides and other methods and effect of different chemicals in the control of Wheat rusts were the objectives studied in D type experiments. Different frequencies, intensities and stages and methods of application of irrigation were tried as factors in I, IM, IMV and ICM types of experiments. 79, 55, 17, 4, 3 and 1 experiments were conducted in Randomised Block Design, Split-plot Design, Confounded Factorial Designs, Incomplete Latin Square Design, Fractional Replication and Split-plot Confounded Design respectively. 28, 25, 16, 5 and 5 Randomised Block Design experiments had 4, 6, 3, 2 and 5 replications respectively while 22, 19, 12 and 2 Split-plot Design experiments had 4, 2, 3 and 6 replications respectively. 2, 1 and 3 replications respectively were used in 9, 5 and 3 experiments conducted with Confounded Factorial Designs. The only Split-plot Confounded experiment was unreplicated. In experiments, other than those of having varieties as a factor, R.S. 31-1, C. 591, N.P. 718 & Malvi varieties were used in 63, 32, 29 and 12 experiments respectively. N.P. 710, N.P. 712, N.P. 792, Kathia and local were the other varieties used.

*Barley* :-27 experiments were reported on this crop, of which all except one were conducted under irrigated conditions. 14 experiments forming 6 groups were concluded during the period under report. 8 experiments each were of M and D types while 5, 3, 2 and 1 experiments were of MV, C, CV and IM types. In the manurial types of experiments, levels of Nitrogen ranged between 0 and 100 Kg/ha. while that of Phosphate and Potash between

\* Figures taken from Indian Agricultural Statistics, Vol. I issued by the Directorate of Economics and Statistics, Ministry of Food and Agriculture, C.D. and Co-operation for 1964-65.

0 and 67 Kg/ha. Forms of Nitrogen and trace-elements were the other factors tried in these experiments. In C and CV types, sowing dates and seed rates were the factors tried. Out of the eight D type experiments, 2 were for controlling weeds in the crop and the remaining were to test the efficacy of different fungicides as seed-dressing. 10, 9, 7 and 1 experiments were conducted in Confounded Factorial Designs, Randomised Block Design, Split-plot Design and Incomplete Latin Square Design respectively. Out of 7 experiments with Split-plot Design, 4 were conducted with 4 replications and the rest with 2 replications. 5, 1 and 3 experiments with Randomised Block Design had 6, 4 and 3 replications respectively. 7 Confounded experiments had 2 replications while 3 were unreplicated. Except in MV and CV types of experiments, all the others were conducted with R.S.-17 variety of Barley.

*Jowar* :—Jowar covers 1194.6\* thousand hectares i.e. 7.71% of the total cropped area. Considering the area of this crop in the State, a few experiments have been reported on this crop. 5 and 4 experiments belonged to M and D types while 2 and 1 experiments were of C and CMV types respectively. Out of these, 9 were conducted under rain fed conditions. Only one experiment was repeated for two years during the period. In four M and CMV types of experiments, levels of Nitrogen, Phosphate and Potash were tried and these ranged between 0 to 112 Kg/ha., 0 to 67 Kg/ha. and 0 to 56 Kg/ha. respectively. In the remaining two manurial experiments, trace-elements were tried as treatments. Four D type experiments were conducted to control weeds in the crop. In three experiments of C and CMV types, seed-rates and row-spacings were tried as factors. Confounded Factorial Designs, Randomised Block Design, Split-plot Design and Strip-cum-Split-plot Design were used in 2, 7, 2 and 1 experiments respectively. Confounded Factorial Designs had 2 replications while in the case of Randomised Block Design, replications ranged between 2 to 8. Experiments with Split-plot Design had 4 and 8 replications while Strip-cum-Split-plot Design had 4 replications. Seven experiments were conducted with R.S.-1 as the variety of Jowar.

*Bajra* :—Bajra covers 4852.8\* thousand hectares i.e. 31.31% of the total cropped area. Among the food-crops, Bajra covers the maximum area in the State, but only 58 experiments were reported on this crop, of which 44 formed 18 groups. 24 experiments of M type, 22 experiments of D type and 4 experiments each of MV, C and CM types were conducted. 56 experiments were conducted under rain-fed conditions. In the manurial experiments, the levels of Nitrogen and Phosphate ranged between 0 and 34 Kg/ha. and that of Potash between 0 and 17 Kg/ha. Sources of Nitrogen and methods of application of fertilizers were the other factors tried in these experiments. Seed-rates and row-spacings were the factors tried in C and CM types of experiments. In D type, 16 and 6 experiments accounted for studying the methods for controlling weeds and diseases respectively. 36, 15, 3, 3 and 1 experiments were laid out in Randomised Block Design, Split-plot Design, Strip-plot Design, Confounded Factorial Designs and Incomplete Latin Square Design respectively. 3, 4 and 6 replications were used in 11, 21 and 4 experiments with Randomised Block Design. 4, 5, 5 and 1 Split-plot experiments were laid out with 2, 3, 4 and 6 replications respectively. Experiments with Confounded Factorial Designs and Strip-plot Design had 3 replications. In M, C, CM and D types, R.S.K., R.S.J. and Local varieties of Bajra were mainly used.

*Maize* :—Maize occupies 709.4\* thousand hectares i.e. 4.58% of the total cropped area. 44 experiments were reported on this crop, of which M, D, CM and C types accounted for 24, 17, 2 and 1 experiments respectively. 24 of these experiments constituted 9 groups during the period under report. 25 experiments were conducted under irrigated and the remaining 19 under rain-fed conditions. In M and CM types, levels of Nitrogen ranged between 0 and 247 Kg/ha. while that of Phosphate and Potash between 0 and 100 Kg/ha. Forms of N, methods of application of fertilizers and row-spacings were the other factors tried in these experiments. 4 experiments were conducted with trace-elements as treatments. 13 of the D type experiments were for controlling weeds in the crop and the remaining 4 were to study the effect of fungicides as seed-dressing. 27, 8, 4, 3, 1 and 1 experiments were laid with

Randomised Block Design, Confounded Factorial Designs, Split-plot Design, Strip-plot Design, Latin Square Design and Incomplete Latin Square Design respectively. Replications ranged between 2 and 6 in the case of Randomised Block Design and 1 to 3 in the case of Confounded Factorial Designs. 3 Split-plot experiments were conducted with 4 replications while 1 experiment had 2 replications. Strip-plot experiments had 3 replications. Bassi (Selected) and Milan varieties were used in 29 and 10 experiments. Local variety and Hybrids were used in the remaining experiments.

*Pulse Crops* :— Pulses occupy 3228.3\* thousand hectares i.e. 20.83% of the total cropped area. 23, 20, 15, 7 and 4 experiments were reported on Pea, Gram, Moong, Urd and Guar crops respectively. 1 experiment each on Moth and Cowpea crops, conducted under un-irrigated conditions, were also reported. 22, 13, 5, 1 and 1 experiments on Pea, Gram, Urd, Guar and Moong respectively were conducted under irrigated conditions. Majority of the experiments were of D type, of which 13 were on Moong, 3 on Guar and 6 each were on Urd and Pea crops. 7 experiments on Gram, 3 on Pea and 1 each on Urd and Guar were of M type while 3 on Gram and 7 on Pea were of IM and IMV types. 7 experiments each on Gram and Pea and 1 each on Moth, Moong and Cowpea accounted for C, CV, CM and CMV types. 3 experiments on Gram and 1 on Moong were of MV type.

On Gram crop, levels of Nitrogen, Phosphate and Potash ranged between 0 and 37 Kg/ha., 0 and 74 Kg/ha. and 0 and 67 Kg/ha. respectively. Methods of application of fertilizers, trace-elements, sowing dates, effect of topping and levels of irrigations were the other factors tried. In majority of the experiments R.S.-10 variety of Gram was used. Split-plot and Confounded Factorial Designs were used in 15 and 3 experiments. 1 experiment each in Randomised Block Design and Balanced Incomplete Block Design was conducted.

On Moong crop, 13 experiments of D type were conducted to study the effect of seed-dressing of fungicides. In MV and CM types, levels of Nitrogen and Phosphate and row-spacings were the other factors tried. R.S.-4 and Local varieties were used in equal number of experiments. 8, 6, and 1 experiments were conducted in Randomised Block, Incomplete Latin Square and Split-plot Designs respectively.

Out of the six D type experiments conducted on Urd crop, 5 were to study the effect of seed-dressing of fungicides. Local variety of Urd was used in the experiments. 4, 2 and 1 experiments were conducted in Randomised Block, Split-plot and Incomplete Latin Square Designs respectively.

In manurial experiments conducted on Pea crop, levels of Nitrogen, Phosphate and Potash ranged between 0 and 34 Kg/ha., 0 and 90 Kg/ha. and 0 and 67 Kg/ha. respectively. In cultural experiments, different isolates of Rhyzobia, mulching materials and row-spacings were tried as factors. In the six D type experiments, fungicides for the control of powdery mildew of Pea were tried. N.P. 29 and Bonevillia varieties were used in majority of the experiments. Randomised Block, Split-plot and Youden Square Designs were used in 10, 10 and 3 experiments respectively.

In the manurial experiment conducted on Guar crop, besides the quantities of green matter added, levels of Nitrogen ranging between 0 and 34 Kg/ha. and levels of Phosphate ranging between 0 and 67 Kg/ha. were tried. In the D type experiments, different fungicides were used to control blight and powdery mildew diseases of Guar. 3 experiments with Local variety and 1 with C. 591 variety were conducted. Incomplete Latin Square Design was used in 2 experiments while Confounded Factorial and Randomised Block Designs were used in 1 experiment each.

*Vegetable Crops* :—11 experiments on vegetable crops were reported and all were conducted under irrigated conditions. 7 and 2 experiments on Potato accounted for M and D types respectively while M type on Carrot and D type on Brinjal were conducted. On Potato crop, levels of Nitrogen ranged between 0 and 1.4 Kg/ha. while levels of Phosphate and Potash ranged between 0 and 100 Kg/ha. Levels of Nitrogen and Phosphate ranged between 0 and 45 Kg/ha. and 0 and 101 Kg/ha. respectively in the case of Carrot crop. Sources of Nitrogen as a factor was also tried on Potato crop. In D type experiments, effect of insecticides were studied for controlling pests and virus. Seven experiments in Randomised Block Design were laid with 4 replications while 1 had 3 replications. One experiment each with Split-plot Design had 2 and 3 replications. The only Confounded Design experiment had 2 replications.

*Sugarcane* :—Sugarcane occupies 42.9\* thousand hectares i.e. 0.28% of the total cropped area. 24 experiments, all under irrigated conditions, were reported on this crop. Out of these, 15 experiments formed 7 groups during the period under report. 8, 6, 3 and 2 experiments respectively were of IM, CM, D and M types. One experiment each was of MV, CV, IMV, IC and ICM types. In all the manurial types of experiments (M, MV, CM, IM, IMV and ICM), levels of Nitrogen were tried and these ranged between 0 and 224 Kg/ha. Of these, 2 with Phosphate and 1 with Potash had levels between 0 and 112 Kg/ha. In cultural types of experiments (CV, CM, IC and ICM), methods and period of planting and row-spacings as factors were tried. Times of application of weedicide with and without weedings were tried in three D type experiments. Co. 419 and Co. 312 were the main varieties used. 1, 15 and 4 experiments conducted in Split-plot Design were with 4, 3 and 2 replications respectively. 1 experiment each in Randomised Block Design had 3 and 4 replications. The two Confounded Factorial Design experiments were unreplicated.

*Cotton* :—Cotton occupies 261.1\* thousand hectares i.e. 1.68% of the total cropped area. 13 experiments, conducted under irrigated conditions, were reported on this crop. Of these, 12 experiments formed 5 groups during the period under report. 9 experiments were of M type and 2 each were of MV and CV types. In M and MV types of experiments, levels of Nitrogen Phosphate and Potash ranged between 0 and 101 Kg/ha., 0 and 67 Kg/ha. and 0 and 90 Kg/ha. respectively. Besides different varieties, sowing dates were tried in the 2 CV type experiments. In 8 of the M type experiments, 320-F, an American variety, was used. 6 and 4 experiments conducted in Randomised Block and Split-plot Designs respectively had 4 replications. The 3 Confounded Factorial experiments had 4 replications each.

*Tobacco* :—Tobacco occupies 9.2\* thousand hectares i.e. 0.06% of the total cropped area. Only one D type experiment to control *orobanche* by sprays of chemical was reported on this crop.

*Groundnut* :—Groundnut covers 197.9\* thousand hectares i.e. 1.28% of the total cropped area. 26 experiments were reported on this crop, of which 6 experiments formed 3 groups during the period under report. Half of the experiments were of D type and the remaining 7, 3, 2 and 1 accounted for M, C, ICM and CM types. 15 experiments were conducted under rain-fed conditions. In M, CM and ICM types of experiments, levels of Nitrogen and Phosphate ranged between 0 and 74 Kg/ha. and those of Potash between 0 and 34 Kg/ha. Sources of Nitrogen, time and methods of application of Phosphate and doses of Sulphur and Molybdenum were the other factors tried. In C, CM and ICM types of experiments, sowing dates, methods of sowing and earthing, row and plant spacings and seed-rates were the factors tried. In all the D type experiments, effect of fungicides as seed-dressing was studied. Among the varieties, R.S.-1 and Local were mainly used. 7 and 5 experiments in Split-plot Design were conducted with 4 and 3 replications respectively. 3, 4 and 6 replications respectively were used in 2, 1 and 4 experiments laid with Randomised Block Design. The two Confounded Factorial experiments had 2 replications each. Three experiments in Split-plot with Lattice arrangements had 3 replications while 1 Split-plot Confounded experiment was unreplicated. 1 experiment was conducted in Incomplete Latin Square Design.

*Rape and Mustard* :—Rape and Mustard occupies 207.8\* thousand hectares i.e. 1.34% of the total cropped area. 19 experiments were reported on Mustard, of which 8 experiments formed 4 groups during the period under report. 18 experiments were conducted under irrigated conditions. 11 experiments were of M type, 4 of IM type and 1 experiment each was of MV, C, CM and D types. In M, MV, CM and IM types, levels of Nitrogen, Phosphate and Potash ranged between 0 and 101 Kg/ha., 0 and 74 Kg/ha. and 0 and 66 Kg/ha. respectively. Sources of N and Methods of application of fertilizers were the other factors tried. In C and CM types of experiments, sowing dates, row-spacings and seed-rates were the factors tried. In the only D type experiment, effectiveness of insecticides in the control of pests was studied. Among the varieties, L-18 and R.L-18 were used in 7 and 5 experiments respectively while Local, R.L-13, Z-18 and R.L-17 were the other varieties used. 2, 3 and 4 replications were used in 2, 7 and 5 Split-plot Design experiments respectively while 1 and 4 experiments in Randomised Block Design had 2 and 4 replications.

*Linseed* :—Linseed occupies 90.1\* thousand hectares i.e. 0.58% of the total cropped area. 13 experiments were reported on this crop, of which 9 experiments formed 4 groups during the period under report. 6 experiments were conducted under irrigated and the remaining under rain-fed conditions. 7 experiments were of M type while 3 each were of C and IMV types. In the M and IMV types of experiments, levels of Nitrogen, Phosphate and Potash ranged between 0 and 67 Kg/ha. Time and methods of application of fertilizers, sources of Nitrogen and trace-elements were the other factors tried in these experiments. In cultural experiments, seed-rates and row-spacings were the factors tried. In M and C types of experiments, R.R-45 and Local varieties were used in 7 and 3 experiments. 2, 3 and 4 replications were used in 3, 2 and 4 experiments respectively conducted with Split-plot Design. 2 experiments each, laid in Randomised Block Design, had 3 and 4 replications.

*Other Oilseeds* :—2 experiments each on Til, Castor and Rai crops were reported. Considering the area of Til, which was 578.6\* thousand hectares i.e. 3.73% of the total cropped area of the State, experimentation on this crop was negligible. While experiments on Castor and Rai were conducted under irrigated conditions, those on Til were under rain-fed conditions. The two MV type of experiments on Rai formed a group and besides the varieties, levels of Nitrogen and Phosphate ranging between 0 and 101 Kg/ha. and 0 and 67 Kg/ha. respectively were tried. In the CV type experiment on Til, besides the 2 varieties, seed-rates and row-spacings were tried as factors while in the CM type experiment on Castor, plant-spacings and levels of Nitrogen, Phosphate and Potash ranging between 0 and 37 Kg/ha. were tried. Fungicidal and insecticidal treatments were used to control Til blight and Castor hairy caterpillars in each of the D type experiment on Til and Castor crops. Split-plot Design, Randomised Block Design and Incomplete Latin Square Design were used in 4, 1 and 1 experiments respectively.

*Spices* :—5 experiments on Cumin, 4 on Corriander and 2 experiments on Chillies were reported. 3 experiments conducted on Cumin formed a group during the period under report. All the 4 cultural and 1 manurial experiments on Cumin and 1 manurial and 1 D type experiment on Chillies were conducted under irrigated conditions, while 2 experiments on Corriander were conducted under rain-fed conditions. While Local varieties were used in all the experiments on Corriander and Chillies, Local, S-404 and K-1 varieties of Cumin were used in 2, 2 and 1 experiments respectively. In the C type experiments on Cumin, dates and methods of sowing and seed-rates as factors were tried. In the manurial experiment on Cumin, besides the method of application of fertilizers, levels of Nitrogen, Phosphate and Potash were tried and these ranged between 0 and 100 Kg/ha. In the CM and ICM types of experiments on Corriander, besides the factors of dates of sowing, seed-rates and levels of irrigation tried, levels of Nitrogen, Phosphate and Potash ranged between 0 and 67 Kg/ha. While in the M type experiment on Chillies, levels of Nitrogen ranged between 0 and 99 Kg/ha. and that of Phosphate and Potash between 0 and 74 Kg/ha., in the D type experiment different fungicides were used for the control of die-back and fruit-rot diseases of Chillies. Eight experiments were conducted in Split-plot Design and 1 each in Confounded Factorial Design, Split-plot Confounded Design and Randomised Block Design.



*Fodder Crops* :—7 experiments on fodder crops were reported, of which 6 experiments formed 2 groups during the period under report. All the experiments were conducted under irrigated conditions. M and CM types accounted for 3 and 4 experiments respectively. In the CM type experiments, for obtaining maximum fodder yields, mixture of Jowar and Guar crops were tried in different ratio of seed rates with levels of Nitrogen ranging between 0 and 74 Kg/ha. In the M type experiments, Berseem and Senji crops were used and levels of Nitrogen and Potash ranged between 0 and 45 Kg/ha. while that of Phosphate between 0 and 125 Kg/ha. Split-plot Design with 4 replications was used in 4 experiments and Split-plot Confounded Design with 2 replications in 3 experiments.

*Opium* :—7 experiments were reported on Opium crop, of which 4 experiments formed 2 groups during the period under report. All the experiments were conducted under irrigated conditions. 3 experiments were of D type and 2 each were of M and C types. In the manurial experiments, besides the split application of Nitrogen, levels of Nitrogen, Phosphate and Potash ranging between 0 and 112 Kg/ha., 0 and 67 Kg/ha. and 0 and 67 Kg/ha. respectively were tried. Sowing dates and row and plant spacings as factors were tried in the cultural experiments. In the D type experiments, study of chemical control of powdery mildew disease of opium was made. 4, 2 and 1 experiments were conducted in Split-plot Design, Randomised Block Design and Balanced Incomplete Block Design respectively.

*Mixed Cropping* :—8 experiments, all conducted under rain-fed conditions, were reported on mixed crops. 4 experiments constituted 2 groups during the period under report. 5 experiments with Bajra and Pulses (Cowpea, Guar, Moong and Moth), 2 with Wheat and Gram and 1 with Cotton and Moth were conducted. Experiments with mixtures of Bajra and Pulses and Wheat and Gram were conducted to study the economics of mixed cropping while the experiment with Cotton and Moth was conducted to study the beneficial effect of Moth in the control of root-rot disease of Cotton. All the experiments were conducted in Randomised Block Design and 5, 2 and 1 experiments had 4, 8 and 12 replications respectively.

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# PARTICULARS OF RESEARCH STATIONS AND SOIL ANALYSIS

## 1. Government Agriculture Farm, Banswara.

### A. General Information :

(i) Situated at Borwat in Banswara district ; 80 Km. from Ratlam R.S. ; The land is of even topography, upto 2% slope with normal relief ; bears erosion barriers. (ii) N.A. (iii) 1963. (iv) Maize-Wheat, Paddy-Wheat, Cotton-Cotton and Paddy-Gram. (v) Research Programme on Rice, Cotton, Maize and Wheat carried out.

### B. Normal Rainfall :

Average annual rainfall is 111.3 cm. (92.2 cm. in Monsoon).

(The period on which the figures are based is not available).

### C. Irrigation and Drainage facilities :

(i) (a) and (b) Irrigation available from well and perennial nallah. Irrigational facilities available for carrying out research programmes during *Kharif* and *Rabi*. (ii) Proper drainage system exists.

### D. Soil type and Soil analysis :

(i) The soil of the farm lies in the deep medium black soil as classified in broad soil gr. of Rajasthan, having mixed red and black character. The soils are clay to clay loam in texture and angular bulky in structure, moderately drained deep soils. Possess sufficient moisture below 5 cm. depth. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

### E. No. of Experiments :

Paddy—1, Wheat—2, Maize—2, Pea—1, Groundnut—1, and Til—1. Total=8.

## 2. Government Agricultural Experimental Farm, Bassi.

### A. General Information :

(i) In Jaipur district ; 1.6 Km. from Bassi R.S. ; Plain area. (ii) N.A. (iii) 1947. (iv) Barley-Bajra-Wheat. (v) N.A.

### B. Normal Rainfall :

June to Sept.	Oct. to May	Total
48.5	4.8	53.3

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

### C. Irrigation and Drainage facilities :

(i) (a) Yes, since establishment. (b) Irrigation done from well. (ii) Proper drainage system exists.

### D. Soil type and Soil analysis :

(i) Sandy loam soil having red and yellow mixed colour. (ii) Chemical analysis : O.C.—0.45% ; pH—8.12 ; E.C.—0.24 mhos/cm. ;  $P_2O_5$ —13.2 Kg/ha. (iii) Mechanical analysis : N.A.

### E. No. of Experiments :

Wheat—9, Barley—17, Bajra—11, Maize—8, Gram—1, Moong—5, Cumin—1 and Mixed crops—2. Total=54.

**3. Nadia Farm, Bharatpur.****A. General Information :**

(i) In Bharatpur district ; 8 Km. from Bharatpur R.S. ; The general topography of the experimental area is plane and low lying. (ii) N.A. (iii) 1965. (iv) *Rabi* :- Wheat, Barley, Mustard, Gram and Pea ; *Kharif* :- Paddy, Jowar, Bajra, Til and Vegetables. (v) Nil.

**B. Normal Rainfall :**

June to Sept.	Oct. to May	Total
57.0	3.6	60.6

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

**C. Irrigation and Drainage facilities :**

(i) (a) Yes. (b) By Girraj canal—only once during *Rabi* season, otherwise by pumps and tubewells. (ii) Yes ; Proper drainage system exists.

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

(i) Soil type—Clay loam. (ii) Chemical analysis : pH—8.0 ; E.C. (in mhos/cm.)—0.4 ; O.C.—0.93% ; P<sub>2</sub>O<sub>5</sub>—12.0 Kg/ha. ; The soil is non-alkaline, high in organic carbon percentage and low in available phosphorus. (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Wheat—1. Total = 1.

**4. Kalmi Bagh, Bhusawar, Bharatpur.****A. General Information :**

(i) (a) In Bharatpur district ; about 24 Km. from Bayana R.S. ; The general topography of the experimental area is levelled. (ii) N.A. (iii) 1951—52. (iv) It is a nursery orchard. (v) Nil.

**B. Normal Rainfall :**

June to Sept.	Oct. to May	Total
57.0	3.6	60.6

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

**C. Irrigation and Drainage facilities :**

(i) (a) Yes, since establishment. (b) 2 wells fitted with pumping sets. (ii) Yes ; Proper drainage system exists.

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

(i) Soil type—Sandy to sandy loam. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

**E. No. of Experiments .**

Groundnut—1. Total = 1.

**5. Government Seed Multiplication Farm, Bhilwara.****A. General Information :**

(i) Situated at Arjia in Bhilwara district ; nearest Railway Station is Bhilwara ; The general topography of the experimental area is levelled. (ii) It represents Mewar tract. (iii) 1957—58. (iv) Maize, Jowar, Moong, Cowpea, Wheat, Barley and Gram. (v) Nil.

**B. Normal Rainfall :**

June to Sept.	Oct. to May	Total
49.0	2.3	51.3

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

**C. Irrigation and Drainage facilities :**

(i) (a) Yes, since establishment. (b) By well. (ii) No proper drainage system exists.

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

(i) Soil type—Sandy loam ; Saline in patches ; Colour—Brown ; Structure—Granular.  
 (ii) Chemical analysis : pH—7.9 to 9.0 ; E.C.—0.3 mhos/cm. ; O. C.—0.130% to 0.135%.  
 (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Wheat-1. Total=1.

**6. Government Agriculture Farm, Bilara.****A. General Information :**

(i) In Jodhpur district ; near Bilara R.S. ; The general topography of the experimental area is levelled. (ii) Semi-arid tract. (iii) 1962. (iv) Fallow-Wheat ; Bajra—Barley.  
 (v) Research on all aspects of crops.

**B. Normal Rainfall :**

Annual rainfall—50 cm. to 70 cm.

(The period on which the figures are based is not available).

**C. Irrigation and Drainage facilities :**

(i) (a) Yes, since establishment. (b) By well. (ii) No drainage problem.

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

(i) Depth—75 cm. ; Colour—Brown. (ii) Chemical analysis : N—Low ; P and K—Medium. (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Wheat—9. Total=9.

**7. Government Agricultural Research Farm, Borkhera.****A. General Information :**

(i) In Ladpura tehsil of Kotah district ; It is a levelled flat area ; Slightly low lying.  
 (ii) Medium black soils. (iii) 1960. (iv) N.A. (v) Working out judicious schedules of cultural and manurial requirements of major crops and plant protection research.

**B. Normal Rainfall :**

June	July	August	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	Total
1.0	10.3	13.8	47.3	6.6	1.2	0.7	5.4	0.2	—	0.1	—	86.6

(Av. rainfall in cm. ; The period on which the averages are based is not available).

**C. Irrigation and Drainage facilities :**

(i) (a) and (b) Canal irrigation from 1960. In addition, there are three wells for emergency use. (ii) Yes, after each hectare-plot, there is a field drain which runs into the main drain leading to a natural nala.

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

(i) Soil type—Medium black cotton soils. (ii) Chemical analysis : Available Nitrogen—Low to medium; Available Phosphate—Medium and Available Potash—Medium. (iii) Mechanical analysis : Clay—30%.

**E. No. of Experiments :**

Paddy-11, Wheat-20, Jowar-7, Maize-1, Gram-6, Urd-3, Potato-4, Pea-7, Sugarcane-10, Cotton-3, Groundnut-4, Mustard-2, Linseed-9, Corriender-4, Fodder crops-3 and Opium-4. Total=98.

**8. Government Agriculture Farm, Bundi.****A. General Information :**

(i) Situated at Chhaterpura in Bundi district ; 37 Km. from Kota R.S. : The general topography of the experimental area is levelled. (ii) N.A. (iii) 1950. (iv) Wheat-Maize-Cotton. (v) Nil.

**B. Normal Rainfall :**

June to Sept.	Oct. to May	Total
62.8	2.0	64.8

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

**C. Irrigation and Drainage facilities :**

(i) (a) Yes, since 1958 (8 ha. irrigated and 16 ha. rain-fed). (b) 2 electric pumping sets. (ii) No proper drainage system exists.

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

(i) Soil type—Heavy clay loam ; Colour—Medium black ; Depth—1.5 m. : Structure—Columnar. (ii) Chemical analysis : pH—7.0 to 8.2 ; E.C.—0.5 to 0.8 mhos/cm. (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Wheat-2. Total=2.

**9. Government Agriculture Farm, Chittorgarh.****A. General Information :**

(i) In Chittorgarh district ; about 3 km. from Chittorgarh R. S. ; The general topography of the experimental area is mostly levelled. (ii) N.A. (iii) 1955. (iv) & (v) Nil.

**B. Normal Rainfall :**

June to Sept.	Oct. to May	Total
65.0	4.6	69.6

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

**C. Irrigation and Drainage facilities :**

(i) (a) Yes, since 1963. (b) Canal irrigation and electric motors.

(ii) Yes, proper drainage system exists.

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

(i) Soil type—Black cotton soil ; Depth—1.0 m to 1.5 m ; Colour—Black ; Structure—Columnar. (ii) Chemical analysis : pH—8.2 (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Opium—3. Total=3.

**10. Janta College Farm, Dabok.****A. General Information :**

- (i) In Udaipur district ; About 12 km. from Dabari R.S. ; The experimental area is plain  
 (ii) It represents rocky tract. (iii) 1956. (iv) Maize—Wheat is the main cropping pattern  
 (v) Nil.

**B. Normal Rainfall :**

June to Sept.	Oct. to May	Total
56.7	3.6	60.3

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

**C. Irrigation and Drainage facilities :**

(i) (a) Yes, since establishment. (b) Canal, well and 2 electric motors. (ii) Yes, proper drainage system exists.

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

(i) Soil type—Clay loam; Depth—1.0 m. to 1.5 m.; Colour—Light yellow to deep brown.; Structure—Columnar (Prisms with rounded tops). (ii) Chemical analysis : pH—5.5 to 6.5 ; Soil has sufficient amount of Potash but there is deficiency of N and P<sub>2</sub>O<sub>5</sub>. (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Wheat—2 and Groundnut—2. Total=4.

**11. Government Agriculture Farm, Dhakerkheri.****A. General Information :**

(i) In Kota district; the nearest Railway Station is Kota ; The topography of the experimental area is levelled. (ii) N.A. (iii) 1957. (iv) Paddy—Wheat; Paddy—Gram ; Green manure—Wheat. (v) Experiments on Paddy, Wheat, Gram, etc. are conducted.

**B. Normal Rainfall :**

Av. annual rainfall is 90 cm.

(The period on which the figure is based is not available).

*Kharif*

Crop	Existing pattern	Crop	Existing pattern
1. Paddy	6.0% of the total area.	6. <i>Kharif</i> Oilseeds,	1.5% of the total area.
2. Maize	0.3% of the total area.	Groundnut and Sunflower	
3. Sugar cane	0.4% of the total area.	7. <i>Kharif</i> Pulses	0.5% of the total area.
4. Fruits and Vegetables	0.8% of the total area.	(Urad, Arhar, Moong and Cowpea).	
5. Jowar	3.0% of the total area.		

*Rabi*

1. Wheat	30.0% of the total area.	4. Gram	22.6% of the total area.
2. <i>Rabi</i> fodder	0.5% of the total area.	5. <i>Rabi</i> Oilseeds (Linseed, Mustard and Sunflower).	0.7% of the total area.
3. Pea/Lentil	0.5% of the total area.		

(v) Various types of experiments are conducted on different crops.

*B. Normal Rainfall :*

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
0.9	0.4	0.5	0.5	0.7	7.9	30.7	26.8	13.2	1.5	0.6	0.3	84.0

(Av. rainfall in cm. ; based on the data of last 30 years).

*C. Irrigation and Drainage facilities :*

(i) (a) Yes, since establishment. (b) (1) Tubewell having a discharge of 1300 litres/hour. (2) Open surface well with a discharge of about 4500 litres/hour. (3) An outlet from Nanta minor of the Chambal Irrigation system feeds the farm with a discharge of 1.5 cusecs. (ii) Yes.

*D. Soil type and Soil analysis :*

(i) Soil type—Heavy clay loam ; Colour—Medium black ; Depth—1.5 m. ; Structure—*When dry* :—Sets very hard and forms deep vertical cracks ; *When wet* :—The fine clay particles tend to disperse losing mechanical strength. There is a very narrow range of moisture content.

(ii) Chemical analysis :—Organic matter content is very low, usually less than 1%. The lime content in the soil and sub-soil lies between 1 to 5%. Soils are low in N, P and K contents and moderately alkaline; pH—7.4 to 7.9 ; E.C. (in mhos/cm.)—0.5 to 0.8 ; Organic Carbon %—0.30 to 0.55 ; Available P<sub>2</sub>O<sub>5</sub> (Kg/ha.)—20 to 60 ; Available K<sub>2</sub>O (Kg/ha.)—50 to 67.

(iii) Mechanical analysis : N.A.

*E. No. of Experiments :*

Paddy-2. Total=2.

**17. Soil Conservation Research, Demonstration and Training Centre, Kota.***A. General Information :*

(i) In Kota district with Lat.—25°11' N/Long.—75°51' E/Alt.—257 m.above M.S.L. ; The farm area has a flat topography. The lands are nearly levelled (0.1% slope). Adjacent to

the agricultural fields, there are ravines as deep as 18.3 m. which have been formed due to scarving action of Chambal river. (ii) Medium black soil tract. (iii) 1954. (iv) Dry farming. (v) Experiments on Agronomical, Soil Science, Forestry and Agriculture Engineering aspects are conducted with special reference to soil and water conservation.

*B. Normal Rainfall :*

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1.7	—	0.3	0.7	1.0	4.0	22.4	21.9	14.5	0.7	0.7	0.2	68.1

(Av. rainfall in cm. ; based on the data for the period 1957-65).

*C. Irrigation and Drainage facilities :*

(i) (a) and (b) Nil. (ii) There are drains to take care of the excess water from the fields.

*D. Soil type and Soil analysis :*

(i) Two types of soil—(a) Dark grey brown and (b) Brown ; Depth—More than 1.5 m. ; Colour—Dark grey brown, brown and yellowish brown ; Structure—Angular blocky and blocky.

(ii) Chemical analysis : The soils are of medium fertility. The phosphorus is fixed up due to high pH. Application of F.Y.M. helps in increasing the yield. N—0.032 to 0.05% ;  $P_2O_5$ —0.05 to 0.08%.

(iii) Mechanical analysis : Clay content varies from 23 to 44%. The silt is nearly 20%. Rest is sand.

*E. No. of Experiments :*

Wheat-11, Jowar-3 and Mixed crops-2. Total=16.

**18. Government Agricultural Farm, Mandore.**

*A. General Information :*

(i) In Jodhpur tehsil of Jodhpur district ; 0.2 Km. from Mandore R.S. ; The land is levelled. (ii) Desert. (iii) 1931. (iv) Fallow-wheat ; Legumes-Fallow-Bajra-Fallow. (v) N.A.

*B. Normal Rainfall :*

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
—	—	0.2	—	0.6	0.4	9.9	9.5	6.3	—	—	—	26.9

(Av. rainfall in cm. ; based on the data for the period 1961-64).

*C. Irrigation and Drainage facilities :*

(i) (a) and (b) There are three wells at this farm and electric pumps have been fitted on these wells. These wells were constructed prior to the formation of Rajasthan. (ii) There is no drainage problem.

*D. Soil type and Soil analysis :*

(i) Depth—Deep soils ; Colour—Light brown ; Structure—Granular.

(ii) Chemical analysis ; N—131 to 306 Kg/ha. ;  $P_2O_5$ —18 to 80.9 Kg/ha. ;  $K_2O$ —146 to 448 Kg/ha. and pH—7.9 to 8.48.

(iii) Mechanical analysis : N.A.

*E. No. of Experiments :*

Wheat-16, Barley-3, Bajra-24, Moth-1, Moong-8, Pea-2, Til-1, Guar-2 and Mixed crops-1. Total=58.



## 19. Government Seed Multiplication Farm, Ora-Sirohi.

### A. General Information :

(i) In Sirohi district ; nearest Railway Station is Sirohi Road; The general topography of experimental area is levelled. (ii) Semi-humid tract. (iii) 1963. (iv) Fallow, Barley, G.M., Wheat, Mustard. (v) Research work on all aspects of crops.

### B. Normal Rainfall :

Annual rainfall ranges between 70 cm. to 90 cm.

(The period on which the figures are based is not available).

### C. Irrigation and Drainage facilities :

(i) (a) Yes, since establishment. (b) by canal. (ii) No drainage problem.

### D. Soil type and Soil analysis :

(i) Depth—75 cm. ; Colour—Dark brown. (ii) Chemical analysis : N—Low ; P and K—Medium. (iii) Mechanical analysis : N.A.

### E. No. of Experiments :

Wheat-3 and Mustard-2. Total=5.

## 20. Government Agricultural Farm, Rampura.

### A. General Information :

(i) In Jodhpur District ; near Marwar Mathania R.S. ; The general topography of the experimental area is levelled. (ii) Arid tract. (iii) 1962. (iv) Chillies—Wheat—Bajra—Onion. (v) Research on all aspects of crops.

### B. Normal Rainfall :

Av. annual rainfall is 45.6 cm.

(The period on which the figure is based is not available).

### C. Irrigation and Drainage facilities :

(i) (a) Yes, since establishment. (b) By well. (ii) No problem of drainage.

### D. Soil type and Soil analysis :

(i) Depth—75 cm. ; Colour—Desert grey ; Structureless soil.

(ii) Chemical analysis : N—Low; P and K—Medium.

(iii) Mechanical analysis : N.A.

### E. No. of Experiments :

Chillies-2. Total=2.

## 21. Government Seed Multiplication Farm, Sardargarh.

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

### E. No. of Experiments :

Potato-1. Total=1.

**22. Government Agriculture Farm, Sawai Madhopur.****A. General Information :**

(i) In Sawai Madhopur tehsil of Sawai Madhopur district ; fields are not very well levelled. (ii) Hilly tract on North side, but sandy and clayey loam tract on the other three sides. (iii) 1958. (iv) G.M.-Wheat-Maize; Wheat-Jowar-Fallow.

**B. Normal Rainfall :**

June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	Total
3	12	5	1	—	—	1	1	—	—	—	—	23

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

**C. Irrigation and Drainage facilities :**

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

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

(i) Sandy loam to clayey loam; brown to dark black in colour.

(ii) Chemical analysis and (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Jowar-1 and Groundnut-2. Total=3.

**23. Government Agriculture Farm, Sewar (Bharatpur).****A. General Information :**

(i) In Bharatpur district; nearest Railway Station Sewar. (ii) Alluvial soils of recent origin. (iii) 1958. (iv) Rabi—Wheat, Barley, Gram, Mustard ; Kharif—Bajra, Paddy, Jowar, Sunflower, Moeng. (v) Nil.

**B. Normal Rainfall :**

Jan.	Feb.	March	April	May	June	July
1 2	1 2	1 2	1 2	1 2	1 2	1 2
0.3	—	0.5	—	0.2	1.2	0.4
0.5	0.5	0.9	1.4			
Aug.	Sept.	Oct.	Nov.	Dec.	Total	
1 2	1 2	1 2	1 2	1 2		
2.4	0.8	3.2	1.2	—	—	13.5

(Av. fortnightly rainfall in cm. ; based on the data for the period 1969-71).

**C. Irrigation and Drainage facilities :**

(i) (a) Proper irrigation facilities available since 1968. (b) Three tubewells and trapajodial channels supplied by underground pipe lines. (ii) Drainage facilities not available.

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

(i) Clay loam soil.

(ii) Chemical analysis : N—Low to medium ;  $P_2O_5$ —Medium ;  $K_2O$ —High ; pH—7.2 to 7.9 ; E.C.—0.35 to 1.25 mhos/cm.

(iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Potato-2, Groundnut-1 and Mustard-1. Total=4.

**24. Government Agriculture Research Farm, Sriganaganar.***A. General Information :*

(i) In Sriganaganar tehsil of Sriganaganar district ; Levelled. (ii) Indo-Gangetic alluvial plains of North India. (iii) 1949. (iv) Sugarcane-Cotton-Wheat. (v) Experiments are conducted on Botanical, Agronomical, Entomological and Plant Pathological aspects.

*B. Normal Rainfall :*

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
0.6	0.2	0.7	0.5	2.6	2.0	5.4	5.5	6.8	0.3	0.3	0.7	25.6

(Av. rainfall in cm. ; based on the data for the period 1961—64).

*C. Irrigation and Drainage facilities :*

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

*D. Soil type and Soil analysis :*

(i) Sandy loam ; light brown in colour and granular in structure. (ii) Chemical analysis : pH—8.2; Available N—191 Kg/ha.; Available P<sub>2</sub>O<sub>5</sub>—28 Kg/ha.; Available Potash—258 Kg/ha. (iii) Mechanical analysis : Clay—15.8%, Silt—22.5%, Coarse sand—1.2% and Fine sand—60.5.

*E. No. of Experiments :*

Paddy-2, Wheat-30, Barley-2, Maize-1, Gram-12, Urd-4, Brinjal-1, Pea-7, Sugarcane 9, Cotton-8, Groundnut-4, Mustard-13, Castor-1, Guar-1, Jowar (fodder)-1, Fodder crops-3 and Mixed crops-1. Total=100.

**25. Government Agriculture Research Farm, Sultanpur.***A. General Information :*

(i) In Kota district ; nearest Railway Station is Digod ; Lat.—76° 11' N/Long.—25° 18'E/Alt.—778.6 m. above M.S.L. ; It represents plain topography. (ii) Harati tract. (iii) From 1961 to 1969 as research farm and from 1970 as seed farm. (iv) Paddy—Wheat ; Fallow—Wheat ; Paddy—Gram. (v) Nil.

*B. Normal Rainfall :*

90 cm. (Total rainfall from 15th June, 1972 to 15th Oct., 1972).

*C. Irrigation and Drainage facilities :*

(i) (a) and (b) Irrigation by canal since 1961. (ii) No proper drainage system.

*D. Soil type and Soil analysis :*

(i) Black cotton soil ; Depth—1.52 m. to 1.82 m. ; Colour—Black ; Structure - Fine. (ii) Chemical analysis : Conductivity—0.45 to 2.20 in different plots ; Organic Carbon—0.45 to 1.05 in different plots ; Phosphate—9.0 to 50.6 in different plots. (iii) Mechanical analysis : Not Available.

*E. No. of Experiments :*

Paddy-5, Wheat-6, Barley-1, Maize-1, Gram-1, Pea-3, Groundnut-1, Mustard-1, Linseed-3 and Rai-2. Total=24.

**26. Agricultural Research Station, Sumerpur.****A. General Information :**

(i) In Pali district ; nearest Railway station is Jawai Bandh ; The general topography of the experimental area is levelled. (ii) Semi-arid tract. (iii) 1958-59. (iv) Bajra-Wheat, Guar-Wheat, Moong-Barley, Til-Barley, Cowpea-Mustard. (v) Research on all aspects of crops.

**B. Normal Rainfall :**

Annual rainfall ranges between 55 cm. to 75 cm.

(The period on which the data are based is not available).

**C. Irrigation and Drainage facilities :**

(i) (a) Yes, since establishment. (b) Well and Jawai canal. (ii) No drainage problem.

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

(i) Broad soil type—Sandy loam ; Depth—75 cm. ; Colour—Brown ; Structure—Massive.

(ii) Chemical analysis : Available N—Low ; Available P & K—Medium ; pH—7.7 ; E.C.—Normal. (iii) Mechanical analysis : Sand%—68, Silt%—17 and Clay%—14%.

**E. No. of Experiments :**

Wheat-2 and Maize-1. Total=3.

**27. Government Agricultural Farm, Tabiji.****A. General Information :**

(i) In Ajmer tehsil of Ajmer district ; 5 km. from Tabiji R.S. ; Fairly levelled land. (ii) Sandy loam tract. (iii) 1930. (iv) *Kharif* : Bajra, Maize, Cotton, Groundnut, Moong and Cowpea. *Rabi* : Wheat, Barley, Gram, Pea and Raya. (v) Experiments on different aspects such as Agronomy, Breeding Agriculture Chemistry, Entomology, Economic Botany, Pathology, etc. are conducted.

**B. Normal Rainfall :**

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
—	—	0.3	0.1	1.7	4.2	11.2	14.2	8.1	—	0.6	—	40.4

(Av. rainfall in cm. ; based on the data for the period 1960-64).

**C. Irrigation and Drainage facilities :**

(i) (a) and (b) 5 wells, out of which 3 are fitted with electric motors and centrifugal pumps since 1956 ; before this *Charas* was used. (ii) There is no problem of water logging and natural drainage system exists.

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

(i) Sandy loam ; Light brown in colour ; 1.52 to 1.83 m. deep. (ii) Chemical analysis and (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Wheat-12, Bajra-11 and Maize-16. Total=39.

**28. Government Agriculture Farm, Tonk.****A. General Information :**

(i) In Tonk district ; nearest Railway Station is Banasthali Newai. (ii) Plain except some ravine spots. (iii) Since the times of old Tonk state. (iv) Fallow-Gram ; Bajra-Wheat ; Til-Gram ; Jowar-Fallow. (v) This is a seed multiplication farm, but some trials are conducted.

**B. Normal Rainfall :**

Av. annual rainfall—54·7 cm.

(based on the data for the period 1964—67).

**C. Irrigation and Drainage facilities :**

- (i) (a) Yes, since the establishment of the farm. (b) Well irrigation for about 3·5 ha.  
 (ii) No problem of drainage.

**D. Soil type and Soil Analysis :**

- (i) Soil type—Sandy loam ; Colour—Greyish. (ii) Chemical analysis : pH—Normal.  
 (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Cumin-4. Total=4.

**29. Government Agricultural (Rajasthan College of Agriculture) Farm, Udaipur.****A. General Information :**

(i) In Udaipur district ; 4·8 Km. from Udaipur R.S. (ii) N.A. (iii) Established in 1957. (iv) Maize. (v) N.A.

**B. Normal Rainfall :**

Information N.A.

**C. Irrigation and Drainage facilities :**

(i) (a) and (b) Irrigation is done by well. (ii) N.A.

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

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

**E. No. of Experiments :**

Paddy-1, Wheat-8, Jowar-1, Maize-12 and Groundnut-1. Total=23.

**30. Vidya Bhawan Rural Institute, Udaipur.****A. General Information :**

(i) In Udaipur district ; 5 Km. from Udaipur R.S. with Lat.—24·5°N/Long.—73·6°E ; The farm is fairly well established on the road side from Udaipur to Gogunda in the East direction and canal and hillock in the West direction. The North direction of the farm area is a consolidated one and suitable for experimentation. (ii) Plains surrounded by hills. (iii) 1956. (iv) Rabi—Wheat, Barley and Pea. Kharif—Maize (v) Regular trials on Sugarcane, Maize, Wheat, etc. are laid out.

**B. Normal Rainfall :**

Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
—	—	20·3	—	—	3·8	12·7	20·3	6·4	—	—	—	63·5

(Av. rainfall in cm. ; based on the data for the period 1966-67).

**C. Irrigation and Drainage facilities :**

- (i) (a) Irrigation facilities are available since establishment. (b) Irrigated by canal.  
 (ii) There is no proper drainage system but at the same time the fields are well drained and excess of rain water can be drained out by the side ditches.

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

(i) Soil type—Sandy loam and loam; Depth—23 cm. to 30 cm.; Colour—Brown ; Structure—N.A. (ii) Chemical analysis : Nitrogen—1.40 (normal); Phosphorous—1.96; Potash—2.24 (normal). (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Wheat-2, Maize-1 and Sugarcane-5. Total=8.

**31. Bhinder Panchayat Samiti, Udaipur.****A. General Information :**

In Udaipur district.

**B. Normal Rainfall to D. Soil type and Soil analysis : Information N.A.****E. No. of Experiments :**

Groundnut-1. Total=1.

**32. Mechanised Government Agriculture Farm, Ummedganj.****A. General Information :**

(i) In Kota district ; nearest Railway Station is Kota City ; The general topography of the experimental area is mostly levelled. (ii) N.A. (iii) 1960. (iv) Fallow-Wheat; Maize-Wheat ; Paddy-Wheat ; Bajra-Wheat ; Jowar-Wheat. (v) Nil.

**B. Normal Rainfall :**

June to Sept.	Oct. to May.	Total
65.0	3.7	68.7

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

**C. Irrigation and Drainage facilities :**

(i) (a) Yes, since establishment. (b) By canal and lift pump from perennial nallas. (ii) Yes, there is a proper drainage system.

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

(i) Soil type—Medium Black Cotton Soil. (ii) Chemical analysis : Available N—Medium ; Available  $P_2O_5$ —Low to medium ; Available  $K_2O$ —Low to medium. (iii) Mechanical analysis : N.A.

**E. No. of Experiments :**

Cotton—2 and Linseed—1. Total=3.

**EXPERIMENTAL DATA**

**Crop :- Paddy (Kharif).**

**Ref :- Rj 63(6).**

**Site :- Govt. Agri. Farm ; Banswara.**

**Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 20.8.63. (iv) to (ix) N.A. (x) 30.11.63.

**2. TREATMENTS :**

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

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=33.6$  and  $N_2=67.3$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.3$  Kg/ha.

(3) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=33.6$  Kg/ha.

**3. DESIGN :**

(i)  $3^2 \times 2$  confd. (ii) (a) 6 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield grain. (iv) (a) 1963 only. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 3045 Kg/ha. (ii) 452.0 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	Mean
$N_0$	2450	2386	2968	2441	2762	2601
$N_1$	3052	3255	3320	3150	3267	3209
$N_2$	3380	3126	3468	3295	3354	3325
Mean	2961	2922	3252	2962	3128	3045
$K_0$	3030	2651	3206			
$K_2$	2891	3193	3298			

C.D. for N marginal means = 393.0 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Rj. 62(83), 63(30), 64(29).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'M'.**

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



## 1. BASAL CONDITIONS :

(i) (a) Nil. for 62(83) and 64(29) Fallow-Wheat-Paddy for 63(30). (b) N.A. for 62(83); Wheat for 63(30); Fallow for 64(29). (c) N.A. for 62(83); Nil for others. (ii) Medium clay soil. (iii) N.A.; 21.6.1963; 20.6.1964. (iv) (a) 4 ploughings, 2 bakhenings and 1 planking for 62(83); 2 puddlings for 63(30); 1 disc ploughing, 1 planking 1 disc harrowing and 1 puddling for 64(29). (b) Line sowing for 62(83); Broadcasting for others. (c) N.A. for 62(83); 74 Kg/ha. for 63(30) and 64(29). (d) 23 cm. between lines for 62(83); N.A. for others. (e) N.A. (v) N.A. for 62(83), 63(30); Nil for 64(29). (vi) N.P.—130. (vii) Irrigated. (viii) 1 to 2 weedings. (ix) N.A. for 62(83); 84 cm. for 63(30); 72 cm. for 64(29). (x) N.A. for 62(83); 6, 7.10.1963; 29, 30.9.1964.

## 2. TREATMENTS :

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

- (1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=44.8$  and  $N_2=89.7$  Kg/ha.  
 (2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=44.8$  and  $P_2=89.7$  Kg/ha.  
 (3) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$ ,  $K_1=44.8$  and  $K_2=89.7$  Kg/ha.

## 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) [9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 7.9 m. × 5.5 m. (b) 7.3 m. × 4.9 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962 to 1964. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) The error variances are heterogeneous and Treatments × years interaction is present.

## 5. RESULTS :

(i) 2946 Kg/ha. (ii) 620.0 Kg/ha. [28 d.f. made up of interactions of N, P, K, N × P, N × K with years]. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$N_0$	1734	2216	2504	2081	2208	2165	2151
$N_1$	2900	3318	3269	3130	3143	3214	3162
$N_2$	3186	3659	3730	3508	3611	3456	3525
Mean	2607	3064	3168	2906	2987	2945	2946
$K_0$	2557	2981	3181				
$K_1$	2712	3114	3136				
$K_2$	2551	3097	3188				

C.D. for N or P marginal means=244.3 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Rj. 63(24).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'M'.**

**Object :-** To find out the suitable source, level and time of application of N for Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Peas-Fallow-Wheat-Paddy. (b) Wheat. (c) Nil. (ii) Medium clay soil. (iii) 4 to 7.7.1963. (iv) (a) 2 puddlings and laddering. (b) Transplanting. (c) N.A. (d) 30 cm. × 30 cm. (e) N.A. (v) N.A. (vi) NP-130. (vii) Unirrigated. (viii) 2 weedings. (ix) 84 cm. (x) 7.10.1963.

## 2. TREATMENTS :

## Main-plot treatments :

4 sources of N :  $S_1=A/S$ ,  $S_2=A/S/N$ ,  $S_3=C/A/N$  and  $S_4=Urea$ .

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of N :  $N_0=0$ ,  $N_1=44.8$  and  $N_2=89.7$  Kg/ha.

(2) 2 times of application of fertilizers :  $T_1=2$  doses and  $T_2=3$  doses.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.5m.  $\times$  4.8 m. (b) 4.9 m.  $\times$  3.1 m. (v) 30 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 3369 Kg/ha. (ii) (a) 593.0 Kg/ha. (b) 686.0 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$T_1$	$T_2$	Mean
$N_0$	—	—	—	—	—	—	2796
$N_1$	3814	3567	4125	3140	3806	3518	3662
$N_2$	3951	3555	3701	3386	3629	3668	3648
Mean	3882	3561	3913	3263	3717	3593	3369
$T_1$	3881	3486	4160	3341			
$T_2$	3883	3636	3666	3185			

C.D. for N marginal means = 343.0 Kg/ha.

**Crop :- Paddy (Kharif).**

**Site :- Govt. Agri. Farm, Jatsar.**

**Ref :- Rj. 62(37).**

**Type :- 'M'.**

Object :- To study the effect of N, P and K applied alone and in combinations on Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Fallow-Paddy. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 7.7.62. (iv) (a) 2 ploughings. (b) Transplanting. (c) 25 Kg/ha. (d) N.A. (e) 2. (v) N.A. (vi) T-21. (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) 10.11.62.

## 2. TREATMENTS :

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

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=44.8$  and  $N_2=89.7$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=44.8$  and  $P_2=89.7$  Kg/ha.

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

N applied  $\frac{1}{2}$  dose at sowing by broadcast and  $\frac{1}{2}$  top dressed after one month.  $P_2O_5$  drilled at sowing and  $K_2O$  by broadcast at sowing.

## 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 6.1 m.  $\times$  4.6 m. (b) 5.6 m.  $\times$  4.1 m. (v) 23 cm.  $\times$  23 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 2303 Kg/ha. (ii) 439.7 Kg/ha. (iii) Main effect of N alone is highly significant (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	1540	1426	1715	1503	1633	1543	1560
N <sub>1</sub>	2460	2354	2244	2443	2301	2313	2353
N <sub>2</sub>	3258	2777	2949	2859	3059	3067	2995
Mean	2419	2186	2303	2268	2331	2308	2303
K <sub>0</sub>	2399	2236	2171				
K <sub>1</sub>	2591	2151	2252				
K <sub>2</sub>	2269	2171	2484				

C.D. for N marginal means = 303.8 Kg/ha.

**Crop :- Paddy (Kharif).**

**Site :- Govt. Agri. Res. Farm, Srigananagar.**

**Ref :- Rj. 65(10).**

**Type :- 'M'.**

**Object :-** To study the effect of different times of application of N as Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 19.7.1965. (iv) (a) Ploughing by *desi* plough and patta. (b) Dibbling. (c) N.A. (d) 23 cm. × 15 cm. (e) 2. (v) 74.1 Kg/ha. of N and 49.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) T-21. (vii) Irrigated. (viii) 2 hoeings and weedings. (ix) N.A. (x) 22.10.1965.

## 2. TREATMENTS :

9 times of applications of N : M<sub>1</sub>=Full dose at transplanting, M<sub>2</sub>=Full dose at 30 days of transplanting, M<sub>3</sub>=Full dose at flowering initiation, M<sub>4</sub>=Half at transplanting+half after 30 days, M<sub>5</sub>=Half at transplanting+half at flowering, M<sub>6</sub>=Half after one month+half at flowering, M<sub>7</sub>=Half at transplanting+one fourth after 30 days+one fourth at flowering, M<sub>8</sub>=One fourth at transplanting+one fourth after 30 days+half at flowering and M<sub>9</sub>=One third at transplanting +one third after 30 days+one third at flowering.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 3.7 m. (b) 4.1 m. × 3.2 m. (v) 23 cm. × 23 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Stand, tiller, height, no. of ears/plant and yield of grain. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1359 Kg/ha. (ii) 482.0 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>	M <sub>8</sub>	M <sub>9</sub>
Av. yield	1557	645	940	1352	2031	1158	1600	1348	1604

C.D. = 703.4 Kg/ha.

**Crop :- Paddy (Kharif).****Ref :- Rj. 61(116).****Site :- Raj. College Agri. Farm, Udaipur.****Type :- 'M'.**

Object :—To find out the effect of different concentrations of iron and zinc applied alone and in combinations through soil and by spraying on the yield of Paddy.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Wheat. (c) 44.8 Kg/ha. of N as A/S. (ii) Sandy Clay loam. (iii) 8.6.1961. (iv) (a) 3 ploughings with mould board plough. (b) Transplanting. (c) —. (d) and (e) N.A. (v) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and 22.4 Kg/ha. of  $K_2O$ . (vi) T-3. (vii) Irrigated. (viii) Weeding once a week followed by a light hoeing with an iron pointed peg. (ix) Negligible. (x) 12 to 18.10.1961.

**2. TREATMENTS :**

13 manurial treatments:  $T_0$ =Control (2 plots),  $T_1$ =16.7 Kg/ha. of Fe. Sul. in soil,  $T_2$ =27.8 Kg/ha. of Fe. Sul. in soil,  $T_3$ =5.6 Kg/ha. of Fe. Sul. by spray,  $T_4$ =11.1 Kg/ha. of Fe. Sul. by spray,  $T_5$ =11.1 Kg/ha. of Zn. Sul., in soil,  $T_6$ =16.7 Kg/ha. of Zn. Sul. in soil,  $T_7$ =5.6 Kg/ha. of Zn. Sul. by spray,  $T_8$ =11.1 Kg/ha. of Zn. Sul. by spray,  $T_9$ = $T_1+T_5$ ,  $T_{10}$ = $T_2+T_6$ ,  $T_{11}$ = $T_3+T_7$ ,  $T_{12}$ = $T_4+T_8$ .

**3. DESIGN :**

(i) R.B.D. (ii) (a) 14. (b) 35.2 m.×18.6 m. (iii) 4. (iv) (a) 9.1 m.×5.0 m. (b) 8.2 m.×4.1 m. (v) 46 cm.×46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Height of plants, number of tillers, yield of grain and straw. (iv) (a) No. (b) and (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 3712 Kg/ha. (ii) 458.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$	$T_{10}$	$T_{11}$	$T_{12}$
Av. yield	3480	3370	3840	3540	3990	3480	3940	4040	4160	3510	3310	3630	3960

**Crop :- Paddy (Kharif).****Ref :- Rj. 63(34).****Site :- Govt. Agri. Farm, Jatsar.****Type :- 'MV'.**

Object :—To study the effect of different level. of N on different varieties of Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Fallow. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 8.7.1963. (iv) (a) 8 ploughings and 1 puddling. (b) Transplanting. (c) — (d) 23 cm.×23 cm. (e) 1. (v) 33.6 Kg/ha. of  $P_2O_5$ . (vi) As per treatment. (vii) Irrigated. (viii) 2 hand hoeings. (ix) N.A. (x) 20.11.1963.

**2. TREATMENTS :****Main-plot treatments :**

4 varieties :  $V_1$ =NP-130,  $V_2$ =T-21,  $V_3$ =T-136 and  $V_4$ =T-22.

**Sub-plot treatments :**

4 levels of N :  $N_0$ =0,  $N_1$ =33.6,  $N_2$ =57.3 and  $N_3$ =100.9 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 2.7 m.×2.7 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—contd. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

**Crop :- Paddy (Kharif).**

**Ref :- Rj. 63(31), 64(20), 65(18).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'C'.**

Object :—To find out the optimum date of planting and suitable spacing for Paddy.

**1. BASAL CONDITIONS :**

(i) Nil. (b) Fallow for 63(31), 65(18), Gram for 64(20). (c) Nil for 63(31), 65(18), 22.4 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$  for 64(20). (ii) Sandy loam. (iii) As per treatments. (iv) (a) 6 ploughings for 63(31) and 64(20), 1 to 2 ploughings, 1 puddling and 1 bakhening for 65(18). (b) Transplanting. (c) N.A. (d) As per treatments. (e) 2 to 4. (v) 45 Kg/ha. of N applied half at the time of transplanting and half as top dressing+24 Kg/ha. of  $P_2O_5$  applied at transplanting for 63(31), 45 Kg/ha. of N+45 Kg/ha. of  $P_2O_5$  by drilling at the time of sowing for 64(20), Nil for 65(18). (vi) N.P.—130. (vii) Irrigated. (viii) 1 to 3 weedings. (ix) N.A. for 63(31), 65(18), 72 cm. for 64(20). (x) N.A. for 63(31), 4.10.1964 to 11.12.1964, 27.9.65 to 9.12.1965.

**2. TREATMENTS :**

**Main-plot treatments :**

7 dates of transplanting :  $D_1=10$  th June,  $D_2=25$ th June,  $D_3=10$ th July,  $D_4=25$ th July,  $D_5=10$ th August,  $D_6=25$ th August and  $D_7=12$  th September.

**Sub-plot treatments :**

6 spacings :  $S_1=10$  cm.  $\times$  10 cm,  $S_2=10$  cm.  $\times$  20, cm.  $S_3=10$  cm.  $\times$  30 cm,  $S_4=20$  cm.  $\times$  20 cm.,  $S_5=20$  cm.  $\times$  30 cm, and  $S_6=30$  cm.  $\times$  30 cm.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 7 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 4.27 m.  $\times$  3.0 m, (b) 3.7 m.  $\times$  2.4 m. (v) 30 cm.  $\times$  30 cm. (v) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) 1963 to 1965, (b) No. (c) Nil. (v) and (vi) N.A. (vii) Since the sub-plot error variances are heterogeneous, the results of individual years are presented yield for treatment  $D_7$  is N.A.

**5. RESULTS :**

**63(31)**

(i) 2921 Kg/ha. (ii) (a) 618.0 Kg/ha. (b) 179.0 Kg/ha, (iii) Main effects of D and S are highly significant. (iv) Av. yield of grain in Kg/ha.

	$D_1$	$D_2$	$D_3$	$D_4$	$D_5$	$D_6$	Mean
$S_1$	4298	3924	3812	3214	3102	3326	3097
$S_2$	3812	4111	4149	3775	3289	3083	3174
$S_3$	3962	3401	4130	4036	3102	2411	3006
$S_4$	4036	3962	3812	3252	2261	2953	2897
$S_5$	3924	3775	3700	2990	2541	2317	2750
$S_6$	3326	3812	3270	2915	2242	2654	2603
Mean	3893	3831	3812	3364	2756	2791	2921

C.D. for D marginal means=448.9 Kg/ha.

C.D. for S marginal means=119.2 Kg/ha.

**64(20)**

(i) 1897 Kg/ha. (ii) (a) 499.0 Kg/ha. (b) 337.0 Kg/ha. (iii) Main effects of D, S are highly significant. Interaction  $D \times S$  is significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	D <sub>7</sub>	Mean
S <sub>1</sub>	2784	3382	3575	3696	2358	1577	28	2481
S <sub>2</sub>	2018	2953	3382	3181	2022	1050	27	2090
S <sub>3</sub>	2112	2186	2508	2885	1869	1020	10	1799
S <sub>4</sub>	1813	2343	3020	2760	2220	669	13	1834
S <sub>5</sub>	1757	2168	2627	3351	1439	561	4	1701
S <sub>6</sub>	1637	1678	2130	2876	1506	486	8	1475
Mean	2020	2452	2874	3125	1902	894	15	1897

C.D. for D marginal means

=361.7 Kg/ha.

C.D. for S marginal means

=207.7 Kg/ha.

C.D. for S means at the same level of D

=551.1 Kg/ha.

C.D. for D means at the same level of S

=618.3 Kg/ha.

65(18)

- (i) 1677 Kg/ha. (ii) (a) 890.9 Kg/ha. (b) 481.2 Kg/ha. (iii) Main effects of D and S are highly significant.  
 (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	D <sub>7</sub>	Mean
S <sub>1</sub>	1906	2433	3136	3147	1749	1671	1017	2151
S <sub>2</sub>	1177	2766	2807	2119	1704	1387	576	1791
S <sub>3</sub>	1196	2026	2788	2280	2231	1465	587	1796
S <sub>4</sub>	1346	1738	2044	1383	2310	1166	684	1524
S <sub>5</sub>	1308	2295	2183	1663	1659	927	527	1509
S <sub>6</sub>	1215	1659	1839	1723	1469	804	336	1292
Mean	1358	2153	2466	2052	1854	1237	621	1677

C.D. for D marginal means=647.1 Kg/ha.

C.D. for S marginal means=296.6 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Rj. 62(53).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'CV'.**

**Object :-** To find out the suitable method of sowing for different varieties of Paddy.

#### 1. BASAL CONDITIONS :

- (i) (a) Gram-G.M.—Wheat-fallow-Paddy. (b) Fallow. (c) Nil. (ii) Medium clay soil. (iii) N.A. (iv) (a) 4 ploughings, 2 bakhering. (b) As per treatments. (c) 49 Kg/ha. (d) Rows 30 cm apart. (e) N.A. (v) N.A. (vi) As per treatments, (vii) Irrigated. (viii) 2 weedings. (ix) and (x) N.A.

#### 2. TREATMENTS :

**Main-plot treatments :**

5 methods of sowing : M<sub>1</sub>=Broadcasting, M<sub>2</sub>=Drilling, M<sub>3</sub>=Bushening, M<sub>4</sub>=Transplanting and M<sub>5</sub>=Drilling.

**Sub-plot treatments :**

5 varieties : V<sub>1</sub>=Kamood, V<sub>2</sub>=Basmati, V<sub>3</sub>=NP-130, V<sub>4</sub>=NT 415 and V<sub>5</sub>=T-21.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 5 main-plots/replication, 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 3.7 m. × 3.1 m. (b) 3.1 m. × 2.4 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 2452 Kg/ha. (ii) (a) 836.7 Kg/ha. (b) 597.3 Kg/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	Mean
V <sub>1</sub>	1295	1740	2836	3902	1840	2323
V <sub>2</sub>	1261	2627	2473	3532	2237	2426
V <sub>3</sub>	1211	2765	3616	4245	2160	2799
V <sub>4</sub>	1612	2389	2513	3401	1871	2357
V <sub>5</sub>	1143	2705	2405	3663	1864	2356
Mean	1304	2445	2769	3749	1994	2452

C.D. for M marginal means = 576.3 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Rj. 63(29), 64(15).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'CV'.**

**Object :-** To find out a suitable method of sowing with different varieties of Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Barley-Paddy-Gram for 63(29); N.I for 64(15). (b) Barely for 63(29); Gram for 64(15). (c) Nil. for 63(29); 22.4 Kg/ha. of N + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(15). (ii) N.A. (iii) 7.7.1953; 1.7.1954. (iv) (a) 3 ploughings, 2 bakhening, 3 puddings for 63(29), 2 cross ploughings and 1 discing for 64(15). (b) As per treatments. (c) to (e) N.A. (v) N.A. for 63(29); 45 Kg/ha. of N + 45 Kg/ha. of P<sub>2</sub>O<sub>5</sub> by drilling for 64(15). (vi) As per treatments. (vii) Irrigated. (viii) 1 to 2 weedings. (ix) 81 cm.; 72 cm. (x) 25.9.1963 and 10.10.1963; 4.10.1964.

## 2. TREATMENTS :

**Main-plot treatments :**

5 methods of sowing: M<sub>1</sub>=Broadcasting, M<sub>2</sub>=Drilling, M<sub>3</sub>=Bushening, M<sub>4</sub>=Transplanting and M<sub>5</sub>=Dibbling.

**Sub-plot treatments :**

5 varieties: V<sub>1</sub>=Basmati, V<sub>2</sub>=Kumoli, V<sub>3</sub>=N.P.—130, V<sub>4</sub>=M.F.U—15 and V<sub>5</sub>=T—21.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 5 main-plots/replication, 5 sub-plots/main-plot. (b) N.A. for 63(29), 20.8 m. × 3.1 m. for 64(15). (iii) 4. (iv) (a) 3.7 m. × 3.1 m. (b) 3.1 m. × 2.4 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 63(29), Good for 64(15). (ii) N.A. for 63(29), Nil for 64(15). (iii) Yield of grain. (iv) (a) 1963 to 1964. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) N.A. (vii) Both the error variances are homogeneous, and Treatments × years interaction for main-plots and sub-plots are presented.

## 5. RESULTS :

(i) 2410 Kg/ha. (ii) (a) 1704.4 Kg/ha. (based on 4 d.f. made up of Treatments × years interaction). (b) 609.7 Kg/ha. (based on 14 d.f. made up of Treatments × years interaction and pooled error). (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	Mean
M <sub>1</sub>	1580	1808	2326	2054	1726	1899
M <sub>2</sub>	2088	2358	2956	1822	1945	2234
M <sub>3</sub>	2136	2512	3409	2394	2522	2595
M <sub>4</sub>	3262	3527	3956	3179	3440	3473
M <sub>5</sub>	1543	1928	2921	1385	1466	1849
Mean	2122	2427	3114	2167	2219	2410

C.D. for V marginal means = 269.9 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Rj. 63(35).**

**Site :- Govt. Agri. Farm, Jatsar.**

**Type :- 'CM'.**

**Object :-** To find out the optimum date of transplanting, fertilizer requirement and suitable spacing for Paddy.

**I. BASAL CONDITIONS :**

(i) (a) Paddy-Fallow. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) As per treatments (iv) (a) 3 ploughings and 1 puddling. (b) Transplanting. (c) N.A. (d) As per treatments. (e) N.A. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) T-21 (medium). (vii) Irrigated. (viii) 2 hand hoeings. (ix) N.A. (x) 18.11.63.

**2. TREATMENTS :**

**Main-plot treatments:**

3 dates of transplanting : D<sub>1</sub>=26.6.1963, D<sub>2</sub>=17.7.1963 and D<sub>3</sub>=18.8.1963.

**Sub-plot treatments :**

3 spacings : S<sub>1</sub>=15 cm. × 15 cm., S<sub>2</sub>=23 cm. × 23 cm. and S<sub>3</sub>=30 cm. × 30 cm.

**Sub-sub-plot treatments :**

3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots main-plot, 3 sub-sub-plot/sub-plot. (b) N.A. (iii) 3. (iv) (a) N.A., (b) 4.6 m. × 3.7 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963 to 1965 (Treatments modified). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 589 Kg/ha. (ii) (a) 392.0 Kg/ha. (b) 206.0 Kg/ha. (c) 204.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
S <sub>1</sub>	682	686	484	558	624	670	617
S <sub>2</sub>	636	651	527	667	519	628	605
S <sub>3</sub>	488	632	515	488	500	647	545
Mean	602	656	509	571	548	648	589
N <sub>0</sub>	589	690	434				
N <sub>1</sub>	624	535	484				
N <sub>2</sub>	593	744	608				



**Crop :- Paddy (Kharif).****Ref :- Rj. 65(14).****Site :- Govt. Agri. Farm, Jatsar.****Type :- 'CM'.**

**Object :-** To find out the optimum date of transplanting, fertilizers requirement and suitable spacing for Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Fallow-Paddy. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) As per treatments. (iv) (a) Ploughing and planking. (b) and (c) N.A. (d) As per treatments. (e) 2. (v) 49.4 Kg/ha. of  $P_2O_5$ . (vi) T-21. (vii) Irrigated. (viii) 2 hoeings and weedings. (ix) N.A. (x) 15, 22 and 31.10.65.

**2. TREATMENTS :****Main-plot treatments :**

3 dates of transplanting :  $D_1=23.6.65$ ,  $D_2=18.7.65$  and  $D_3=25.8.65$ .

**Sub-plot treatments :**

3 spacings :  $S_1=15\text{ cm.} \times 15\text{ cm.}$ ,  $S_2=23\text{ cm.} \times 23\text{ cm.}$  and  $S_3=30\text{ cm.} \times 30\text{ cm.}$

**Sub-sub-plot treatments :**

3 levels of N :  $N_0=0$ ,  $N_1=37.1$  and  $N_2=74.2$  Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot, 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a) 2.7 m.  $\times$  2.7 m. (b) 1.8 m.  $\times$  1.8 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Height, tiller count, stand and number of ears/plant and yield of grain. (iv) (a) 1953 to 65 (64 N.A. Treatments modified). (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1242 Kg/ha. (ii) (a) 623.6 Kg/ha. (b) 613.2 Kg/ha. (c) 311.8 Kg/ha. (iii) Main effects of D and N are highly significant. (iv) Av. yield of grain in Kg/ha.

	$D_1$	$D_2$	$D_3$	$N_0$	$N_1$	$N_2$	Mean
$S_1$	2063	957	880	950	1409	1541	1300
$S_2$	2023	1409	744	907	1455	1814	1392
$S_3$	1658	821	625	628	1033	1442	1035
Mean	1915	1062	750	828	1299	1599	1242
$N_0$	1309	701	475				
$N_1$	2143	1003	751				
$N_2$	2292	1482	1023				

C.D. for D marginal means = 471.1 Kg/ha.

C.D. for N marginal means = 172.2 Kg/ha.

**Crop :- Paddy (Kharif).****Ref :- Rj. 64(24).****Site :- Govt. Agri. Res. Farm, Sriganagar.****Type :- 'CM'.**

**Object :-** To study the effect of different dates of transplanting, spacings and fertilizer levels on Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Fallow-Paddy. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) As per treatments. (iv) (a) 4 ploughings, 1 discing and 2 pattas. (b) Transplanting. (c) Nil. (d) As per treatments. (e) 2. (v) 37 Kg/ha. of  $P_2O_5$  as Super, by broadcast. (vi) T-21. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 9 to 12.10.1964.

## 2. TREATMENTS :

## Main-plot treatments :

3 dates of transplanting :  $D_1=21.6.1964$ ,  $D_2=16.7.1964$  and  $D_3=7.8.1964$ .

## Sub-plot treatments :

3 spacings :  $S_1=15 \text{ cm.} \times 15 \text{ cm.}$ ,  $S_2=23 \text{ cm.} \times 23 \text{ cm.}$  and  $S_3=30 \text{ cm.} \times 30 \text{ cm.}$

## Sub-sub-plot treatments :

3 levels of N :  $N_0=0$ ,  $N_1=16.8$  and  $N_2=33.6$  Kg/ha. of N.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot, 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a)  $3.2 \text{ m.} \times 3.2 \text{ m.}$  (b)  $2.7 \text{ m.} \times 2.7 \text{ m.}$  (v)  $23 \text{ cm.} \times 23 \text{ cm.}$  (vi) Yes.

## 4. GENERAL :

(i) Very good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964 only. (b) and (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 3062 Kg/ha. (ii) (a) 771.0 Kg/ha. (b) 632.0 Kg/ha. (c) 539.0 Kg/ha. (iii) Main effects of D and N are highly significant. (iv) Av. yield of grain in Kg/ha.

	$D_1$	$D_2$	$D_3$	$N_0$	$N_1$	$N_2$	Mean
$S_1$	3573	3599	2620	2992	3440	3361	3264
$S_2$	3522	3875	1858	2623	3159	3472	3085
$S_3$	3410	3393	1706	2436	3130	2943	2836
Mean	3501	3622	2061	2684	3243	3259	3062
$N_0$	3082	3332	1636				
$N_1$	3564	3926	2238				
$N_2$	3858	3608	2310				

C.D. for D marginal means=582.4 Kg/ha.

C.D. for N marginal means=297.8 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Rj. 64(16).**

**Site :- Irrigation Res. Stn., Kota.**

**Type :- 'IC'.**

Object :- To study the effect of submergence at different stages of crop growth and weeding on Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Heavy clay. (iii) 8.8.64. (iv) (a) 3 ploughings. (b) Transplanting. (c) Nil. (d)  $30 \text{ cm.} \times 10$  to  $15 \text{ cm.}$  (e) 4. (v) 44.8 Kg/ha. of N and 44.8 Kg/ha. of  $P_2O_5$  by broadcast. (vi) NP-130. (vii) and (viii) As per treatments. (ix) 72 cm. (x) 25.10.64.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1), (2) and (3) with one control (No irrigation)

(1) 2 levels of submergence from plant establishment to tillering :  $A_0$ =No submergence and  $A_1$ =Submergence.

(2) 2 levels of submergence from tillering to emergence :  $B_0$ =No submergence and  $B_1$ =Submergence.

(3) 2 levels of submergence from emergence and maturity :  $C_0$ =No submergence and  $C_1$ =Submergence.

**Sub-plot treatments :**

3 types of weedings :  $W_0$ =No weeding,  $W_1$ =Hand weeding and  $W_2$ =Chemical weeding.

In no submergence irrigation was given according to the field capacity.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 9 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 3.1 m. (b) 8.5 m. × 2.4 m. (v) 30 cm. × 30 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1964 only. (b) No. (c) N.A. (v) No. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 2322 Kg/ha. (ii) (a) 691.0 Kg/ha. (b) 440.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

No irrigation :  $W_0=1958$ ,  $W_1=2246$  and  $W_2=2012$  Kg/ha.)

	$W_0$	$W_1$	$W_2$	$C_0$	$C_1$	$B_0$	$B_1$	Mean
$A_0$	2209	2243	2270	2301	2180	2265	2217	2241
$A_1$	2614	2391	2390	2519	2412	2684	2246	2465
Mean	2412	2317	2330	2410	2296	2475	2231	2353
$B_0$	2556	2383	2484	2582	2366			
$B_1$	2267	2251	2177	2238	2225			
$C_0$	2461	2425	2344					
$C_1$	2362	2209	2317					

**Crop :- Paddy (Kharif).**

**Ref :- Rj. 63(28), 64(14), 65(11).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'ICV'.**

**Object :-** To find out the best irrigation schedule and seed rate for broadcasting Paddy.

**1. BASAL CONDITIONS ;**

(i) (a) Nil. (b) N.A. for 63(28) ; Fallow for 64(14) and 65(11). (c) N.A. for 63(28) ; Nil for 64(14), 65(11). (ii) Black soil. (iii) 18.5.1963 ; 6.6.1964 ; 15.6.1965. (iv) (a) 4 ploughings for 63(28) ; Disc ploughing, planking disc harrowing, palewa and puddling for 64(14), 65(11). (b) Broadcasting. (c) As per treatments. (d) and (e) N.A. (v) Nil for 63(28) ; 44.8 Kg/ha. of N and 44.8 Kg/ha. of  $P_2O_5$  for 64(14) ; 22.4 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$  for 65(11). (vi) and (vii) As per treatments. (viii) 1 to 3 weedings. (ix) N.A. for 63(28) and 65(11) ; 72 cm. for 64(14). (x) 12.9.1963 ; 18.9.1964 ; 1,10.1965.

**2. TREATMENTS :****Main-plot treatments :**

4 irrigation schedule :  $I_1$ =Standing water,  $I_2$ =Irrigations when ever necessary to keep field wet,  $I_3$ =Irrigation after keeping field dry for 3 days and  $I_4$ =Irrigation after keeping field dry for 6 days.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 varieties :  $V_1$ =Basmati and  $V_2$ =N.P.—130.

(2) 3 seed rates :  $S_1=44.8$ ,  $S_2=89.7$  and  $S_3=134.5$  Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. for 63(28), and 65(11) ; 14.1 m. × 7.9 m. for 64(14). (iii) 3. (iv) (a) 4.3 m. × 3.7 m. (b) 3.7 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Good for 63(28) ; Normal for 64(14) and 65(11). (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) N.A. (vi) Heavy rain fall during flowering and maturity for 63(28). (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5.

## 5. RESULTS :

## 63(28)

(i) 2725 Kg/ha. (ii) (a) 874.0 Kg/ha. (b) 340.0 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
V <sub>1</sub>	2357	2556	2332	2661	2526	2482	2422	2477
V <sub>2</sub>	2850	3254	2930	2862	2844	3237	2840	2974
Mean	2604	2905	2631	2761	2685	2860	2631	2725
S <sub>1</sub>	2781	2743	2736	2482				
S <sub>2</sub>	2654	3132	2571	3083				
S <sub>3</sub>	2377	2840	2586	2721				

C.D. for V marginal means=161.9 Kg/ha.

## 64(14)

(i) 2009 Kg/ha. (ii) (a) 796.0 Kg/ha. (b) 581.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
V <sub>1</sub>	1912	1948	2123	1730	2099	1869	1817	1928
V <sub>2</sub>	2332	1819	2295	1910	2067	1980	2220	2089
Mean	2122	1884	2209	1820	2083	1924	2018	2009
S <sub>1</sub>	2198	1899	2332	1903				
S <sub>2</sub>	1891	1809	2165	1833				
S <sub>3</sub>	2277	1943	2130	1724				

## 65(11)

(i) 2050 Kg/ha. (ii) (a) 700.9 Kg/ha. (b) 479.0 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
S <sub>1</sub>	1729	1415	2048	2148	1925	1809	1772	1835
S <sub>2</sub>	2108	2018	2601	2332	2463	2183	2149	2263
Mean	1919	1717	2325	2240	2194	1996	1960	2050
S <sub>1</sub>	1988	1742	2594	2452				
S <sub>2</sub>	1944	1667	2160	2213				
S <sub>3</sub>	1824	1742	2220	2056				

C.D. for V marginal means=228.4 Kg/ha.

**Crop :- Paddy (Kharif).****Ref :- Rj. 64(28).****Site :- Irrigation. Res. Centre, Kota.****Type :- 'ICM'.**

Object : -To work out different water regimes, nitrogen and weeding treatments suitable for drilled Paddy.

**1. BASAL CONDITIONS :**(i) (a) Nil. (b) Linseed. (c) Nil. (ii) Heavy clay soil. (iii) 1.8.1964. (iv) (a) 3 ploughings, (b) Drilling in rows. (c) N.A. (d) 30 cm.  $\times$  10 to 15 cm. (e) N.A. (v) 44.8 Kg/ha. of  $P_2O_5$ . (vi) N.P-130. (vii) and (viii) As per treatments. (ix) 72 cm. (x) 15.10.1964.**2. TREATMENTS :**

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

(1) 3 irrigation schedules :  $I_0$ =Rainfall only,  $I_1$ =60% available moisture and  $I_2$ =Field capacity.(2) 3 weeding schedules :  $W_0$ =No weeding.  $W_1$ =Cultural weeding by hand implement and  $W_2$ =Chemical weeding (3-4. D.P.A.)(3) 3 levels of N :  $N_0=0$ ,  $N_1=44.8$  and  $N_2=89.7$  Kg/ha.**3. DESIGN ;**(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 10.7 m.  $\times$  7.6 m. (b) 9.8 m.  $\times$  6.7 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.**4. GENERAL :**

(i) Satisfactory. (ii) Nil. (iii) Growth observations and yield of grain. (iv) (a) 1964—contd. (b) No. (c) Nil (v) to (vii) Nil.

**5. RESULTS :**

(i) 1514 Kg/ha. (ii) 231.0 Kg/ha. (iii) All effects except main effect of W are highly significant, (iv) Av. yield of grain in Kg/ha.

	$W_0$	$W_1$	$W_2$	$N_0$	$N_1$	$N_2$	Mean
$I_0$	981	827	1163	248	1059	1665	990
$I_1$	1540	1860	1640	357	1883	2800	1680
$I_2$	1794	1953	1872	418	1898	3303	1873
Mean	1438	1547	1558	341	1613	2589	1514
$N_0$	325	341	357				
$N_1$	1707	1599	1533				
$N_2$	2283	2700	2785				

C.D. for N or I marginal means = 159.5 Kg/ha.

C.D. for body of any table = 276.5 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 64(59).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'M'.**

Object :—To study the effect of different levels of N and P on the yield of Wheat.

**1. BASAL CONDITIONS :**(i) (a) Fallow-Wheat. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 19.11.1964. (iv) (a) 4 ploughings with tractor drawn mould board and disc plough. (b) Line sowing. (c) 90 Kg/ha. (d) 23 cm.  $\times$  8 cm. (e) N.A. (v) 33.6 Kg/ha. of  $K_2O$ . (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 weeding with *Khurfi*. (ix) Nil. (x) 8.4.1965.

## 1. TREATMENTS :

All combinations of (1) and (2)

(1) 4 levels of N as A/S :  $N_0=0$ ,  $N_1=33.6$ ,  $N_2=67.3$  and  $N_3=100.9$  Kg/ha.

(2) 4 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$ ,  $P_2=67.3$  and  $P_3=100.9$  Kg/ha.

N broadcast  $\frac{1}{2}$  at sowing and  $\frac{1}{2}$  at first irrigation and P applied by drilling.

## 3. DESIGN :

(i) 4<sup>2</sup> confd. (ii) (a) 4 plots/block, 4 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 7.3 m.  $\times$  5.5 m. (b) 6.4 m.  $\times$  5.0 m. (v) 46 cm.  $\times$  23 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 3078 Kg/ha. (ii) 101.0 Kg/ha. (iii) Main effect of N and (N  $\times$  P) interaction are highly significant. Main effect of P is significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	Mean
$P_0$	2516	3176	3231	3621	3136
$P_1$	2470	3093	3200	3623	3096
$P_2$	2746	2608	3625	3461	3110
$P_3$	2685	2561	3316	3324	2972
Mean	2604	2860	3343	3507	3078

C.D. for N or P marginal means = 107.0 Kg/ha.

C.D. for body of N  $\times$  P table = 214.1 Kg/ha.

**Crop :- Wheat (Rabi)**

**Ref :- Rj. 60(50).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam, (iii) 30.10.1960. (iv) (a) 9 ploughings. (b) Drilling. (c) 92 Kg/ha. (d) Between rows 23 cm. (e) N.A. (v) 5604 Kg/ha. of F.Y.M. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 26.4.1961.

## 2. TREATMENTS :

All combinations of (1), (2) and (3) with 3 extra treatments per block

(1) 3 sources of N :  $S_1=A/S$ ,  $S_2=A/S/N$  and  $S_3=Urea$ .

(2) 3 levels of N :  $N_0=0$ ,  $N_1=22.4$  and  $44.8$  Kg/ha.

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

Extra treatments :  $E_1=M+44.8$  Kg/ha. of N as A/S of  $K_2O$ ,  $E_2=M+44.8$  Kg/ha. of N as A/S/N and  $E_3=M+44.8$  Kg/ha. of N as Urea.

$M=44.8$  Kg/ha. of  $P_2O_5$  as Super + 22.4 Kg/ha. of  $K_2O$  as Mur. Pot.

## 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 12 plots/block, 3 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes,

## 4. GENERAL :

(i) Good. (ii) No. (iii) Yield of grain. (iv) (a) 1960 only. (b) and (c) —. (v) to (vii) N.A.

## 5. RESULTS :

(i) 2074 Kg/ha. (ii) 429.1 Kg/ha. (iii) Main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.

$E_1 = 2466$ ,  $E_2 = 2452$  and  $E_3 = 2337$  Kg/ha.

	$N_0$	$N_1$	$N_2$	$S_1$	$S_2$	$S_3$	Mean
$P_0$	1337	1905	2280	2099	1690	1733	1841
$P_1$	1230	1891	2545	1905	1863	1899	1889
$P_2$	1546	2293	2603	2063	2236	2143	2147
Mean	1371	2030	2476	2022	1930	1925	1959
$S_1$	—	2049	2697				
$S_2$	—	2035	2280				
$S_3$	—	2006	2452				

C.D. for N marginal means = 440.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 64(78).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'M'.**

Object : - To study the effect of micronutrients applied alone and in combinations on the yield of Wheat.

## 1. BASAL CONDITIONS:

(i) (a) Nil. (b) Maize. (c) 24.7 C.L/ha. of F.Y.M. (ii) Sandy loam. (iii) 1.12.64. (iv) (a) 4 ploughings with tractor disc plough, 1 planking, 2 ploughings with disc plough and planting, (b) Line sowing. (c) 89 Kg/ha. (d) 23 cm. between lines. (e) N.A. (v) 44.8 Kg/ha. of N as A/S by broadcast, 44.8 Kg/ha. of  $P_2O_5$  as Super by drilling and 22.4 Kg/ha. of  $K_2O$  by broadcast. (vi) R.S. 31-1. (vii) Irrigated. (viii) 2 hand weedings. (ix) N.A. (x) 10 to 12.4.1965.

## 2. TREATMENTS :

All combinations of (1), (2), (3), (4) and (5)

(1) 3 levels of Fe. Sul. :  $F_0 = 0$ ,  $F_1 = 9.0$  and  $F_2 = 17.9$  Kg/ha.

(2) 3 levels of Mn. Sul. :  $M_0 = 0$ ,  $M_1 = 9.0$  and  $M_2 = 17.9$  Kg/ha.

(3) 3 levels of Cu. Sul. :  $C_0 = 0$ ,  $C_1 = 9.0$  and  $C_2 = 17.9$  Kg/ha.

(4) 3 levels of Borax :  $B_0 = 0$ ,  $B_1 = 9.0$  and  $B_2 = 17.9$  Kg/ha.

(5) 3 levels of Zn. Sul. :  $Z_0 = 0$ ,  $Z_1 = 9.0$  and  $Z_2 = 17.9$  Kg/ha.

Treatments applied by broadcast.

## 3. DESIGN :

(i) 3<sup>5</sup> confd. fractional replication. (ii) (a) 9 plots/block, 9 blocks/replication. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. (ii) Incidence of white ants. (iii) Yield of grain and fodder. (iv) (a) 1964 only. (b) —. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 2031 Kg/ha. (ii) 481.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	B <sub>0</sub>	B <sub>1</sub>	B <sub>2</sub>	Mean
Z <sub>0</sub>	2008	2183	2071	2034	2124	2103	1945	2245	2071	1865	2450	1946	2087
Z <sub>1</sub>	2186	2011	1884	2211	1973	1897	2294	1804	1983	1967	2138	1976	2027
Z <sub>2</sub>	1942	1768	2223	1767	1882	2284	1967	1747	2218	2050	1849	2034	1978
Mean	2045	1987	2059	2004	1993	2095	2069	1932	2091	1961	2146	1985	2031
B <sub>0</sub>	2097	1680	2105	1913	2036	1934	1838	1803	2242				
B <sub>1</sub>	2052	2287	2097	2094	2018	2324	2166	2188	2082				
B <sub>2</sub>	1986	1994	1976	2005	1926	2026	2204	1804	1948				
C <sub>0</sub>	1869	2136	2203	2030	2041	2136							
C <sub>1</sub>	1907	1877	2011	1804	1779	2213							
C <sub>2</sub>	2361	1948	1964	2179	2159	1935							
F <sub>0</sub>	1934	1990	2088										
F <sub>1</sub>	2038	2029	1912										
F <sub>2</sub>	2164	1942	2178										

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(46), 61(53).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'M'.**

Object :—To study the effect of Gypsum on the yield of Wheat in saline and alkaline land.

#### 1. BASAL CONDITIONS :

(i) (a) No. (b) Zeera for 60(45); Fallow for 61(53). (c) Nil. (ii) Sandy loam with saline patches. (iii) 15.11.1960; 23.11.1961. (iv) (a) 9 to 11 ploughings. (b) Drilling. (c) 92 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) R.S.—31—1. (vii) Irrigated. (viii) 1 to 2 weedings. (ix) N.A. (x) 2.4.1961; 3.4.1962.

#### 2. TREATMENTS :

12 manurial treatments : M<sub>0</sub>=Control, M<sub>1</sub>=50 Q/ha. of Gypsum in May—June, M<sub>2</sub>=100 Q/ha. of Gypsum in May—June, M<sub>3</sub>=251 Q/ha. of F.Y.M. in May—June, M<sub>4</sub>=251 Q/ha. of F.Y.M. in October. M<sub>5</sub>=50 Q/ha. of Agremone Maxicana in May—June, M<sub>6</sub>=100 Q/ha. of Agremone Maxicana in May—June, M<sub>7</sub>=50 Q/ha. of Gypsum+251 Q/ha. of F.Y.M., M<sub>8</sub>=100 Q/ha. of Gypsum+251 Q/ha. of F.Y.M., M<sub>9</sub>=33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, M<sub>10</sub>=M<sub>9</sub>+50 Q/ha. of Gypsum+251 Q/ha. of F.Y.M. and M<sub>11</sub>=M<sub>9</sub>+100 Q/ha. of Gypsum+251 Q/ha. of F.Y.M.

#### 3. DESIGN :

(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

(i) Good. (ii) Nil. for 60(45); Attack of white ants for 61(53). (iii) Yield of grain and fodder. (iv) (a) 1960 to 61. (b) N.A. (c) Results of combined analysis given under 5. (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments × years interaction are absent.

#### 5. RESULTS :

(i) 2706 Kg/ha. (ii) 410.4 Kg/ha. (based on 55 d.f. made up of Treatments × years interaction and pooled error). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.



Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>
Av. yield	1873	2078	2316	2172	2484	3117	3376
Treatment	M <sub>7</sub>	M <sub>8</sub>	M <sub>9</sub>	M <sub>10</sub>	M <sub>11</sub>		
Av. yield	2474	2488	3228	3494	3372		

C.D.=475.2 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(45), 61(52).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'M'.**

**Object :-**To study the effect of Gypsum, F.Y.M., A/S and Super on growth of Wheat in saline and alkaline lands.

**1. BASAL CONDITIONS :**

(i) (a) Nil, (b) Fallow. (c) Nil. (ii) Saline and alkaline lands. (iii) 5.11.60 ; 9.11.1961. (iv) (a) 7 to 10 ploughings. (b) Drilling. (c) 92 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 28.3.1961 ; 2.4.1962.

**2. TREATMENTS :**

10 manurial treatments : M<sub>0</sub>=Control, M<sub>1</sub>=251 Q/ha. of F.Y.M. in May, M<sub>2</sub>=251 Q/ha. of F.Y.M. in October, M<sub>3</sub>=50 Q/ha. of Gypsum +251 Q/ha. of F.Y.M., M<sub>4</sub>=100 Q/ha. of Gypsum+251 Q/ha. of F.Y.M., M<sub>5</sub>=150 Q/ha. of Gypsum+251 Q/ha. of F.Y.M., M<sub>6</sub>=22.4 Kg/ha. of N as A/S+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, M<sub>7</sub>=M<sub>4</sub>+M<sub>5</sub>, M<sub>8</sub>=M<sub>6</sub>+100 Q/ha. of Gypsum and M<sub>9</sub>=100 Q/ha. of Gypsum.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 2. (iv) 9.2 m. × 7.3 m. (b) 7.4 m. × 5.5 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Good for 60(45) ; Germination was poor for other. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1960 to 1961. (b) N.A. (c) Results of combined analysis given under 5. (v) and (vi) N.A. (vii) Error variances are homogeneous Treatments × years interaction is absent.

**5. RESULTS :**

(i) 1898 Kg/ha. (ii) 760.0 Kg/ha. (based on 27 d.f. made up of pooled error and Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>	M <sub>8</sub>	M <sub>9</sub>
Av. yield	1485	1004	1592	1572	1574	2092	1942	2758	2549	2413

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(70), 63(16).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'M'.**

**Object :-**To study the effect of different levels of N, P, K and different sources of N on the yield of Wheat.

**1. BASAL CONDITIONS:**

(i) (a) Nil. (b) Fallow ; N.A. (c) Nil. (ii) Sandy loam. (iii) 14.11.61 ; N.A. (iv) (a) 6 to 8 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Between rows 23 cm. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1-2 weedings. (ix) N.A. (x) 6.4.62 ; N.A.

## 2. TREATMENTS :

## Main-plot treatments :

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

(1) 2 levels of N :  $N_1=33.6$  and  $N_2=67.3$  Kg/ha.

(2) 4 sources of N :  $S_1=A/S$ ,  $S_2=A/S/N$ ,  $S_3=Urea$  and  $S_4=C/A/N$ .

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=33.6$  Kg/ha.

(2) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=33.6$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.4 m.  $\times$  5.5 m. (b) 6.5 m.  $\times$  4.6 m. (v) 45 cm.  $\times$  45 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of white ants ; N.A. (iii) Yield of grain. (iv) (a) N.A. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Yield of "no nitrogen with PK" treatments for the year 1963 is not available. Hence the results of individual years are presented.

## 5. RESULTS :

61(70)

(i) 2316 Kg/ha. (ii) (a) 312.5 Kg/ha. (b) 246.0 Kg/ha. (iii) Main effects of N and P are significant. (iv) Av. yield of grain in Kg/ha.

## Without Nitrogen

	$K_0$	$K_1$	Mean
$P_0$	1802	1588	1695
$P_1$	1856	1815	1836
Mean	1829	1702	1765

## With Nitrogen

	$S_1$	$S_2$	$S_3$	$S_4$	$K_0$	$K_1$	$P_0$	$P_1$	Mean
$N_1$	2325	2305	2294	2155	2232	2308	2174	2366	2270
$N_2$	2297	2453	2584	2665	2526	2473	2313	2686	2500
Mean	2311	2379	2439	2410	2379	2390	2243	2526	2385
$P_0$	2120	2262	2286	2306	2243	2243			
$P_1$	2502	2496	2592	2513	2515	2537			
$K_0$	2334	2434	2402	2345					
$K_1$	2287	2323	2475	2475					

C.D. for N marginal means=113.9 Kg/ha.

C.D. for P marginal means=86.7 Kg/ha.

63(16)

(i) 2592 Kg/ha. (ii) (a) 410.0 Kg/ha. (b) 278.0 Kg/ha. (iii) Main effects of N, P and interaction  $N \times P$  are highly significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	K <sub>0</sub>	K <sub>1</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>1</sub>	2275	2602	2580	2381	2437	2483	2309	2610	2460
N <sub>2</sub>	2604	2685	2830	2778	2776	2673	2403	3046	2724
Mean	2440	2644	2705	2580	2606	2578	2356	2828	2592
P <sub>0</sub>	2242	2483	2366	2332	2333	2288			
P <sub>1</sub>	2637	2804	3044	2827	2731	2740			
K <sub>0</sub>	2490	2711	2669	2553					
K <sub>1</sub>	2389	2576	2741	2607					

C.D. for N marginal means = 149.4 Kg/ha.  
 C.D. for P marginal means = 97.9 Kg/ha.  
 C.D. for P means at the same level of N = 138.6 Kg/ha.  
 C.D. for N means at the same level of P = 175.0 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(52), 61(59), 61(60).**

**Site :- Govt. Agri. Farm, Bilara.**

**Type :- 'M'.**

Object :—To study the effect of Agremone maxicara and F.Y.M. on the saline and alkaline lands.

#### 1. BASAL CONDITIONS .

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Saline and alkaline lands. (iii) 30.10.60; 1.11.1960; 3.12.1961; 8.12.1961. (iv) (a) 4 to 8 ploughings. (b) N.A. for 60(52); Drilling for others. (c) 92 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) N.P. 718. (vii) Irrigated. (viii) 1 to 2 weedings. (ix) N.A. (x) 3.4.1961; 14.4.1962 for 61(59), 61(60).

#### 2. TREATMENTS :

7 manurial treatments : M<sub>0</sub> = Control, M<sub>1</sub> = 25 Q/ha. of *Agrecre neniccha*, M<sub>2</sub> = 75 Q/ha. of *Agrecre maxicana*, M<sub>3</sub> = 67.2 Q/ha. of *Sesbania* (G.M.), M<sub>4</sub> = 125 Q/ha. of F.Y.M., M<sub>5</sub> = 251 Q/ha. of F.Y.M. and M<sub>6</sub> = 33.6 Kg/ha. of N as A<sub>1</sub>S + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.

#### 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

(i) N.A. for 60(52); Good for others. (ii) N.A. for 60(52); Nil for others. (iii) Yield of grain and fodder. (iv) (a) 1960 to 1961. (b) N.A. (c) Results of combined analysis given under 5. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatments × years interaction is present.

#### 5. RESULTS :

(i) 1744 Kg/ha. (ii) 503.0 Kg/ha. (based on 12 d.f. made up of Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>
Av. yield	1695	1847	1870	1481	1721	1822	1775

**Crop :- Wheat (Rabi).****Ref :- Rj. 60(51), 61(57).****Site :- Govt. Agri. Farm, Bilara.****Type :- 'M'.**

Object :—To study the effect of Gypsum for reclamation of saline and alkaline land on the growth of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Saline alkaline. (iii) 4.11.1960 and 6.12.1961. (iv) (a) 8 to 9 ploughings for 60(51), 4 ploughings for the other. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) N.P.—718. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 3.4.1961 and 15.4.1962.

**2. TREATMENTS :**

10 manurial treatments :  $M_0$ =Control,  $M_1$ =251 Q/ha. of F.Y.M. in June,  $M_2$ =251 Q/ha. of F.Y.M. in October,  $M_3$ =50 Q/ha. of Gypsum+251 Q/ha. of F.Y.M.,  $M_4$ =100 Q/ha. of Gypsum+251 Q/ha. of F.Y.M.,  $M_5$ =150 Q/ha. of Gypsum+251 Q/ha. of F.Y.M.,  $M_6$ =22.4 Kg/ha. of N as A/S+33.6 Kg/ha. of  $P_2O_5$  as Super,  $M_7$ =22.4 Kg/ha. of N as A/S+33.6 Kg/ha. of  $P_2O_5$  as Super+100 Q/ha. of Gypsum+251 Q/ha. of F.Y.M.,  $M_8$ =22.4 Kg/ha. of N as A/S+33.6 Kg/ha. of  $P_2O_5$  as Super+100 Q/ha. of Gypsum and  $M_9$ =100 Q/ha. of Gypsum.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) 9.2 m.×7.3 m. (b) 7.4 m.×5.5 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) N.A. for 60(51), Good for 61(57). (ii) N.A. for 60(51), Nil for other. (iii) Yield of grain and fodder. (iv) (a) 1960 to 1961. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) The error variances are heterogeneous and the Treatments×years interaction is absent, therefore the results of individual years are presented under 5.

**5. RESULTS :****60(51)**

(i) 1491 Kg/ha. (ii) 341.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$	$M_8$	$M_9$
Av. yield	1170	1716	1615	1510	1941	1529	1371	1553	1103	1400

**61(57)**

(i) 1850 Kg/ha. (ii) 130.3 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$	$M_8$	$M_9$
Av. yield	1170	1697	1760	1859	2158	1975	1946	2095	1956	1889

C.D.=223.4 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(61), 61(62).****Site :- Govt. Agri. Farm, Bilara.****Type :- 'M'.**

Object :—To study the effect of Gypsum through saline water on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow for 61(61), Wheat for 61(62). (c) Nil. (ii) Saline and alkaline land. (ii) 7.12.1961, N.A. (iv) (a) 4 to 5 ploughings. (b) Drilling. (c) 92 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) N.P. 718. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 13.4.1962, 15.4.1962.

## 2. TREATMENTS :

7 manurial treatments :  $M_0$  = Control,  $M_1$  = 50 Q/ha. of Gypsum,  $M_2$  = 50 Q/ha. of F.Y.M.,  $M_3$  =  $M_1 + M_2$ ,  $M_4$  = 67.2 Kg/ha. of *Sesbania* seed for G.M.,  $M_5$  = Water through at 50 Q/ha. of Gypsum ann  $M_6$  = Water through at 50 Q/ha. of F.Y.M.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 3. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1961 only. (b) N.A. (c) Results of combined analysis given under 5 Results. (v) and (vi) N.A. (vii) Two experiments conducted during the year. Error variances are homogeneous, Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 1688 Kg/ha. (ii) 214.8 Kg/ha. [6 d.f. made up of interaction of treatments with years]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$
Av. yield	1550	1657	1801	1848	1644	1646	1673

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(58).**

**Site :- Govt. Agri. Farm, Bilara.**

**Type :- 'M'.**

**Object :-** To study the effect of Gypsum, F.Y.M. and artificial fertilizers on saline and alkaline lands for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Saline and alkaline land. (iii) 7.12.61. (iv) (a) 5 ploughings. (b) Drilling (c) 92 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) N.P. 718. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 13.4.62.

## 2. TREATMENTS :

10 manurial treatments :  $M_0$  = Control,  $M_1$  = 251 Q/ha. of F.Y.M. in June,  $M_2$  = 50 Q/ha. of Gypsum + 251 Q/ha. of F.Y.M.,  $M_3$  = 44.8 Kg/ha of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super.  $M_4$  = 44.8 Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super + 251 Q/ha. of F.Y.M.,  $M_5$  = 44.8 Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super + 251 Q/ha. of F.Y.M. + 50 Q/ha. of Gypsum,  $M_6$  = 502 Q/ha. of F.Y.M.,  $M_7$  = 502 Q/ha. of F.Y.M. + 50 Q/ha. of Gypsum,  $M_8$  = 502 Q/ha. of F.Y.M. + 44.8 Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super and  $M_9$  = 502 Q/ha. of F.Y.M. + 44.8 Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super + 50 Q/ha. of Gypsum.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1961 only. (b) and (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2126 Kg/ha. (ii) 131.2 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$	$M_8$	$M_9$
Av. yield	1819	1998	1640	2093	2503	2164	2215	2006	2445	2373

C.D. = 224.8 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 65(25).**

**Site :- Govt. Seed Multiplication Farm, Bhilwara.**

**Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) (a) Wheat-Sanai-Wheat. (b) Sanai. (c) 44.8 Kg/ha. of  $P_2O_5$ . (ii) Slightly alkaline-loam. (iii) 18.11.65.  
(iv) (a) 4 ploughings. (b) N.A. (c) 100 Kg/ha. (d) Between lines 30 cm. (e) N.A. (v) 40 Kg/ha. of  $P_2O_5$   
(vi) N.P. 718 (medium). (vii) Irrigated. (viii) 1 hand weeding. (ix) N.A. (x) 23, 24.3.66.

**2. TREATMENTS :**

**Main-plot treatments :**

12 methods of application :  $M_1 = \frac{1}{2}$  basal as broadcast +  $\frac{1}{2}$  top dressing at first irrigation,  $M_2 = \frac{1}{2}$  broadcast before sowing +  $\frac{1}{2}$  drilled at first irrigation,  $M_3 = \frac{1}{2}$  drilled with seed +  $\frac{1}{2}$  top dressing at first irrigation,  $M_4 = \frac{1}{2}$  drilled with seed +  $\frac{1}{2}$  drilled at first irrigation,  $M_5 = \frac{1}{2}$  drilled before seed +  $\frac{1}{2}$  top dressing at first dressing,  $M_6 = \frac{1}{2}$  drilled before seed +  $\frac{1}{2}$  drilled at first irrigation,  $M_7 = \frac{2}{3}$  basal as broadcast +  $\frac{2}{3}$  top dressing at first irrigation,  $M_8 = \frac{2}{3}$  broadcast before sowing +  $\frac{2}{3}$  drilled at first irrigation,  $M_9 = \frac{2}{3}$  drilled with seed +  $\frac{2}{3}$  drilled at first irrigation,  $M_{10} = \frac{2}{3}$  drilled with seed +  $\frac{2}{3}$  top dressing at first irrigation,  $M_{11} = \frac{2}{3}$  drilled before seed +  $\frac{2}{3}$  top dressing at first irrigation,  $M_{12} = \frac{2}{3}$  drilled before seed +  $\frac{2}{3}$  drilled at first irrigation.

**Sub-plot treatments :**

3 levels of N :  $N_1 = 45$ ,  $N_2 = 90$  and  $N_3 = 135$  Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 12 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 5 m x 3 m. (b) 4 m. x 2 m. (v) 50 cm. x 50 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and other biometric data. (iv) (a) 1965- contd. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 1568 Kg/ha. (ii) (a) 892.6 Kg/ha. (b) 315.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	
$N_1$	2169	1562	1512	1156	1015	1469	
$N_2$	1844	1562	1362	1394	1594	1700	
$N_3$	1544	1644	1688	1138	1344	1031	
Mean	1852	1589	1521	1229	1318	1400	
	$M_7$	$M_8$	$M_9$	$M_{10}$	$M_{11}$	$M_{12}$	Mean
$N_1$	1594	1313	1781	1481	1519	1981	1546
$N_2$	1706	1425	2513	1825	1050	1981	1663
$N_3$	1513	2138	1419	1231	1456	1781	1494
Mean	1604	1625	1904	1512	1342	1914	1568

**Crop :- Wheat (Rabi).****Ref :- Rj. 60(75), 61(92).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'M'.**

Object . -To study the effect G.M. on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) G.M.—Wheat for 60(75), N.A. for 61(92). (b) G.M. (c) N.A. (ii) Medium clay soil. (iii) 7.11.60 for 60(75); N.A. for 61(92). (iv) (a) 2 to 3 ploughings and 2 bakharrings. (b) N.A. (c) 92 Kg/ha. for 60(75); 69 Kg/ha. for 61(92). (d) Row to Row 30 cm. (e) N.A. (v) N.A. (vi) N.P.718. (vii) Irrigated (viii) 1 weeding. (ix) and (x) N.A.

**2. TREATMENTS :****Main-plot treatments :**2 levels of Molybdenum :  $M_0=0$  and  $M_1=1$  Kg/ha.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 4 G.M. crops :  $G_0$ =Control,  $G_1$ =Sandi,  $G_2$ =Gowar and  $G_3$ =Cowpea.(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication, 12 sub-plots/main-plots. (b) N.A. (iii) 3 for 60(75), 4 for 61(92). (iv) (a) 8.0 m. x 5.5 m. (b) 7.8 m. x 4.6 m. (v) 30 cm. x 46 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 1961. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Error variances for sub-plots are heterogeneous therefore results of individual years are presented under 5 Results.

**5. RESULTS :****60(75)**

(i) 1745 Kg/ha. (ii) (a) 106.9 Kg/ha. (b) 653.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$G_0$	$G_1$	$G_2$	$G_3$	$P_0$	$P_1$	$P_2$	Mean
$M_0$	1544	1962	1805	1523	1718	1810	1598	1709
$M_1$	1625	1873	1718	1907	1886	1792	1664	1781
Mean	1585	1917	1761	1715	1802	1801	1631	1745
$P_0$	1508	2049	1856	1794				
$P_1$	1584	1955	1886	1780				
$P_2$	1764	1748	1542	1572				

**61(92)**

(i) 1434 Kg/ha. (ii) (a) 83.1 Kg/ha. (b) 134.1 Kg/ha. (iii) Main effects of G and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	$G_0$	$G_1$	$G_2$	$G_3$	$P_0$	$P_1$	$P_2$	Mean
$M_0$	1378	1604	1288	1601	1279	1559	1566	1468
$M_1$	1141	1591	1286	1586	1286	1477	1439	1401
Mean	1259	1597	1287	1594	1283	1518	1502	1434
$P_0$	1131	1393	1203	1402				
$P_1$	1345	1750	1329	1648				
$P_2$	1302	1649	1329	1731				

C.D. for G marginal means=106.1 Kg/ha.

C.D. for P marginal means=91.9 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(97), 62(57), 64(42).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'M'.**

Object :—To find out the efficiency of foliar application of different sources and levels of N at different sources and levels of N at different stages of growth of wheat.

**1. BASAL CONDITION:**

(i) (a) Nil for 61(97) and 64(42) Sugarcane-Fallow-Wheat for 62(57). (b) Fallow for 61(97) and 64(42), Sugarcane for 62(57). (c) Nil. (ii) Medium clay soil. (iii) 16.11.1961, 1.11.1962, 26.10.1964. (iv) (a) 2 ploughings and 3 bakherings for 61(97), Cross discs and 1 bakhering for 61(57), One ploughing, cross tillering and planting for 64(42). (b) Drilling. (c) 69 Kg/ha. for 61(97), 92 Kg/ha. for others. (d) 30 cm. between rows. (e) N.A. (v) 11.2 Kg/ha. of N for 61(97), 62(57), 44.8 Kg/ha. of  $P_2O_5$  was applied by drilling for 64(42). (vi) NP—718. (vii) Irrigated. (viii) 2 weedings for 61(97), 62(57), 1 hoeing for 64(42). (ix) N.A. (x) N.A. for 61(97), 2.4.1963, 23.3.1965.

**2. TREATMENTS :**

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

(1) 4 sources of N :  $S_1$ =Urca,  $S_2$ =A/S,  $S_3$ =A/S/N and  $S_4$ =C/A/N.(2) 4 levels of N :  $N_1$ =11.2,  $N_2$ =22.4,  $N_3$ =33.6 and  $N_4$ =44.8 Kg/ha.(3) 3 stages of foliar application of N :  $T_1$ =At early tillering,  $T_2$ =At late tillering and  $T_3$ =At flowering stage.

8 extra treatments applied in 61(97) which are given below.

$E_0$ =control,  $E_1$ =22.4 Kg/ha. of N as Urea,  $E_2$ =22.4 Kg/ha. of N as A/S,  $E_3$ =22.4 Kg/ha. of N as A/S/N,  $E_4$ =22.4 Kg/ha. of N as C/A/N,  $E_5$ =No. fertilizer,  $E_6$ =Only water sprayed,  $E_7$ =Fertilizer and water spray.

**3. DESIGN :**

(i) Fact. in R.B.D. for 61(97),  $4^2 \times 3$  Fact. confd. for others. (ii) (a) 56 for 61(97); 12 plots/block and 4 blocks/replication for others. (b) N.A. (iii) 4 for 61(97), 3 for others. (iv) (a) 4.6 m.  $\times$  3.0 m. for 61(97), 6.1 m.  $\times$  4.3 m. for others. (b) 4.0 m.  $\times$  2.7 m. for 61(97), 5.5 m.  $\times$  3.7 m. for others. (v) 30 cm.  $\times$  15 cm. for 61(97), 30 cm.  $\times$  30 cm. for others. (vi) Yes.

**4. GENERAL :**

(i) N.A. for 61(97); good for others. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1961 to 1964 (Expt for 1963 N.A.) (b) No. (v) N.A. (vi) Nil. (vii) Combined results of expt. No. 62(57), 64(42) and individual year results of expt No. 61(97) are presented under results. Error variances for two years are homogeneous and Treatments  $\times$  years interaction is presented.

**5. RESULTS :**

(i) 1724 Kg/ha. (ii) 925.9 Kg/ha. (29 d.f. made up of interaction of various components of treatments with years.) (iii) Main effects of T and N are highly significant and that of S is significant. (iv) Av. yield of grain in Kg/ha..

	$S_1$	$S_2$	$S_3$	$S_4$	$N_1$	$N_2$	$N_3$	$N_4$	Mean
$T_1$	1568	1752	1574	1906	1253	1618	1908	2021	1700
$T_2$	2037	1658	1486	1824	1412	1984	2320	2289	2001
$T_3$	1359	1470	1402	1652	1092	1428	1623	1741	1471
Mean	1655	1960	1487	1794	1252	1677	1950	2017	1424
$N_1$	1103	1421	1172	1312					
$N_2$	1617	1906	1388	1795					
$N_3$	1926	2226	1662	1988					
$N_4$	1972	2287	1728	2081					



C.D. for T marginal means =273.3 Kg/ha.

C.D. for S or N marginal means =315.5 Kg/ha.

61(97)

(i) 2268 Kg ha. (ii) 294.4 Kg/ha. (iii) Interaction N×T alone is highly significant. (iv) Av. yield of grain in Kg/ha,

$E_0=1081, E_1=1449, E_2=1495, E_3=1174, E_4=1345, E_5=1299, E_6=1311$  and  $E_7=1219$  Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	Mean
T <sub>1</sub>	1147	1432	1371	1366	1150	1446	1291	1429	1329
T <sub>2</sub>	1281	1193	1205	1273	1372	1150	1287	1143	1238
T <sub>3</sub>	1193	1146	1183	1372	1276	1334	1133	1151	1223
Mean	1207	1257	1253	1337	1266	1310	1237	1241	1263
N <sub>1</sub>	1185	1200	1265	1414					
N <sub>2</sub>	1284	1353	1296	1307					
N <sub>3</sub>	1142	1242	1253	1311					
N <sub>4</sub>	1217	1233	1198	1316					

C.D. for the body of N×T table=117.8 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 62(88), 63(59).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'M'.**

Object :—To find out the suitability of wheat transplanting under different fertility levels and application of N through in organic and organic manures.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow for 62(88) ; Cotton for 63(59). (c) Nil for 62(88) ; 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63(59)  
(ii) Medium clay soil. (iii) 21.1.1963 ; 22.1.1964, (iv) (a) 2 bakherings, 2 weedings with disc harrow and 1 planting with patota for 62(88) ; 1 ploughing, 1 discing and 1 planking for 63(59). (b) Transplanting. (c) 20 Kg/ha. (d) 30 cm. between lines. (e) 3. (v) Nil. (vi) NP—718. (vii) Irrigated. (viii) 1 hoeing  
(ix) Nil for 62(88) ; 140.4 cm. for 63(59). (x) 8.5.1963 ; 23.4.1964.

#### 2. TREATMENTS :

##### Main-plot treatments :

3 levels of fertilizers : F<sub>1</sub>=22.4 Kg ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+11.2 Kg/ha. of K<sub>2</sub>O, F<sub>2</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of K<sub>2</sub>O and F<sub>3</sub>=67.2 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+44.8 Kg/ha. of K<sub>2</sub>O.

N as A/S, P<sub>2</sub>O<sub>5</sub> as Super K<sub>2</sub>O applied as Pot. Sul.

##### Sub-plot treatments :

7 sources of N: M<sub>1</sub>=100% in organic, M<sub>2</sub>=50% F.Y.M.+50% inorganic, M<sub>3</sub>=50% oil cake+50% in organic, M<sub>4</sub>=25% F.Y.M.+25% oil sake+50% inorganic, M<sub>5</sub>=25% F.Y.M.+75% inorganic, M<sub>6</sub>=25% oil cake+75% inorganic, and M<sub>7</sub>=12.5% F.Y.M.+12.5% oil cake+75% inorganic.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 7 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 3.7 m. × 2.5 m. (b) 3.0 m. × 1.8 m. (v) 30 cm. × 30 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1962—1963. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous, the results of individual years are presented under 5 Results.

## 5. RESULTS :

62(68)

(i) 1452 Kg/ha. (ii) (a) 135.4 Kg/ha. (b) 189.1 Kg/ha. (iii) Main effects of F and M are highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>	Mean
F <sub>1</sub>	1718	1462	870	1292	2009	1058	1951	1480
F <sub>2</sub>	2108	1650	1184	1655	2296	1377	1637	1701
F <sub>3</sub>	1390	1336	789	1049	1659	870	1126	1174
Mean	1739	1483	948	1332	1988	1102	1571	1452

C.D. for F marginal means = 218.6 Kg/ha.

C.D. for M marginal means = 229.2 Kg/ha.

63(59)

(i) 1151 Kg/ha. (ii) (a) 35.8 Kg/ha. (b) 67.1 Kg/ha. (iii) Main effects of F and M are highly significant and interaction F × M is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>	Mean
F <sub>1</sub>	1328	1124	749	936	1480	1108	1148	1133
F <sub>2</sub>	1489	1386	848	1202	1794	955	1287	1280
F <sub>3</sub>	1180	1103	821	888	1399	857	1032	1040
Mean	1332	1204	806	1029	1558	973	1156	1151

C.D. for F marginal means = 58.1 Kg/ha.

C.D. for M marginal means = 81.5 Kg/ha.

C.D. for M means at the same level of F = 133.6 Kg/ha.

C.D. for F means at the same level of M = 140.0 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(105), 63(56)**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Clay Loam. (iii) 18.11.61; 2, 3.12.63. (iv) (a) Ploughing and discing. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. × 30 cm. (e) Nil. (v) Nil. (vi) R.S. 31-1. (vii) Irrigated (viii) 2 weedings. (ix) N.A. : 140 cm. (x) 10 to 13.4.62; 7, 8.4.64.

## 2. TREATMENTS :

## Main-plot treatments :

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

(1) 4 sources of N : S<sub>1</sub>=A/S, S<sub>2</sub>=A/S/N, S<sub>3</sub>=Urea and S<sub>4</sub>=C/A/N

(2) 2 levels of N : N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=33.6 Kg/ha.

(2) 2 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>0</sub>=0 and K<sub>1</sub>=33.6 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/rep., 4 sub-plots/main-plot. (b) N.A., 77.5 m. × 23.8 m. (iii) 3. (iv) (a) 7.4 m. × 5.5 m. (b) 6.5 m. × 4.6 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A- (iii) Yield of grain. (iv) (a) 1961 to 1963 [Not conducted in 1962]. (b) No. (c) Nil. (v) to (vi) Nil. (vii) As the means for (P × K) table under No nitrogen for 61(105) is not available, individual results for the two years are presented.

## 5. RESULTS :

## 61(105)

(i) 2166 Kg/ha. (ii) (a) 285.8 Kg/ha. (b) 270.0 Kg/ha. (iii) Main effects of P and K are significant and that of N is highly significant. (iv) Av. yield of grain in Kg/ha.

Control=1847 Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>1</sub>	2011	2182	1993	2174	2019	2161	2067	2113	2090
N <sub>2</sub>	2424	2292	2224	2349	2251	2393	2239	2404	2322
Mean	2218	2237	2108	2262	2135	2277	2153	2258	2206
K <sub>0</sub>	2083	2328	2033	2170	2006	2200			
K <sub>1</sub>	2352	2146	2183	2354	2190	2268			
P <sub>0</sub>	2132	2236	2022	2148					
P <sub>1</sub>	2303	2237	2194	2375					

C.D. for N marginal means=123.6 Kg/ha.

C.D. for P or K marginal means=110.6 Kg/ha.

## 63(56)

(i) 1564 Kg/ha. (ii) (a) 517.9 Kg/ha. (b) 248.0 Kg/ha. (iii) Main effect of P is highly significant and control vs others is significant. (iv) Av. yield of grain in Kg/ha.

## Without nitrogen

	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	1238	1092	1165
P <sub>1</sub>	1148	1317	1233
Mean	1193	1205	1194

## With nitrogen

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>1</sub>	1459	1435	1734	1512	1479	1591	1555	1515	1535
N <sub>2</sub>	1686	1864	1621	1567	1572	1798	1607	1762	1685
Mean	1572	1650	1677	1539	1526	1694	1581	1638	1610
K <sub>0</sub>	1601	1559	1618	1545	1451	1625			
K <sub>1</sub>	1544	1740	1736	1535	1601	1674			
P <sub>0</sub>	1539	1500	1582	1480					
P <sub>1</sub>	1605	1800	1773	1690					

C.D. for P marginal means=101.6 Kg/ha.

C.D. for Control vs others=336.8 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 64(76), 65(37).****Site :- Janta College Farm, Dabok.****Type :- 'M'.****Object :-**To study the effect of split-application of different levels of N on Wheat.**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Loam. (iii) 1.12.1964 ; 2.11.1965. (iv) (a) N.A. (b) Line sowing. (c) 92 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of  $P_2O_5$  as Super drilled and 44.8 Kg/ha. of  $K_2O$  as Mur. Pot. by broadcasting. (vi) NP-718. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 4, 5.4.1965 ; 2, 3.4.1966.

**2. TREATMENTS :**

All combinations (1) and (2)

(1) 2 methods of application :  $M_1$ =In two doses and  $M_2$ =In 3 doses.(2) 4 levels of N as A/S :  $N_0=0$ ,  $N_1=44.8$ ,  $N_2=89.7$  and  $M_3=134.5$  Kg/ha.

N applied by broadcast as sowing.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Spraying of 2, 4-D at 1:1 Kg/ha. of acid equivalent as a precautionary measure for 64(76) ; Nil for 65(37). (iii) Yield of grain and fodder (iv) (a) 1964 to 1965. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is absent.

**5. RESULTS :-**

(i) 1030 Kg/ha. (ii) 247.4 Kg/ha. (based on 48 d.f. made up of interaction of treatments with years and pooled error). (iii) Control vs. others is highly significant. (iv) Av. yield of grain in Kg/ha.

Control=639 Kg/ha.

	$N_1$	$N_2$	$N_3$	Mean
$M_1$	1087	1182	1272	1180
$M_2$	1049	1191	1178	1139
Mean	1068	1186	1225	1160

C.D. for control vs. others=203.3 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 60(56), 61(78).****Site :- Govt. Agri. Farm, Durgapura.****Type :- 'M'.****Object :-**To study the effect of foliar spray of different levels of N through different sources.**1. BASAL CONDITIONS :**

(1) (a) N.A. for 60(56) ; Fallow-Wheat for 61(78). (b) Bajra for 60(56) ; Fallow for other. (c) N.A. (ii) Sandy loam. (iii) 12.10.1960 ; 5.11.1961. (iv) (a) 4 ploughings. (b) and (c) N.A. (d) 23 cm. between rows. (e) N.A. (v) 22.4 Kg/ha. of N+9223 Kg/ha. of F.Y.M and 41.8 Kg/ha. of Super for 60(56) ; N.A. for 61(78). (vi) R.S. 31-1. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. for 60(56) ; Nil for 61(78). (x) 27.4.1961 ; 4.4.1962.

## 2. TREATMENTS :

All combinations of (1), (2) and (3) with 3 extra treatments.

(1) 3 levels of N :  $N_1=11.2$ ,  $N_2=16.8$  and  $M_3=22.4$  Kg/ha.

(2) 3 sources of N :  $S_1=Urea$ ,  $S_2=A/S$  and  $S_3=A/N$

(3) 2 times of application of N :  $T_1=Before$  tillering and  $T_2=Just$  before flowering.

Extrt treatments are :  $E_1=One$  water spray before tillering,  $E_2=One$  water spray just before flowering and  $E_3=Top$  dressing.

## 3. DESIGN :

(i) Fact. R.B.D. (ii) (a) 21. (b) N.A. (iii) 2 for 60(56) ; 3 for 61(78). (iv) (a) 9.8 m.  $\times$  6.4 m. for 60(56) ; 5.7 m.  $\times$  3.7 m. for 61(78). (b) 9.1 m.  $\times$  5.9 m. for 60(56) ; 5.1 m.  $\times$  3.1 m. for 61(78). (v) 30 cm.  $\times$  23 cm. for 60(56) ; 30 cm.  $\times$  30 cm. for 61(78). (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 to 61. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) Error variances are heterogenous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

## 60(56)

(i) 1259 Kg/ha. (ii) 233.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

$E_1=11741$ .  $E_2=897$  and  $E_3=1221$  Kg/ha.

	$S_1$	$S_2$	$S_3$	$T_1$	$T_2$	Mean
$N_1$	1381	1283	1468	1330	1425	1378
$N_2$	1305	1369	1092	1262	1249	1255
$N_3$	1425	1228	1025	1373	1079	1226
Mean	1370	1293	1195	1322	1251	1286
$T_1$	1309	1316	1340			
$T_2$	1431	1271	1050			

## 61(78)

(i) 2584 Kg/ha. (ii) 587.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

$E_1=1399$ ,  $E_2=1485$  and  $E_3=2238$  Kg/ha.

	$P_0$	$P_1$	$P_2$	$T_1$	$T_2$	Mean
$N_1$	2938	2691	2562	2627	2834	2730
$N_2$	2757	2861	2691	2863	2677	2770
$N_3$	2788	2572	2712	2871	2511	2691
Mean	2828	2708	2655	2787	2674	2730
$T_1$	2928	2712	2720			
$T_2$	2727	2705	2590			

Crop :- Wheat (Rabi).

Site :- Govt. Agri. Farm, Dhurgapura.

Ref :- Rj. 64(74).

Type :- 'M'.

Object :- To study the effect of different micronutrients on the yield of Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) *Moong*. (c) Nil. (ii) (a) Sandy loam. (iii) 26.11.64. (iv) (a) N.A. (b) Line sowing. (c) 92 Kg/ha. (d) Between lines 25 cm. (e) N.A. (v) 44.8 Kg/ha. of N as A/S+44.8 Kg/ha. of  $P_2O_5$  as Super +22.4 Kg/ha. of  $K_2O$  as Mur. Pot. (vi) N.P.—718. (vii) Irrigated. (viii) 1 *khurpi*. (ix) 1 cm. (x) 4 to 7.4.65.

## 2. TREATMENTS :

All combinations of (1), (2), (3), (4) and (5)

- (1) 3 levels of Fe as Fe.Sul. :  $F_0=0$ ,  $F_1=9$  and  $F_2=18$  Kg/ha.  
 (2) 3 levels of M as Mn. Sul. :  $M_0=0$ ,  $M_1=9$  and  $M_2=18$  Kg/ha.  
 (3) 3 levels of C as Cu. Sul. :  $C_0=0$ ,  $C_1=9$  and  $C_2=18$  Kg/ha.  
 (4) 3 levels of B as Borax .  $B_0=0$ ,  $B_1=9$  and  $B_2=18$  Kg/ha.  
 (5) 3 levels of Zn as Zn. Sul. :  $Z_0=0$ ,  $Z_1=9$  and  $Z_2=18$  Kg/ha.

Trace elements applied by broadcast.

## 3. DESIGN :

- (i) 3<sup>5</sup> confd. (fractional replication). (ii) (a) 9 plots/block ; 9 blocks/replication. (b) N.A. (iii)  $\frac{1}{2}$ . (iv) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

- (i) 1359 Kg/ha. (ii) 207.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	B <sub>0</sub>	B <sub>1</sub>	B <sub>2</sub>	Mean
Z <sub>0</sub>	1334	1343	1324	1314	1339	1347	1266	1468	1267	1316	1342	1343	1334
Z <sub>1</sub>	1351	1411	1311	1413	1389	1271	1301	1367	1405	1273	1397	1403	1358
Z <sub>2</sub>	1374	1393	1387	1449	1380	1324	1431	1361	1361	1369	1424	1360	1384
Mean	1353	1382	1341	1392	1369	1314	1333	1399	1344	1319	1388	1369	1359
B <sub>0</sub>	1297	1391	1269	1331	1369	1257	1319	1357	1281				
B <sub>1</sub>	1364	1382	1417	1388	1404	1371	1349	1442	1372				
B <sub>2</sub>	1398	1374	1335	1457	1336	1314	1329	1397	1380				
C <sub>0</sub>	1287	1357	1354	1411	1314	1272							
C <sub>1</sub>	1465	1410	1322	1421	1501	1274							
C <sub>2</sub>	1307	1379	1346	1345	1293	1396							
F <sub>0</sub>	1371	1388	1417										
F <sub>1</sub>	1366	1359	1384										
F <sub>2</sub>	1322	1400	1220										

Crop :- Wheat (*Rabi*).

Ref :- Rj. 61(66).

Site :- Govt. Agri. Farm, Durgapura.

Type :- 'M'.

Object :- To study the effect of N, P and K on quality and yield of grain.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 18.11.1161. (iv) (a) 4 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Row to row 23 cm. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) 3 weedings. (ix) N.A. (x) 3, 4.4.62.

## 2. TREATMENTS:

## Main-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of  $P_2O_5$  as Super:  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.

(2) 2 levels of  $K_2O$  as Mur. of Pot.  $K_0=0$  and  $K_1=22.4$  Kg/ha.

## Sub-plot treatments :

5 manurial treatments:  $N_0=0$ ,  $N_1=33.6$  Kg/ha. of N as A/S in single application,  $N_2=33.6$  Kg/ha. of N as A/S in split application,  $N_3=67.2$  Kg/ha. of N in single application and  $N_4=67.2$  Kg/ha. of N in split application.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.7 m. x 4.0 m. (b) 5.8 m. x 3.1 m. (v) 46 cm. x 48 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) to (vii) N.A.

## 5. RESULTS :

(i) 1708 Kg/ha. (ii) (a) 339.0 Kg/ha. (b) 256.1 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	$N_4$	$K_0$	$K_1$	Mean
$P_0$	958	1454	1501	2187	2178	1673	1638	1656
$P_1$	1044	1617	1570	2389	2127	1696	1803	1749
$P_2$	915	1741	1612	2195	2135	1790	1649	1720
Mean	972	1604	1561	2257	2147	1720	1697	1708
$K_0$	977	1572	1568	2269	2214			
$K_1$	968	1636	1554	2245	2080			

C.D. for N marginal means=147.5 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- Rj. 64(66).

Site :- Govt. Agri. Farm, Durgapura.

Type :- 'M'.

Object :- To study the effect of different levels of N, P and different times of application of fertilizers on Wheat.

## 1. BASAL CONDITIONS:

(i) (a) G.M.-Wheat. (b) G.M. (c) N.A. (ii) Sandy loam. (iii) 12.11.64. (iv) (a) 3 ploughings. (b) Line sowing. (c) 99 Kg/ha. (d) 23 cm. x 8 cm. (e) N.A. (v) G.M. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 hand hoeing. (ix) 1.2 cm. (x) 13.4.65.

## 2. TREATMENTS :

## Main-plot treatments :

4 times and methods of application of fertilizers :  $M_1$ =Whole at the time of sowing by broadcasting,  $M_2$ =Whole at the time of sowing by drilling,  $M_3$ = $\frac{1}{2}$  N+full  $P_2O_5$  at the time of sowing+ $\frac{1}{2}$  N as top dressing and  $M_4$ = $\frac{1}{2}$  N+full  $P_2O_5$  at the time of sowing by drilling+ $\frac{1}{2}$  N as top dressing.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of N :  $N_0=0$ ,  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.

(2) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication, 9 sub-plots/main-plots. (b) N.A. (iii) 3. (iv) (a) 3.7 m.  $\times$  2.7 m. (b) 3.1 m.  $\times$  2.3 m. (v) 30 cm.  $\times$  23 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 2158Kg/ha. (ii) (a) 821.2 Kg/ha. (b) 805.3 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant. (iv) Av. yield of grain in Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	$P_0$	$P_1$	$P_2$	Mean
$N_0$	2312	1532	1634	1607	1243	1911	2161	1771
$N_1$	2417	1799	2016	2180	1997	2208	2104	2103
$N_2$	2622	2893	2606	2277	2158	2763	2878	2599
Mean	2450	2075	2085	2021	1799	2294	2381	2158
$P_0$	1968	1746	1706	1776				
$P_1$	2599	2303	2167	2106				
$P_2$	2784	2175	2382	2181				

C.D. for N or P marginal means=379.4 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- Rj. 64(82).

Site :- Govt. Agri. Farm, Hemawas.

Type :- 'M'.

Object :- To study the effect of different levels and sources of N on soil fertility and yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Smai*. (c) Nil. (ii) N.A. (iii) 28.11.64. (iv) (a) 3 hoeing cultivations. (b) Line sowing. (c) 92 Kg/ha. (d) Between lines 23 cm. (e) N.A. (v) Nil. (vi) R.S. 31-1. (vii) Irrigated. (viii) 2 hand weedings and 2 hand hoeings. (ix) N.A. (x) 2.4.65.

## 2. TREATMENTS:

All combinations of (1) and (2) with two extra treatments

(1) 2 levels of N :  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.

(2) 3 sources of N :  $S_1=A/S$ ,  $S_2=A/S/N$  and  $S_3=C/A/N$ .

These plots also receive 33.6 Kg/ha.  $P_2O_5$  as Super.

Extra treatments :

$C_0$ =Control and  $C_1=33.6$  Kg/ha. of  $P_2O_5$  as Super.



## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 5. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Fair. (ii) N.I. (iii) Yield of grain and fodder. (iv) (a) 1963 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1052 Kg/ha. (ii) 182.2 Kg/ha. (iii) 'Extra vs. others' alone is highly significant. (iv) Av. yield of grain in Kg/ha.

$C_0=702$  and  $C_1=488$  Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$N_1$	1152	1179	1190	1174
$N_2$	1145	1309	1250	1235
Mean	1148	1244	1220	1204

C.D. for 'extra vs. others' = 136.2 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(84).**

**Site :- Govt. S.K.N. Agri. College Farm, Jobner.**

**Type :- 'M'.**

Object :—To study the effect of different levels of N and P on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Guar (G.M.), Wheat. (b) Guar. (c) Nil. (ii) Sandy loam. (iii) 16.10.1960. (iv) (a) 2 ploughings. (b) N.A. (c) 92 Kg/ha. (d) Rows 23 cm. apart (e) N.A. (v) N.A. (vi) C-591. (vii) Irrigated. (viii) 1 weeding. (ix) Nil. (x) 3.3.61.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N :  $N_0=0$ ,  $N_1=44.8$  and  $N_2=89.7$  Kg/ha.

(2) 4 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=44.8$ ,  $P_2=89.7$  and  $P_3=134.5$  Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 11.0 m. × 3.7 m. (b) 10.4 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1960 only. (b) and (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 3126 Kg/ha. (ii) 376.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>0</sub>	3118	3150	3317	3411	3249
N <sub>1</sub>	2865	3126	3007	3126	3031
N <sub>2</sub>	2896	3134	3150	3221	3100
Mean	2960	3137	3158	3253	3127

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 65(52).**

**Site :- Govt. S.K.N. Agri. College Farm, Jobner.**

**Type :- 'MP'.**

**Object :-** To study the effect of spartan-B on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) to (v) N.A. (vi) R.S. 31-1. (vii) Unirrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

9 manurial treatments : T<sub>0</sub>=Control, T<sub>1</sub>=75, T<sub>2</sub>=100, T<sub>3</sub>=125, T<sub>4</sub>=150, T<sub>5</sub>=175, T<sub>6</sub>=200, T<sub>7</sub>=225 and T<sub>8</sub>=250 Kg/ha. of spartan-B.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 5.0 m. × 3.0 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965 only. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 2651 Kg/ha. (ii) 600.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>
Av. yield	2433	2667	2050	2550	2800	3350	2992	2575	2442

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 65(1),**

**Site :- Govt. S.K.N. Agri. College Farm, Jobner.**

**Type :- 'MP'.**

**Object :-** To study the effect of pre-sowing seed treatments and split application of N on Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 23.10.65. (iv) and (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) Two light hoeings. (ix) and (x) N.A.

**2. TREATMENTS :**

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

(1) Two pre sowing seed treatments :

S<sub>1</sub>=Soaking the heads in 5% solution of KH<sub>2</sub>P<sub>2</sub>O<sub>4</sub> and S<sub>2</sub>=Soaking the heads in 2.5% solution of NaCl.

(2) 8 levels of N :

N<sub>1</sub>=40, N<sub>2</sub>=50, N<sub>3</sub>=60, N<sub>4</sub>=70, N<sub>5</sub>=80, N<sub>6</sub>=90, N<sub>7</sub>=100 and N<sub>8</sub>=110 Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 17. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 6'0 m. × 5'0 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1965 only. (b) N.A. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 3377 Kg/ha. (ii) 463'0 Kg/ha. (iii) Effect of "control vs. other treatments" is highly significant. (iv) Av. yield of grain in Kg/ha.

Control=2646 Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	N <sub>6</sub>	N <sub>7</sub>	N <sub>8</sub>	Mean
S <sub>1</sub>	3381	3462	3552	2930	3492	3531	3467	3563	3422
S <sub>2</sub>	3395	3467	3360	3408	3483	3319	3476	3490	3424
Mean	3388	3464	3456	3169	3488	3425	3472	3527	3423

C.D. for 'control vs. others'=480'6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 64(107).**

**Site :- Soil Cons. Res. Demons. and Trg. Centre, Kota.**

**Type :- 'M'.**

Object :- To study the effect of G.M. on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Clay loam. (iii) 17.10.64. (iv) (a) 2 ploughings and bakhering. (b) Behind the plough. (c) and (d) N.A. (e) —. (v) Nil. (vi) *Malvi*. (vii) Unirrigated. (viii) 3 weedings. (ix) N.A. (x) 11.2.65.

## 2. TREATMENTS:

All combinations of (1) and (2) with control

(1) 5 G.M. crops : G<sub>1</sub>=Sannhemp, G<sub>2</sub>=Guar, G<sub>3</sub>=Sannhemp+Guar, G<sub>4</sub>=Dhaincha and G<sub>5</sub>=Cowpea.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0 and P<sub>1</sub>=25 Kg/ha.

P<sub>2</sub>O<sub>5</sub> applied at the time of sowing.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 11. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 20'0 m. × 16'0 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Fair. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1964 and 1965 (modified in 1965). (b) Yes. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 554 Kg/ha. (ii) 183'2 Kg/ha. (iii) Interaction of P × G is significant. (iv) Av. yield of grain in Kg/ha.

Control=358 Kg/ha.

	G <sub>1</sub>	G <sub>2</sub>	G <sub>3</sub>	G <sub>4</sub>	G <sub>5</sub>	Mean
P <sub>0</sub>	519	490	555	747	476	557
P <sub>1</sub>	880	541	514	306	713	591
Mean	700	515	535	527	594	574

C.D. for P × G table=220'7 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 65(53).****Site :- Soil Cons. Res. Demons. and Trg. Centre, Kota.****Type :- 'M'.**Object :—To study the effect of G.M. and  $P_2O_5$  on the yield of Wheat.**1. BASAL CONDITIONS:**

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Clay loam. (iii) 21.10.65: (iv) (a) 2 ploughings and bukhering. (b) Behind the plough. (c) 69.2 Kg/ha. (d) 23 cm. between rows. (e) —. (v) Nil. (vi) Malvi. (vii) Un-irrigated. (viii) 2 weedings. (ix) N.A. (x) 8.3.66.

**2. TREATMENTS :****Main-plot treatments :**6 G.M. treatments :  $M_0$ =No G.M.,  $M_1$ =Sannhemp,  $M_2$ =Gwar,  $M_3$ =Dhaincha,  $M_4$ =Sannhemp + gwar and  $M_5$ =Cowpea.**Sub-plot treatments :**2 levels of  $P_2O_5$  :  $P_0$ =0 and  $P_1$ =25 Kg/ha. of  $P_2O_5$ . $P_2O_5$  applied at the time of sowing of G.M. crop.**3. DESIGN :**(i) Split-plot. (ii) (a) 6 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 10.0 m.  $\times$  10.0 m. (v) Nil. (vi) Yes.**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1964 and 65 (modified in 1965). (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 301 Kg/ha. (ii) (a) 73.4 Kg/ha. (b) 107.5 Kg/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of grain in Kg/ha.

	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	Mean
$P_0$	215	344	272	275	334	250	282
$P_1$	268	358	296	298	391	316	321
Mean	242	351	284	286	362	283	301

C.D. for M marginal means=78.2 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 62(81), 63(62), 64(61).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'M'.**

Object :—To study the effect of different levels of N and P alone and in combination on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 3.10.1952 ; 30.10.1953 ; 10.11.1954. (iv) (a) N.A. for 62(81) ; 1 discing, 2 ploughings for 63(62), 3 summer ploughings and 2 ploughings with tractor for 64(61). (b) Sown in lines for 62(81) ; Behind the plough for others. (c) 86 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) RS—31—1. (vii) Irrigated. (viii) 2 weedings for 62(81), 63(62) ; N.A. for 64(61). (ix) N.A. (x) N.A. ; 18.3.1964 ; 29.3.1965.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 4 levels of N as A/S :  $N_0$ =0,  $N_1$ =33.6,  $N_2$ =67.2 and  $N_3$ =100.9 Kg/ha.(2) 4 levels of  $P_2O_5$  as Super :  $P_0$ =0,  $P_1$ =33.6,  $P_2$ =67.2 and  $P_3$ =100.9 Kg/ha. $\frac{1}{2}$  N broadcast at the time of sowing and  $\frac{1}{2}$  N at the time of first irrigation and  $P_2O_5$  drilled.

## 3. DESIGN :

(i) 4<sup>2</sup> confd. (ii) 4 plots/block ; 4 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.1 m. × 3.7 m. (b) 8.5 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) N.A. for 62(81) ; Nil for 63(62) ; Incidence of termites for 64(61). (iii) Yield of grain and fodder. (iv) (a) 1962 to 64. (b) No. (c) Nil. (v) Orasirohi. (vi) Nil. (vii) As the error variances are heterogeneous and Treatments × years interaction is absent therefore, results of individual years are presented under 5.

## 5. RESULTS :

## 62(81)

(i) 2109 Kg/ha. (ii) 278.8 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>0</sub>	1869	1519	2020	1738	1786
N <sub>1</sub>	2074	2107	2007	2378	2142
N <sub>2</sub>	2260	1641	2299	2460	2165
N <sub>3</sub>	2601	2180	2059	2537	2344
Mean	2201	1862	2096	2278	2109

C.D. for N marginal means = 296.8 Kg/ha.

## 63(62)

(i) 1661 Kg/ha. (ii) 320.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>0</sub>	1573	1890	1317	1948	1682
N <sub>1</sub>	1503	1877	1496	1663	1635
N <sub>2</sub>	1823	1506	1877	1265	1618
N <sub>3</sub>	1836	1676	1768	1557	1709
Mean	1684	1737	1614	1608	1661

## 64(61)

(i) 2218 Kg/ha. (ii) 532.6 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>0</sub>	1376	1220	1324	1372	1323
N <sub>1</sub>	2578	1857	2039	2314	2197
N <sub>2</sub>	2654	2318	2629	2406	2502
N <sub>3</sub>	2787	2972	2939	2710	2852
Mean	2349	2092	2233	2200	2218

C.D. for N marginal means = 567.5 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(56).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'M'.**

Object :—To study the effect of different levels of N, P and different sources of N on the yield and quality of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) N.A. (ii) (a) Sandy. (iii) 30.11.61. (iv) (a) 4 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Rows 23 cm. apart. (e) N.A. (v) 5604 Kg/ha. of F.Y.M. (vi) C—591. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 10.4.62.

**2. TREATMENTS :**

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

(1) 3 sources of N :  $S_1=A/S$ ,  $S_2=A/S/N$  and  $S_3=Urea$ .

(2) 3 levels of N :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.

(3) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_3=44.8$  Kg/ha.

3 extra treatments :  $T_1=44.8$  Kg/ha. of N as A/S+44.8 Kg/ha. of  $P_2O_5$  as Super+22.4 Kg/ha. of  $K_2O$  as Mur. Pot.,  $T_2=44.8$  Kg/ha. of N as A/S/N+44.8 Kg/ha. of  $P_2O_5$  as Super+22.4 Kg/ha. of  $K_2O$  as Mur. Pot. and  $T_3=44.8$  Kg/ha. of N as Urea+44.8 Kg/ha. of  $P_2O_5$  as Super+22.4 Kg/ha. of  $K_2O$  as Mur. Pot.

**3. DESIGN :**

(i) 3<sup>2</sup> confd.+3 extra treatments in each block. (ii) (a) 12 plots/block, 3 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9.2 m.×5.5 m. (b) 7.4 m.×3.6 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS:**

(i) 2831 Kg/ha. (ii) 339.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

$T_1=2844$ ,  $T_2=2747$  and  $T_3=2671$  Kg/ha.

	$N_0$	$N_1$	$N_2$	Mean	$S_1$	$S_2$	$S_3$
$P_0$	2998	2920	2891	2936	2847	2798	3164
$P_1$	3057	2711	2682	2817	2697	2912	2841
$P_2$	2941	2869	2632	2814	3042	2251	3150
Mean	2999	2833	2735	—			
$S_1$	—	2840	2718	2779			
$S_2$	—	2581	2661	2621			
$S_3$	—	3078	2826	2952			

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(65).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'M'.**

Object :—To study the effect of application of N, P and K applied alone and in mixture on soil preparation and quality of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy. (iii) 29.11.61. (iv) (a) 2 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Rows 23 cm. apart. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 6/7.4.62.

## 2. TREATMENTS :

## Treatments in one direction

A<sub>1</sub>=Separate application of treatments andA<sub>2</sub>=Mixed application of treatment.

## Treatments in orthogonal direction

All combinations of (1), (2) and (3) with one control

(1) 2 levels of N as A/S : N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.(2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.(3) 2 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>1</sub>=33.6 and K<sub>2</sub>=67.2 Kg/ha.

## 3. DESIGN :

(i) Split-plot design. (ii) (a) 2 strips in one direction and 9 strips in perpendicular direction. (b) N.A.  
(iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 249.4 Kg/ha. (ii) (a) 463.4 Kg/ha. (b) 331.4 Kg/ha. (c) 320.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=1566 Kg/ha.

	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
A <sub>1</sub>	2624	2834	2540	2919	2697	2762	2729
A <sub>2</sub>	2593	2386	2236	2744	2449	2530	2490
Mean	2609	2610	2388	2832	2573	2646	2610
K <sub>1</sub>	2631	2516.	2283	2864			
K <sub>2</sub>	2587	2705	2492	2799			
N <sub>1</sub>	2455	2301					
N <sub>2</sub>	2763	2900					

Crop :- Wheat (Rabi).

Ref :- Rj. 62(51), 63(54), 64(63).

Site :- Govt. Seed Multiplication Farm, Ora,

Sirohi.

Type :- 'M'.

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

## 1. BASAL CONDITIONS :

(i) N.A. for 62(51), Nil for 63(54), Fallow-Wheat for 64(63). (b) N.A. for 62(51), 63(54); Fallow for 64(63).  
(c) N.A. for 62(51), 63(54); Nil for 64(53). (ii) R:1 laterite soil. (iii) 3.11.1962; 12.11.1963; 27.11.1964. (iv)  
(a) 2 discings with tractor disc, 2 cross cultivations with *desi* plough and pata for levelling. (b) Line sowing. (c) 86 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. for 62(51), 63(54); Nil for 64(63).  
(vi) R.S. 31-1. (vii) Irrigated. (viii) 1 to 2 weedings. (ix) N.A. (x) N.A.; 16.4.1964; 18.4.1965.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6, N<sub>2</sub>=57.2 and N<sub>3</sub>=100.9 Kg/ha.(2) 4 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6, P<sub>2</sub>=67.2 and P<sub>3</sub>=100.9 Kg/ha.½ N broadcast at the time of sowing and ½ N at first irrigation. P<sub>2</sub>O<sub>5</sub> was drilled.

## 3. DESIGN :

(i) 4<sup>2</sup> confd. (ii) (a) 4 plots/block, 4 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.1 m. × 3.7 m. (b) 8.5 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-64. (b) No. (c) Results of combined analysis given under 5. (v) Mandore. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is present.

## 5. RESULTS :

(i) 1820 Kg/ha. (ii) 505.0 Kg/ha. [based on 30 d.f. made up of Treatments × years interaction]. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>0</sub>	1087	1284	1133	1362	1216
N <sub>1</sub>	1874	1792	2056	1595	1829
N <sub>2</sub>	1890	2014	2078	2101	2021
N <sub>3</sub>	2021	2231	2302	2302	2214
Mean	1718	1830	1892	1840	1820

C.D. for N marginal means = 297.7 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 62(45), 64(49).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'M'.**

Object :—To study the effect of different levels of N and P and their methods of application on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 3.11.1962, 6.11.1964. (iv) (a) 3 to 4 ploughings. (b) N.A. (c) 66 Kg/ha., 74 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) C 591. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 16.4.1963, 19.4.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

4 methods of application : M<sub>1</sub> = Whole at sowing as broadcasting, M<sub>2</sub> = Whole at sowing drilling, M<sub>3</sub> =  $\frac{1}{2}$  N + full P<sub>2</sub>O<sub>5</sub> by broadcasting at sowing +  $\frac{1}{2}$  N as top dressing and M<sub>4</sub> =  $\frac{1}{2}$  N + full P<sub>2</sub>O<sub>5</sub> by drilling at sowing +  $\frac{1}{2}$  N as top dressing.

**Sub-plot treatments :**

For 62(45)

All combinations of (1) and (2)

(1) 3 levels of N : N<sub>0</sub> = 0, N<sub>1</sub> = 33.6 and N<sub>2</sub> = 67.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub> = 0, P<sub>1</sub> = 33.6 and P<sub>2</sub> = 67.2 Kg/ha.

For 64(49)

All combinations of (1) and (2)

(1) 3 levels of N : N<sub>0</sub> = 0, N<sub>1</sub> = 37.1 and N<sub>2</sub> = 74.1 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub> = 0, P<sub>1</sub> = 37.1 and P<sub>2</sub> = 74.1 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication. 9 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m. × 4.6 m. for 62(45), 5.5 m. × 3.7 m. for 64(49). (b) 4.6 m. × 3.7 m. for 62(45), 5.0 m. × 3.2 m. for 64(49). (v) 46 cm. × 45 cm. for 62(45), 23 cm. × 23 cm. for 64(49). (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1962 to 1964. (1963 N.A.). (b) No. (c) Nil. (v) and (vi) N.A. (vii) As the doses for N and P<sub>2</sub>O<sub>5</sub> are different for two years the results have not been pooled.



## 5. RESULTS :

62(45)

- (i) 3149 Kg/ha. (ii) (a) 837.2 Kg/ha. (b) 562.1 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	2538	2761	2823	3053	2746	2717	2918	2794
N <sub>1</sub>	3375	2957	3508	3542	3266	3351	3419	3345
N <sub>2</sub>	3429	3435	2950	3412	2983	3429	3508	3307
Mean	3114	3051	3094	3336	2998	3166	3282	3149
P <sub>0</sub>	2837	2834	3073	3249				
P <sub>1</sub>	3163	3126	3042	3332				
P <sub>2</sub>	3342	3193	3166	3425				

C.D. for N marginal means = 265.0 Kg/ha.

64(49)

- (i) 2364 Kg/ha. (ii) (a) 479.0 Kg/ha. (b) 291.0 Kg/ha. (iii) Main effects of N, P and interaction N×P are highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	1940	2326	2217	2266	2111	2173	2278	2187
N <sub>1</sub>	2450	2509	2276	2516	2334	2486	2494	2438
N <sub>2</sub>	2393	2516	2413	2546	2275	2454	2672	2467
Mean	2261	2451	2302	2443	2240	2371	2481	2364
P <sub>0</sub>	2016	2326	2245	2373				
P <sub>1</sub>	2334	2489	2266	2395				
P <sub>2</sub>	2433	2537	2395	2560				

C.D. for N or P marginal means = 137.2 Kg/ha.

C.D. for means in the body of N×P table = 237.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(53), 60(54).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'M'.**

**Object :-** To study the effect of different levels of N, P and different sources of N on the yield of Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) N.A. (b) Mustard and Cotton. (c) Nil. (ii) Sandy loam. (iii) 15.11.1960. (iv) (a) 4 ploughings. (b) N.A. (c) 45 Kg/ha. (d) 23 cm. × 8 cm. to 15 cm. (e) N.A. (v) 5604 Kg/ha. F.Y.M. (vi) C 591. (vii) Irrigated. (viii) 1 weeding and hoeing. (ix) N.A. (x) 26, 27.4.61 for 60(53) ; 25, 26.4.61 for 60(54).

## 2. TREATMENTS :

All combinations of (1), (2) and (3) with 3 extra treatments.

(1) 3 sources of N :  $S_1 = A/S$ ,  $S_2 = A/S/N$  and  $S_3 = \text{Urea}$ .

(2) 3 levels of N :  $N_0 = 0$ ,  $N_1 = 22.4$  and  $N_2 = 44.8$  Kg/ha.

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

3 extra treatments :  $T_1 = 44.8$  Kg/ha. N as A/S+44.8 Kg.  $P_2O_5$  as Super+22.4 Kg. of  $K_2O$  as Mur. Pot.,  $T_2 = 44.8$  Kg/ha. N as A/S/N+44.8 Kg.  $P_2O_5$  as Super+22.4 Kg/ha.  $K_2O$  as Mur. Pot. and  $T_3 = 44.8$  Kg/ha. N as urea+44.8 Kg/ha.  $P_2O_5$  as Super+22.4 Kg/ha.  $K_2O$  as Mur. Pot.

Under  $S_3$  above A/C has been used instead of A/S/N in expt. no. 60(54).

## 3. DESIGN :

(i)  $3^3$  confd. (ii) (a) 12 plots/block, 2 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 8.0 m.  $\times$  5.0 m. (v) 60 cm.  $\times$  23 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) and (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) As the sources of N are different for two years, results have not been pooled.

## 5. RESULTS :

60(53)

(i) 2097 Kg/ha. (ii) 258.2 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

$T_1 = 2608$ ,  $T_2 = 2290$  and  $T_3 = 2252$  Kg/ha.

	$N_0$	$N_1$	$N_2$	Mean	$S_1$	$S_2$	$S_3$
$P_0$	1653	1950	2093	1898	1877	1924	1894
$P_1$	1669	2205	2362	2079	2094	2056	2086
$P_2$	1567	2093	2415	2025	1765	2077	2231
Mean	1630	2083	2290	—			
$S_1$	—	1994	2290	2142			
$S_2$	—	2149	2318	2234			
$S_3$	—	2105	2263	2184			

C.D. for N marginal means = 297.9 Kg/ha.

60(54)

(i) 2239 Kg/ha. (ii) 179.6 Kg/ha. (iii) Main effects of S, N and interaction  $S \times N$  are highly significant. Main effect of P and interaction  $S \times P$  are significant. (iv) Av. yield of grain in Kg/ha.

$T_1 = 2219$ ,  $T_2 = 2243$ ,  $T_3 = 2559$  Kg/ha.

	$N_0$	$N_1$	$N_2$	Mean	$P_0$	$P_1$	$P_2$
$P_0$	1475	2000	2250	2242	1796	2069	1858
$P_1$	1936	2278	2441	2218	1905	2355	2395
$P_2$	2081	1864	2518	2154	1751	2004	2709
Mean	1831	2047	2403	—			
$S_1$	—	1475	2149	1812			
$S_2$	—	2507	2179	2343			
$S_3$	—	2159	2282	2220			

C.D. for N or P marginal means =207.3 Kg/ha.  
 C.D. for S marginal means =253.7 Kg/ha.  
 C.D. for body of (S×N) or (S×P) table=358.8 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 64(81).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'M'.**

**Object :-**To study the effect of micronutrients alone and in combination on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Guwar* (G.M.) (c) Nil. (ii) Sandy loam. (iii) 29.11.64. (iv) (a) 5 ploughings. (b) Line sowing. (c) 90 Kg/ha. (d) Between rows 23 cm. (e) N.A. (v) 44.8 Kg/ha. of N as A/S by broadcasting + 44.8 Kg/ha. of  $P_2O_5$  as Super by drilling + 22.4 Kg/ha. of  $K_2O$  by broadcasting at the time of sowing. (vi) C 591. (vii) Irrigated. (viii) 1 hoeing and weeding. (ix) 2.0 cm. (x) 12 to 14.5.1965.

**2. TREATMENTS :**

All combinations of (1), (2), (3), (4) and (5)

(1) 3 levels of Fe as Fe. Sul. :  $F_1=5.6$ ,  $F_2=11.2$  and  $F_3=16.8$  Kg/ha.

(2) 3 levels of Mn as Mn. Sul. :  $M_1=5.6$ ,  $M_2=11.2$  and  $M_3=16.8$  Kg/ha.

(3) 3 levels of Cu as Cu. Sul. :  $C_1=5.6$ ,  $C_2=11.2$  and  $C_3=16.8$  Kg/ha.

(4) 3 levels of B as Borax :  $B_1=5.6$ ,  $B_2=11.2$  and  $B_3=16.8$  Kg/ha.

(5) 3 levels of Zn as Zn. Sul. :  $Z_1=5.6$ ,  $Z_2=11.2$  and  $Z_3=16.8$  Kg/ha.

Micronutrients were applied at sowing by broadcast.

**3. DESIGN :**

(i)  $3^3$  confd. Fractional replication. (ii) (a) 9 plots/block, 9 blocks/replication. (b) N.A. (iii) 1'3. (iv) (a) 11.1 m. × 4.6 m. (b) 7.4 m. × 3.7 m. (v) 1.8 m. × 0.5 m. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1964 only. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

**5. RESULTS :**

(i) 1710 Kg/ha. (ii) 293.0 Kg/ha. (iii) Interaction B×C is highly significant and interaction B×Z is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	Mean
Z <sub>1</sub>	1615	1648	1716	1679	1482	1819	1598	1796	1590	1603	1498	1878	1660
Z <sub>2</sub>	1917	1736	1798	1695	1989	1767	1923	1730	1798	1825	1812	1814	1817
Z <sub>3</sub>	1654	1745	1564	1738	1648	1576	1882	1551	1529	1841	1599	1523	1654
Mean	1729	1710	1693	1704	1706	1721	1799	1692	1639	1756	1636	1738	1710
B <sub>1</sub>	1747	1724	1798	1679	1482	1819	1831	1714	1724				
B <sub>2</sub>	1732	1685	1492	1695	1989	1767	1847	1695	1366				
B <sub>3</sub>	1708	1720	1788	1738	1648	1576	1720	1669	1827				
C <sub>1</sub>	1878	1769	1751	1884	1667	1847							
C <sub>2</sub>	1671	1890	1607	1566	1854	1658							
C <sub>3</sub>	1638	1560	1720	1662	1599	1656							
F <sub>1</sub>	1796	1761	1556										
F <sub>2</sub>	1597	1767	1755										
F <sub>3</sub>	1794	1601	1767										

C.D. for means in the body of B×C or B×Z table=284.6 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 64(50).****Site :- Govt. Agri. Res. Farm, Sriganganagar.****Type :- 'M'.****Object :-**To find out the effect of N and P under water scarcity condition the yield of Wheat.**1. BASAL CONDITIONS:**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 7.11.64. (iv) (a) 3 ploughings. (b) Drilling. (c) 74 Kg/ha. (d) Between rows 23 cm. (e) N.A. (v) Nil. (vi) C 591. (vii) Irrigated. (viii) 2 hand hoeings. (ix) N.A. (x) 3.4.65.

**2. TREATMENTS:****Main-plot treatments:**

3 methods of application :  $M_1$  = Full fertilizer dose as soil application at sowing,  $M_2 = \frac{1}{2}$  as soil application at sowing and  $\frac{1}{2}$  as foliar spray and  $M_3$  = Full as foliar spray.

**Sub-plot treatments:**

All combinations of (1) and (2)

(1) 2 levels of N :  $N_0 = 0$ ,  $N_1 = 24.7$  Kg/ha.

(2) 2 levels of  $P_2O_5$  :  $P_0 = 0$ ,  $P_1 = 24.7$  Kg/ha.

**3. DESIGN:**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.5 m.  $\times$  3.7 m. (b) 5.0 m.  $\times$  3.2 m. (v) 23 cm.  $\times$  23 cm. (vi) Yes.

**4. GENERAL:**

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1964 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS:**

(i) 1594 Kg/ha. (ii) (a) 374.0 Kg/ha. (b) 297.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$M_1$	$M_2$	$M_3$	$P_0$	$P_1$	Mean
$N_0$	1589	1461	1455	1503	1500	1502
$N_1$	1741	1714	1605	1683	1691	1687
Mean	1665	1588	1530	1593	1596	1594
$P_0$	1684	1600	1495			
$P_1$	1646	1575	1565			

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(68), 63(18).****Site :- Govt. Agri. Res. Farm, Sriganganagar.****Type :- 'M'.****Object :-**To study the effect of different sources and levels of N along with different levels of P and K on the yield of Wheat.**1. BASAL CONDITIONS:**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 26.10.1961, 1.12.1963. (iv) (a) 4 to 7 ploughings. (b) Drilling for 61(68), behind the plough for 63(18). (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) C 591. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 9, 10.4.1962, 30.4.1964.

## 2. TREATMENTS :

## Main-plot treatments :

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

(1) 4 sources of N :  $S_1=A/S$ ,  $S_2=A/S/N$ ,  $S_3=Urea$  and  $S_4=C/A/N$ .

(2) 2 levels of N :  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=33.6$  Kg/ha.

(2) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=33.6$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/block, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.4 m.  $\times$  5.5 m. (b) 5.6 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 61(68), Normal for others. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1963 (1962 N.A.). (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Nil. (vii) Both main and sub-plot error variances are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 2176 Kg/ha, (ii) (a) 478.1 Kg/ha. [based on 56 d.f. made up of interaction of various components of main-plot Treatments  $\times$  years and pooled errors]. (b) 317.2 Kg/ha. [based on 175 d.f. made up of interaction of various components of sub-plot Treatments  $\times$  years and pooled error]. (iii) Main effect of N and interaction  $P \times N$  are significant while 'control vs. others' is highly significant. (iv) Av. yield of grain in Kg/ha.

	$K_0$	$K_1$	Mean
$P_0$	1757	1865	1811
$P_1$	1978	2065	2022
Mean	1867	1965	1916

	$S_1$	$S_2$	$S_3$	$S_4$	$P_0$	$P_1$	$K_0$	$K_1$	Mean
$N_1$	2172	2104	2117	2178	2169	2117	2154	2132	2143
$N_2$	2208	2242	2293	2362	2208	2344	2322	2230	2276
Mean	2190	2173	2205	2270	2188	2230	2238	2181	2209
$K_0$	2175	2175	2260	2344	2218	2258			
$K_1$	2205	2171	2150	2196	2158	2202			
$P_0$	2192	2134	2161	2267					
$P_1$	2188	2212	2249	2273					

C.D. for N marginal means = 119.8 Kg/ha.

C.D. for 'control vs. others' = 179.6 Kg/ha.

C.D. for P means at the same level of N = 109.9 Kg/ha.

C.D. for N means at the same level of P = 143.0 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- Rj. 64(77), 65(38).

Site :- Govt. Agri. Farm, Sumerpur.

Type :- 'M'.

Object :- To study the effect of organic and inorganic manures on the yield of wheat and soil fertility.

## 1. BASAL CONDITIONS :

(i) (a) N.A. for 64(77) ; Nil for 65(38). (b) N.A. for 64(77) ; Cowpea for 65(38). (c) N.A. for 64(77) ; 22.4 Kg/ha. of N for 65(38). (ii) Sandy loam. (iii) 22.11.1964 ; 15.11.1965. (iv) (a) 6 ploughings followed by 2 plankings. (b) Line sowing for 64(77) ; Drilling with *desi* plough for 65(38). (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) 22.4 Kg/ha. of  $P_2O_5$  as Super by drilling on 21.11.64 for 64(77) ; 44.8 Kg/ha. of  $P_2O_5$  for 65(38). (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 to 2 hand weedings. (ix) 2 cm. for 64(77) ; N.A. for 65(38). (x) 7.4.1965 ; 24.3.1966.

## 2. TREATMENTS :

8 manurial treatments :  $M_0$ =Control,  $M_1$ =22.4 Kg/ha. of N as A/S,  $M_2$ =44.8 Kg/ha. of N as A/S,  $M_3$ =4483 Kg/ha. of F.Y.M.,  $M_4$ =8967 Kg/ha. of F.Y.M.,  $M_5$ = $M_1+M_3$ ,  $M_6$ = $M_2+M_3$  and  $M_7$ = $M_1+M_4$ .

N applied at the time of sowing as broadcast  $P_2O_5$  and F.Y.M. applied before sowing by mixing with the soil and broadcast.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 5. (iv) (a) 9.2 m.×5.5 m. (b) 7.4 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Height of plants and yield of grain. (iv) (a) 1964 to 1965. (b) No. (c) Results of combined analysis are given under 5. (v) Nil. (vi) Dry wind and high temperature affected the earheads in the first week of March in 1964. (vii) Error variances are homogeneous and Treatments×years interaction is present.

## 5. RESULTS :

(i) 1313 Kg/ha. (ii) 425.1 Kg/ha. (based on 7 d.f. made up of Treatments×years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	823	1417	1704	804	883	1649	1824	1403

C.D.=449.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 62(79).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'M'.**

Object :—To study the effect of foliar application of different levels, sources and time of application of N on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Black cotton soil. (iii) 21.10.62. (iv) 2 bakherings, 5 ploughings and 5 plankings. (b) Line sowing. (c) 92.2 Kg/ha. (d) Rows 30 cm. apart. (e) N.A. (v) 33.6 Kg/ha. of  $P_2O_5$  as Super 16.8 Kg/ha. of  $K_2O$  as Pot. Sul. by broadcasting at the time of sowing. (vi) *Kathia*. (vii) Unirrigated. (viii) 1 hand hoeing. (ix) N.A. (x) Last week of March, 1963.

## 2. TREATMENTS :

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

(1) 3 levels of N :  $N_0=0$ ,  $N_1=11.2$  and  $N_2=16.8$  Kg/ha.

(2) 2 sources of N :  $S_1$ =Urea and  $S_2$ =C/A/N.

(3) 2 stages of fertilizer application :  $T_1$ =At tillering and  $T_2$ =At flowering.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) 29.3 m.×9.8 m. (iii) 4. (iv) (a) 4.6 m.×3.1 m. (b) 4.0 m.×2.4 m. (v) 30 cm.×30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1952-only. (b) and (c) N.A. (v) N.A. (vi) and (vii) Nil.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize. (c) As per treatments. (ii) Sandy loam. (iii) 12.11.61. (iv) (a) 2 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Row to row 23 cm. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 5.4.62.

## 2. TREATMENTS :

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

(1) 3 sources of N :  $S_1$ =T.C.,  $S_2$ =F.Y.M. and  $S_3$ =A/S.

(2) 2 levels of N :  $N_1$ =50.4 and  $N_2$ =100.9 Kg/ha.

Fertilizers were applied to previous Maize crop.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1961 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1664 Kg/ha. (ii) 149.3 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of grain in Kg/ha.

Control = 1556 Kg/ha.				
	$S_1$	$S_2$	$S_3$	Mean
$N_1$	1695	1707	1745	1716
$N_2$	1519	1548	1880	1649
Mean	1607	1628	1813	1683

C.D. for S marginal means = 156.8 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(54).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'M'.**

Object :- To study the effect of different levels of N, P and different sources of N on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize. (c) Nil. (ii) Sandy loam. (iii) 15.11.61. (iv) (a) 4 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Row to row 23 cm. (e) Nil. (v) 5604 Kg/ha. of F.Y.M. (vi) N.P. 718. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 6.4.62.

## 2. TREATMENTS :

All combinations of (1), (2) and (3) with 3 extra treatments

(1) 3 sources of N :  $S_1$ =A/S,  $S_2$ =C/A/N and  $S_3$ =Urea.

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

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

Extra treatments :  $T_1$ =44.8 Kg/ha. of N as A/S+44.8 Kg/ha. of  $P_2O_5$  as Super+22.4 Kg/ha. of  $K_2O$  as Mur. Pot.,  $T_2$ =44.8 Kg/ha. of N as A/S/N+44.8 Kg/ha. of  $P_2O_5$  as Super+22.4 Kg/ha. of  $K_2O$  as Mur. Pot. and  $T_3$ =44.8 Kg/ha. of N as Urea+44.8 Kg/ha. of  $P_2O_5$  as Super+22.4 Kg/ha. of  $K_2O$  as Mur. Pot.

$P_2O_5$  is applied by drilling and N and  $K_2O$  broadcast before sowing.

## 3. DESIGN :

(i)  $3^3$  confd. + 3 extra treatments (per block). (ii) (a) 12 plots/block, 3 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 1. BASAL CONDITIONS :

(i) (a) N.A. for 64(77) ; Nil for 65(38). (b) N.A. for 64(77) ; Cowpea for 65(38). (c) N.A. for 64(77) ; 22.4 Kg/ha. of N for 65(38). (ii) Sandy loam. (iii) 22.11.1964 ; 15.11.1965. (iv) (a) 6 ploughings followed by 2 plankings. (b) Line sowing for 64(77) ; Drilling with *desi* plough for 65(38). (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) 22.4 Kg/ha. of  $P_2O_5$  as Super by drilling on 21.11.64 for 64(77) ; 44.8 Kg/ha. of  $P_2O_5$  for 65(38). (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 to 2 hand weedings. (ix) 2 cm. for 64(77) ; N.A. for 65(38). (x) 7.4.1965 ; 24.3.1966.

## 2. TREATMENTS :

8 manurial treatments :  $M_0$ =Control,  $M_1$ =22.4 Kg/ha. of N as A/S,  $M_2$ =44.8 Kg/ha. of N as A/S,  $M_3$ =4483 Kg/ha. of F.Y.M.,  $M_4$ =8967 Kg/ha. of F.Y.M.,  $M_5$ = $M_1$ + $M_3$ ,  $M_6$ = $M_2$ + $M_3$  and  $M_7$ = $M_1$ + $M_4$ .

N applied at the time of sowing as broadcast  $P_2O_5$  and F.Y.M. applied before sowing by mixing with the soil and broadcast.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 5. (iv) (a) 9.2 m.×5.5 m. (b) 7.4 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Height of plants and yield of grain. (iv) (a) 1964 to 1965. (b) No. (c) Results of combined analysis are given under 5. (v) Nil. (vi) Dry wind and high temperature affected the earheads in the first week of March in 1964. (vii) Error variances are homogeneous and Treatments×years interaction is present.

## 5. RESULTS :

(i) 1313 Kg/ha. (ii) 425.1 Kg/ha. (based on 7 d.f. made up of Treatments×years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	823	1417	1704	804	883	1649	1824	1403

C.D.=449.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 62(79).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'M'.**

Object :—To study the effect of foliar application of different levels, sources and time of application of N on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Black cotton soil. (iii) 21.10.62. (iv) 2 bakherings, 5 ploughings and 5 plankings. (b) Line sowing. (c) 92.2 Kg/ha. (d) Rows 30 cm. apart. (e) N.A. (v) 33.6 Kg/ha. of  $P_2O_5$  as Super 16.8 Kg/ha. of  $K_2O$  as Pot. Sul. by broadcasting at the time of sowing. (vi) *Kathia*. (vii) Unirrigated. (viii) 1 hand hoeing. (ix) N.A. (x) Last week of March, 1963.

## 2. TREATMENTS :

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

(1) 3 levels of N :  $N_0$ =0,  $N_1$ =11.2 and  $N_2$ =16.8 Kg/ha.

(2) 2 sources of N :  $S_1$ =Urea and  $S_2$ =C/A/N.

(3) 2 stages of fertilizer application :  $T_1$ =At tillering and  $T_2$ =At flowering.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) 29.3 m.×9.8 m. (iii) 4. (iv) (a) 4.6 m.×3.1 m. (b) 4.0 m.×2.4 m. (v) 30 cm.×30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1952-only. (b) and (c) N. (v) N.A. (vi) and (vii) Nil.



## 5. RESULTS :

(i) 499 Kg/ha. (ii) 131.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=492 Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	Mean
S <sub>1</sub>	518	518	531	505	518
S <sub>2</sub>	482	491	507	466	486
Mean	500	504	519	485	502
T <sub>1</sub>	501	537			
T <sub>2</sub>	499	472			

**Crop :- Wheat (Rabi).**

**Ref:- :- Rj. 64(44).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'M'.**

**Object :-**To study the effect of foliar application of different levels, sources and time of application of N on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Black cotton soil. (iii) 28.10.64. (iv) (a) 2 bakherings. (b) Drilling. (c) 98 Kg/ha. (d) Between lines 30 cm. (e) N.A. (v) 16.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and 16.8 Kg/ha. of K<sub>2</sub>O by drilling on 28.10.64. (vi) N.A. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 20.3.65.

## 2. TREATMENTS :

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

(1) 2 sources of N : S<sub>1</sub>=Urea, S<sub>2</sub>=C/A/N.

(2) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=11.2, and N<sub>2</sub>=22.4 Kg/ha.

(3) 2 stages of fertilizer application : T<sub>1</sub>=At tillering, and T<sub>2</sub>=Before flowering.

## 3. DESIGN :

(i) 3×2<sup>2</sup> confd. (ii) (a) 6 plots/block, 2 blocks/replication. (b) N.A. (iii) 3. (iv) (a) 4.6 m.×3.1 m. (b) 4.0 m.×2.4 m. (v) 30 cm.×30 cm. (vi) Yes.

## 4. GENERAL :

(iv) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-contd. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

## 5. RESULTS :

(i) 663 Kg/ha. (ii) 106.0 Kg/ha. (iii) All the main effects and interaction N×S×T are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean	T <sub>1</sub>	T <sub>2</sub>
S <sub>1</sub>	—	718	1045	881	788	655
S <sub>2</sub>	—	587	819	703	655	555
Mean	405	652	932	—	—	—
T <sub>1</sub>	—	746	1058	902		
T <sub>2</sub>	—	559	806	682		

C.D. for N marginal means=89.9 Kg/ha.

C.D. for S or T marginal means=73.7 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 63(43).****Site :- Govt. Agri. Res. Farm., Sultanpur.****Type :- 'M'.**

Object :- To study the effect of different G.M. crops at different levels of P with and without molybdenum on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) G.M.—Wheat. (b) G.M. (c) N.A. (ii) Black cotton soil. (iii) 13.7.63. (iv) (a) 1 ploughing and 1 planking. (b) Drilling. (c) 98 Kg/ha. (d) Rows 30 cm. apart. (e) N.A. (v) 22.4 Kg/ha. of N by broadcasting. (vi) N.P.-718. (vii) Irrigated. (viii) 1 weeding and hoeing. (ix) N.A. (x) 14.4.64.

**2. TREATMENTS :****Main-plot treatments :**

2 levels of Molybdenum :  $M_0=0$  and  $M_1=3$  gm/ha.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 4 G.M. treatments :  $G_0$ =Control,  $G_1$ =Sanai,  $G_2$ =Guax and  $G_3$ =Cowpea.

(2) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 12 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 8.0 m. × 5.5 m. (b) 7.4 m. × 4.6 m. (v) 30 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1618 Kg/ha. (ii) (a) 89.5 Kg/ha. (b) 193.1 Kg/ha. (iii) Main effects of G and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	$G_0$	$G_1$	$G_2$	$G_3$	$P_0$	$P_1$	$P_2$	Mean
$M_0$	1382	1662	1477	1915	1442	1654	1731	1609
$M_1$	1390	1673	1501	1939	1376	1651	1857	1628
Mean	1386	1668	1493	1927	1409	1652	1794	1618
$P_0$	1196	1461	1369	1609				
$P_1$	1482	1668	1493	1968				
$P_2$	1481	1874	1618	2204				

C.D. for G marginal means=133.0 Kg/ha.

C.D. for P marginal means=115.4 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(55).****Site :- Govt. Agri. Farm, Tabiji.****Type :- 'M'.**

Object :- To study the residual effect of T.C., F.Y.M. and A/S applied to previous Maize crop on subsequent Wheat crop.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize. (c) As per treatments. (ii) Sandy loam. (iii) 12.11.61. (iv) (a) 2 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Row to row 23 cm. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 5.4.62.

## 2. TREATMENTS :

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

(1) 3 sources of N :  $S_1 = \text{T.C.}$ ,  $S_2 = \text{F.Y.M.}$  and  $S_3 = \text{A/S}$ .

(2) 2 levels of N :  $N_1 = 50.4$  and  $N_2 = 100.9$  Kg/ha.

Fertilizers were applied to previous Maize crop.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1961 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1664 Kg/ha. (ii) 149.3 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of grain in Kg/ha.

Control = 1556 Kg/ha.				
	$S_1$	$S_2$	$S_3$	Mean
$N_1$	1695	1707	1745	1716
$N_2$	1519	1548	1880	1649
Mean	1607	1628	1813	1683

C.D. for S marginal means = 156.8 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(54).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'M'.**

Object :- To study the effect of different levels of N, P and different sources of N on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize. (c) Nil. (ii) Sandy loam. (iii) 15.11.61. (iv) (a) 4 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Row to row 23 cm. (e) Nil. (v) 5604 Kg/ha. of F.Y.M. (vi) N.P. 718. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 6.4.62.

## 2. TREATMENTS :

All combinations of (1), (2) and (3) with 3 extra treatments

(1) 3 sources of N :  $S_1 = \text{A/S}$ ,  $S_2 = \text{C/A/N}$  and  $S_3 = \text{Urea}$ .

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

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

Extra treatments :  $T_1 = 44.8$  Kg/ha. of N as A/S + 44.8 Kg/ha. of  $P_2O_5$  as Super + 22.4 Kg/ha. of  $K_2O$  as Mur. Pot.,  $T_2 = 44.8$  Kg/ha. of N as A/S/N + 44.8 Kg/ha. of  $P_2O_5$  as Super + 22.4 Kg/ha. of  $K_2O$  as Mur. Pot. and  $T_3 = 44.8$  Kg/ha. of N as Urea + 44.8 Kg/ha. of  $P_2O_5$  as Super + 22.4 Kg/ha. of  $K_2O$  as Mur. Pot.

$P_2O_5$  is applied by drilling and N and  $K_2O$  broadcast before sowing.

## 3. DESIGN :

(i)  $3^3$  confd. + 3 extra treatments (per block). (ii) (a) 12 plots/block, 3 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1958 to 1961 [Not conducted in 1960]. (b) N.A. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

- (i) 3247 Kg/ha. (ii) 291.9 Kg/ha. (iii) Main effect of T alone is significant. (iv) Av. yield of grain in Kg/ha.

$T_1=3507$ ,  $T_2=3120$  and  $T_3=3730$  Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
P <sub>0</sub>	2914	3356	3003	3091	2998	3059	3216
P <sub>1</sub>	2970	3350	3395	3238	3261	2942	3513
P <sub>2</sub>	3339	3143	3143	3206	3624	2948	3048
Mean	3072	3283	3180	—	—	—	—
S <sub>1</sub>	—	3120	3412	3266			
S <sub>2</sub>	—	3020	3171	3096			
S <sub>3</sub>	—	3708	2958	3333			

C.D. for T marginal means = 583.1 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 64(73).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'M'.**

Object :—To study the effect of gypsum treated water along with N, P and K on the yield of Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) *Guar* (G.M). (c) N.A. (ii) Sandy loam. (iii) 9.11.64. (iv) (a) 4 ploughings. (b) Behind the plough. (c) 98 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) 5604 Kg/ha. of F.Y.M. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 weeding. (ix) Nil. (x) 1, 2, 4.65.

## 2. TREATMENTS :

**Main-plot treatments :**

2 type of water :  $T_1$  = Water treated with Gypsum and  $T_2$  = Untreated with Gypsum.

**Sub-plot treatments :**

4 manurial treatments :  $N_0$  = Control,  $N_1$  = 22.4 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  + 22.4 Kg/ha. of  $K_2O$ ,  $N_2$  = 44.8 Kg/ha. of N + 44.8 Kg/ha. of  $P_2O_5$  + 22.4 Kg/ha. of  $K_2O$  and  $N_3$  = 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  + 22.4 Kg/ha. of  $K_2O$ .

N as A/S by broadcast,  $P_2O_5$  as Super by drilling and  $K_2O$  as Mur. Pot. by broadcast.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 2 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964—contd. [1965 not conducted]. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

- (i) 2004 Kg/ha. (ii) (a) 424.0 Kg/ha. (b) 230.9 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
T <sub>1</sub>	1782	2041	2102	2176	2025
T <sub>2</sub>	1726	2145	2010	2053	1984
Mean	1754	2093	2055	2114	2004

C.D. for N marginal means=234.7 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(67).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'M'.**

**Object :-**To study the effect of N, P and K fertilizers in two split doses of N on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Maize-Wheat. (b) Maize. (c) Nil. (ii) Sandy loam. (iii) 15.11.61. (iv) (a) 4 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 5.4.62.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

(2) 2 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>0</sub>=0 and K<sub>1</sub>=22.4 Kg/ha.

**Sub-plot treatments :**

Smanurial treatments : M<sub>0</sub>=Control, M<sub>1</sub>=33.6 Kg/ha. of N as A/S in single dose, M<sub>2</sub>=33.6 Kg/ha. of N as A/S in split doses, M<sub>3</sub>=67.2 Kg/ha. of N as A/S in single dose and M<sub>4</sub>=67.2 Kg/ha. of N as A/S in split doses.

**3. DESIGN :**

(i) Split-plot. (ii) 6 main-plots/replication, 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. (b) 6.4 m. × 4.6 m. (v) 46 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1961 only. (b) N.A. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 2661 Kg/ha. (ii) (a) 320.4 Kg/ha. (b) 390.9 Kg/ha. (iii) Main effect of M is highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	1839	2745	2525	3010	3175	2597	2720	2659
P <sub>1</sub>	1732	2418	2593	3394	2845	2595	2598	2596
P <sub>2</sub>	1932	2788	2564	3151	3202	2710	2745	2727
Mean	1834	2650	2561	3185	3074	2634	2688	2661
K <sub>0</sub>	1822	2750	2569	3143	2885			
K <sub>1</sub>	1847	2550	2552	3227	3262			

C.D. for M marginal means=225.1 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 63(20), 64(72).****Site :- Govt. Agri. Farm, Tabiji.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) (a) N.A. for 63(20) ; Nil for 64(72). (b) N.A. for 63(20) ; Maize for 64(72). (c) N.A. for 63(20) ; 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 11.11.1963 ; 23.11.1964. (iv) (a) 5 ploughings. (b) Behind the plough. (c) 98 Kg/ha. (d) 23 cm.  $\times$  15 cm. (e) N.A. (v) Nil. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. for 63(20) ; 1 cm. for 64(72). (x) 6.4.1964 ; 3 to 5.4.1965.

**2. TREATMENTS :****Main-plot treatments :**

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

(1) 4 sources of N :  $S_1=A/S$ ,  $S_2=A/S/N$ ,  $S_3=Urea$  and  $S_4=C/A/N$ .(2) 2 levels of N :  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=33.6$  Kg/ha.(2) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=33.6$  Kg/ha.N and  $K_2O$  broadcast,  $P_2O_5$  drilled before sowing:**3. DESIGN :**

(i) Split-plot. (ii) (a) 9 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4 for 63(20) ; 3 for 64(72). (iv) (a) 7.4 m.  $\times$  5.5 m. for 63(20) ; 9.2 m.  $\times$  5.5 m. for 64(72). (b) 6.5 m.  $\times$  4.6 m. for 63(20) ; 7.4 m.  $\times$  3.7 m. for 64(72). (v) 46 cm.  $\times$  46 cm. ; 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1963 to 1964. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the sub-plot error variances are heterogenous, results of individual years are presented under 5.

**5. RESULTS :****63(20)**

(i) 1054 Kg/ha. (ii) (a) 333.0 Kg/ha. (b) 212.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

**Without nitrogen**

	$K_0$	$K_1$	Mean
$P_0$	988	1072	1030
$P_1$	1048	988	1018
Mean	1018	1030	1024

**With nitrogen**

	$S_1$	$S_2$	$S_3$	$S_4$	$P_0$	$P_1$	$K_0$	$K_1$	Mean
$N_1$	977	1053	1057	1163	1049	1076	1076	1049	1062
$N_2$	1114	1011	1011	1078	1064	1044	1036	1071	1054
Mean	1046	1032	1034	1120	1056	1060	1056	1060	1058
$K_0$	1068	1036	1007	1114	1046	1066			
$K_1$	1024	1028	1062	1127	1066	1054			
$P_0$	1002	1024	1066	1133					
$P_1$	1089	1040	1002	1108					

64(72)

(i) 2865 Kg/ha. (ii) 823.5 Kg/ha. (b) 462.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

**Without Nitrogen**

	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	2898	3255	3077
P <sub>1</sub>	2762	2848	2805
Mean	2830	3052	2941

**Without Nitrogen**

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>1</sub>	2919	3332	2660	2614	2931	2831	2987	2776	2881
N <sub>2</sub>	2540	2975	3083	2719	2898	2760	2871	2786	2829
Mean	2729	3153	2871	2666	2914	2796	2929	2781	2855
K <sub>0</sub>	2789	3196	2842	2888	3008	2850			
K <sub>1</sub>	2669	3110	2901	2444	2819	2743			
P <sub>0</sub>	2796	3169	2913	2780					
P <sub>1</sub>	2663	3138	2830	2552					

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(64).****Site :- Raj. College Agri. Farm, Udaipur.****Type :- 'M'.**

Object :—To study the effect of N, P and K at various levels on the yield and quality of Maize and its residual effect on Wheat crop.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Maize. (c) As per treatments. (ii) Clay loam. (iii) 23.11.61. (iv) (a) 4 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Rows 23 cm. apart. (e) N.A. (v) Nil. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 weeding. (ix) aad (x) N.A.

**2. TREATMENTS :**

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

(1) 5 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4, N<sub>2</sub>=44.8, N<sub>3</sub>=67.2 and N<sub>4</sub>=90 Kg/ha.

(2) 3 level of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=26.9 and P<sub>2</sub>=53.8 Kg/ha.

All plots excepting control plot received 44.8 Kg/ha. of K<sub>2</sub>O as Mur. Pot. These treatment were applied to maize crop in Kharif residual effect is studied on wheat crop.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 6. (iv) (a) 9.2 m. × 3.7 m. (b) 7.4 m. × 2.7 m. (v) 91 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1961 only. (b) Yes. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 2710 Kg/ha. (ii) 473.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=2614 Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	Mean
P <sub>0</sub>	2714	2622	2592	2597	2301	2565
P <sub>1</sub>	2999	2646	3099	3118	2449	2862
P <sub>2</sub>	2938	2987	2535	2511	2646	2723
Mean	2884	2752	2742	2742	2465	2717

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(63).****Site :- Raj. College Agri. Farm, Udaipur.****Type :- 'M'.**

**Object :-** To study the effect of N, P and K at various levels on the yield and quality of Maize and its residual effect on Wheat crop.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Maize. (c) As per treatments. (ii) Clay loam. (iii) 23.11.61. (iv) (a) 4 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1weeding. (ix) and (x) N.A.

**2. TREATMENTS :**

8 manurial treatments : N<sub>0</sub>=Control, N<sub>1</sub>=44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+44.8 Kg/ha. of K<sub>2</sub>O as Mur. of Pot., N<sub>2</sub>=22.4 Kg/ha. of N as A/S+N<sub>1</sub>, N<sub>3</sub>=44.8 Kg/ha. of N as A/S+N<sub>1</sub>, N<sub>4</sub>=67.2 Kg/ha. of N as A/S+N<sub>1</sub>, N<sub>5</sub>=89.7 Kg/ha. of N as A/S+N<sub>1</sub>, N<sub>6</sub>=112.1 Kg/ha. of N as A/S+N<sub>1</sub> and N<sub>7</sub>=184.5 Kg/ha. of N as A/S+N<sub>1</sub>.

These treatments were given to the maize crop in *kharif*.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 5. (iv) (a) 9.2 m.×5.5 m. (b) 7.4 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 2231 Kg/ha. (ii) 281.1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	N <sub>6</sub>	N <sub>7</sub>
Av. yield	2097	1935	1997	2293	2293	2256	2279	2697

C.D.=364.1 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 65(50).****Site :- Rural Institute Farm, Vidhya Bhawan, Udaipur.****Type :- 'M'.**

**Object :-** To work out the suitable fertilizer schedule for irrigated Wheat.



## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Loam. (iii) 29.10.65. (iv) (a) N.A. (b) Behind the plough. (c) 100 Kg/ha. (d) 30 cm. between the rows. (e) —. (v) As per treatments. (vi) N.P.—718 (medium). (vii) Irrigated. (viii) 1 hoeing and 1 weeding. (ix) N.A. (x) 19, 20.4.66.

## 2. TREATMENTS :

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

(1) 4 levels of N :  $N_0=0$ ,  $N_1=45$ ,  $N_2=90$  and  $N_3=135$  Kg/ha.

(2) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=45$  and  $P_2=90$  Kg/ha.

(3) 3 levels of  $K_2O$  :  $K_0=0$ ,  $K_1=22.5$  and  $K_2=45$  Kg/ha.

$P_2O_5$  drilling before sowing. Half N at sowing and half at first irrigation,  $K_2O$  at first irrigation.

## 3. DESIGN :

(i)  $4 \times 3 \times 3$  confd. (ii) (a) 12 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 5.0 m.  $\times$  4.0 m. (b) 4.0 m.  $\times$  3.0 m. (v) 50 cm.  $\times$  50 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 4587 Kg/ha. (ii) 467.6 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant. (iv) Av. yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$N_0$	3722	4090	4240	3851	4191	4010	4017
$N_1$	4826	4719	4667	4506	4983	4724	4737
$N_2$	4226	5184	5050	4455	4913	5092	4820
$N_3$	4702	4619	4995	5043	4799	4474	4772
Mean	4369	4653	4738	4464	4722	4575	4587
$K_0$	4044	4626	4721				
$K_1$	4878	4667	4620				
$K_2$	4185	4667	4874				

C.D. for P marginal means = 270.6 Kg/ha.

C.D. for N marginal means = 312.1 Kg/ha.

**Crop :-** Wheat (*Rabi*).

**Ref :-** Rj. 65(26).

**Site :-** Rural Institute Farm, Vidhya Bhawan, Udaipur.

**Type :-** 'M'.

**Object :-** To see the effect of N and method of application of manure on the yield of irrigated Wheat.

## 1. BASAL CONDITIONS :

(i) (a) No. (b) Fallow. (c) Nil. (ii) N.A. (iii) 30.10.65. (iv) (a) N.A. (b) Behind the plough. (c) 100 Kg/ha. (d) 30 cm. between the rows. (e) Nil. (v) As per treatments. (vi) N.P. 718 (medium). (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 21 to 23.4.66.

## 2. TREATMENTS :

## Main-plot treatments :

12 methods of application of  $P_2O_5$  at 40 Kg/ha.

- $M_1 = \frac{1}{2}$  as broadcast +  $\frac{1}{2}$  top dressing at 1st irrigation.  
 $M_2 = \frac{1}{2}$  broadcast before sowing +  $\frac{1}{2}$  drilled at 1st irrigation.  
 $M_3 = \frac{1}{2}$  drilled with seed +  $\frac{1}{2}$  top dressing at 1st irrigation.  
 $M_4 = \frac{1}{2}$  drilled with seed +  $\frac{1}{2}$  drilled at 1st irrigation.  
 $M_5 = \frac{1}{2}$  drilled before seed +  $\frac{1}{2}$  top dressing at 1st irrigation.  
 $M_6 = \frac{1}{2}$  drilled before seed +  $\frac{1}{2}$  drilled at 1st irrigation.  
 $M_7 = \frac{1}{3}$  as broadcast +  $\frac{2}{3}$  as top dressing at 1st irrigation.  
 $M_8 = \frac{1}{3}$  as broadcast before sowing +  $\frac{2}{3}$  drilled at 1st irrigation.  
 $M_9 = \frac{1}{3}$  drilled with seed +  $\frac{2}{3}$  drilled at 1st irrigation.  
 $M_{10} = \frac{1}{3}$  drilled with seed +  $\frac{2}{3}$  top dressing at first irrigation.  
 $M_{11} = \frac{1}{3}$  drilled before seed +  $\frac{2}{3}$  as top dressing at 1st irrigation and  
 $M_{12} = \frac{1}{3}$  drilled before seed +  $\frac{2}{3}$  drilled at 1st irrigation.

## Sub-plot treatments :

3 levels of N :  $N_1 = 45$ ,  $N_2 = 90$  and  $N_3 = 135$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 12 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 5.0 m.  $\times$  3.0 m. (b) 4.0 m.  $\times$  2.0 m. (v) 50 cm.  $\times$  50 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) Arjiya. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 4860 Kg/ha. (ii) (a) 1247.1 Kg/ha. (b) 750.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	
$N_1$	5500	4421	5434	4371	5288	4234	
$N_2$	6219	5500	5921	4028	4265	3859	
$N_3$	5303	5750	4003	4515	6094	4053	
Mean	5674	5224	5119	4305	5182	4049	
	$M_7$	$M_8$	$M_9$	$M_{10}$	$M_{11}$	$M_{12}$	Mean
$N_1$	3546	5071	5000	5115	4156	4140	4681
$N_2$	5125	5259	4688	5452	4938	3944	4933
$N_3$	4625	5453	5188	5328	4578	4694	4965
Mean	4432	5261	4959	5298	4557	4259	4680

Crop :- Wheat (Rabi).

Ref :- Rj. 60, 61, 62, 63, 64(M.A.E).

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

Type :- 'M'.

Object :- To study the effect of different levels of N, P, K and F.Y.M. on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Senji-Maize-Wheat. (b) Maize. (c) As per treatments for 63 ; N.A. for others. (ii) Sandy loam. (iii) 15th November. (iv) (a) 3 ploughings and harrowings. (b) Line sowing. (c) 80.1 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) C-591 (late). (vii) Irrigated. (viii) 3 weedings. (ix) 3 cm. for 61, 63; N.A. for others. (x) 3rd week of April.

## 2. TREATMENTS :

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

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

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

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

(4) 2 levels of F.Y.M. :  $F_0=0$  and  $F_1=5600$  Kg/ha.

A/S broadcast, super drilled, F.Y.M. and Mur. Pot. also broadcast.

## 3. DESIGN :

(i)  $3 \times 2$  Fact. confd. (ii) (a) 9 plots/block, 6 blocks/replication (3 blocks receiving  $F_0$  and other 3 blocks received  $F_1$ ). (b) N.A. (iii) 1. (iv) (a) 10.1 m.  $\times$  5.0 m. (b) 8.8 m.  $\times$  4.6 m. (v) Yes.

## 4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1956-1964. (b) No. (c) Results of combined analysis are given under 5. (v) At other M.A.E. Centre. (vi) Nil. (vii) Expt. No. 56, 57, 58 and 59(M.A.E.) have also been taken for pooling. Error variances are homogeneous and Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 1634 Kg/ha. (ii) 352.4 Kg/ha. [based on 200 d.f. minus up of interaction of treatments components (F, N, P, K, F  $\times$  N, F  $\times$  P, F  $\times$  K, N  $\times$  P, N  $\times$  K, and P  $\times$  K) with years]. (iii) Main effects of F, N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$F_0$	1201	1592	1853	1380	1560	1706	1521	1570	1555	1549
$F_1$	1383	1732	2044	1570	1721	1869	1729	1702	1729	1720
Mean	1292	1652	1949	1475	1640	1787	1625	1636	1642	1634
$K_0$	1262	1643	1970	1499	1628	1748				
$K_1$	1287	1674	1948	1490	1656	1763				
$K_2$	1327	1670	1928	1436	1637	1851				
$P_0$	1146	1510	1770							
$P_1$	1317	1695	1910							
$P_2$	1414	1782	2166							

C.D. for F marginal means=84.1 Kg/ha.

C.D. for N or P marginal means=102.9 Kg/ha.

Crop :- Wheat.

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

Ref :- Rj. 60 and 61(M.A.E).

Type :- 'M'.

Object :- Type IV :- To study the effect of phosphatic manuring of legumes on the succeeding Wheat crop.

## 1. BASAL CONDITIONS :

(i) (a) Legume-Wheat. (b) Legume. (c) As per treatments. (ii) Desert soil. (iii) N.A. ; 12.11.61. (iv) (a) Ploughing and bakhering. (b) Line sowing. (c) 81 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) C-591 (late). (vii) Irrigated. (viii) 3 weedings. (ix) N.A., 3 cm. (x) N.A., 29.4.62.

## 2. TREATMENTS :

## Main-plot treatments :

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

(1) 2 leguminous crops :  $L_1$ =Moong and  $L_2$ =Urd.

(2) 3 levels of  $P_2O_5$  as Super given to legumes :  $P_0=0$ ,  $P_1=44.8$  and  $P_2=89.7$  Kg/ha.

## Sub-plot treatments :

3 levels of N as A/S given to Wheat crop :  $N_0=0$ ,  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 7 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 10.1 cm. × 5.0 m. (b) 8.8 m. × 4.6 m. (v) 61 cm. × 23 cm. (vi) Yes.

## 4. GENERAL :

(i) Growth and stand poor for 61. (ii) Mild attack of white ants. (iii) Yield of grain and straw. (iv) (a) 1957-1961. (b) No. (c) Results of combined analysis are presented under 5 results. (v) N.A. (vi) Nil. (vii) Results of 1957, 58 and 59 have also been considered in presenting the pooled Results.

## 5. RESULTS :

(i) 1301 Kg/ha. (ii) (a) 393.8 Kg/ha. [based on 60 d.f. made up of pooled error]. (b) 239.1 Kg/ha. (based on 140 d.f. made up of pooled error), (iii) Main effects of (LP) and N are highly significant. (iv) Av. yield of grain in Kg/ha.

	$L_0P_0$	$L_1P_0$	$L_1P_1$	$L_1P_2$	$L_2P_0$	$L_2P_1$	$L_2P_2$	Mean
$F_1$	1456	845	978	1083	985	1062	1181	1084
F	1689	1074	1153	1304	1217	1281	1422	1304
$F_2$	1913	1168	1361	1618	1360	1521	1652	1513
Mean	1686	1029	1164	1335	1187	1288	1415	1301

C.D. for (LP) marginal means = 164.0 Kg/ha.

C.D. for N marginal means = 65.0 Kg/ha.

**Crop :- Wheat.**

**Ref :- Rj. 60(M.A.E).**

**Site :- M.A.E. Centre, Sriganaganagar.**

**Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Desert soil. (iii) N.A. (iv) (a) 2 disc harrowings and 1-2 beamings. (b) N.A. (c) 78 Kg/ha. (d) 23 cm. (e) —. (v) N.A. (vi) C 591. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

All combinations of (1), (2) and (3) with a control

(1) 2 sources of  $P_2O_5$  :  $S_1$ =Triple Super and  $S_2$ =Ammono. Phos.

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

(3) 3 methods of application :  $M_1$ =Broadcasting,  $M_2$ =6 cm. below seed and  $M_3$ =Basal placement.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) (a) and (b) N.A. (v) N.A.

## 4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1956-60. (b) No. (c) Results of combined analysis are presented under 5 Results. (v) N.A. (vi) Nil. (vii) Results 1956 to 1959 have been considered while presenting the pooled results.

## 5. RESULTS :

Response of Wheat (Kg/ha.) to different methods of application of  $P_2O_5$ 

Yield without					
$P_2O_5$	$M_1$	$M_2$	$M_3$	Significance	C.D.
2188	270	330	231	—	—

Response of Wheat (Kg/ha) to different sources of  $P_2O_5$ 

Yield without					
$P_2O_5$	$S_1$	$S_2$	Significance	C.D.	
2188	219	337	—	—	

**Crop :- Wheat.****Ref :- Ref :- Rj. 62, 63, 64, 65(MAE).****Site :- M.A.E. Cetre, Sriganaganagar.****Type :- 'M'.**

Object :—Type X : To study the effect of green manure on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. ; 10.11.63 ; 13.11.1954. (iv) and (v) N.A. (vi) C-591. (vii) Irrigated. (viii) to (x) N.A. (x) N.A. ; 28.4.64, 30.4.65 ; N.A.

## 2. TREATMENTS :

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

(1) 3 G.M. treatments :  $G_0 = N_0$  G.M.,  $G_1 = G.M.$  raised in situ with 33.6 Kg/ha. of  $P_2O_5$  and  $G_2 = G.M.$  raised in situ without  $P_2O_5$ .(2) 3 levels of N :  $N_0 = 0$ ,  $N_1 = 16.8$  and  $N_2 = 33.6$  Kg/ha.(3) 3 levels of  $P_2O_5$  :  $P_0 = 0$ ,  $P_1 = 33.6$  Kg/ha. and  $P_2 = 67.2$  Kg/ha.

Extra treatment : T=N, P and K fertilizers equivalent to those present in G.M.

## 3. DESIGN :

(i)  $3^2$  confd. (ii) (a) 10 plots/block, 3 blocks/replication. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 14.5 m. x 5.9 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) to (ii) N.A. (iii) Yield of grain. (iv) (a) 1962—1966. (b) No. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

1962

(i) 2130 Kg/ha. (ii) 85.6 Kg/ha. (iii) Main effects of G, N and P and interactions  $G \times N$  and  $G \times N \times P$  and T vs. others are highly significant. (iv) Av. yield of grain in Kg/ha.

T=2279 Kg/ha.

	$G_0$	$G_1$	$G_2$	$N_0$	$N_1$	$N_2$	Mean
$P_0$	1907	2289	2366	2069	2278	2215	2187
$P_1$	1655	2086	2134	1959	1942	1973	1958
$P_2$	1888	2330	2373	2127	2137	2328	2197
Mean	1817	2235	2291	2052	2119	2172	2114
$N_0$	1636	2182	2337				
$N_1$	1718	2346	2293				
$N_2$	2097	2177	2242				

C.D. for G, N or P marginal means=40.2 Kg/ha.

C.D. for body of G×N table =69.6 Kg/ha.

C.D. for 'T vs. others' =56.2 Kg/ha.

1963

(i) 1792 Kg/ha. (ii) 71.6 Kg/ha. (iii) Main effects of G, N and P, interactions G×N and G×P and T vs. others are highly significant. (iv) Av. yield of grain in Kg/ha.

T=2078 Kg/ha.

	G <sub>0</sub>	G <sub>1</sub>	G <sub>2</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	1171	1736	1944	1410	1661	1781	1617
P <sub>1</sub>	1249	1984	2043	1518	1793	1964	1758
P <sub>2</sub>	1412	2148	2156	1663	1938	2115	1905
Mean	1277	1956	2048	1530	1797	1953	1760
N <sub>0</sub>	999	1702	1891				
N <sub>1</sub>	1267	2020	2103				
N <sub>2</sub>	1566	2145	2149				

C.D. for G, N or P marginal means =33.6 Kg/ha.

C.D. for body of G×N or G×P table=58.3 Kg/ha.

C.D. for 'T vs. others' =47.0 Kg/ha.

1964

(i) 2658 Kg/ha. (ii) 139.7 Kg/ha. (iii) Main effects of G and N, interactions G×N, G×P and G×N×P and 'T vs. others' highly significant. Main effect of P and interaction N×P are significant. (iv) Av. yield of grain in Kg/ha.

T=3398 Kg/ha.

	G <sub>0</sub>	G <sub>1</sub>	G <sub>2</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>1</sub>	1629	2979	3375	2451	2568	2964	2661
P <sub>2</sub>	1894	2667	2974	2462	2551	2522	2512
P <sub>3</sub>	1898	2802	2966	2484	2555	2626	2555
Mean	1807	2816	3105	2466	2558	2704	2576
N <sub>0</sub>	1472	2813	3112				
N <sub>1</sub>	1711	2822	3142				
N <sub>2</sub>	2238	2813	3061				

C.D. for G, or N marginal means=65.6 Kg/ha.

C.D. for body of G×N or G×P table=113.6 Kg/ha.

C.D. for 'T vs. others' =91.9 Kg/ha.

1965

(i) 2898 Kg/ha. (ii) 927.0 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

T=3628 Kg/ha.

Treatment	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>
Av. yield	2393	2814	3243
Treatment	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
Av. yield	2451	2756	3243

C.D. for N or P means=437.0 Kg/ha.

Treatment	G <sub>0</sub>	G <sub>1</sub>	G <sub>2</sub>
Av. yield	2519	2863	3069

**Crop :- Wheat****Ref :- Rj, 65(MAE).****Site :- M.A.E. Centre Sriganaganagar.****Type - 'M'.**

Object :—Type XI :—To determine the effect of micronutrients on Wheat.

**1. BASAL CONDITIONS :**

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

**2. TREATMENTS :**

15 micronutrient treatments :  $T_0$ =Control (No fertiliser) applied to soil only,  $T_1$ =35 Kg/ha. of N+35 Kg/ha. of  $P_2O_5$ +35 Kg/ha. of  $K_2O$ ,  $T_2$ = $T_1$ +manganese as manganese sulphate at 60 Kg/ha.,  $T_3$ = $T_1$ +Zn as Zinc sulphate at 30 Kg/ha.,  $T_4$ = $T_1$ +Cu as copper sulphate at 30 Kg/ha.,  $T_5$ = $T_1$ +Boron as Borax at 17.5 Kg/ha.,  $T_6$ = $T_1$ +Molybdenum as Sodium Molybdate at 1.25 Kg/ha.,  $T_7$ = $T_1$ +Mn+Zn+Cu+Bo+Mo.,  $T_8$ = $T_1$ +Manganese as Manganese Sulphate at 17.5 Kg/ha.,  $T_9$ = $T_1$ +Zn as Zinc Sulphate at 12.5 Kg/ha.,  $T_{10}$ = $T_1$ +Cu as Copper Sulphate at 12.5 Kg/ha.,  $T_{11}$ = $T_1$ +Boron as Borax at 6.2 Kg/ha.,  $T_{12}$ = $T_1$ +Molybdenum as Sodium Molybdate at 0.62 Kg/ha.,  $T_{13}$ = $T_1$ +Mn+Zn+Cu+Bo+Mo and  $T_{14}$ = $T_1$ +Spartan at 395 Kg/ha. by soil application. Treatments  $T_2$  to  $T_7$  by soil application and  $T_8$  to  $T_{13}$  by foliar spray.

**3. DESIGN :**

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

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1965-1966. (b) No. (c) Nil. (v) Sumerpur. (vi) N.A. (vii) Nil.

**5. RESULTS :**

(i) 1983 Kg/ha. (ii) 158.4 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield	1763	1968	1942	1762	2095	1576	1951	2331
Treatment	$T_8$	$T_9$	$T_{10}$	$T_{11}$	$T_{12}$	$T_{13}$	$T_{14}$	
Av. yield	1918	1917	2199	1703	2030	2358	2231	

C.D.=224 Kg/ha.

**Crop :- Wheat.****Ref :- Rj. 65(MAE).****Site :- M.A.E. Centre Sumerpur.****Type :- 'M'.**

Object :—Type XI :—To determine the effect of micronutrients on Wheat.

**1. BASAL CONDITIONS :**

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

**2. TREATMENTS :**

Same as in expt. no. 65(MAE) conducted at Sriganaganagar.

**3. DESIGN :**

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

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1965-1966. (b) No. (c) Nil. (v) Sriganaganagar. (vi) and (vii) Nil.

## 5. RESULTS:

(i) 1008 Kg/ha. (ii) 271.9 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	
Av. yield	855	1340	765	1230	965	881	983	
Treatment	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>	T <sub>13</sub>	T <sub>14</sub>
Av. yield	1044	1092	985	1158	794	840	760	1425

C.D. = 386 Kg/ha.

**Crop :- Wheat.**

**Ref :- Rj. 63, 64(MAE).**

**Site :- M.A.E. Centre, Sriganaganagar.**

**Type :- 'M'.**

Object :—Type XII—To study the efficiency of foliar spray of fertilizers compared to soil application on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 18.11.1963. (iv) (a) to (e) N.A. (v) Nil. (vi) C-591(164 days). (vii) Irrigated. (viii) and (ix) N.A. (x) 30.4.1964 ; N.A.

## 2. TREATMENTS :

## Main-plot treatments :

4 fertilizer treatments : F<sub>1</sub> = 44.8 Kg/ha. of N as A/S, F<sub>2</sub> = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, F<sub>3</sub> = 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and F<sub>4</sub> = 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 22.4 Kg/ha. of K<sub>2</sub>O.

## Sub-plot treatments :

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

(1) 3 methods of application : M<sub>1</sub> = Soil application, M<sub>2</sub> = Foliar application and M<sub>3</sub> = Soil application and foliar application.

(2) 2 levels of application : L<sub>1</sub> =  $\frac{1}{2}$  dose and L<sub>2</sub> = Full dose.

2 extra treatments C<sub>1</sub> = Water spray and C<sub>2</sub> = Absolute control.

## 3. DESIGN :

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

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963-1966 (1965 N.A.). (b) No. (c) Nil. (v) (a) Sumapur. (b) Nil. (vi) and (vii) Nil.

## 5. RESULTS :

## 1963

(i) 1231 Kg/ha. (ii) (a) 139.9 Kg/ha. (b) 91.7 Kg/ha. (iii) Main effects of F, (LM) and (F × LM) interaction are highly significant. (iv) Av. yield of grain in Kg/ha.

C<sub>1</sub> = 969 Kg/ha., C<sub>2</sub> = 838 Kg/ha.

	L <sub>1</sub> M <sub>1</sub>	L <sub>2</sub> M <sub>1</sub>	L <sub>1</sub> M <sub>2</sub>	L <sub>2</sub> M <sub>2</sub>	L <sub>1</sub> M <sub>3</sub>	L <sub>2</sub> M <sub>3</sub>	Mean
F <sub>1</sub>	1258	1628	1077	1393	1129	1792	1380
F <sub>2</sub>	1211	1199	957	1106	982	1208	1111
F <sub>3</sub>	1187	1756	1077	1360	1334	1899	1435
F <sub>4</sub>	1208	1831	1028	1283	1325	1931	1434
Mean	1216	1604	1034	1286	1122	1708	1340



C.D. for F marginal means=79.0 Kg/ha.

C.D. for (LM) marginal means=63.0 Kg/ha.

C.D. for (LM) means at the same level of F=129.0 Kg/ha.

C.D. for F means at the same level of (LM)=141.0 Kg/ha.

1964

(i) 972 Kg/ha. (ii) (a) 194.0 Kg/ha. (b) 164.0 Kg/ha. (iii) Main effects of F and (LM) are highly significant. (iv) Av. yield of grain in Kg/ha.

$C_1=552$  Kg/ha. and  $C_2=474$  Kg/ha.

	$L_1M_1$	$L_2M_1$	$L_1M_2$	$L_2M_2$	$L_1M_3$	$L_2M_3$	Mean
$F_1$	1028	1356	858	1090	1158	1383	1145
$F_2$	716	945	522	722	682	1047	772
$F_3$	1013	1482	713	1044	1087	1661	1167
$F_4$	1266	1871	877	1247	1204	2035	1417
Mean	1006	1413	742	1026	1033	1532	1125

C.D. for F marginal means=110.0 Kg/ha.

C.D. for (LM) marginal means=114.0 Kg/ha.

**Crop :- Wheat.**

**Ref :- 64 and 65(MAE).**

**Site :- M.A.E Centre, Sumerpur.**

**Type :- 'M'.**

Object :- Type XII—To study the efficiency of foliar spray of fertilizers compared to soil application on Wheat.

1. BASAL CONDITIONS :

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

2. TREATMENTS and 3. DESIGN :

Same as in Type XII expt. conducted at Sriganganagar on page 65.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964—1965. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) Sriganganagar. (vi) Nil. (vii) Both error variances are homogeneous and main-plot and sub-plot Treatments  $\times$  years interaction are absent.

5. RESULTS :

(i) 649 Kg/ha. (ii) (a) 142.1 Kg/ha. (based on 21 d.f. made up of Treatments  $\times$  years interaction and pooled error) (b) 104.0 Kg/ha. (based on 168 d.f. made of pooled error). (iii) Main effects of F and (LM) are significant. (iv) Av. yield of grain in Kg/ha.

$C_1=508$  and  $C_2=441$  Kg/ha.

	$L_1M_1$	$L_2M_1$	$L_1M_2$	$L_2M_2$	$L_3M_1$	$L_3M_2$	Mean
$F_1$	730	821	546	660	692	759	701
$F_2$	471	527	452	494	536	520	500
$F_3$	733	963	672	654	623	728	729
$F_4$	759	939	520	654	739	733	724
Mean	673	813	548	615	648	684	664

C.D. for F marginal means =57.0 Kg/ha.

C.D. for (LM) marginal means =51.0 Kg/ha.

Crop :- Wheat.

Ref :- 62, 63, 64, 65(S.F.T.).

Site :- (District) : Banswara, Sriganganagar,  
Pali and Kota.

Type :- 'M'.

Object :- To study the response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with other nutrients (Type : A<sub>1</sub>).

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and yellow ; Desert soil ; Grey brown ; Red and black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

O=Control (no manure).

N<sub>1</sub>=33.6 Kg/ha. of N.N<sub>2</sub>=67.2 Kg/ha. of N.P<sub>1</sub>=33.6 Kg/ha. of P.N<sub>1</sub>P<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>1</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.N applied as A/S ; P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A<sub>1</sub>, 11 of type A<sub>2</sub>, 11 of type A<sub>3</sub> and 3 are of type C. The eleven experiments under type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are distributed as 3 on a kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are laid out. For conducting the three type-C trials three villages are randomly selected in each block.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962-1966. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Banswara

## 62(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	312	770	225	604	848	1075	1223	112.4

Control yield=512 Kg/ha. ; No. of trials=6.

## 63(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	304	485	—8	532	636	787	745	83.7

Control yield=741 Kg/ha. ; No. of trials=7.

## 64(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	593	487	52	698	507	619	830	193.8

Control yield=1133 Kg/ha. ; No. of trials=3.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	375	537	115	590	722	917	943	49.1

Control yield=705 Kg/ha. ; No. of trials=10.

**Sriganganagar****62 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	275	339	118	212	508	593	684	67.7

Control yield=983 Kg/ha. ; No. of trials=9.

**63 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	171	289	-5	177	353	465	523	48.7

Control yield=1333 Kg/ha. ; No. of trials=5.

**64 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	244	416	61	337	542	579	725	67.5

Control yield=1214 Kg/ha. ; No. of trials=10.

**65 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	243	317	53	324	638	798	826	71.3

Control yield=991 Kg/ha. ; No. of trials=12.

**Pali****62 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	226	365	111	397	484	593	809	62.1

Control yield=889 Kg/ha. ; No. of trials=10.

**63 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	134	210	123	199	275	383	434	33.3

Control yield= 1114 Kg/ha ; No. of trials=21.

**64 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	186	269	97	245	369	399	462	47.6

Control yield=800 Kg/ha. ; No. of trials=17.

**65 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	212	301	73	247	323	457	395	54.1

Control yield=1106 Kg/ha. ; No. of trials=14.

## Kota

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	324	365	197	481	463	692	822	74.3

Control yield=660 Kg/ha. ; No. of trials=11.

## 63(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	203	517	25	541	793	780	829	120.6

Control yield=765 Kg/ha. ; No. of trials=12.

## 64(S.F.T.)

Treatments	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	270	492	211	412	549	598	755	55.8

Control yield=802 Kg/ha. ; No. of trials=12.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	121	250	82	200	285	381	395	29.7

Control yield=691 Kg/ha. ; No. of trials=10.

**Crop :- Wheat.****Ref :- Rj. 62(SFT).****Site :- (District) : Banswara.****Type :- 'M'.**

Object :- To study the response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with others nutrients (Type : A<sub>1</sub>).

## 1. BASAL CONDITIONS :

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

## 2. TREATMENTS :

8 manurial treatments

O=Control (no manure)

N<sub>1</sub>=33.6 Kg/ha. of NN<sub>2</sub>=67.2 Kg/ha. of NP<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>1</sub>P<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>1</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O  
N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page 67.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962—only (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

62(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	88	332	9	425	464	563	569	56.5

Control yield=589 Kg/ha. ; No. of trials=3.

**Crop :- Wheat (Rabi).****Ref :- Rj. 62, 63, 64, 65(S.F.T.)****Site :- (District) : Banswara Pali.  
Sriganganagar and Kota****Type :- 'M'.**Object :- To study the response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and yellow ; Grey brown ; Desert soil ; Red and black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments :

O=Control (no manure).

N<sub>1</sub>=33.6 Kg/ha. of NP<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>P<sub>2</sub>=67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>1</sub>P<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>1</sub>P<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub>K<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page 67.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

62 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	270	271	434	815	902	1219	1230	167.4

Control yield=696 Kg/ha. ; No. of trials=6.

63 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	247	220	197	516	452	678	760	173.5

Control yield=655 Kg/ha. ; No. of trials=6.

64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	566	355	316	408	349	705	1027	190.2

Control yield=1107 Kg/ha. ; No. of trials=3.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	379	186	179	572	712	882	965	52.1

Control yield=670 Kg/ha. ; No. of trials=9.

## Pali

## 62 (S.F.T.)

Treatment :	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	94	106	123	310	385	524	618	69.1

Control yield=748 Kg/ha. ; No. of trials=9.

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	123	75	89	147	186	309	330	28.7

Control yield=878 Kg/ha. ; No. of trials=22.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	118	125	131	174	228	314	375	27.4

Control yield=892 Kg/ha. ; No. of trials=18.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	306	40	117	300	353	497	522	07.6

Control yield=1078 Kg/ha. ; No. of trials=13.

## Sriganganagar

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	341	150	236	411	450	603	711	71.5

Control yield=1021 Kg/ha. ; No. of trials=8.

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	162	-21	91	240	220	326	375	49.3

Control yield=1145 Kg/ha. ; No. of trials=7.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	260	69	131	384	435	653	731	72.0

Control yield=1221 Kg/ha. ; No. of trials=8.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	417	1	222	458	695	872	895	175.2

Control yield=1091 Kg/ha. ; No. of trials=9.

## Kota

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	286	92	118	417	414	643	649	62.0

Control yield= 544 Kg/ha. ; No. of trials=10.

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	278	185	251	410	613	803	900	89.3

Control yield=701 Kg/ha. ; No. of trials=11.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	220	122	219	278	374	543	726	49.1

Control yield=726 Kg/ha. ; No. of trials=12.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	177	84	101	217	291	399	511	31.7

Control yield=744 Kg/ha. ; No. of trials=10.

**Crop :- Wheat.**

**Site :- (District) Banswara.**

**Ref :- Rj. 62 (S.F.T.).**

**Type :- 'M'.**

Object :—To study the response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS:

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

## 2. TREATMENTS :

8 manurial treatments

O = Control (no manure)

N<sub>1</sub> = 33.6 Kg/ha. of N

P<sub>1</sub> = 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

P<sub>2</sub> = 67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>1</sub>P<sub>1</sub> = 33.6 Kg/ha. of N + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>1</sub>P<sub>2</sub> = 33.6 Kg/ha. of N + 67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>2</sub>P<sub>2</sub> = 67.2 Kg/ha. of N + 67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>2</sub>P<sub>2</sub>K<sub>2</sub> = 67.2 Kg/ha. of N + 67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 67.2 Kg/ha. of K<sub>2</sub>O

N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page 67.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 only. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	209	327	403	347	268	571	510	171.7

Control yield=614 Kg/ha. ; No. of trials=4.

Crop :- Wheat (*Rabi*).

Ref. :- Rj. (62), (63), (64), (65), (S.F.T.)

Site :- (District) : Banswara,

Type :- 'M.'

Sriganganagar, Pali and Kota.

Object :- To study the response curves of important cereal, cash and oilseed crops to potash applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and yellow ; Desert soil ; Grey brown and Red and black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

O=Control (no manure).

N<sub>1</sub>=33.6 Kg/ha. of N.K<sub>1</sub>=33.6 Kg/ha. of K<sub>2</sub>O.K<sub>2</sub>=67.2 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.N<sub>2</sub>K<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page 67.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962—1966. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Banswara

## 62(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	394	284	203	670	637	720	728	136.8

Control yield=848 Kg/ha. ; No. of trials=7.

## 63(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	210	92	200	242	457	528	494	144.2

Control yield=604 Kg/ha. ; No. of trials=6.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	32	204	230	625	533	467	507	328.1

Control yield=1074 Kg/ha. ; No. of trials=3.



## 65 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	290	-38	-26	294	419	557	623	93.2

Control yield=700 Kg/ha. ; No. of trials=7.

## Sriganganagar

## 62(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	308	41	116	381	413	709	612	56.9

Control yield=961 Kg/ha. ; No. of trials=9.

## 63(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	184	25	73	183	148	332	198	54.2

Control yield=841 Kg/ha. ; No. of trials=6.

## 64(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	231	1	69	264	290	535	430	46.0

Control yield=1016 Kg/ha. ; No. of trials=9.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	296	80	45	300	319	541	408	65.6

Control yield=887 Kg/ha. No. of trials=12.

## Pali

## 62(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	301	282	304	402	482	562	683	71.1

Control yield=748 Kg/ha. ; No. of trials=12.

## 63(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	120	71	91	160	189	273	275	22.3

Control yield=871 Kg/ha. ; No. of trials=20.

## 64(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain of Kg/ha.	168	66	100	205	255	391	314	26.4

Control yield=824 Kg/ha. ; No. of trials=87.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	183	104	194	241	285	386	267	38.6

Control yield=860 Kg/ha. ; No. of trials=15.

## Kota

## 62(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	299	64	109	346	301	493	531	64.4

Control yield=599 Kg/ha. ; No. of trials=10.

## 63(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	204	104	202	346	352	622	613	48.5

Control yield=611 Kg/ha. ; No. of trials=11.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	207	109	126	271	314	463	472	47.1

Control yield=621 Kg/ha. ; No. of trials=12.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	117	56	84	200	251	354	310	32.6

Control yield=567 Kg/ha. ; No. of trials=10.

**Crop :- Wheat (Rabi).****Ref :- 62(S.F.T.).****Site :- (District) : Banswara and Kota.****Type :- 'M'.**Object :- To study response curves of important cereal cash and oilseed crops to Potash applied singly and combination with other nutrients (Type : A<sub>3</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Red and yellow ; Red and black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

O=Control (no manure)

N<sub>1</sub>=33.6 Kg/ha. of NK<sub>1</sub>=33.6 Kg/ha. of K<sub>2</sub>OK<sub>2</sub>=67.2 Kg/ha. of K<sub>2</sub>ON<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>ON<sub>1</sub>K<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>ON<sub>2</sub>K<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>ON<sub>1</sub>P<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub>(Irrigated) on page 67.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 only. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

**Banswara**

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	98	-14	-9	103	153	266	197	36.2

Control yield=494 Kg/ha ; No. of trials=2.

**Kota**

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	81	171	160	138	207	322	413	—

Control yield=496 Kg/ha. ; No. of trials=1.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(SFT) 61(SFT).**

**Site :- As per results.**

**Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) N.A. (ii) As per results. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O=Control (no manure)

n=22.4 Kg/ha. of N

p=22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

k=22.4 Kg/ha. of K<sub>2</sub>O

np=22.4 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

nk=22.4 Kg/ha. of N + 22.4 Kg/ha. of K<sub>2</sub>O

pk=22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 22.4 Kg/ha. of K<sub>2</sub>O

npk=22.4 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 22.4 Kg/ha. of K<sub>2</sub>O  
N applied as A/S ; P<sub>2</sub>O<sub>5</sub> as SUPER and K<sub>2</sub>O as M.F. of Pot.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year 8 on kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of Type C. Residual effects of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 98.8 ha. (b) 197.7 ha. (iv) Yes.

## 4. GENERAL :

(i) to (vii) N.A.

## Irrigated 1960

Av. yield of grain Kg/ha.

District	Soil class	No. of trials	Control yield	N	P	K	S.E.	NP	NK	PK	NPK	S.E.
Banswara	Red and black	9	1070	220	60	60	33.0	40	10	30	10	37.0
Kota	Medium black	7	1030	250	90	160	51.0	-60	140	70	30	41.0
Pali	Desert	10	1250	60	250	30	44.0	-180	-60	220	-70	50.0
Sriganganagar	Desert	13	1060	380	150	60	34.0	0	-10	-10	0	24.0

## 1961

Banswara	Red and black	3	990	230	230	130	69.0	-60	40	80	50	67.2
Kota	Medium black	6	780	290	290	110	83.0	-70	130	-20	60	86.0
Pali	Desert	20	1180	310	200	50	30.0	100	0	30	30	26.0
Srinagar	Desert	11	1300	310	130	20	27.0	10	0	-30	-10	26.0

**Crop :- Wheat (Rabi).****Site :- As per results.****Ref :- Rj. 60, 61(S.F.T.).****Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) N.A. (ii) As per results. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS and 3. DESIGN :

Same as in 60(S.F.T.) on page 76.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

## 1960

District	Soil class	No. of trials	Control yield	N	P	K	S.E.	NP	NK	PK	NPK	S.E.
Kota	Medium black	2	580	160	90	40	60.0	10	-20	0	50	28.0
Banswara	Red and black	5	610	110	80	-10	21.0	20	-10	30	10	15.0

## 1961

Kota	Medium black	6	440	10	90	120	28.0	0	-30	10	10	19.0
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**Crop :- Wheat (Rabi).****Site :- As per results.****Ref :- Rj. 60 , 61 (S.F.T.).****Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) N.A. (ii) As per results. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O = Control (no manure).

 $n_1 = 22.4$  Kg/ha. of N as A/S. $n_2 = 44.8$  Kg/ha. of N as A/S. $n_1' = 22.4$  Kg/ha. of N as Urea. $n_2' = 44.8$  Kg/ha. of N as Urea. $n_1'' = 22.4$  Kg/ha. of N as C/A/N. $n_2'' = 44.8$  Kg/ha. of N as C/A/N.

## 3. DESIGN :

Same as in type A on page 76.

## 4. GENERAL :

(i) to (vii) N.A.

Av. yield of grain in Kg/ha.

## 5. RESULTS :

## 1960

District	Soil class	No. trials	O	$n_1$	$n_2$	$n_1'$	$n_2'$	$n_1''$	$n_2''$	G.M.	S.E./mean
Banswara	Red and black	5	1140	1830	1800	1440	1560	1420	1570	1537	50.0
Kota	Black	4	750	930	1090	1060	1180	1000	1120	1019	77.1
Pali	Desert	11	1160	1370	1620	1340	1500	1340	1670	1429	54.4
Sriganga—nagar	Desert	12	1090	1490	1730	1300	1550	1470	1780	1487	43.1

## 1961

District	soil class	No. of trials	O	$n_1$	$n_2$	$n_1'$	$n_2'$	$n_1''$	$n_2''$	$n_1'''$	$n_2'''$	G.M.	S.E./mean
Banaswara	Red and black	3	770	1100	1240	1320	1560	—	—	1130	1560	1240	31.1
Pali	Desert	20	1240	1580	1720	1450	1620	—	—	1610	1820	1577	41.0
Sriganga—nagar	Desert	10	1230	1540	1720	1390	1520	—	—	1530	1800	1533	33.2
Kota	M. black	3	870	1100	1110	1050	1260	860	1150	—	—	1057	119.5

**Crop :- Wheat (Rabi).****Site :- As per results.****Ref :- Rj. 61(SFT).****Type :- 'M'.**

Object :- Type B.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) As per results. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O = Control (no manure)

 $n_1 = 22.4$  Kg/ha. of N as A/S. $n_2 = 44.8$  Kg/ha. of N as A/S. $n_1' = 22.4$  Kg/ha. of N as Urea. $n_2' = 44.8$  Kg/ha. of N as Urea. $n_1'' = 22.4$  Kg/ha. of N as A/S/N. $n_2'' = 44.8$  Kg/ha. of N as A/S/N. $n_1''' = 22.4$  Kg/ha. of N as C/A/N. $n_2''' = 44.8$  Kg/ha. of N as C/A/N.

## 3. DESIGN :

Same as in type A on page 76.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

1960

District	Soil class	No. of trials	O	n <sub>1</sub>	n <sub>2</sub>	n <sub>1</sub> '	n <sub>2</sub> '	n <sub>1</sub> '''	n <sub>2</sub> '''	G.M.	S.E. /mean
Banswara	Red black	4	610	950	900	790	1070	920	1070	901	142.1
Kota	Black	6	420	450	600	500	540	460	420	484	47.4

1961

Banswara	Red and black	7	520	650	630	620	790	—	—	630	630	639	38.2
Kota	Medium black	3	390	470	470	500	480	510	630	—	—	493	41.7

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(101), 62(63).**

**Site :- Govt. Agri. Farm, Bundi.**

**Type :- 'MV.'**

Object :—To find out the loss in weight due to rust by application of fertilizers on different varieties of Wheat.

## 1. BASAL CONDITION:

(i) (a) N.A. (b) Maize for 61(101); Fallow for the other. (c) N.A. for 61(101); Nil for the other. (ii) N.A. (iii) 17.11.1961; 22.11.1962. (iv) 2 ploughings and 2 bakherings for 61(101); 3 bakherings and pata for 62(63) (b) N.A. (c) 62 Kg/ha; 92 Kg/ha. (d) 30 cm between rows. (e) N.A. (v) N.A. (iv) As per treatments. (vii) Irrigated (viii) 2 to 3 weedings. (ix) N.A. (x) N.A. for 61(101); 8.4.1963.

## 2. TREATMENTS :

**Main-plot treatments :**

2 varieties : V<sub>1</sub>=N.P.—718 and V<sub>2</sub>=Local.

**Sub-plot treatments**

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

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=67.2 and N<sub>2</sub>=134.4 Kg/ha.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0 and P<sub>1</sub>=67.2 Kg/ha.

(3) 2 levels of K<sub>2</sub>O : K<sub>0</sub>=0 and K<sub>1</sub>=67.2 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 12 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.1 m. × 3.1 m. for 61(101); 4.6 m. × 3.1 m. for 62(63). (b) 5.5 m. × 2.4 m. for 61(101); 4.0 m. × 2.4 m. for 62(63). (b) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL:

(i) N.A. (ii) Rust attack for 61(101) control measures N.A.; N.A. for 62(63). (iii) Yield of grain and fodder. (iv) (a) 1961 to 1962. (b) N.A. (c) Results of combined analysis given under 5. Results. (v) and (vi) N.A. (vii) Both main-plot and sub-plot error variances are homogeneous, main-plot Treatments × years interaction is absent, while Sub-plot Treatments × years interaction is present.

## 5. RESULTS :

(i) 2637 Kg/ha. (ii) (a) 1901.6 Kg/ha. (7 d.f. made up of main-plot Treatments × years interaction and pooled error). (b) 1179.0 Kg/ha. (based on 13 d.f. made up of interaction of various components of treatment with years). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	2536	2945	3366	2974	2924	2882	3016	2949
V <sub>2</sub>	2206	2370	2399	2303	2346	2402	2248	2325
Mean	2371	2657	2882	2639	2635	2642	2632	2637
K <sub>0</sub>	2436	2706	2785	2698	2586			
K <sub>1</sub>	2306	2609	2980	2580	2684			
P <sub>0</sub>	2435	2619	2862					
P <sub>1</sub>	2307	2696	2903					

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 62(54).**

**Site :- Govt. Agri. Res Farm, Borkhera.**

**Type :- 'MV'.**

**Object :-**To study the effect of N on different varieties of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Gram-Wheat-Fallow-Wheat. (b) Fallow. (c) Nil. (ii) Medium clay soil. (iii) 1.11.62. (iv) (a) 2 ploughings and 2 *bakherings*. (b) Drilling. (c) 92 kg/ha. (d) Row to row 30 cm. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 16.3.63.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 5 varieties : V<sub>1</sub>=Malvi, V<sub>2</sub>=E.K.—59, V<sub>3</sub>=Hy—65, V<sub>4</sub>=N.P.—718 and V<sub>5</sub>=N.111

(2) 2 methods of applications of 22.4. Kg/ha. of N : M<sub>1</sub>=Basal dressing and M<sub>2</sub>=Foliar spray

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 2. (iv) (a) 8.0 m. × 6.1 m. (b) 7.4 m. × 5.5 m. (v) 30 cm × 30 cm. (vi) yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 783 Kg/ha. (ii) 207.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	
M <sub>1</sub>	933	723	711	600	838	761
M <sub>2</sub>	1094	791	637	538	964	805
Mean	1014	757	674	569	901	783

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 64(57).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'MV'.**

**Object :-**To study the effect of fertilizers on the yield of different varieties of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 29.10.64. (iv) (a) 4 ploughings. (b) Behind the plough. (c) 74 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 3 hoeings with hand hoe. (ix) 1 cm. (x) 23.4.65.

## 2. TREATMENTS :

## Main-plot treatments :

3 varieties :  $V_1 = C-591$ ,  $V_2 = N.P. 825$  and  $V_3 = C-281$ .

## Sub-plot treatments :

10 manurial treatments :  $M_0 = \text{Control}$ ,  $M_1 = 49.4 \text{ Kg/ha. of N}$ ,  $M_2 = 98.8 \text{ Kg/ha. of N}$ ,  $M_3 = 148.2 \text{ Kg/ha. of N}$ ,  $M_4 = 49.4 \text{ Kg/ha. of N} + 24.7 \text{ Kg/ha. of } P_2O_5 + 24.7 \text{ Kg/ha. of } K_2O$ ,  $M_5 = 98.8 \text{ Kg/ha. of N} + 49.4 \text{ Kg/ha. of } P_2O_5 + 49.4 \text{ Kg/ha. of } K_2O$ ,  $M_6 = 148.2 \text{ Kg/ha. of N} + 74.1 \text{ Kg/ha. of } P_2O_5 + 74.1 \text{ Kg/ha. of } K_2O$ ,  $M_7 = 49.4 \text{ Kg/ha. of N} + 49.4 \text{ Kg/ha. of } P_2O_5 + 49.4 \text{ Kg/ha. of } K_2O$ ,  $M_8 = 98.8 \text{ Kg/ha. of N} + 98.4 \text{ Kg/ha. of } P_2O_5 + 98.4 \text{ Kg/ha. of } K_2O$  and  $M_9 = 148.2 \text{ Kg/ha. of N} + 148.2 \text{ Kg/ha. of } P_2O_5 + 148.2 \text{ Kg/ha. of } K_2O$ .

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 10 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m.  $\times$  3.7 m. (b) 5.0 m.  $\times$  3.1 m. (v) 23 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 2049 Kg/ha. (ii) (a) 874.6 Kg/ha. (b) 288.7 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$	$M_8$	$M_9$	Mean
$V_1$	1376	1903	2077	1816	2315	1946	2033	2142	2479	2675	2076
$V_2$	1446	1816	1946	1753	1816	2066	2316	1935	2011	2174	1928
$V_3$	1924	1820	2338	2105	2240	2174	2077	2185	2218	2359	2144
Mean	1582	1846	2120	1891	2124	2062	2142	2087	2236	2403	2049

C.D. for M marginal means = 274.1 Kg/ha.

**Crop :- Wheat.**

**Ref :- Rj. 65(34).**

**Site :- Govt. Agri. Res. Farm, Sriganagar.**

**Type :- 'MV'.**

**Object :-** To see the effect of N on the yield of different varieties of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) No. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 21.11.65. (iv) (a) Ploughing. (b) Behind the plough. (c) 86 Kg/ha. (d) 23 cm. between rows. (e) —. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 3 hand hoeings. (ix) N.A. (x) 18.4.66.

## 2. TREATMENTS :

## Main-plot treatments :

6 levels of N :  $N_0 = 0$ ,  $N_1 = 40$ ,  $N_2 = 80$ ,  $N_3 = 120$ ,  $N_4 = 160$  and  $N_5 = 200 \text{ Kg/ha.}$

## Sub-plot treatments :

2 varieties :  $V_1 = \text{Sonara 64}$  and  $V_2 = \text{Lerma Roja}$ .



## 3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 1.4 m. × 10.0 m. (b) 0.5 m. × 8.0 m. (v) 46 cm. × 100 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965 contd. (b) No. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 2201 Kg/ha. (ii) (a) 485.3 Kg/ha. (b) 182.1 Kg/ha. (iii) Main effect of N and interaction N × V are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	Mean
V <sub>1</sub>	1721	1934	2332	2615	2434	2418	2242
V <sub>2</sub>	1744	2160	2206	2328	2319	2206	2160
Mean	1732	2047	2269	2472	2376	2312	2201

C.D. for N marginal means = 408.1 Kg/ha.  
 C.D. for V means at the same level of N = 215.0 Kg/ha.  
 C.D. for N means at the same level of V = 436.7 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 62(77), 63(51), 64(69).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'MV'.**

Object :- To find out the suitable manurial schedule for different varieties of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Black Cotton soil. (iii) 18.10.1962, 26.10.1963, 20.10.1964. (iv) (a) 2 ploughings and 3 bakherings. (b) Line sowing for 62(77), behind the plough for 63(51), Drilling for 64(69). (c) 99 Kg/ha. for 62(77), 63(51), 74 Kg/ha. for 64(69). (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 1 hoeing and 1 weeding. (ix) N.A. for 62(77), 63(51); Nil for 64(69). (x) 17.4.63, 15.4.64, 10.4.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

2 varieties : V<sub>1</sub> = C-591 and V<sub>2</sub> = N.P. 718.

**Sub-plot treatments :**

10 manurial treatments : M<sub>0</sub> = Control, M<sub>1</sub> = 44.8 Kg/ha. of N, M<sub>2</sub> = 89.7 Kg/ha. of N, M<sub>3</sub> = 134.5 Kg/ha. of N, M<sub>4</sub> = 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, M<sub>5</sub> = M<sub>1</sub> + 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, M<sub>6</sub> = M<sub>2</sub> + 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, M<sub>7</sub> = M<sub>3</sub> + 89.7 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, M<sub>8</sub> = M<sub>3</sub> + 67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>9</sub> = M<sub>3</sub> + 134.5 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N as A/S broadcast  $\frac{1}{2}$  at sowing and  $\frac{1}{2}$  at first irrigation. P<sub>2</sub>O<sub>5</sub> as Super drilled at sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication and 10 sub-plots/main-plot. (b) 17.7 m. × 9.8 m. (iii) 4. (iv) (a) 4.6 m. × 3.1 m. (b) 4.0 m. × 2.4 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Height, stand and yield of grain. (iv) (a) 1962 to 64. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous results of individual years are presented under 5. Results.

## 5. RESULTS:

62(77)

- (i) 2502 Kg/ha. (ii) (a) 1202.0 Kg/ha. (b) 726.1 Kg/ha. (iii) Main effect of M alone is highly significant.  
 (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>	M <sub>8</sub>	M <sub>9</sub>	Mean
V <sub>1</sub>	1397	1992	2199	2380	2096	2186	2316	2329	3700	3855	2445
V <sub>2</sub>	1294	2225	1941	1837	2225	2846	2406	2924	3338	4554	2559
Mean	1346	2108	2070	2108	2160	2516	2361	2626	3519	4204	2502

C.D. for M marginal means = 729.5 Kg/ha.

63(51)

- (i) 2250 Kg/ha. (ii) (a) 462.0 Kg/ha. (b) 689.0 Kg/ha. (iii) Main effect of M alone is highly significant.  
 (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>	M <sub>8</sub>	M <sub>9</sub>	Mean
V <sub>1</sub>	1032	1524	1498	2323	2181	2668	2135	3089	3524	3625	2360
V <sub>2</sub>	1229	2199	1439	1449	2370	2150	2538	2140	2882	3012	2141
Mean	1130	1862	1468	1886	2276	2409	2336	2614	3203	3318	2250

C.D. for M marginal means = 691.4 Kg/ha.

64(69)

- (i) 2890 Kg/ha. (ii) (a) 581.0 Kg/ha. (b) 332.3 Kg/ha. (iii) Main effect of M alone is highly significant.  
 (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>	M <sub>8</sub>	M <sub>9</sub>	Mean
V <sub>1</sub>	1876	2031	2122	1901	2743	3234	3752	3829	3778	4463	2973
V <sub>2</sub>	1734	1889	2186	2303	2355	3118	3351	3286	3907	3946	2808
Mean	1805	1960	2154	2102	2549	3176	3552	3558	3842	4204	2890

C.D. for M marginal means = 333.6 Kg/ha.

Crop :- Wheat (Rabi).

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

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

Type :- 'MV'.

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

## 1. BASAL CONDITIONS :

(i) (a) and (b) N.A. (c) Nil. (ii) Sandy loam. (iii) 17.11.1964. (iv) (a) to (e) N.A. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super. (vi) R.S.—311 (13 days). (vii) Irrigated. (viii) and (ix) N.A. (x) 23.3/1965.

## 2. TREATMENTS :

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

(1) 3 levels of N as A/S : N<sub>1</sub> = 33.6, N<sub>2</sub> = 50.4 and N<sub>3</sub> = 67.2 Kg/ha.(2) 3 methods of application : M<sub>1</sub> = Broadcast at sowing, M<sub>2</sub> = Drilled 6 cm. below the seed and M<sub>3</sub> = Band placement 5 to 7.5 cm. on either side of seed.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a), (b) and (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964-1966 (1965 N.A). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 976 Kg/ha. (ii) 305.8 Kg/ha. (iii) "Control vs. others" alone is highly significant. (iv) Av. yield of grain in Kg/ha.

Control=438 Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
M	877	1119	1289	1095
M <sub>2</sub>	905	933	992	943
M <sub>3</sub>	1028	1020	1162	1070
Mean	937	1024	1147	1036

C.D. for control vs. others=330.7 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 65(27).**

**Site :- Reg. Res. Stn., Berwal, Banswara.**

**Type :- 'C'.**

Object :- To find out the optimum seed rate, row spacings and number of bakherings required for irrigated Wheat.

## 1. BASAL CONDITIONS :

(i) (a) No. (b) Groundnut. (c) N.A. (ii) Black Cotton. (iii) 9.12.65. (iv) (a) As per treatments. (b) Behind the plough. (c) and (d) As per treatments. (e) N.A. (v) N.A. (vi) R.S 31-1 (medium). (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 1 to 3.4.1966.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of bakherings : B<sub>1</sub>=2, B<sub>2</sub>=4 and B<sub>3</sub>=6.

**Sub-plot treatments :**

3 sprayings between rows : S<sub>1</sub>=24, S<sub>2</sub>=30 and S<sub>3</sub>=36 cm.

**Sub-sub-plot treatments :**

3 seed rates : R<sub>1</sub>=75, R<sub>2</sub>=100 and R<sub>3</sub>=125 Kg/ha.

## 3. DESIGN :

(i) Split plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot, 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 5.4 m. × 3.0 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Height, tillers, earlength and yield of grain. (iv) (a) 1965 contd. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1580 Kg/ha. (ii) (a) 391.4 Kg/ha. (b) 337.9 Kg/ha. (c) 317.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
B <sub>1</sub>	1629	1735	1627	1644	1566	1781	1664
B <sub>2</sub>	1787	1519	1784	1498	1713	1879	1697
B <sub>3</sub>	1417	1446	1271	1296	1421	1418	1378
Mean	1611	1567	1561	1479	1567	1693	1580
R <sub>1</sub>	1488	1433	1518				
R <sub>2</sub>	1660	1436	1603				
R <sub>3</sub>	1685	1831	1562				

**Crop :- Wheat (Rabi).**

**Site :- Govt. Agri. Farm, Bilwara.**

**Ref :- Rj. 60(64).**

**Type :- 'C'.**

**Object :-** To find out the optimum seed rate for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Fallow-Wheat. (b) Fallow. (c) Nil. (ii) N.A. (iii) October, 1960. (iv) (a) 3 ploughings. (b) N.A. (c) As per treatments. (d) 23 cm. between rows. (e) N.A. (v) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) R.S. 31-1. (vii) Irrigated. (viii) and (ix) N.A. (x) March, 1961.

**2. TREATMENTS :**

8 seed rates : S<sub>1</sub>=58, S<sub>2</sub>=69, S<sub>3</sub>=81, S<sub>4</sub>=92, S<sub>5</sub>=104, S<sub>6</sub>=115, S<sub>7</sub>=127 and S<sub>8</sub>=138 Kg/ha.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) 9.1 m. × 5.5 m. (b) 8.5 m. × 4.6 m. (v) 30 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 only. (b) —. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 1167 Kg/ha. (ii) (a) 220.9 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	S <sub>8</sub>
Av. yield	968	910	1240	1181	1317	1240	1279	1202

C.D. = 258.8 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Govt. Agri. Res. Farm, Borekhera.**

**Res :- Rj. 60(74), 61(95).**

**Type :- 'C'.**

**Object :-** To study the effect of different seed rates and different dates of sowing on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Fallow, Wheat for 60(74), N.A. for 61(95). (b) Fallow. (c) N.A. (ii) Black soil. (iii) A. J. C. treatments. (iv) (a) 2-3 ploughings and 3 bakherings. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) N.A. for 60(74), 17.8 Kg/ha. of N, as A/S + 22.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super for 61(95). (vi) C-591 for 60(74) and N.P. 718 for 61(95). (vii) Irrigated. (viii) 1-2 weedings. (ix) and (x) N.A.

## 2. TREATMENTS :

## Main-plot treatments :

## 60(74)

4 dates of sowing :  $D_1=12.10.1960$ ,  $D_2=22.10.1960$ ,  $D_3=1.11.1960$  and  $D_4=11.11.1960$ .

## 61(95)

6 dates of sowing :  $D_1=2.11.1961$ ,  $D_2=12.11.1961$ ,  $D_3=22.11.1961$ ,  $D_4=2.12.1961$ ,  $D_5=12.12.1961$  and  $D_6=22.12.1961$ .

## Sub-plot treatments :

8 seed rates :  $S_1=46$ ,  $S_2=58$ ,  $S_3=69$ ,  $S_4=81$ ,  $S_5=92$ ,  $S_6=104$ ,  $S_7=115$  and  $S_8=127$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication, 8 sub-plots/main-plot for 60(74) and 6 main-plots/replication, 8 sub-plots/main-plot for 61(95). (b) N.A. (iii) 2. (iv) (a) 7.3 m.  $\times$  5.5 m. for 61(95), N.A. for 60(74). (b) 60.4 m.  $\times$  4.6 m. for 61(95), 7.3 m.  $\times$  5.5 m. for 60(74). (v) N.A. for 60(74), 46 cm.  $\times$  46 cm. for 61(95). (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 1963 (modified). (b) No. (c) Nil. (v) and (vi) N.A. (vii) Treatments are modified in 1961 and again in 1962. Results of 1962 and 63 are combined and presented.

## 5. RESULTS :

## 60(74)

(i) 787 Kg/ha. (ii) (a) 895.3 Kg/ha. (b) 266.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	$S_7$	$S_8$	Mean
$D_1$	257	111	368	257	316	197	193	111	226
$D_2$	1067	504	993	734	341	496	521	375	629
$D_3$	1325	1179	1204	1342	1255	1520	966	1436	1278
$D_4$	650	845	1204	1136	726	1265	1050	1248	1016
Mean	825	660	942	867	660	870	682	792	787

## 61(95)

(i) 1788 Kg/ha. (ii) (a) 510.8 Kg/ha. (b) 358.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	$S_7$	$S_8$	Mean
$D_1$	1769	2074	2449	2191	2061	1801	2229	2671	2156
$D_2$	1589	1831	2244	1582	2392	2154	2355	1676	1978
$D_3$	2143	1389	1782	1982	2074	1924	1986	1619	1862
$D_4$	1483	1670	1844	1514	1617	1756	1888	2298	1759
$D_5$	1102	1327	1725	1719	1651	1606	1458	1413	1500
$D_6$	1352	1339	1372	1594	1972	1450	1413	1302	1474
Mean	1573	1605	1903	1764	1961	1782	1888	1830	1788

Crop :- Wheat (Rabi).

Ref :- Rj. 62(82), 63(50).

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

Type :- 'C'.

Object :- To find out the optimum date of sowing and seed rate for Wheat crop.

## 1. BASAL CONDITIONS :

(i) (a) Linseed-Fallow-Wheat for 62(82), Nil for 63(50). (b) Fallow. (c) Nil. (ii) Black soil. (iii) As per treatments. (iv) (a) 1 ploughing, 2 discings and 1 planking. (b) Sowing in lines behind the plough. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) N.A. for 62(82), 44.8 Kg/ha. of N as A/S+44.8 Kg/ha. of  $P_2O_5$  as Super at sowing for 63(50). (vi) N.P.—718. (vii) Irrigated. (viii) 1 weeding and 1 hoeing. (ix) N.A. (x) N.A., 2 to 13.4.1964.

## 2. TREATMENTS :

## Main-plot treatments :

8 dates of sowing :  $D_1=12$ th Oct.,  $D_2=22$ nd Oct.,  $D_3=1$ st Nov.,  $D_4=11$ th Nov.,  $D_5=21$ st Nov.,  $D_6=1$ st Dec.,  $D_7=11$ th Dec. and  $D_8=21$ st Dec.

## Sub-plot treatments :

8 seed rates :  $R_1=46$ ,  $R_2=58$ ,  $R_3=69$ ,  $R_4=81$ ,  $R_5=92$ ,  $R_6=104$ ,  $R_7=115$  and  $R_8=127$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/replication, 8 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 7.3 m.  $\times$  5.5 m. (b) 6.7 m.  $\times$  4.9 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal but crop lodged for 62(82), Good for 63(50). (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1960 to 63 (treatments modified in 1961 and 62). (b) No. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nil. (vii) Results of 1960 and 61 are presented separately. Both the error variances are homogeneous, interaction of main-plot and sub-plot Treatments with years are absent.

## 5. RESULTS :

(i) 2653 Kg/ha. (ii) (a) 251.1 Kg/ha. [based on 21 d.f. made up of Treatments  $\times$  years interaction and pooled error]. (b) 317.9 Kg/ha. [based on 168 d.f. made up of interactions of various components of Treatments with years and pooled error]. (iii) Main effects of D and R are highly significant and interaction  $D \times R$  is significant. (iv) Av. yield of grain in Kg/ha.

	$R_1$	$R_2$	$R_3$	$R_4$	$R_5$	$R_6$	$R_7$	$R_8$	Mean
$D_1$	2289	2117	2638	3490	3727	3876	3440	3659	3154
$D_2$	2493	2577	3162	3633	4036	3272	3773	3565	3314
$D_3$	2126	2745	2428	3334	3506	3761	3242	2960	3012
$D_4$	2179	2481	2309	3274	3054	3386	3379	3317	2922
$D_5$	1812	2150	2332	3012	2852	2771	2814	2930	2584
$D_6$	1927	2206	1958	2516	2573	2568	2564	2465	2347
$D_7$	1446	1502	1828	2353	2100	2454	2630	2694	2126
$D_8$	1204	1310	1376	2021	2028	2183	2017	1966	1763
Mean	1934	2136	2254	2954	2984	3034	2982	2944	2653

C.D. for D marginal means = 130.6 Kg/ha.

C.D. for R marginal means = 155.8 Kg/ha.

C.D. for R means at the same level of D = 440.6 Kg/ha.

C.D. for D means at the same level of R = 434.3 Kg/ha.

Crop :- Wheat (Rabi).

Ref :- Rj. 61(96), 62(56).

Site :- Govt. Agri. Farm, Dhakerkhedi.

Type :- 'C'.

Object :- To study the effect of row direction and different spacings on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Wheat for 61(96), Fallow for the other. (c) 33.6 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$  for 61(96), Nil for 62(56). (ii) N.A. (iii) 14.11.1961, N.A. (iv) (a) One discing and 2 bakherings. (b) N.A. (c) 92 Kg/ha. (d) As per treatments. (e) N.A. (v) N.A. (vi) N.P.—718. (vii) Irrigated. (viii) 1 weeding. (ix) and (x) N.A.

## 2. TREATMENTS :

## Main-plot treatments :

4 row directions :  $R_1$ =East to West,  $R_2$ =North to South,  $R_3$ =South West to North East and  $R_4$ =North West to South East.

## Sub-plot treatments :

3 spacings :  $S_1$ =30,  $S_2$ =38 and  $S_3$ =46 cm.

## 3. DESIGN :

(i) Split-plot. (ii) 4 main-plots/block, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 3.1 m. for 61(96), N.A. for 62(56). (b) 3.7 m. × 2.4 m. for 61(96), 4.6 m. × 3.1 m. for 62(56). (v) 46 cm. × 30 cm. for 61(96), N.A. for 62(56). (vi) Yes.

## 4. GENERAL :

(i) N.A. for 61(96), Heavy lodging for the other. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961 to 62. (b) N.A. (v) and (vi) N.A. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

## 5. RESULTS :

## 61(96)

(i) 4379 Kg/ha. (ii) (a) 1244.6 Kg/ha. (b) 829.7 Kg/ha. (iii) Main effect of S alone is significant, (iv) Av. yield of grain in Kg/ha.

	$R_1$	$R_2$	$R_3$	$R_4$	Mean
$S_1$	4626	5333	4149	4898	4751
$S_2$	4142	4367	3764	3580	3963
$S_3$	3497	4898	4534	4764	4423
Mean	4088	4866	4149	4414	4379

C.D. for S marginal means=605.4 Kg/ha.

## 62(56)

(i) 2090 Kg/ha. (ii) (a) 633.6 Kg/ha. (b) 418.4 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of grain in Kg/ha.

	$R_1$	$R_2$	$R_3$	$R_4$	Mean
$S_1$	2255	2566	2386	2530	2434
$S_2$	2001	2210	2126	2097	2109
$S_3$	1821	1771	1560	1753	1726
Mean	2026	2182	2024	2127	2090

C.D. for S marginal means=305.3 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(84).****Site :- Govt. Agri. Farm, Durgapur.****Type :- 'C'.**

Object :—To find out the optimum number of weedings and time of weeding for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Fallow-Wheat. (b) Fallow. (c) 37 C.L/ha. of [compost. (ii) Sandy loam. (iii) 4.11.61. (iv) (a) 4 ploughings. (b) and (c) N.A. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) As per treatments. (ix) N.A. (x) 20.4.62.

**2. TREATMENTS :**7 intervals of weeding : C<sub>0</sub>=No weeding, C<sub>1</sub>=30, C<sub>2</sub>=45, C<sub>3</sub>=60 days after sowing, C<sub>4</sub>=20 and 40, C<sub>5</sub>=30 and 60 and C<sub>6</sub>=45 and 90 days after sowing.**3. DESIGN :**

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 4:3 m. × 3:1 m. (b) 3:7 m. × 2:4 m. (v) 30 cm. × 30 cm. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 2763 Kg/ha. (ii) 527.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>
Av. yield	2214	2439	2718	3054	2859	3168	2886

**Crop :- Wheat (Rabi).****Ref :- Rj. 60(55).****Site :- Govt. Agri. Farm, Durgapur.****Type :- 'C'.**

Object :—To find out the optimum seed rate for Wheat.

**1. BASAL CONDITIONS :**(i) (a) Moong-Wheat. (b) Moong. (c) 44.8 Kg/ha. of N + 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (iii) Sandy loam. (iii) 8.11.60. (iv) (a) 4 ploughings. (b) N.A. (c) As per treatments. (d) 23 cm. between rows (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 29, 30.3.61.**2. TREATMENTS to 4. GENERAL :**

Same as in expt. no. 60(64) conducted at Bilwara on page 85.

**5. RESULTS :**

(i) 2156 Kg/ha. (ii) 426.6 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	S <sub>8</sub>
Av. yield	2172	2236	2093	2264	2012	2154	2200	2116

C.D.=499.9 Kg/ha.

**Crop :- Wheat (Rabi). Ref :- Rj. 60(79), 61(119), 62(114), 63(117), 64(104), 65(54).****Site :- Soil Cons. Res. Demons. and Trg. Centre, Kota.****Type :- 'C'.**

Object :—To find out the optimum seed rate and spacings for Wheat.



## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Clay loam. (iii) N.A. for 60(79), 61(119); 17, 18.10.62 for 62(114); 13.10.63 for 63(117); 24.10.1964 for 64(104); 29.10.65 for 65(54). (iv) (a) 2 ploughings and 3 bakherings for 60(79), 61(119); ploughing and bakhering for others. (b) Behind the plough. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) Malvi. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) N.A. for 60(79), 61(119); 25.3.1963; 1, 2.4.1964; N.A. for 64(104); 28.3.66 for 65(54).

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 seed rates :  $R_1=37$ ,  $R_2=74$  and  $R_3=111$  Kg/ha.

(2) 3 row spacings :  $S_1=20$ ,  $S_2=30$  and  $S_3=40$  cm.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 6 for expts. for 60 to 63; 4 for 64(104); 3 for 65(54). (iv) (a) N.A. (b) 12.5 m.  $\times$  10.0 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Good for 62(114), 63(117), 64(104) and normal for others. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1958 to 1965. (b) Yes. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nil. (vii) Expt. for 1958 and 1959 have also been included for combined analysis. Error variances are heterogeneous, interaction of Treatments  $\times$  years is present.

## 5. RESULTS :

(i) 536 Kg/ha. (ii) 279.8 Kg/ha. (based on 56 d.f. made up of Treatments  $\times$  years interaction). (iii) Main effect of S alone is significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$R_1$	495	624	559	559
$R_2$	496	524	508	509
$R_3$	513	628	479	540
Mean	501	592	515	536

C.D. for S marginal means = 69.7 Kg/ha.

**Crop :- Wheat.**

**Ref :- Rj. 64(106), 65(56).**

**Site :- Soil Cons. Res. Demons. and Trg. Centre, Kota.**

**Type :- 'C'.**

**Object :-** To study the effectiveness of various types of mulches on soil and moisture conservation on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Clay loam. (iii) 23.10.1964; 18.10.1965. (iv) (a) Ploughing and bakhering. (b) Behind the plough. (c) 69 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) Malvi. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 26.3.1965; 10.3.1966.

## 2. TREATMENTS :

5 types of mulches :  $T_0$ =Control,  $T_1$ =Mulching,  $T_2$ =Jowar stalk mulching,  $T_3$ =Dry grass mulching and  $T_4$ =Polythelene mulching.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 12.5 m.  $\times$  10.0 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Fair. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1964 to 1965. (b) N.A. (v) and (vi) Nil. (vii) Since the error variances are heterogeneous and the interaction of Treatments  $\times$  years is absent, results of individual years are presented under 5. Results.

## 5. RESULTS :

64(106)

(i) 669 Kg/ha. (ii) 178.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	616	704	656	712	657

65(56)

(i) 481 Kg/ha. (ii) 42.5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	380	480	514	538	492

C.D.=65.3 Kg/ha.

**Crop :- Wheat.****Ref :- Rj. 62(112).****Site :- Soil Cons. Res. Demons. & Trg. Centre, Kota.****Type :- 'C'.**

Object :- To find out the suitable sowing date for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) (a) Clay loam. (iii) As per treatments. (iv) (a) Ploughing, harrowing, and bakhering. (b) Behind the plough. (c) 67 Kg/ha. (d) Rows 23 cm. apart. (e) N.A. (v) Nil. (vi) Malvi. (vii) Unirrigated. (viii) 1 weeding. (ix) N.A. (x) 24.3.63.

## 2. TREATMENTS :

4 dates of sowing : D<sub>1</sub>=8.10.62, D<sub>2</sub>=20.10.62, D<sub>3</sub>=1.11.62 and D<sub>4</sub>=13.11.62.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 10.7 m.  $\times$  7.3 m. (b) 10.1 m.  $\times$  6.7 Y. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) Poor. (ii) Nil. (iii) Yield of grain. (iv) (a) 1958-1962 (failed in 1960 and 1961 expt. N.A.). (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) Expt. for 1960 failed and for 1961-N.A.

## 5. RESULTS :

(i) 386 Kg/ha. (ii) 202.6 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>
Av. yield	260	503	548	234

C.D.=248.9 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(85).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'C'.**

Object :- To find out the optimum number of weedings and the time of weeding for Wheat crop.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Wheat. (c) 33.6 Kg/ha. of N as A/S. (ii) Sandy loam. (iii) 20.11.61. (iv) (a) 4 ploughings and 2 cross discings. (b) Drilling. (c) 86 Kg/ha. (d) 23 cm. to 30 cm. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) As per treatments. (ix) N.A. (x) 2.4.62.

## 2. TREATMENTS :

7 cultural treatments :  $C_0$  = No weeding,  $C_1$  = One weeding after 30 days of sowing,  $C_2$  = One weeding after 45 days of sowing,  $C_3$  = One weeding after 60 days of sowing,  $C_4$  = Two weedings with the interval of 20 days of sowing,  $C_5$  = Two weedings with the interval of 30 days of sowing and  $C_6$  = Two weedings with the interval of 45 days of sowing.

## 3. DESIGN :

(i) R B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 6.1 m.  $\times$  4.6 m. (b) 5.5 m.  $\times$  4.1 m. (v) 30 cm.  $\times$  25 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 2832 Kg/ha. (ii) 343.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$C_0$	$C_1$	$C_2$	$C_3$	$C_4$	$C_5$	$C_6$
Av. yield	2691	2794	2952	3054	2755	2812	2763

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 62(49), 63(61), 64(60).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'C'.**

**Object :-** To study the effect of different times of sowing and seed rates on growth and yield of Wheat crop.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 2 cross ploughings for 62(49), 1 discing and 1 palewa and ploughing for 63(61), 3 summer ploughings and 2 cross ploughings for 64(60). (b) Drilling for 62(49), behind the plough for others. (c) As per treatments. (d) 23 cm. between rows. (e) N.A. (v) 67.2 Kg/ha. of N as A/S by broadcasting and 67.2 Kg/ha. of  $P_2O_5$  as Super as drilling for 62(49), N.A. for 63(61), 56 Kg/ha. of N as A/S + 67.3 Kg/ha. of  $P_2O_5$  as Super for 64(60). (vi) R.S. 31-1. (vii) Irrigated. (viii) 2 weedings for 62(49), 63(61), N.A. for 64(60). (ix) N.A. (x) N.A., 17, 24.3.1964; 19.3.95 to 3.4.65.

## 2. TREATMENTS :

**Main-plot treatments :**

6 dates of sowing :  $D_1$  = 20th Oct.,  $D_2$  = 30th Oct.,  $D_3$  = 10th November,  $D_4$  = 20th November,  $D_5$  = 30th November, and  $D_6$  = 10th Dec.

**Sub-plot treatments :**

6 seed rates :  $S_1$  = 62,  $S_2$  = 74,  $S_3$  = 87,  $S_4$  = 99,  $S_5$  = 111 and  $S_6$  = 124 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 5.5 m.  $\times$  3.7 m. (b) 4.9 m.  $\times$  3.1 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) Good but heavy lodging in  $D_4$ ,  $D_5$  and  $D_6$  plots in 64(60) only. (ii) N.A. for 62(49), Nil for 63(61), Damage by the incidence of termites. (iii) Yield of grain and fodder. (iv) (a) 1962 to 64. (b) No. (v) and (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous the results of individual years are presented under 5 results.

## 5. RESULTS :

62(49)

(i) 1603 Kg/ha. (ii) (a) 356.6 Kg/ha. (b) 403.6 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	Mean
S <sub>1</sub>	1623	1677	1844	1891	1109	1130	1546
S <sub>2</sub>	1666	1881	2321	2070	1473	1395	1801
S <sub>3</sub>	984	1825	2050	1818	1324	1001	1500
S <sub>4</sub>	1072	1684	1452	1821	1271	1807	1518
S <sub>5</sub>	1721	1932	1177	2086	1216	1073	1534
S <sub>6</sub>	1593	1995	1794	2123	1495	1317	1720
Mean	1443	1832	1773	1968	1315	1287	1603

C.D. for D marginal means=374.3 Kg/ha.

63(61)

(i) 1329 Kg/ha. (ii) (a) 322.0 Kg/ha. (b) 382.0 Kg/ha. (iii) Main effect of D alone is significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	Mean
S <sub>1</sub>	483	1363	1920	1820	1410	948	1324
S <sub>2</sub>	987	1750	1948	1121	1076	919	1300
S <sub>3</sub>	865	2018	1303	1337	1233	757	1252
S <sub>4</sub>	1235	1627	1656	1479	1217	624	1306
S <sub>5</sub>	1490	1586	1666	1673	1195	802	1402
S <sub>6</sub>	811	1704	1632	1272	1617	1314	1392
Mean	978	1675	1687	1450	1291	894	1329

C.D. for D marginal means=338.0 Kg/ha.

64(60)

(i) 2528 Kg/ha. (ii) (a) 1049.0 Kg/ha. (b) 506.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	Mean
N <sub>1</sub>	1638	2843	3308	2693	2673	1931	2514
N <sub>2</sub>	2265	2688	2638	2942	2575	1526	2439
N <sub>3</sub>	2452	2701	2862	2982	2275	1967	2540
N <sub>4</sub>	2153	2726	3589	3071	2311	1749	2600
S <sub>5</sub>	2788	2937	2736	2874	2452	1521	2551
S <sub>6</sub>	1979	2676	2916	3151	2753	1667	2524
Mean	2212	2762	3008	2952	2506	1727	2528

**Crop :- Wheat (Rabi).****Ref :- Rj. 60(62), 60(63).****Site :- Govt. Agri. Res. Farm, Sriganaganagar.  
Govt. Agri. Farm, Mandore.****Type :- 'C'.**

Object :—To find out the optimum seed rate for Wheat.

**1. BASAL CONDITIONS :**

- (i) (a) Fallow-Wheat for 60(62); G.M.—Wheat for 60(63). (b) Fallow for 60(62); G.M. for 60(63). (c) Nil.  
 (ii) Sandy loam. (iii) Nov., 1960. (iv) (a) 3 ploughings. (b) Drilling. (c) As per treatments. (d) 23 cm.  
 between rows. (e) N.A. (v) 22.4 Kg/ha. of  $P_2O_5$  as Super. (vi) R.S. 31-1 ; C-591. (vii) Irrigated. (viii)  
 2 weedings for 60(62), N.A. for 60(63). (ix) N.A. (x) April, 1961.

**2. TREATMENTS :**8 seed rates :  $R_1=58$ ,  $R_2=69$ ,  $R_3=81$ ,  $R_4=92$ ,  $R_5=104$ ,  $R_6=115$ ,  $R_7=127$  and  $R_8=138$  Kg/ha.**3. DESIGN :**

- (i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) N.A. for 60(62); 9.1 m. × 5.5 m. for 60(63). (b) 7.0 m. ×  
 4.9 m. for 60(62); 8.5 m. × 4.6 m. for 60(63). (v) N.A. for 60(62); 30 cm. × 46 cm. for 60(63). (vi) Yes.

**4. GENERAL :**

- (i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 only. (b) N.A. (c) Nil. (v) and (vi) N.A.  
 (vii) Error variances are homogeneous and Treatments × years interaction is absent.

**5. RESULTS :**

- (i) 2547 Kg/ha. (ii) 210.7 Kg/ha. [based on 77 d.f. made up of Treatments × years interaction and pooled  
 error]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$R_1$	$R_2$	$R_3$	$R_4$	$R_5$	$R_6$	$R_7$	$R_8$
Av. yield	2468	2537	2544	2533	2552	2558	2541	2638

**Crop :- Wheat (Rabi).****Ref :- Rj. 60(68), 61(88), 62(47).****Type :- 'C'.****Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

Object :—To study the effect of different seed rates and different dates of sowing on the yield of Wheat.

**1. BASAL CONDITIONS :**

- (i) (a) Fallow-Wheat. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 3 ploughings.  
 (b) N.A. (c) As per treatments. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) R.S. 31-1. for 60(68);  
 C-591 for others. (vii) Irrigated. (viii) N.A. for 60(63); 2 weedings for others. (ix) N.A. (x) 20.4.1961,  
 24.4.1962, 9 to 22.4.1963.

**2. TREATMENTS :****Main-plot treatments :**8 dates of sowing :  $D_1=14$ th Oct.,  $D_2=24$ th Oct.,  $D_3=4$ th Nov.,  $D_4=14$ th Nov.,  $D_5=24$ th Nov.,  $D_6=4$ th Dec.,  $D_7=14$ th Dec. and  $D_8=24$ th Dec.**Sub-plot treatments :**8 seed rates :  $S_1=46$ ,  $S_2=59$ ,  $S_3=69$ ,  $S_4=81$ ,  $S_5=92$ ,  $S_6=104$ ,  $S_7=115$  and  $S_8=127$  Kg/ha.**3. DESIGN :**

- (i) Split-plot. (ii) (a) 8 main-plots/replication, 8 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) N.A. (b)  
 4.6 m. × 2.7 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

- (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 62. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii)  
 The main and sub-plot error variances are heterogeneous. Therefore, the results of individual years are  
 presented under 5. Results.

## 5. RESULTS :

60(68)

(i) 2418 Kg/ha. (ii) (a) 339.9 Kg/ha. (b) 303.8 Kg/ha. (iii) Main effect of D is highly significant and interaction D×S is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	S <sub>8</sub>	Mean
D <sub>1</sub>	2719	3107	2215	2598	2824	2396	2904	2170	2617
D <sub>2</sub>	2766	2981	2892	2532	2668	2656	2745	3028	2784
D <sub>3</sub>	2668	2803	2937	3027	3458	2445	1840	3164	2793
D <sub>4</sub>	2462	2335	2780	2757	2396	2485	2492	2980	2586
D <sub>5</sub>	2303	2651	2462	2532	2308	2780	2403	2439	2485
D <sub>6</sub>	2532	2192	2102	2146	2123	1875	2146	2032	2144
D <sub>7</sub>	2191	2258	2168	2056	2480	2439	2598	2303	2312
D <sub>8</sub>	1740	1468	1559	1763	1761	1604	1378	1761	1629
Mean	2423	2474	2389	2426	2502	2335	2313	2485	2418

C.D. for D marginal means = 284.3 Kg/ha.  
 C.D. for S means at the same level of D = 609.1 Kg/ha.  
 C.D. for D means at the same level of S = 635.4 Kg/ha.

61(88)

(i) 2679 Kg/ha. (ii) (a) 930.0 Kg/ha. (b) 416.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	S <sub>8</sub>	Mean
D <sub>1</sub>	2976	2790	2939	2679	2370	2604	2902	3013	2776
D <sub>2</sub>	2604	3013	3125	3088	3050	3050	3274	2679	2985
D <sub>3</sub>	2493	3385	3422	3013	2679	3199	2827	2939	2995
D <sub>4</sub>	2865	2902	3125	2455	3125	2604	2716	3013	2851
D <sub>5</sub>	2269	2641	3162	3162	3088	3980	3238	3236	3097
D <sub>6</sub>	2344	2418	2753	2530	2381	2493	2418	2753	2511
D <sub>7</sub>	2158	2046	2716	2121	2046	2232	2881	2195	2237
D <sub>8</sub>	1898	2307	1935	1859	1935	1749	1898	2232	1977
Mean	2451	2688	2897	2613	2576	2739	2707	2757	2679

62(47)

(i) 2871 Kg/ha. (ii) (a) 1227.6 Kg/ha. (b) 453.8 Kg/ha. (iii) Main effect of D alone is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	S <sub>8</sub>	Mean
D <sub>1</sub>	3181	3422	3292	3181	4017	3571	3702	3732	3512
D <sub>2</sub>	3143	2604	3032	2976	2902	2567	2252	2810	2786
D <sub>3</sub>	2753	3088	3526	3274	3869	3720	3312	3237	3347
D <sub>4</sub>	2865	3497	3683	3794	2902	3348	3516	3553	3395
D <sub>5</sub>	2995	3088	2641	3088	2920	3460	2587	2717	2937
D <sub>6</sub>	3105	2418	3125	2753	3069	2381	3181	3479	2939
D <sub>7</sub>	2753	3311	2902	3497	2790	2753	2753	3125	2986
D <sub>8</sub>	967	1078	1302	985	1525	669	911	1097	1067
Mean	2720	2813	2938	2944	2999	2809	2777	2969	2871

C.D. for D marginal means = 1026.4 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 60(59).****Site :- Govt. Agri. Farm, Tabiji.****Type :- 'C'.**

Object :—To find out the optimum seed rate for Wheat.

**1. BASAL CONDITIONS :**(i) (a) N.A. (b) Fallow. (c) Nil. (ii) Nil. (iii) Oct., 1960. (iv) (a) 3 ploughings. (b) N.A. (c) As per treatments. (d) Row to row 23 cm. (e) N.A. (v) 22.4 Kg/ha. of  $P_2O_5$ . (vi) R.S. 31-1. (vii) Irrigated. (viii) and (ix) N.A. (x) March, 1961.**2. TREATMENTS :**8 seed rates :  $S_1=58$ ,  $S_2=69$ ,  $S_3=81$ ,  $S_4=92$ ,  $S_5=104$ ,  $S_6=115$ ,  $S_7=127$  and  $S_8=138$  Kg/ha.**3. DESIGN:**(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) 9.1 m.  $\times$  5.5 m. (b) 8.5 m.  $\times$  4.6 m. (v) 30 cm.  $\times$  46 cm. (vi) Yes.**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 only. (b) N.A. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 2060 Kg/ha. (ii) 451.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha,

Treatment	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	$S_7$	$S_8$
Av. yield	1978	1963	2139	2075	2188	2007	2056	2074

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(86).****Site :- Govt. Agri. Farm, Tabiji.****Type :- 'C'.**

Object :—To find out the optimum number of weedings and time of weeding for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Maize-Wheat. (b) Maize. (c) 33.6 Kg/ha. of N. (ii) N.A. (iii) 19.10.61. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) 22 cm. between rows. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) As per treatments. (ix) N.A. (x) 20.4.62.

**2. TREATMENTS :**

Same as in expt. no. 61(85) on page 91.

**3. DESIGN :**(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 7.4 m.  $\times$  5.5 m. (v) N.A. (vi) Yes.**4. GENERAL :**

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

**5. RESULTS :**

(i) 3599 Kg/ha. (ii) 265.4 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$C_0$	$C_1$	$C_2$	$C_3$	$C_4$	$C_5$	$C_6$
Av. yield	2943	3440	3514	3440	4208	3957	3692

C.D. = 394.3 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 60, 61, 62(MAE).****Site :- M.A.E. Centre, Sriganaganagar.****Type :- 'CM'.**

**Object :-**Type VIII.:-To study the effect of cultural practices along with different levels of N and P on the yield of Wheat.

**1. BASAL CONDITIONS :**

- (i) (a) to (c) N.A. (ii) Desert soil. (iii) As. per treatments. (iv) (a) 3 ploughings and 3 harrowings. (b) In furrows. (c) As per treatments. (d) 23 cm. between rows. (e) N.A. (v) 5600 Kg/ha. of F.Y.M. (vi) C-591 (late). (vii) Irrigated. (viii) 3 weedings. (ix) N.A.; 1 to 14-4-62; 23-4-62 and 26-4-62.

**2. TREATMENTS :****Main-plot treatments :**

All combinations of (1) and (2)

(1) 3 dates of sowing :  $D_1=26.10.60$ ;  $D_2=10.11.60$  and  $D_3=25.11.60$ .(2) 3 seed rates :  $S_1=56.0$ ,  $S_2=78.4$  and  $S_3=100.9$  Kg/ha.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.(2) 3 levels of  $P_2O_5$  as super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha. $D_1=2.11.61$ ,  $D_2=17.11.61$  and  $D_3=2.12.61$  for 1961. Dates for 1962 are N.A.**3. DESIGN :**

- (i) Split-plot. (ii) (a) 9 main-plots/replication and 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a)  $11.1$  m.  $\times$   $4.6$  m. for 61. (b)  $9.8$  m.  $\times$   $4.1$  m. for 61. (v)  $61$  cm.  $\times$   $23$  cm. (vi) Yes.

**4. GENERAL :**

- (i) Good. (ii) Attack of white ants in  $D_1$  plots for 61. Nil for others. (iii) Yield of grain. (iv) (a) 1957-62(dates under treatments are modified every year). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :****1960**

- (i) 2428 Kg/ha. (ii) (a) 595.8 Kg/ha. (b) 243.5 Kg/ha. (iii) Main effects of D, N and interaction  $D \times P$  are highly significant. Main effect of P is significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	Mean
$D_1$	2195	2333	2250	2020	2195	2562	2260	2260	2257	2259
$D_2$	2878	2712	2610	2380	2804	3015	2758	2730	2711	2733
$D_3$	2333	2111	2635	1974	2315	2590	2047	2426	2406	2293
Mean	2469	2385	2432	2125	2438	2722	2355	2472	2458	2428
$P_0$	2333	2315	2417	2066	2416	2583				
$P_1$	2555	2380	2481	2149	2453	2814				
$P_2$	2519	2459	2397	2160	2445	2769				
$N_0$	2223	2047	2005							
$N_1$	2481	2389	2444							
$N_2$	2702	2718	2747							

C.D. for D marginal means = 264.5 Kg/ha.

C.D. for N or P marginal means = 93.6 Kg/ha.

C.D. for P means at the same level of D = 162.1 Kg/ha.

C.D. for D means at the same level of P = 295.1 Kg/ha.



1961

(i) 2118 Kg/ha. (ii) (a) 453.2 Kg/ha. (b) 246.1 Kg/ha. (iii) Main effects of N and P are highly significant. Main effect of D is significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	2121	2011	1706	1854	2001	1983	1743	1891	2204	1946
P <sub>1</sub>	2269	2214	1918	2020	2149	2233	1983	2121	2298	2134
P <sub>2</sub>	2435	2343	2048	2250	2269	2306	2066	2352	2407	2275
Mean	2275	2189	1891	2041	2140	2174	1931	2121	2303	2118
N <sub>0</sub>	2075	1955	1763	1789	1992	2012				
N <sub>1</sub>	2287	2177	1899	2066	2149	2148				
N <sub>2</sub>	2463	2435	2011	2268	2279	2362				
S <sub>1</sub>	2260	2131	1732							
S <sub>2</sub>	2352	2204	1864							
S <sub>3</sub>	2213	2232	2077							

C.D. for D marginal means=201.1 Kg/ha.

C.D. for N or P marginal means=94.6 Kg/ha.

1962

(i) 1600 Kg/ha. (ii) (a) 358.8 Kg/ha. (b) 235.1 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	1678	1535	1712	1582	1657	1685	1302	1691	1931	1642
P <sub>1</sub>	1922	1734	1833	1802	1904	1784	1541	1878	2071	1830
P <sub>2</sub>	1939	1781	2017	1874	2011	1850	1557	1915	2265	1911
Mean	1846	1683	1855	1754	1857	1773	1467	1828	2089	1794
N <sub>0</sub>	1540	1371	1489	1431	1531	1439				
N <sub>1</sub>	1895	1687	1903	1798	1915	1772				
N <sub>2</sub>	2104	1992	2171	2032	2126	2109				
S <sub>1</sub>	1883	1666	1712							
S <sub>2</sub>	1845	1759	1968							
S <sub>3</sub>	1811	1625	1883							

C.D. for N or P marginal means=111.7 Kg/ha.

Crop :- Wheat (Rabi).

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

Ref :- Rj. 61(100), 62(60).

Type :- 'CMV'.

Object :- To find out the suitable variety for late sowing with seed rate and fertilizers requirements for Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) N.A. (b) Fallow for 61(100); Groundnut for other. (c) N.A. for 61(100); Nil for other.  
 (ii) Black soil. (iii) As per treatments. (iv) (a) 2 ploughings and 2 bakherings. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated.  
 (viii) 1 to 2 weedings. (ix) and (x) N.A.

## 2. TREATMENTS :

## Main-plot treatments :

2 dates of sowing :  $D_1=15$ th Dec. and  $D_2=30$ th December.

## Sub-plot treatments :

4 varieties :  $V_1=C-228$ ,  $V_2=C-281$ ,  $V_3=N.P.-718$  and  $V_4=C-286$ .

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 seed rates :  $S_1=92$ ,  $S_2=115$  and  $S_3=138$  Kg/ha.

(2) 2 levels of N as A/S :  $M_1=44.8$  and  $M_2=67.2$  Kg/ha.

M applied in 2 splits,  $\frac{1}{2}$  at sowing and  $\frac{1}{2}$  one month after sowing.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 2 main-plots/replication ; 4 sub-plots/main plot ; 6 sub-sub-plots/sub-plot. (b) N.A.  
 (iii) 2. (iv) (a) 4.3 m.  $\times$  3.7 m. (b) 3.7 m.  $\times$  3.1 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

- (i) N.A. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1962. (b) N.A. (c) Nil. (v) and (vi) N.A.  
 (vii) Since the sub-sub-plot error variances are heterogeneous, the results of individual years are presented under 5. Results.

## 5. RESULTS :

## 61(100)

- (i) 886 Kg/ha. (ii) (a) 35.9 Kg/ha. (b) 224.2 Kg/ha. (c) 107.6 Kg/ha. (iii) Main effects of V, N and S are highly significant and that of D is significant. (iv) Av. yield of grain in Kg/ha.

	$V_1$	$V_2$	$V_3$	$V_4$	$S_1$	$S_2$	$S_3$	$N_1$	$N_2$	Mean
$D_1$	1065	1350	957	770	874	1098	1133	952	1118	1035
$D_2$	724	955	690	580	548	729	935	660	814	737
Mean	894	1152	824	675	711	914	1034	806	966	886
$N_1$	826	1088	715	594	629	822	967			
$N_2$	962	1216	932	755	793	1005	1101			
$S_1$	741	958	617	528						
$S_2$	871	1185	887	712						
$S_3$	1071	1313	967	785						

C.D. for D marginal means = 92.7 Kg/ha.

C.D. for V marginal means = 158.3 Kg/ha.

C.D. for S marginal means = 54.4 Kg/ha.

C.D. for N marginal means = 44.5 Kg/ha.

## 62(60)

- (i) 1469 Kg/ha. (ii) (a) 166.8 Kg/ha. (b) 280.8 Kg/ha. (c) 324.7 Kg/ha. (iii) Main effects of D and V are highly significant. (iv) Av. yield of grain in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
D <sub>1</sub>	1853	2224	1493	1205	1590	1775	1716	1643	1745	1694
D <sub>2</sub>	1315	1533	1193	935	1185	1233	1313	1211	1277	1244
Mean	1584	1879	1342	1070	1387	1504	1514	1427	1511	1469
N <sub>1</sub>	1526	1874	1313	995	1386	1433	1460			
N <sub>2</sub>	1641	1884	1373	1145	1389	1576	1568			
S <sub>1</sub>	1446	1802	1330	972						
S <sub>2</sub>	1574	1963	1328	1152						
S <sub>3</sub>	1731	1871	1370	1085						

C.D. for D marginal means = 432.0 Kg/ha.

C.D. for V marginal means = 198.5 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Nadia Farm, Bharatpur.**

**Ref :- Rj. 65(21).**

**Type :- 'CMV'.**

Object :- To study the effect of different seed rates and fertility levels on the growth and yield of different Wheat varieties.

#### 1. BASAL CONDITIONS :

(i) (a) No. (b) and (c) Nil. (ii) (a) N.A. (iii) 18.12.65. (iv) (a) Disc harrowing and ploughing. (b) Behind the plough. (c) As per treatments. (d) 25 cm. × 10 cm. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 3 weedings. (ix) N.A. (x) 21 and 22.4.66.

#### 2. TREATMENTS :

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

(1) 3 varieties : V<sub>1</sub>=R.S. 3-1, V<sub>2</sub>=C 281 and V<sub>3</sub>=C 286.

(2) 3 seed rates : S<sub>1</sub>=90, S<sub>2</sub>=100 and S<sub>3</sub>=110 Kg/ha,

(3) 3 levels of N: N<sub>1</sub>=45, N<sub>2</sub>=90 and N<sub>3</sub>=135 Kg/ha.

#### 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.0 m. × 4.0 m. (b) 8.0 m. × 3.0 m. (v) 50 cm. × 50 cm. (vi) Yes.

#### 4. GENERAL :

(i) Good. (ii) Nil. (iii) Stand, height, no. of tillers, no. of ears, yield of grain and fodder. (iv) (a) 1965-N.A. (b) No. (c) Nil. (v) to (vii) Nil.

#### 5. RESULTS :

(i) 2613 Kg/ha. (ii) 462.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
V <sub>1</sub>	2437	2621	2500	2521	2757	2281	2520
V <sub>2</sub>	2738	2837	2960	2713	2937	2884	2845
V <sub>3</sub>	2573	2618	2232	2607	2507	2309	2474
Mean	2583	2692	2564	2614	2734	2491	2613
N <sub>1</sub>	2651	2760	2430				
N <sub>2</sub>	2833	2726	2642				
N <sub>3</sub>	2264	2590	2619				

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(57), 61(79).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'P'.**

**Object :-** To study the effect of frequency and intensity of irrigation on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Fallow-Wheat for 60(57) ; Maize-Wheat. for 61 (79)(b) Fallow for 60(57) ; Maize for 61(79). (c) 33.6 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) N.A. (iii) Month of October. (iv) (a) 3 to 4 ploughings. (b) and (c) N.A. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) As per treatments. (viii) and (ix) N.A. (x) Month of April.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 3 intensities of irrigation : I<sub>1</sub>=1.5, I<sub>2</sub>=2.0 and I<sub>3</sub>=2.5 acre inches.

(2) 3 methods of irrigation : M<sub>1</sub>=dividing the plot in 4 strips, M<sub>2</sub>=Plot is divided in 4 squares and M<sub>3</sub>=Whole plot.

**Sub-plot treatments :**

3 frequencies of irrigation : F<sub>1</sub>=4, F<sub>2</sub>=5 and F<sub>3</sub>=6.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 9 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 10.1 m. × 10.1 m. (b) 9.0 m. × 9.0 m. (v) 54 cm. × 54 cm. (vi) Yes.

**4. GENERAL :-**

(i) and (ii) N.A. (iii) Yield of grain and fodder, (iv) (a) 1960 to 61. (b) N.A. (c) Results of combined analysis given under 5. (v) and (vi) N.A. (vii) Both the error variances are homogeneous. Main-plot Treatments × years interaction is present, while sub-plot Treatments × years interaction is absent.

**5. RESULTS :**

(i) 2854 Kg/ha. (ii) (a) 694.8 Kg/ha. [based on 8 d.f. made up of Treatments × years interaction]. (b) 292.2 Kg/ha. [based on 46 d.f. made up of Treatments × years interaction and pooled error]. (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
F <sub>1</sub>	2492	2697	2642	2761	2598	2470	2610
F <sub>2</sub>	2778	2683	3014	2922	2724	2828	2825
F <sub>3</sub>	3108	3101	3174	3141	3221	3020	3127
Mean	2793	2827	2943	2941	2848	2773	2854
M <sub>1</sub>	2826	2894	3104				
M <sub>2</sub>	2975	2743	2826				
M <sub>3</sub>	2577	2843	2899				

C.D. for F marginal means = 138.6 Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	I <sub>7</sub>	I <sub>8</sub>	I <sub>9</sub>	Mean
N <sub>0</sub>	892	1144	1412	1531	1380	1724	1915	1872	1811	1520
N <sub>1</sub>	1197	1322	1476	1760	1523	2081	2215	2306	2315	1799
N <sub>2</sub>	1085	1392	1406	1631	1441	1994	2570	2636	2251	1823
Mean	1058	1286	1431	1641	1448	1933	2233	2271	2126	1714

C.D. for I marginal means=364.3 Kg/ha.

C.D. for N marginal means=109.8 Kg/ha.

**Crop :- Wheat.**

**Ref :- Rj. 60 to 62(MAE).**

**Site :- M.A.E. Centre, Sriganaganagar.**

**Type :- 'IM'.**

**Object :-**Type I :-To study the effect of different intensities and frequencies of irrigations along with different levels of N and P on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Desert soil. (iii) N.A. ; 4, 5.11.61 ; N.A. (iv) (a) 3 ploughings and 3 harrowings. (b) Line sowing. (c) 80 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) 5600 Kg/ha. of F.Y.M. (vi) C-591(late). (vii) Irrigated. (viii) 3 weedings. (ix) N.A. ; 3 cm., N.A. (x) N.A. ; 14.4.62 ; N.A.

**2. TREATMENTS :**

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

(1) 3 frequencies of irrigations : F<sub>1</sub>=3, F<sub>2</sub>=4 and F<sub>3</sub>=5 irrigations.

(2) 3 intensities of irrigations : I<sub>1</sub>=5.1, I<sub>2</sub>=7.6 and I<sub>3</sub>=10.2 cm.

(3) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(4) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

**3. DESIGN :**

(i) 3<sup>4</sup> confd. (ii) (a) 9 plots/block and 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 11.1 m. × 4.6 m. for 61 ; N.A. for 62. (b) 9.8 m. × 4.0 m. for 61, 9.8 m. × 4.6 m. for 62. (v) 61 cm. × 26 cm. for 61, N.A.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1956-1962 (modified in 1958). (b) No. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) Water logging in 1961. (vii) Results of 1958 and 1959 have also been considered in presenting pooled results.

**5. RESULTS :**

(i) 2332 Kg/ha. (ii) 377.9 Kg/ha. (iii) Main effects of N, P and F are significant. Interaction I × F is significant. (iv) Av. yield of grain in Kg/ha.

	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	Mean
I <sub>1</sub>	2129	2256	2532	2306
I <sub>2</sub>	2133	2362	2446	2314
I <sub>3</sub>	2271	2369	2484	2375
Mean	2178	2329	2487	2332

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>
Marginal means	2064	2390	2542
	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
Marginal means	2192	2339	2465

C.D. for N or P or F marginal means=90.0 Kg/ha.

C.D. for means in the body of (I × F) table=174.0 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 65(49).****Site :- Govt. Agri Res. Farm, Borkhera.****Type :- 'IMV'.**

Object :—To evolve a manurial and irrigation schedule for Mexican wheat (sonara 64) in comparison to recommended wheat (NP 718) of the area.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Maize. (c) Nil; (ii) Black soil. (iii) 11.11.65. (iv) (a) Ploughing, bakhering, discing and planking. (b) Drilling. (c) 74 Kg./ha. (d) Between lines 31 cm. (e) Nil. (v) 22.4 Kg/ha. of  $K_2O$ . (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings and hoeing. (ix) N.A. (x) 26.3.66 and 5 to 7.4.1966.

**2. TREATMENTS :****Main-plot treatments :**2 levels of irrigation :  $I_1=38$ ,  $I_2=5$  irrigations.**Sub-plot treatments :**

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

(1) 4 levels of N :  $N_1=34$ ,  $N_2=68$ ,  $N_3=102$  and  $N_4=136$  Kg/ha.(2) 2 levels of  $P_2O_5$  :  $P_1=34$  and  $P_2=68$  Kg/ha.(3) 2 varieties :  $V_1=Sonara\ 64$  and  $V_2=NP\ 718$ .**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 2 main-plots/replication, 2 blocks/main-plot ; 8 sub-plots/block. (b) N.A. (iii) 2. (iv) 6.0 cm.  $\times$  4.0 m. (b) 5.7 m.  $\times$  3.7 m. (v) 17 cm.  $\times$  17 cm. (vi) Yes.

**4. GENERAL :**

(i) Fair. (ii) Nil. (iii) Stand height, no. of fillers and yield of grain. (iv) (a) 1965 contd. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 2605 Kg/ha. (ii) (a) 1790.5 Kg/ha. (b) 417.8 Kg/ha. (iii) Main effects of N and V are highly significant. Interaction  $I \times N \times P$  is also significant. (iv) Av. yield of grain in Kg/ha.

	$N_1$	$N_2$	$N_3$	$N_4$	$P_1$	$P_2$	$V_1$	$V_2$	Mean
$I_0$	1885	2082	2522	2537	2267	2246	1977	2535	2256
$I_1$	2326	3004	3138	3354	2988	2918	2746	1342	2953
Mean	2105	2543	2825	2946	2627	2582	2371	2839	2605
$V_0$	1707	2401	2769	2606	2366	2375			
$V_1$	2504	2685	2881	3285	2888	2788			
$P_0$	1930	2564	2917	3098					
$P_1$	2280	2522	2733	2794					

C.D. for N marginal means=301.6 Kg/ha.

C.D. for V marginal means=213.2 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 65(51).****Site :- Govt. Agri. Res. Farm, Sriganganagar.****Type :- 'IMV'.**

Object :—To study the effect of irrigation, N and P on the yield of different varieties of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 19.11.65. (iv) (a) Tractor ploughing and bullock ploughing. (b) Behind the plough. (c) C-591-75 Kg/ha. and Sonara 64—87.5 Kg/ha. (d) Rows 23 cm. apart. (e) Nil. (v) 30 Kg/ha. of  $K_2O$ . (vi) and (vii) As per treatments. (viii) 4 hand hoeings. (ix) N.A. (x) 16.4.66.

## 2. TREATMENTS :

## Main-plot treatments :

2 levels irrigation :  $I_1$  = Normal irrigation (three) and  $I_2$  = Two extra irrigations over normal (five).

## Sub-plot treatments :

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

(1) 4 levels of N :  $N_1=37.5$ ,  $N_2=75$ ,  $N_3=112.5$  and  $N_4=150$  Kg/ha.

(2) 2 levels of  $P_2O_5$  :  $P_1=37.5$  and  $P_2=75$  Kg/ha.

(3) 2 varieties :  $V_1$  = Sonara—64 and  $V_2$  = C—591.

## 3. DESIGN :

(i) Split—plot confd. 2 main-plots/replication ; 2 blocks/main-plot. (ii) (a) 8 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 6.4 m. × 5.5 m. (b) 6.0 m. × 4.6 m. (v) 23 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1918 Kg/ha. (ii) (a) 234.3 Kg/ha. (b) 248.4 Kg/ha. (iii) Main effect of P is highly significant and that of N, interactions  $I \times N$  and  $I \times P$  are significant. (iv) Av. yield of grain in Kg/ha.

	$N_1$	$N_2$	$N_3$	$N_4$	$P_1$	$P_2$	$V_1$	$V_2$	Mean
$I_1$	1574	1579	1960	1386	1599	1650	1531	1719	1625
$I_2$	1848	2411	2264	2317	1955	2466	2202	2218	2210
Mean	1711	1995	2112	1852	1777	2058	1867	1968	1918
$V_1$	1663	1849	2067	1887	1715	2018			
$V_2$	1759	2141	2156	1816	1839	2098			
$P_1$	1726	1780	2005	1597					
$P_2$	1696	2210	2219	2106					

C.D. for N marginal means = 177.5 Kg/ha.

C.D. for P marginal means = 125.5 Kg/ha.

C.D. for N means at the same level of I = 251.0 Kg/ha.

C.D. for I means at the same level of N = 547.0 Kg/ha.

C.D. for I means at the same level of P = 584.3 Kg/ha.

C.D. for P means at the same level of I = 173.5 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 65(24).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'ICM'.**

**Object :-** To study the fertility and moisture relationship with germination, initial growth and yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) No. (b) Moong. (c) N.A. (ii) Sandy. (iii) 3.11.65. (iv) (a) Disc ploughing and harrowing, mould board ploughing. (b) Behind the plough. (c) 92.2 Kg/ha. (d) 22 cm. × 10 cm. (e) N.A. (v) 30 Kg/ha. of  $K_2O$ . (vi) RS 31-1 (120 days). (vii) Irrigated. (viii) 3 weedings. (ix) N.A. (x) 23, 24.3.66.

## 2. TREATMENTS:

## Main-plot treatments :

4 cultural-cum-irrigational treatments :  $S_1$ =Dry sowing and post irrigation with normal seed,  $S_2$ =Pre irrigation and post sowing with normal seed,  $S_3$ =Dry sowing and post irrigation with 12 hrs. soaked seed and  $S_4$ =Pre irrigation and post sowing with 12 hrs. soaked seed.

## Sub-plot treatments:

4 manurial treatments :  $F_1$ =40 Kg/ha. of N+20 Kg/ha. of P,  $F_2$ =Twice  $F_1$ ,  $F_3$ =40 Kg/ha. of N+40 Kg/ha. of P and  $F_4$ =Twice  $F_3$ .

## 3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plots. (b) N.A. (iii) 4. (iv) (a) 4.5 m. × 2.3 m. (b) 3.5 m. × 1.3 m. (v) 50 cm. × 50 cm. (vi) Yes.

## 4. GENERAL:

(i) Good. (iv) Nil. (iii) No. of tillers, height of plants, no. of tillers, yield of grain and fodder etc. (iv) (a) 1965 to 66. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 3311 Kg/ha. (ii) (a) 1042 Kg/ha. (b) 4389 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$F_1$	$F_2$	$F_3$	$F_4$	Mean
$S_1$	3446	4000	3160	3594	3550
$S_2$	2800	4000	2686	3543	3257
$S_3$	2514	3886	3143	3583	3282
$S_4$	2743	3600	2857	3428	3157
Mean	2874	3872	2962	3537	3311

C.D. for F marginal means=314.8 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 63(93).**

**Site :- Govt. Agri. Farm, Banswara.**

**Type :- 'D'.**

Object :—To test the relative efficiency of seed dressing fungicides on the yield and vigour of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Red loam. (iii) 29.11.63. (iv) (a) 4 ploughings and planking. (b) Dibbling. (c) N.A. (d) 23 cm. × 15 cm. (e) 3. (v) 85 Kg/ha. of Urea. (vi) R.S. 31-1. (vii) Irrigated. (viii) 2 hand weedings. (ix) N.A. (x) 2.4.64.

## 2. TREATMENTS :

10 seed dressing treatments :  $T_0$ =Control,  $T_1$ =2 gm. of Agrosan G.N.,  $T_2$ =2 gm. of Caresan,  $T_3$ =2 gm. of Lunasan,  $T_4$ =3 gm. of Thirum,  $T_5$ =2 gm. of Harvasan,  $T_6$ =2 gm. of Tillex,  $T_7$ =2 gm. of Shell seed drener B,  $T_8$ =4 gm. of Trilisan,  $T_9$ =2 gm. of Beej powder.

Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

i) Incomplete 'L' sq. (ii) (a) 3 plots/block, 10 blocks/sq. and 3 sqs. (b) N.A. (iii) 9. (iv) (a) 5.5 m. × 3.7 m. (b) 4.6 m. × 2.7 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Germination percentage and yield of grain and fodder. (iv) (a) 1963 only. (b) No. (c) Nil. (v) (a) Sriganaganar, Durgapura and Mandore. (b) N.A. (vi) N.A. (vii) Nil.



## 5. RESULTS :

(i) 46.33 degrees. (ii) 3.0 degrees. (iii) Treatment differences are not significant. (iv) Mean % of germination in degrees.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Mean angle	44.8	45.71	45.31	45.26	49.08	46.27	46.80	44.51	46.77	49.06

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(32).**

**Site :- Govt. Agri. Res. Farm, Borekhera.**

**Type :- 'D'.**

Object :- To find out the effect of different chemicals for the control of rusts on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Fallow-G.M.-Wheat. (b) G.M. (c) N.A. (ii) Black soil. (iii) 18.11.61. (iv) (a) 6 ploughings. (b) N.A. (c) 92 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) *Malbie*. (vii) Irrigated. (viii) and (ix) N.A. (x) 14.4.62.

## 2. TREATMENTS :

6 chemical treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Dusting of sulphur, T<sub>2</sub>=Spraying with colloidal sulphur, T<sub>3</sub>=Spraying with ultra sulphur, T<sub>4</sub>=Spraying Dithane 2.8 and T<sub>5</sub>=Spraying Dithane M 22(04).

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 7.3 m. x 5.5 m. (b) 5.5 m. x 3.7 m. (v) 91 cm. x 91 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 1205 Kg. ha. (ii) 294.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	1278	1110	1046	1171	1307	1319

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(33).**

**Site :- Govt. Agri. Res. Farm, Borekhera.**

**Type :- 'DC'.**

Object :- To find out the economic way of controlling weeds in Wheat.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) G.M. (c) N.A. (ii) Black soil. (iii) 15.11.61. (iv) (a) 6 ploughings. (b) N.A. (c) 92 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) and (ix) N.A. (x) 6.4.62

## 2. TREATMENTS :

5 weedicial treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Local method of weeding, T<sub>2</sub>=Post emergence (once), T<sub>3</sub>=Post emergence (twice) and T<sub>4</sub>=Post emergence +weeding

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 7.3 m.×5.5 m. (b) 5.5 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 1457 Kg/ha. (ii) 289.1 Kg/ha. (iii) Treatments differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	1416	1453	1423	1477	1508

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 63(94).**

**Site :- Govt. Agri. Res. Farm, Borekhera.**

**Type :- 'D'.**

**Object :-**To test the relative efficiency of seed dressing fungicides on the field and vigour of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) N.A. (ii) Black soil. (iii) 10, 11.11.63. (iv) (a) 1 ploughing, discing and planking. (b) Drilling. (c) 35 Kg/ha. (d) 46 cm.×46 cm. (e) Nil. (v) 98.8 Kg/ha. of N by broadcasting and 98.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> by drilling. (vi) C—591. (vii) Irrigated. (viii) 1 hand weeding. (ix) 140 cm. (x) 8.4.64.

## 2. TREATMENTS : and 3. DESIGN :

Same as in Expt. No. 63(93) on page 107

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1963 only. (b) No. (c) N.A. (v) (a) Durgapura, Mandore, Sriganagar. (b) Nil. (vi) A cold wave and heavy frost in the month of January. (vii) Nil.

## 5. RESULTS :

(i) 1448 Kg/ha. (ii) 321.0 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. yield	1241	1237	1611	1504	1261	1651	1294	1536	2078	1067

C.D.=303.5 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(29), 61(27).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

**Object :-**To find out the economic way of controlling weeds in Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Wheat-Cotton-Fallow-*Bajra* for 60(29) ; Barley-*Jowar*-Wheat for 61(27). (b) *Bajra* for 60(29); *Jowar* for 61(27). (c) N.A. for 60(29); Nil for 61(27). (ii) Sandy loam. (iii) 22.11.1960, 14.11.1961. (iv) (a) 3 to 4 ploughings. (b) N.A. (c) 105 Kg/ha. for 60(29); 92 Kg/ha. for others. (d) 23 cm. between rows for 60(29); 23 cm.×15 cm. for others. (e) N.A. (v) N.A. (vi) C—591 for 60(29); R.S. 31-1 for 61(27). (vii) Irrigated. (viii) N.A. (ix) N.A.; 7 cm. for 61(27). (x) 25.4.1961; 2.4.1962.

## 2. TREATMENTS :

5. methods of controlling weeds :  $W_0$ =Control (Unweeded),  $W_1$ =Local methods of weeding,  $W_2$ =Post emergence application of weedicides (once),  $W_3$ =Post emergence application of weedicides (twice) and  $W_4$ =Post emergence application of weedicides+weeding.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 7.3 m.×5.5 m. (b) 5.5 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

- (i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 to 1961. (b) N.A. (c) Results of combined analysis given under 5. (v) and (vi) N.A. (vii) Error variances are homogeneous, Treatments×years interaction is absent.

## 5. RESULTS :

- (i) 1729 Kg/ha. (ii) 195.2 Kg/ha. [44 d.f. made up of pooled error and Treatments×years interaction]. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$W_0$	$W_1$	$W_2$	$W_3$	$W_4$
Av. yield	1676	1889	1701	1589	1792

C.D.=160.7 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- 60(22).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

Object :-To study the effect of different levels and formulation of weedicides in the control of weeds in Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) Wheat-Cotton-Fallow-Bajra. (b) Bajra. (c) N.A. (ii) Sandy. (iii) 22.11.1960. (iv) (a) 3 ploughings. (b) N.A. (c) 115 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) C-591. (vii) Irrigated. (viii) and (ix) N.A. (x) 17, 18.4.61.

## 2. TREATMENTS :

## Main-plot treatments :

4 weedicides :  $W_1$ =Sodium salt of 2, 4-D,  $W_2$ =Ethylester of 2, 4-D,  $W_3$ =Amine salt of 2, 4-D and  $W_4$ =Sodium salt of M.C.P.A.

## Sub-plot treatments :

5 levels of Weedicides :  $D_0$ =Control,  $D_1$ =560 gm. acid equivalent per hectare,  $C$ =841 gm. acid equivalent per hectare,  $D$ =1.1 Kg. acid equivalent per hectare,  $E$ =1.4 Kg. acid equivalent per hectare.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 4 main-plots/block ; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.3 m.×5.5 m. (b) 5.5 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

- (i) and (ii) N.A. (ii) Yield of grain and fodder. (iv) to (vii) N.A.

## 5. RESULTS :

- (i) 888 Kg/ha. (ii) (a) 177.6 Kg/ha. (b) 152.3 Kg/ha. (iii) Main effect of D alone is significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
W <sub>1</sub>	755	982	862	961	847	881
W <sub>2</sub>	706	905	890	841	883	845
W <sub>3</sub>	890	954	961	933	785	905
W <sub>4</sub>	727	954	1010	897	1018	921
Mean	769	949	931	908	883	888

C.D. for D marginal means = 108.2 Kg/ha.

**Crop :-** Wheat (*Rabi*).

**Ref :-** Rj. 60(28).

**Site :-** Govt. Agri. Farm, Durgapur.

**Type :-** 'D'.

**Object :-** To test the relative efficiency of seed dressing fungicides on the yield and vigour of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Wheat-Cotton-Fallow-Bajra. (b) Bajra. (c) N.A. (ii) Sandy. (iii) 23.11.60. (iv) (a) 3 ploughings. (b) Dibbling. (c) 70 Kg/ha. (d) 23 cm. × 15 cm. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) and (ix) N.A. (x) 23.4.61.

**2. TREATMENTS :**

10 seed dressing treatments : T<sub>0</sub>=Control, T<sub>1</sub>=3 gm. of Agrosan G.N., T<sub>2</sub>=2 gm. of Ceresan, T<sub>3</sub>=3 gm. of Ceresan, T<sub>4</sub>=2 gm. of Lumasan, T<sub>5</sub>=3 gm. of Thiram, T<sub>6</sub>=2 gm. of Harvasan, T<sub>7</sub>=2 gm. of Tillex, T<sub>8</sub>=4 gm. of Copper Carbonate and T<sub>9</sub>=4 gm. of Sulphur,

Treatments applied to per Kg. of seed as dressing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) and (b) 4.6 m. × 2.7 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 to 62 [modified every year]. (b) N.A. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 1388 Kg/ha. (ii) 169.8 Kg/ha. (iii) Treatments differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. yield	1228	1484	1462	1454	1288	1342	1462	1477	1334	1348

**Crop :-** Wheat (*Rabi*).

**Ref :-** Rj. 61(26).

**Site :-** Govt. Agri. Farm, Durgapura.

**Type :-** 'D'.

**Object :-** To test the relative efficiency of seed dressing fungicides on the yield and vigour of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Jowar. (c) Nil. (ii) Sandy loam. (iii) 16.11.61. (iv) (a) 4 ploughings. (b) Dibbling. (c) 70 Kg/ha. (d) 23 cm. × 15 cm. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated, (viii) N.A. (ix) 66 cm. (x) 1.4.62.

## 2. TREATMENTS :

10 seed dressing treatments :  $T_0$ =Control,  $T_1$ =3 gm. of Agrosan G.N.,  $T_2$ =2 gm. of Ceresan,  $T_3$ =3 gm. of Ceresan,  $T_4$ =2 gm. of Lunasan,  $T_5$ =3 gm. of Thiram,  $T_6$ =2 gm. of Hervasan,  $T_7$ =2 gm. of Tillex,  $T_8$ =4 gm. of Shell B and  $T_9$ =4 gm. of Tritisan.

Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) and (b) 4.6 m. × 2.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-62 [modified every year]. (b) N.A. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 3051 Kg/ha. (ii) 287.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Av. yield	2891	2997	2997	3064	3307	3183	3135	3155	2990	2785

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 62(70).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

Object :- To test the relative efficacy of seed dressing fungicides on the yield and vigour of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Wheat-Fallow-Wheat. (b) Fallow. (c) Nil. (ii) Sandy. (iii) 5.11.62. (iv) (a) 2 ploughings. (b) Dibbling. (c) N.A. (d) 23 cm. × 15 cm. (e) 3. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) and (ix) N.A. (x) 2.4.63.

## 2. TREATMENTS :

10 seed dressing treatments :  $T_0$ =Control,  $T_1$ =2 gm. of Agrosan G.N.,  $T_2$ =2 gm. Ceresan,  $T_3$ =2 gm. Lunasan,  $T_4$ =3 gm. Thiram,  $T_5$ =2 gm. Hervasan,  $T_6$ =2 gm. Tillex,  $T_7$ =4 gm. Shell seed dresser,  $T_8$ =4 gm. Tritisan and  $T_9$ =3 gm. Beej Powder.

Treatments are applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) and (b) 4.6 m. × 2.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1950 to 62 (modified every year). (b) N.A. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 1310 Kg/ha. (ii) 470.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Av. yield	1089	1156	1502	1374	1578	1236	1169	1541	1216	1241

**Crop :- Wheat (Rabi).****Ref :- Rj. 60(31).****Site :- Govt. Agri. Farm, Durgapura.****Type :- 'D'.**

Object :- To find out the effect of different chemicals for the control of rust of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Wheat-Cotton-Fallow-Bajra. (b) Bajra. (c) N.A. (ii) Sandy. (iii) 23.11.60. (iv) (a) 3 ploughings. (b) N.A. (c) 115 Kg/ha. (d) Row to row 23 cm. (e) N.A. (v) N.A. (vi) Local. (vii) Irrigated. (viii) and (ix) N.A. (x) 26.4.61.

**2. TREATMENTS :**

6 chemical treatments :  $T_0$ =Control,  $T_1$ =Sulphur dust,  $T_2$ =Colloidal Sulphur (1 : 25),  $T_3$ =Ultra sulphur (5 Kg. in 272 litres of water),  $T_4$ =Colloidal sulphur (1 : 50) and  $T_5$ =Colloidal sulphur (1 : 100).

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 and 1961 [modified in 1961]. (b) N.A. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 893 Kg/ha. (ii) 170.5 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Av. yield	961	989	1010	954	568	875

C.D.=256.9 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 61(106).****Site :- Govt. Agri. Farm, Durgapura.****Type :- 'D'.**

Object :- To find out the effect of different chemicals for the control of rust of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) No. (b) Jowar. (c) Nil. (ii) Sandy loam. (iii) 14.11.61. (iv) (a) 4 ploughings. (b) N.A. (c) 92 Kg/ha. (d) Row to row 23 cm. (e) N.A. (v) N.A. (vi) Local. (vii) Irrigated. (viii) N.A. (ix) 6.6 cm. (x) 10.4.62.

**2. TREATMENTS :**

6 chemical treatments :  $T_0$ =Control,  $T_1$ =Sulphur dust,  $T_2$ =Colloidal Sulphur (1 : 25),  $T_3$ =Ultra sulphur,  $T_4$ =Dithane Z-78 (0.3%) and  $T_5$ =Dithane  $M_{22}$ .

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 6.9 m. × 5.0 m. (v) N.A. (vii) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 and 1961 [modified in 1961]. (b) N.A. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 3316 Kg/ha. (ii) 440.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	3183	3504	3184	3263	3188	3571

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(21), 61(29).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

Object :—To find out the economic way of controlling weeds in Wheat.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) N.A. for 60(21); Maize for other. (c) N.A. for 60(21); Compost for 61(29) but quantity N.A. (ii) Sandy loam. (iii) N.A.; 24.11.1961. (iv) (a) 4 ploughings. (b) Dibbling. (c) 70 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) RS 31-1. (vii) Irrigated. (viii) 2 weedings for 60(21); N.A. for other. (ix) N.A. (x) N.A. for 60(21); 4.4.1962.

**2. TREATMENTS :**

5 methods of controlling weeds : W<sub>0</sub>=Control (unweeded), W<sub>1</sub>=Local method of weeding, W<sub>2</sub>=Post emergence of weedicides (once), W<sub>3</sub>=Post emergence of weedicides (twice) and W<sub>4</sub>=Post emergence+weeding.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960—1961. (b) N.A. (c) Results of combined analysis are given under 5. Results. (v) and (vi) N.A. (vii) Error variances are homogeneous, interaction of Treatments × years is present.

**5. RESULTS :**

(i) 1763 Kg/ha. (ii) 6420 Kg/ha. [4 d.f. made up of interaction of Treatments with years]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>
Av. yield	1561	1862	1884	1970	1540

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(28).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

Object :—To study the effect of different levels and formulations of weedicides in controlling weeds in Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Maize. (c) City compost. (ii) Sandy loam. (iii) 23.12.61. (iv) (a) 4 ploughings. (b) N.A. (c) 92 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) RS 31-1. (vii) Irrigated. (viii) N.A. (ix) Nil. (x) 2.4.62.

**2. TREATMENTS :**

10 seed dressing treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Sodium salt of 2-4-D at .8 Kg/ha. of acid equivalent, T<sub>2</sub>=Sodium salt of 2-4-D at 1.4 Kg/ha. of acid equivalent, T<sub>3</sub>=Ethyle ester of 2-4-D at 8 Kg/ha. of acid equivalent, T<sub>4</sub>=Ethyle ester of 2-4-D at 1.4 Kg/ha. of acid equivalent, T<sub>5</sub>=Amine salt of 2-4-D at .8 Kg/ha. of acid equivalent, T<sub>6</sub>=Amine salt of 2-4-D at 1.4 Kg/ha. of acid equivalent, T<sub>7</sub>=Sodium salt of MCPA at .8 Kg/ha. of acid equivalent, T<sub>8</sub>=Sodium salt of MCPA at 1.4 Kg/ha. of acid equivalent and T<sub>9</sub>=Local method of weeding.

**DESIGN :**

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) to (vii) N.A.

**5. RESULTS :**

(i) 2473 Kg/ha. (ii) 393.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. yield	2441	2491	2478	2703	2281	2179	2503	2540	2692	2417

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 63(85).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

**Object :-** To study the efficacy of different chemicals in the control of rust of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 29.11.63. (iv) (a) 3 ploughings. (b) Behind the plough. (c) 99 Kg/ha. (d) Rows 23 cm. apart. (e) N.A. (v) 21 cu. m./ha. of compost + 44.8 Kg/ha. of N as A/S. (vi) Local. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 1.4.64.

**2. TREATMENTS :**

7 chemical treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Nickel chloride spray, T<sub>2</sub>=Sulphur dusting, T<sub>3</sub>=Colloidal sulphur spray (1 : 25), T<sub>4</sub>=Ultra sulphur spray (1 : 25), T<sub>5</sub>=Dithane Z-78 spray (0.5%) and T<sub>6</sub>=Dithane M-22 spray (0.4%).

**3. DESIGN :**

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 3. (iv) (a) 2.7 m. × 1.8 m. (b) 2.1 m. × 1.2 m. (v) 30 cm. × 30 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1963 only. (b) No. (c) N.A. (v) Sriganganagar, Durgapura and Kota. (vi) N.A. (vii) Nil.

**5. RESULTS :**

(i) 616 Kg/ha. (ii) 180 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	660	461	596	384	718	743	750

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 62(71).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

**Object :-** To test the relative efficacy of seed dressing fungicides on the yield and vigour of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Fallow. (c) N.A. (ii) Sandy. (iii) 19.11.62. (iv) (a) 1 ploughing. (b) and (c) N.A. (d) 23 cm. × 15 cm. (e) N.A. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 23.3.63.





Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	1914	2274	2451	2190	2353	2289	2190
	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>	T <sub>13</sub>
	2402	2204	2550	2571	2296	2041	2239

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(33).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'D'.**

**Object :-** To study the effect of different levels and formulations of weedicides in the control of weeds in Wheat.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Cotton. (c) 44.8 Kg/ha. of N. (ii) Sandy loam. (iii) 17.11.60. (iv) (a) 4 ploughings. (b) N.A. (c) 69 Kg/ha, (d) and (e) N.A. (v) N.A. (vi) C-591. (vii) Irrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

**Main-plot treatments :**

4 weedicides : W<sub>1</sub>=Sodium salt of 2-4-D, W<sub>2</sub>=Ethyles of 2-4-D, W<sub>3</sub>=Amines alt of 2-4-D. and W<sub>4</sub>=Sodium salt of M.C.P.A.

**Sub-plot treatments :**

5 levels of weedicides : D<sub>0</sub>=Control (No weedicide), D<sub>1</sub>=6, D<sub>2</sub>=8, D<sub>3</sub>=1.1 and D<sub>4</sub>=1.4 Kg. acid equivalent per ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication, 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.3 m. x 5.5 m. (b) 5.5 m. x 3.7 m. (v) 91 cm. x 91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 only. (b) N.A. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 2517 Kg/ha. (ii) (a) 1196.8 Kg/ha. (b) 515.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=2505 Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
W <sub>1</sub>	2522	2501	2839	2737	2650
W <sub>2</sub>	2381	2292	2476	2412	2390
W <sub>3</sub>	2299	2253	2331	2476	2340
W <sub>4</sub>	2977	2568	2635	2786	2741
Mean	2545	2403	2570	2603	2530

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 62(69).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'D'.**

**Object :-** To test the relative efficacy of seed dressing fungicides on the yield and vigour of Wheat.

## 2. TREATMENTS :

10 seed dressing treatments : T<sub>0</sub>=Control, T<sub>1</sub>=3 gm. of Agrosan, T<sub>2</sub>=2 gm. Ceresan, T<sub>3</sub>=3 gm. Ceresan, T<sub>4</sub>=2 gm. Lunasan, T<sub>5</sub>=3 gm. Thiram, T<sub>6</sub>=2 gm. Hervasan, T<sub>7</sub>=2 gm. Tillex, T<sub>8</sub>=4 gm. Shell seed dresser and T<sub>9</sub>=4 gm. Tritisan.

Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) and (b) 4.6 m. × 2.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 to 1961 [Treatments modified in 1960]. (b) N.A. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 2017 Kg/ha. (ii) 296.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. yield	1899	2012	1955	2170	2245	1944	1966	1921	1944	2102

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(23).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'D'.**

Object :—To study the effect of different doses and formulation of weedicides in the control of weeds in Wheat.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Wheat. (c) 44.8 Kg/ha. (ii) Sandy loam. (iii) 14.11.61. (iv) (a) 4 ploughings. (b) N.A. (c) 76 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) C-591. (vii) Irrigated. (viii) and (ix) N.A. (x) 23.4.62.

## 2. TREATMENTS :

14 weedicidal treatments T<sub>0</sub>=Control, T<sub>1</sub>=Sodium salt of 2-4-D @ .6 Kg. of acid equivalent per ha., T<sub>2</sub>=Sodium salt at 2-4-D @ 1.1 Kg. of acid equivalent per ha., T<sub>3</sub>=Sodium salt at 2-4-D @ 1.7 Kg. of acid equivalent per ha., T<sub>4</sub>=Ethyle easter of 2-4-D @ .6 Kg. of acid equivalent per ha., T<sub>5</sub>=Ethyle easter of 2-4-D @ 1.2 Kg. of acid equivalent per ha., T<sub>6</sub>=Ethyle easter of 2-4-D @ 1.7 Kg. of acid equivalent per ha., T<sub>7</sub>=Amine salt of 2-4-D @ .6 Kg. of acid equivalent per ha., T<sub>8</sub>=Amine Salt of 2-4-D @ 1.1 Kg. of acid equivalent per ha., T<sub>9</sub>=Amine Salt of 2-4-D @ 1.7 Kg. of acid equivalent per ha., T<sub>10</sub>=Sodium salt of M.C.P.A. .6 Kg. of acid equivalent per ha., T<sub>11</sub>=Sodium salt of M.C.P.A. 1.1 Kg. of acid equivalent per ha., T<sub>12</sub>=Sodium salt of M.C.P.A. 1.7 Kg. of acid equivalent per ha. and T<sub>13</sub>=Hand weeding.

Treatments applied to equivalent/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 2283 Kg/ha. (ii) 342.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

## 4. GENERAL :

(i) N.A. ; Good for 63(83). (ii) N.A. for 62(72) ; Mild incidence of yellow rust and incidence of brown and black rust below 5% for other. (iii) Yield of grain and fodder. (iv) (a) 1962 to 1963. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) N.A. (vii) Error variances are homogeneous, interaction Treatments  $\times$  years is absent.

## 5. RESULTS :

(i) 2032 Kg/ha. (ii) 311.9 Kg/ha. [30 d.f. made up of pooled error and interaction of Treatments with years]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	1807	2160	2078	1863	2082	2177	2058

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(25).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'D'.**

Object :- To test the relative efficacy of seed dressing fungicides on the yield and vigour of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Cotton. (c) 44.8 Kg/ha. of N. (ii) Sandy loam. (iii) 11.11.60. (iv) (a) 4 ploughings. (b) Dibbling. (c) 70 Kg/ha. (d) 23 cm.  $\times$  15 cm. (e) N.A. (v) N.A. (vi) C-591. (vii) Irrigated. (viii) 2 weedings. (ix) and (x) N.A.

## 2. TREATMENTS :

10 seed dressing treatments : T<sub>0</sub>=Control, T<sub>1</sub>=3 gm. of Agrosan G.N., T<sub>2</sub>=2 gm. of Ceresan, T<sub>3</sub>=3 gm. of Ceresan, T<sub>4</sub>=2 gm. of Lunasan, T<sub>5</sub>=2 gm. of Thiram, T<sub>6</sub>=2 gm. of Hervasan, T<sub>7</sub>=2 gm. of Tillex, T<sub>8</sub>=4 gm. of Copper Carbonate and T<sub>9</sub>=4 gm. of Sulphur.

Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) and (b) 4.6 m.  $\times$  2.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 and 1961 [Expt. modified in 1961]. (b) N.A. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 2388 Kg/ha. (ii) 255.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. yield	2344	2184	2283	2641	2414	2430	2502	2279	2445	2362

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(21).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'D'.**

Object :- To test the relative efficiency of seed dressing fungicide on the yield and vigour of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Wheat. (c) 44.8 Kg/ha. (ii) Sandy loam. (iii) 13.11.61. (iv) (a) 4 ploughings. (b) Dibbling. (c) 70 Kg/ha. (d) 30 cm.  $\times$  15 cm. (e) N.A. (v) N.A. (vi) C-591. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 24.4.62.

**Crop :- Wheat (Rabi).****Ref :- Rj. 60(34), 61(24).****Site :- Govt. Agri. Res. Farm, Sriganaganagar.****Type :- 'D'.**

Object :—To find out the economic way of controlling weeds in Wheat.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Cotton for 60(34); Wheat for 61(24). (c) 44.8 Kg/ha. of N as A/S. (ii) N.A. (iii) 18.11.60; 15.11.61. (iv) (a) 4 ploughings. (b) N.A. (c) 69 Kg/ha. for 60(34); 82 Kg/ha. for 61(24). (d) N.A. for 60(34); 23 cm. between rows for other. (e) N.A. (v) N.A. (vi) C-591. (vii) Irrigated. (viii) and (ix) N.A. (x) N.A. for 60(34); 24.4.1962 for 61(24).

**2. TREATMENTS :**

5 methods of weedings :  $W_0$ =Control (unweeded),  $W_1$ =Local method of weeding,  $W_2$ =Post emergence of weedicides (once),  $W_3$ =Post emergence of weedicides (twice) and  $W_4$ =Post emergence of weedicides + weeding.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 to 1961. (b) N.A. (c) Results of combined analysis are given under 5. (v) and (vi) N.A. (vii) Error variances are homogeneous, Treatments × years interaction is absent.

**5. RESULTS :**

(i) 2266 Kg/ha. (ii) 246.8 Kg/ha. [44 d.f. made up of pooled error and Treatments × years interaction]. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$W_0$	$W_1$	$W_2$	$W_3$	$W_4$
Av. yield	2010	2386	2252	2340	2342

C.D.=203.2 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Rj. 62(72), 63(83).****Site :- Govt. Agri. Res. Farm, Sriganaganagar.****Type :- 'D'.**

Object :—To find out the effect of different chemicals for the control of rust of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton for 62(72); Fallow for 63(83). (c) 44.8 Kg/ha. of N for 62(72); Nil for 63(83). (ii) Sandy loam. (iii) 14.11.1962; 13.11.1963. (iv) (a) 3 ploughings. (b) Dibbling for 62(72); Behind the plough for other. (c) 69 to 74 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. for 62(72); G.M. + 44.8 Kg/ha. of  $P_2O_5$  for 63(83). (vi) C-591. (vii) Irrigated. (viii) 3 hoeings and weedings for 62(72); 2 weedings for 63(83). (ix) N.A. (x) 22.4.1963; 23.4.1964.

**2. TREATMENTS :**

7 chemical treatments :  $T_0$ =Control,  $T_1$ =Nickel chloride at 5 Kg/ha. in 899 litres of water,  $T_2$ =Dusting of wheat with Sulphur,  $T_3$ =Spraying with colloidal sulphur,  $T_4$ =Spraying with ultra sulphur solution (1 : 25),  $T_5$ =Spraying with Dithane Z-73(0.5) and  $T_6$ =Spraying with Dithane N—22(0.4).

**3. DESIGN :**

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 3. (iv) (a) 7.3 m. × 5.5 m. for 62(72); 5.5 m. × 3.7 m. for other. (b) 7.3 m. × 5.5 m. for 62(72); 4.6 m. × 2.7 m. for other. (v) Nil for 62(72); 45 cm. × 45 cm. for other. (vi) Yes.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of N. (ii) Sandy loam. (iii) 15.11.62. (iv) (a) 3 ploughings. (b) Dibbling. (c) 70 Kg/ha. (d) 23 cm. x 15 cm. (e) N.A. (v) N.A. (vi) C—591. (vii) Irrigated. (viii) 2 hoeings and weedings. (ix) N.A. (x) 29.4.63.

## 2. TREATMENTS :

10 chemical treatments : T<sub>0</sub>=Control, T<sub>1</sub>=2 gm. of Agrosan G.N., T<sub>2</sub>=2 gm. of Ceresan, T<sub>3</sub>=2 gm. of Lunasan, T<sub>4</sub>=3 gm. of Thiram, T<sub>5</sub>=2 gm. of Harvasan, T<sub>6</sub>=2 gm. of Tillex, T<sub>7</sub>=4 gm. of Shell B, T<sub>8</sub>=4 gm. of Tritisan and T<sub>9</sub>=3 gm. of Beej powder.  
Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) and (b) 4.6 m. x 2.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1962 to 1963 [Design modified in 63]. (b) No. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 2458 Kg/ha. (ii) 347.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. yield	1834	2870	2631	2392	2631	2233	2312	2551	2471	2658

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 63(77).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'D'.**

Object :—To test the relative efficacy of seed dressing fungicides on the yield and growth of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 13, 14.11.63. (iv) (a) 3 ploughings. (b) Dibbling. (c) 74 Kg/ha. (d) 23 cm. x 15 cm. (e) 3, (v) 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super. (vi) C—591. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 22.4.64.

## 2. TREATMENTS :

Same as in expt. no. 62(69) conducted at Sriganganagar above

## 3. DESIGN :

(i) Incomplete L. sq. (ii) (a) 3 plots/block, 10 blocks/sq., 3 squares. (b) N.A. (iii) 9. (iv) (a) and (b) 2.7 m. x 1.8 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Infection of rusts. (iii) No. of seeds germinated and yield of grain and fodder. (iv) (a) 1962 to 1963 [Design modified in 1962]. (b) No. (c) Nil. (v) Banswara, Mandore and Kota. (vi) N.A. (vii) Nil.

## 5. RESULTS :

(i) 58.6 degrees. (ii) 5.0 degrees. (iii) Treatment differences are not significant. (iv) Av. no. of seeds germinated in degrees

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Mean angle	52.2	62.5	59.7	61.2	59.6	55.6	57.2	57.1	58.6	62.4

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	2814	3754	3454	3513	3978

C.D.=414.2 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 61(34).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'D'.**

**Object :-**To study the effect of different doses and formulation of weedicides in controlling of weeds in Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Pea. (c) N.A. (ii) Sandy loam. (iii) 11.11.61. (iv) (a) 6 ploughings. (b) N.A. (c) 99 Kg/ha. (d) Rows 23 cm. apart. (e) Nil. (v) N.A. (vi) R.S. 31-1. (vii) Irrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

Same as in expt. no. 61(23) conducted at Govt. Agri. Farm, Sriganaganagar on page 119.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 4117 Kg/ha. (ii) 428.5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha,

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	3588	4025	4273	4162	4260	4485	3114
	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>	T <sub>13</sub>
	3899	4673	4037	4597	4273	3502	4747

C.D.=611.9 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(27).**

**Site :- Govt. Agri. Farm, Udaipur.**

**Type :- 'D'.**

**Object :-**To study the effect of different doses and formulations of weedicides in control of weeds in Wheat.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Jowar. (c) 22.4 Kg/ha. of N. (ii) Clay loam. (iii) 30.11.60. (iv) (a) 3 ploughings. (b) N.A. (c) 92 Kg/ha. (d) N.A. (e) N.A. (v) N.A. (vi) N.P. 792. (vii) Irrigated. (viii) and (ix) N.A. (x) 16.4.61.

**2. TREATMENTS :**

**Main-plot treatments :**

4 weedicides : W<sub>1</sub>=Sod. Salt of 2, 4-D, W<sub>2</sub>=Ethyl ester of 2, 4-D, W<sub>3</sub>=Amine salt of 2, 4-D and W<sub>4</sub>=Sod. Salt of M.C.P.A.

**Sub-plot treatments :**

5 levels of weedicides : D<sub>0</sub>=Control, D<sub>1</sub>=.6, D<sub>2</sub>=.8, D<sub>3</sub>=1.1 and D<sub>4</sub>=1.4 Kg. acid equivalent per hectare.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main plots/block ; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 to 1964 [modified every year. Not conducted in 1962 61(30), 63(114) and 64(92)]. (b) N.A. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 3078 Kg/ha. (ii) (a) 1142.8 Kg/ha. (b) 686.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=2782 Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
P <sub>1</sub>	3630	3264	3023	3157	3268
P <sub>2</sub>	3031	3002	2939	2755	2932
P <sub>3</sub>	2952	3179	3143	2868	3110
P <sub>4</sub>	3066	3652	3391	3369	2972
Mean	3170	3274	3124	3037	3152

**Crop :-** Wheat (*Rabi*).

**Ref :-** Rj. 61(30).

**Site :-** Govt. Agri. Farm, Udaipur.

**Type :-** 'D'.

**Object :-** To study the effect of different doses and formulations of weedicides in the control of weeds in Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize. (c) 44.8 Kg/ha. of N. (ii) Clay loam. (iii) 12.12.61. (iv) (a) 3 Ploughings. (b) N.A. (c) 92 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) N.P. 712. (vii) Irrigated. (viii) N.A. (ix) Nil. (x) 22.4.62.

## 2. TREATMENTS :

14 weedicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=560 gm. of Sod. salt of acid eq./ha., T<sub>2</sub>=1.12 Kg Sod. salt of 2, 4-D of acid eq./ha., T<sub>3</sub>=1.7 Kg. Sod. salt of 2, 4-D of acid eq./ha., T<sub>4</sub>=560 gm. of Ethyle easter of 2, 4-D of acid eq./ha., T<sub>5</sub>=1.12 Kg. of Ethyle easter of 2, 4-D of acid eq./ha., T<sub>6</sub>=1.7 Kg. of Ethyle easter of 2, 4-D of acid eq./ha., T<sub>7</sub>=560 gm. of 2, 4-D amine salt of acid eq./ha., T<sub>8</sub>=1.1 Kg. 2, 4-D amine salt of acid eq./ha., T<sub>9</sub>=1.7 Kg. of 2, 4-D amine salt of acid, eq./ha. T<sub>10</sub>=560 gm. of M.C.P.A. Sod. salt of acid eq./ha., T<sub>11</sub>=1.1 Kg. of M.C.P.A. of Sod. salt of acid eq./ha., T<sub>12</sub>=1.7 Kg. of M.C.P.A. Sod. salt of acid eq./ha. and T<sub>13</sub>=Hand weeding.

Where eq. stands for equivalent.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960—1964 [modified every year. Not conducted in 1962. 60(27), 63(114), 64(99)]. (b) N.A. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2280 Kg/ha. (ii) 525.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.



Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	1977	2112	2316	1871	2062	2174	2288	2613
Treatment	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>	T <sub>13</sub>		
Av. yield	2312	2768	2266	2132	1867	3163		

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 63(114).**

**Site :- Rajasthan College of Agri., Udaipur.**

**Type :- 'D'.**

**Object :-** To study the effect of different formulations, doses and time of application of 2-4-D on controlling of weeds in Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) 3.11.63. (iv) (a) Ploughings and cross ploughings. (b) Drilling. (c) and (d) N.A. (e) Nil. (v) N.A. (vi) N.P. 710. (vii) Unirrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

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

(1) 3 formulations of 2, 4-D : F<sub>1</sub>=Sodium, F<sub>2</sub>=Amine and F<sub>3</sub>=Easter,

(2) 4 levels of 2, 4-D : R<sub>1</sub>=0.5, R<sub>2</sub>=1.0, R<sub>3</sub>=1.5 and R<sub>4</sub>=2.0 Kg/ha.

(3) 3 times of application : P<sub>1</sub>=Pre-emergence, P<sub>2</sub>=Pre + post emergence and P<sub>3</sub>=post emergence.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 37. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 8.0 m. x 5.0 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1950-63 [modified every year. Not conducted in 1962. 60(27), 61(30), 64(99)]. (b) N.A. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 2939 Kg/ha. (ii) 508.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control = 2688 Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
F <sub>1</sub>	2982	3169	2690	2982	2765	3282	2845	2953
F <sub>2</sub>	3294	3190	3023	9261	3064	3283	3003	3117
F <sub>3</sub>	2773	3669	3036	3148	2846	2847	3064	2919
Mean	3016	3009	2933	3030	2882	3138	2971	2997
P <sub>1</sub>	2773	2585	3148	3023				
P <sub>2</sub>	3232	3399	2982	2940				
P <sub>3</sub>	3044	3044	2669	3128				

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 64(99).**

**Site :- Rajasthan College of Agri., Udaipur.**

**Type :- 'DM'.**

**Object :-** To study the effect of different herbicides with different levels of N in controlling the weeds in Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) 24.10.64. (iv) (a) Ploughings and cross-ploughing. (b) Drilling. (c) 80 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) N.P. 718. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 20.3.65.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 8 herbicides :  $H_0$ =Control,  $H_1$ =Hand weeding,  $H_2$ =2, 4-D Sod. salt,  $H_3$ =2, 4-D, ester;  $H_4$ =2, 4-D +2, 4; 5-T,  $H_5$ =Sinazine,  $H_6$ =Herbazine and  $H_7$ =T C/A/N.

(2) 2 levels of N as A/S :  $N_0$ =0 and  $N_1$ =22.4 Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 5.0 cm.  $\times$  4.0 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1960 to 64 [modified every year, not conducted in 1962. 60(27), 61(30), 63(114)]. (b) N.A. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2680 Kg/ha. (ii) 469 Kg/ha. (iii) All effects are highly significant. (iv) Av. yield of grain in Kg/ha.

	$H_0$	$H_1$	$H_2$	$H_3$	$H_4$	$H_5$	$H_6$	$H_7$	Mean
$N_0$	2900	3110	2920	3000	1710	550	2680	3070	2490
$N_1$	3000	3500	3540	3570	2260	500	3280	3250	2860
Mean	2950	3360	3230	3280	1980	520	2980	3160	2680

C.D. for H marginal means = 382.0 Kg/ha.

C.D. for N marginal means = 192.0 Kg/ha.

C.D. for means in  $H \times N$  table = 538.9 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Rj. 60(26), 61(31).**

**Site :- Govt. Agri. Farm, Udaipur.**

**Type :- 'D'.**

**Object :-** To find out the economic way of controlling weeds in Wheat.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) *Jawar* for 60(26), *Maize* for 61(31). (c) 22.4 Kg/ha. of N for 60(26), 44.8 Kg/ha. of N for 61(31). (ii) Clay loam. (iii) 27.11.1960; 10.12.1961. (iv) (a)  $\frac{1}{3}$  ploughings. (b) N.A. (c) 92 Kg/ha. (d) N.A. for 60(26), 23 cm. between rows for 61(31). (e) N.A. (v) N.A. (vi) N.P. 792 for 60(26); N.P. 712 for other. (vii) Irrigated. (viii) N.A. (ix) N.A. for 60(26); Nil for 61(31). (x) 21.4.1961; 28.4.1962.

## 2. TREATMENTS :

5 weedings methods :  $M_0$ =Control,  $M_1$ =Local methods of weeding,  $M_2$ =Post emergence of weedicides (once),  $M_3$ =Post emergence of weedicides (twice) and  $M_4$ =Post emergence + weeding.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 7.3 m  $\times$  5.5 m. (b) 5.5 m  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 to 1961. (b) N.A. (c) Results of combined analysis given under 5. Results. (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 2499 Kg/ha. (ii) 723.7 Kg/ha. (44 d.f. made up of pooled error and Treatments  $\times$  years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	2078	2717	2485	2620	2597

**Crop :- Barley (Rabi).**

**Ref :- Rj. 60(48), 61(50), 62(105).**

**Site : Govt. Agri. Farm, Bassi.**

**Type :- 'M'.**

**Object :-** To study the effect of different types and levels of nitrogenous fertilizers with levels of P on the yield of Barley.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 30.10.1960; 23.11.1961; N.A. (iv) (a) 7 to 8 ploughings. (b) Behind the plough for 60(48); Drilling for 61(50); N.A. for 62(105). (c) 90 to 112 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) 5604 Kg/ha. of F.Y.M. (vi) R.S.—17. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 15.3.1961; 23.3.1962. N.A.

## 2. TREATMENTS :

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

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

(3) 3 sources of N : S<sub>1</sub>=A/S, S<sub>2</sub>=A/S/N and S<sub>3</sub>=Urea.

Extra treatments : E<sub>1</sub>=44.8 Kg/ha. of N as A/S+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot., E<sub>2</sub>=44.8 Kg/ha. of N as A/S/N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot. and E<sub>3</sub>=44.8 Kg/ha. of N as Urea+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

(i) 3<sup>3</sup> Fact. confd. (ii) (a) 12 plots/block; 3 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) Yes.

## 4. GENERAL :

(i) Good. (ii) Incidence of aphids for 60(48); Nil for 61(50).N.A. ; for 62(105). (iii) Yield of grain. (iv) (a) 1960 to 1962. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) The error variances are heterogeneous and Treatments  $\times$  years interaction is absent. Results of individual years are presented under 5 Results.

## 5. RESULTS :

60(48)

(i) 2441 Kg/ha. (ii) 733.8 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

E<sub>1</sub>=2480, E<sub>2</sub>=3185 and E<sub>3</sub>=3501 Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
P <sub>0</sub>	1122	1776	3042	1980	1812	2165	1963
P <sub>1</sub>	1812	1855	2891	2186	2798	2093	1668
P <sub>2</sub>	1711	2733	3179	2541	2186	2610	2826
Mean	1548	2121	3037	—	—	—	—
S <sub>1</sub>	—	2215	2848	2531			
S <sub>2</sub>	—	1905	3092	2498			
S <sub>3</sub>	—	2242	3171	2707			

C.D. for N marginal means=742.2 Kg/ha.

61(50)

(i) 3091 Kg/ha. (ii) 311.1 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant. (iv) Av. yield of grain in Kg/ha.

$E_1=4027$ ,  $E_2=4055$  and  $E_3=3796$  Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
P <sub>0</sub>	1682	2560	2948	2397	2280	2739	2171
P <sub>1</sub>	2122	3099	3739	2986	3034	3114	2811
P <sub>2</sub>	1891	3221	3954	3022	3063	2710	3293
Mean	1898	2960	3547	—	3168	3408	1925
S <sub>1</sub>	—	2697	3638	3168			
S <sub>2</sub>	—	3207	3609	3408			
S <sub>3</sub>	—	2977	3394	3188			

C.D. for N or P marginal means = 312.5 Kg/ha.

62(105)

(i) 2994 Kg/ha. (ii) 399.8 Kg/ha. (iii) Main effect of N and extra vs. others are highly significant. (iv) Av. yield of grain in Kg/ha.

$E_1=3434$ ,  $E_2=3530$  and  $E_3=3499$  Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
P <sub>0</sub>	2367	2863	2692	2640	1895	2338	3689
P <sub>1</sub>	2721	3259	2787	2922	2390	2932	3445
P <sub>2</sub>	2592	3101	3089	2927	2536	2762	3483
Mean	2560	3074	2856	—	2274	2677	3539
S <sub>1</sub>	—	2599	2330	2465			
S <sub>2</sub>	—	2819	2769	2794			
S <sub>3</sub>	—	3805	3467	3636			

C.D. for N marginal means = 410.8 Kg/ha.

C.D. for extra vs. others = 153.9 Kg/ha.

**Crop :- Barley (Rabi).**

**Ref :- Rj. 60(67), 61(81).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'M'.**

Object :- To find out the N, P and K requirements of Barley.

#### 1. BASAL CONDITIONS :

(i) (a) Fallow-Barley. (b) Fallow for 60(67); Barley for 61(81). (c) Nil for 60(67); N.A. for 61(81).  
 (ii) Sandy loam. (iii) Oct., 1960; 24.11.1961. (iv) (a) 3 to 4 ploughings. (b) Drilling. (c) 91 Kg/ha.  
 (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) R.S.—17. (vii) Irrigated. (viii) 1 weeding. (ix) N.A.  
 (x) April, 1961; 1.4.1962.

## 2. TREATMENTS :

## Main-plot treatments :

7 nitrogeous treatments :  $N_0$ =No nitrogen,  $N_1$ =33.6 Kg/ha. of N as A/S,  $N_2$ =67.2 Kg/ha. of N as A/S,  $N_3$ =33.6 Kg/ha. of N as C/N,  $N_4$ =67.2 Kg/ha. of N as C/N,  $N_5$ =33.6 Kg/ha. of N as Urea and  $N_6$ =67.2 Kg/ha. of N as Urea.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of  $P_2O_5$  as Super ;  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

(2) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=33.6$  Kg/ha.

N and  $K_2O$  broadcast, N applied  $\frac{1}{2}$  at sowing and  $\frac{1}{2}$  one month after sowing. P applied at sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 7 main-plots/block ; 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 5.3 m.  $\times$  3.7 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960-1961. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) Since the sub-plot error variances are heterogeneous, therefore results of individual years are presented under 5 results.

## 5. RESULTS :

60(67)

(i) 2327 Kg/ha. (ii) (a) 1924.7 Kg/ha. (b) 561.4 Kg/ha. (iii) Main effect of P alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	$N_4$	$N_5$	$N_6$	$K_0$	$K_1$	Mean
$P_0$	1408	1511	2064	1363	2011	973	1651	1512	1625	1568
$P_1$	1703	2852	3568	2617	3170	1282	2757	2436	2691	2563
$P_2$	2262	3052	3170	3412	3774	1592	2698	2874	2828	2851
Mean	1791	2472	2934	2464	2985	1282	2369	2274	2381	2327
$K_0$	1768	2393	2869	2599	2987	1258	2044			
$K_1$	1812	2550	2997	2328	2982	1307	2692			

C.D. for P marginal means=304.5 Kg/ha.

61(81)

(i) 2475 Kg/ha. (ii) (a) 938.7 Kg/ha. (b) 266.5 Kg/ha. (iii) Main effect of P and interactions  $N \times K$ ,  $N \times P$  are highly significant and interaction  $P \times K$  is significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	$N_4$	$N_5$	$N_6$	$K_0$	$K_1$	Mean
$P_0$	1378	1950	2019	1326	2030	1348	2498	1624	1961	1793
$P_1$	1658	2704	2763	2605	3169	2285	3176	2560	2685	2623
$P_2$	1871	2992	3316	3029	3671	2720	3479	3072	2950	3011
Mean	1636	2549	2699	2320	2957	2118	3051	2419	2532	2475
$K_0$	1636	2483	2574	2432	2918	2201	2687			
$K_1$	1636	2614	2825	2209	2995	2034	3415			

C.D. for P marginal means =144.5 Kg/ha.

C.D. for P means at the same level of N =382.5 Kg/ha.

C.D. for N means at the same level of P =982.7 Kg/ha.

C.D. for means in the body of  $P \times K$  table=204.4 Kg/ha.

C.D. for K means at the same level of N =312.4 Kg/ha.

C.D. for N means at the same level of K =962.1 Kg/ha.

**Crop :- Barley (Rabi).****Ref :- Rj. 60(43).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 12.11.60. (iv) (a) 9 ploughings. (b) Drilling. (c) 90 Kg/ha. (d) Row to row 23 cm. (e) N.A. (v) 5604 Kg/ha. of F.Y.M. (vi) R.S.-17. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 23.3.61.

**2. TREATMENTS :**

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

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.(3) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=22.4$  Kg/ha.**3. DESIGN :**

(i)  $3^3 \times 2$  confd. (ii) (a) 6 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Incidence of aphids, control measures N.A. (iii) Yield of grain. (iv) (a) 1960 only. (b) and (c) N.A. (v) to (vii) N.A.

**5. RESULTS :**

(i) 3031 Kg/ha. (ii) 340.0 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant. (iv) Av. yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	Mean
$N_0$	2362	2136	2626	2334	2417	2375
$N_1$	2804	3155	3192	3013	3089	3051
$N_2$	3349	3759	3894	3739	3596	3696
Mean	2838	3017	3237	3029	3034	3031
$K_0$	2915	3024	3145			
$K_1$	2762	3009	3330			

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

**Crop :- Barley (Rabi).****Ref :- Rj. 60(47).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'M'.**

Object :- To study the effect of different types and levels of trace elements on the yield of Barley.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 13.11.60. (iv) (a) 9 ploughings. (b) Drilling. (a) 90 Kg/ha. (d) Row to row 23 cm. (e) Nil. (v) 33.6 Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super. (vi) R.S. 17. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 24.3.61.

**2. TREATMENTS :**

All combinations of (1) and (2) with control

(1) 5 trace elements :  $M_1$ =Ferrous sulphate,  $M_2$ =Copper sulphate,  $M_3$ =Zinc Sul.,  $M_4$ =Manganese sulphate and  $M_5$ =Borax powder.(2) 3 levels of trace elements :  $L_1=5.6$ ,  $L_2=11.2$  and  $L_3=16.3$  Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) and (b) 7.4 m. × 3.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Incidence of aphids ; control measures—N.A. (iii) Yield of grain. (iv) to (vii) N.A.

## 5. RESULTS :

(i) 2866 Kg/ha. (ii) 491.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control=2452 Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	Mean
L <sub>1</sub>	2920	3250	2567	3351	2675	2953
L <sub>2</sub>	2891	2970	3143	2726	2394	2825
L <sub>3</sub>	3114	3179	2575	2632	3027	2905
Mean	2975	3133	2762	2903	2699	2894

**Crop :- Barley (Rabi).**

**Ref :- Rj. 64(70).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Black cotton soil. (iii) 7.11.64. (iv) (a) 3 bakherings. (b) Drilling. (c) N.A. (d) 30 cm. between lines (e) N.A. (v) Nil. (vi) R.S. 17. (vii) Irrigated. (viii) Nil. (ix) Negligible. (x) 30.3.65.

## 2. TREATMENTS :

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

(1) 4 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 3 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0, K<sub>1</sub>=33.6 and K<sub>2</sub>=67.2 Kg/ha.

## 3. DESIGN :

(i) 4 × 3<sup>2</sup> confd. Fact. (ii) (a) 12 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 7.0 m. × 4.3 m. (b) 6.4 m. × 3.7 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963-contd. (b) No. (c) N.A. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 2488 Kg/ha. (ii) 458.5 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
K <sub>0</sub>	1304	2606	2616	3221	1965	2648	2703	2437
K <sub>1</sub>	1232	2563	3205	2876	2064	2584	2759	2469
K <sub>2</sub>	1644	2178	3164	3243	2197	2731	2744	2557
Mean	1393	2449	2995	3113	2075	2653	2735	2488
P <sub>0</sub>	1200	2089	2228	2784				
P <sub>1</sub>	1538	2545	3260	3268				
P <sub>2</sub>	1443	2712	3497	3289				

C.D. for N marginal means = 310.3 Kg/ha.

C.D. for P marginal means = 268.7 Kg/ha.

**Crop :- Barley (Rabi).**

**Ref :- Rj. 62(50), 63(60), 64(67).**

**Site :- Govt. Agri. Farm, Hemawas.**

**Type :- 'MV'.**

**Object :-** To study the effect of different levels of N and P on the yield of different varieties of Barley.

#### 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Heavy soil for 62(50), 63(60); Laterite for 64(67). (iii) 27.11.1962; 30.11.1963; 28.11.1964. (iv) (a) 3 ploughings with tractor. (b) Behind the plough. (c) 101 Kg/ha., 92 Kg/ha., 79 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) N.A.; 27.3.1964; 3.4.1965.

#### 2. TREATMENTS :

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

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 2 varieties : V<sub>1</sub>=Local and V<sub>2</sub>=R.S.-17.

#### 3. DESIGN :

(i) 3<sup>2</sup> × 2 confd. (ii) (a) 6 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 5.5 m. × 3.7 m. (b) 4.9 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

#### 4. GENERAL :

(i) N.A. for 62(50); Good for 63(60); Poor for 64(67). (ii) N.A. for 62(50); Incidence of aphids which was controlled by spraying 5% B.H.C. powder for others. (iii) Yield of grain. (iv) (a) 1962 to 1964. (b) No. (c) Nil. (v) Mandore. (vi) N.A. (vii) Since the error variances are heterogeneous and the Treatments × years interaction is absent, therefore results of individual years are presented under 5. Results.

#### 5. RESULTS :

##### 62(50)

(i) 1274 Kg/ha. (ii) 356.6 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.



	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
V <sub>1</sub>	959	1028	1473	1166	1154	1141	1153
V <sub>2</sub>	929	1434	1822	1392	1298	1495	1395
Mean	944	1231	1648	1278	1226	1319	1274
P <sub>0</sub>	1125	1177	1533				
P <sub>1</sub>	874	1185	1620				
P <sub>2</sub>	834	1332	1790				

C.D. for N marginal means = 314.3 Kg/ha.

63(60)

(i) 2015 Kg/ha. (ii) 367.4 Kg/ha. (iii) Main effects of N and P are highly significant and interaction N×P is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
V <sub>1</sub>	1632	2245	2131	1652	2119	2237	2003
V <sub>2</sub>	1783	1908	2388	1626	2189	2265	2026
Mean	1708	2076	2260	1639	2154	2251	2015
P <sub>0</sub>	1510	1722	1684				
P <sub>1</sub>	1875	1875	2711				
P <sub>2</sub>	1736	2633	2384				

C.D. for N or P marginal means = 316.5 Kg/ha.

C.D. for means in the body of N×P table = 548.1 Kg/ha.

64(67)

(i) 1156 Kg/ha. (ii) 1124 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
V <sub>1</sub>	796	1152	1387	982	1017	1337	1112
V <sub>2</sub>	883	1296	1422	1110	1279	1212	1200
Mean	840	1224	1405	1046	1148	1274	1156
P <sub>0</sub>	704	1089	1346				
P <sub>1</sub>	781	1107	1556				
P <sub>2</sub>	1034	1477	1312				

Crop :- Barley (Rabi).

Site :- Govt. Agri. Farm, Mandore.

Ref :- Rj. 62(80), 64(62).

Type :- 'MV'.

Object :- To study the effect of different levels of N and P on the yield of different varieties of Barley.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 18.11.1962 ; 7.11.1964. (iv) (a) 2 cross discings followed by patta for 62(80) ; 3 summer ploughings and 2 ploughings at the time of sowing with tractor for 64(62). (b) Sowing in lines by drilling for 62(80) ; Behind the plough for 64(62). (c) 101 Kg/ha. ; 79 Kg/ha. (d) 23 cm. between lines. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 1 *khurpi* weeding for 62(80) ; N.A. for the other. (ix) N.A. (x) 20.3.1963 ; 19.3.1965.

## 2. TREATMENTS and 3. DESIGN :

Same as in Expts no. 62(50), 63(60), 64(67) conducted at Hemawas on page 133.  
N as A/S broadcast  $\frac{1}{2}$  at sowing and  $\frac{1}{2}$  at first irrigation and  $P_2O_5$  as Super drilled at sowing.

## 4. GENERAL :

(i) Normal for 62(80) ; Good for 64(62) but lodging during February. (ii) N.A. for 62(80) ; Heavy incidence of aphids, spraying of Nicotine sulphate for 64(62). (iii) Yield of grain. (iv) (a) 1962—1964(1963 N.A.). (b) No. (c) Results of combined analysis given under 5 Results. (v) N.A. (vi) Nil for 62(80) ; Rains with speedy winds during February for 64(62). (vii) Error variances are heterogeneous Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 2605 Kg/ha. (ii) 400.7 Kg/ha. (based 39 d.f. made up of pooled error and Treatments  $\times$  years interaction). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
V <sub>1</sub>	2251	2702	2731	2532	2551	2600	2561
V <sub>2</sub>	2477	2724	2746	2764	2660	2524	2649
Mean	2364	2713	2739	2648	2605	2562	2605
P <sub>0</sub>	2437	2863	2644				
P <sub>1</sub>	2426	2614	2775				
P <sub>2</sub>	2227	2663	2796				

C.D. for N marginal means = 233.5 Kg/ha.

**Crop :- Barley (Rabi).**

**Site :- Govt. Agri. Farm, Bassi.**

**Ref :- Rj. 60(61).**

**Type :- 'C'.**

Object :- To find out the optimum seed rate and date of sowing for Barley.

## 1. BASAL CONDITIONS :

(i) (a) Millets - Barley. (b) Millets. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 3 ploughings. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) R.S. - 17. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) April, 1960.

## 2. TREATMENTS :

**Main-plot treatments :**

8 dates of sowing : D<sub>1</sub> = 12.10.59 ; D<sub>2</sub> = 22.10.59 ; D<sub>3</sub> = 1.11.59 ; D<sub>4</sub> = 11.11.59 ; D<sub>5</sub> = 21.11.59 ; D<sub>6</sub> = 1.12.59 ; D<sub>7</sub> = 11.12.59 and D<sub>8</sub> = 22.12.59.

**Sub-plot treatments :**

8 seed rates : R<sub>1</sub> = 46, R<sub>2</sub> = 58, R<sub>3</sub> = 69, R<sub>4</sub> = 81, R<sub>5</sub> = 92, R<sub>6</sub> = 104, R<sub>7</sub> = 115 and R<sub>8</sub> = 127 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/block ; 8 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 7.3 m.  $\times$  5.5 m. (b) 6.4 m.  $\times$  4.6 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 2501 Kg/ha. (ii) (a) 635.5 Kg/ha. (b) 514.1 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	D <sub>7</sub>	D <sub>8</sub>	Mean
R <sub>1</sub>	2422	3003	3229	2890	2067	1776	1583	1032	2250
R <sub>2</sub>	3197	2745	3552	3035	2616	2018	2356	807	2541
R <sub>3</sub>	2728	3003	2518	3229	2939	2131	1419	743	2339
R <sub>4</sub>	2841	3133	3423	2745	2518	1727	2599	1597	2573
R <sub>5</sub>	2646	2890	3277	3391	2777	2179	1774	1227	2520
R <sub>6</sub>	2663	2211	3907	3713	2777	1436	2390	2001	2637
R <sub>7</sub>	3326	2808	3456	3164	2890	1695	2357	1583	2660
R <sub>8</sub>	2550	2728	2745	3358	1873	2275	2397	1985	2489
Mean	2797	2815	3263	3191	2557	1905	2109	1372	2501

C.D. for D marginal means=531.4 Kg/ha.

**Crop :- Barley (Rabi)****Ref :- Rj. 60(60), 60(58).****Site :- Govt. Agri. Farm, Bassi and Durgapura.****Type :- 'C'.**

Object :- To find out the optimum seed rate for Barley.

## 1. BASAL CONDITIONS :

(i) (a) Millets-Barley for 60 (60) ; Fallow-Barley for 60 (58). (b) Millets for 60 (60) ; Fallow for 60 (58). (c) Nil. (ii) Sandy loam. (iii) 17.11.1960 ; 4.11.1960. (iv) (a) 3 ploughings. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) N.A. (v) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) R.S.—17. (vii) Irrigated. (viii) 1 weeding. (ix) and (x) 26.3.1961 for 60 (60) ; April, 1961 for 60 (58).

## 2. TREATMENTS :

8 seed rates : R<sub>1</sub>=58, R<sub>2</sub>=69, R<sub>3</sub>=81, R<sub>4</sub>=92, R<sub>5</sub>=104, R<sub>6</sub>=115, R<sub>7</sub>=127 and R<sub>8</sub>=138 Kg/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4 for 60 (60) ; 6 for 60 (58). (iv) (a) 9.1 m. × 5.5 m. (b) 8.5 m. × 4.6 m. (v) 30 cm. × 46 cm. (vi) Yes,

## 4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 only. (b) —. (c) Nil. (v) and (vi) N.A. (vii) Error variances are heterogeneous and (Treatments × years) interaction is absent. Results of individual years are presented under 5. Results.

## 5. RESULTS :

## 60(60)

(i) 3048 Kg/ha. (ii) 244.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>	R <sub>8</sub>
Av. yield	3255	3102	2942	3000	3255	2957	2877	2994

## 60(58)

(i) 2381 Kg/ha. (ii) 478.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>	R <sub>8</sub>
Av. yield	2584	2250	2669	2506	2050	2341	2403	2243

**Crop :- Barley (Rabi).**

**Ref :- Rj. 61(80).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'CV'.**

Object :- To find out the variety and optimum time of sowing for Barley,

**1. BASAL CONDITIONS :**

(i) (a) Fallow-Barley. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) 3 ploughings. (b) and (c) N.A. (d) Row to row 23 cm. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Unirrigated (viii) 1 weeding. (ix) N.A. (x) 1.5.1962.

**2. TREATMENTS :**

**Main-plot treatments :**

3 dates of sowing : D<sub>1</sub>=27.10.61, D<sub>2</sub>=16.11.61 and D<sub>3</sub>=11.12.61.

**Sub-plot treatments :**

6 varieties : V<sub>1</sub>=Local, V<sub>2</sub>=R.S.-17, V<sub>3</sub>=R-16, V<sub>4</sub>=R-11, V<sub>5</sub>=R-14 and V<sub>6</sub>=R-2.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) 7.0 m. × 4.6 m. (v) 6.5 × 4.0 m. (vi) 27 cm. × 27 cm. (vii) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961 to 1962 (Treatments modified in 1962). (b) and (c) N.A. (v) to (vii) N.A.

**5. RESULTS :**

(i) 2100 Kg/ha. (ii) (a) 627.7 Kg/ha. (b) 416.2 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>	Mean
D <sub>1</sub>	2766	2466	2183	1990	2661	2303	2395
D <sub>2</sub>	2460	2226	1991	2297	2365	2717	2343
D <sub>3</sub>	1549	1474	1585	1460	1985	1316	1562
Mean	2258	2055	1920	1916	2337	2112	2100

C.D. for D marginal means=443.3 Kg/ha.

**Crop :- Barley (Rabi).**

**Ref :- Rj. 62(44).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'CV'.**

Object :- To find out suitable variety and optimum date of sowing for Barley.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) [(a) 4 ploughings. (b) and (c) N.A. (d) Row to row. 23 cm. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 2 weeding. (ix) N.A. (x) 26.3.63 and 1.4.63.

## 2. TREATMENTS :

**Main-plot treatment :**3 dates of sowing :  $D_1=13.10.62$ ,  $D_2=13.11.62$  and  $D_3=26.11.62$ .**Sub-plot treatments :**6 varieties :  $V_1=Local$ ,  $V_2=R.S.-17$ ,  $V_3=R-16$ ,  $V_4=R-11$ ,  $V_5=R-14$  and  $V_6=R-2$ .

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/block ; 6 sub-plots/main-plots (b) N.A. (iii) 4. (iv) 6.0 m.  $\times$  4.6 m. (v) 5.2 m.  $\times$  3.7 m. (vi) 46 cm.  $\times$  46 cm. (vii) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-62 (Treatments modified in 1962). (b) N.A. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 2025 Kg/ha. (ii) (a) 812.6 Kg/ha. (b) 511.8 Kg/ha. (iii) Main effect of V alone is significant. (iv) Av. yield of grain in Kg/ha.

	$V_1$	$V_2$	$V_3$	$V_4$	$V_5$	$V_6$	Mean
$D_1$	1768	1484	2506	1992	2295	2888	2156
$D_2$	1978	2084	2486	1912	2078	2236	2129
$D_3$	1464	1976	1932	1506	2024	1840	1790
Mean	1737	1848	2308	1803	2132	2321	2025

C.D. for V marginal means=421.1 Kg/ha.

**Crop :- Barley (Rabi).****Ref :- Rj. 65(8).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'IM'.**

Object :- To study the effect of different frequencies and depths of irrigation on the yield of Barley with varying levels of N.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize. (c) 44.8 Kg/ha. of  $P_2O_5$  + 67.2 Kg/ha. of N. (ii) Sandy loam. (iii) 21.10.65. (iv) (a) Ploughing and disc harrowing by tractor and *desi* plough. (b) Behind the plough. (c) 65 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) 17 Kg/ha. of  $K_2O$ . (vi) R.S. 17. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 25.3.66.

## 2. TREATMENTS :

**Main-plot treatments :**3 levels of irrigation :  $F_1=3$ ,  $F_2=4$  and  $F_3=5$  irrigations.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 manures,  $M_1=45$  Kg/ha. of N + 34 Kg/ha. of  $P_2O_5$ .(2) 3 levels of irrigation :  $I_1=3$ ,  $I_2=6$  and  $I_3=9$  cm. depth of irrigation.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 4 m.  $\times$  9 m. (b) 3 m.  $\times$  8 m. (v) 50 cm.  $\times$  50 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Height, tiller, length and yield of grain. (iv) (a) 1965—N.A. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2514 Kg/ha. (ii) (a) 1547.9 Kg/ha. (b) 530.0 Kg/ha. (iii) None of the effect is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
F <sub>1</sub>	2122	2401	2155	2141	2311	2226
F <sub>2</sub>	2422	2672	2708	2584	2617	2601
F <sub>3</sub>	3107	2396	2645	2695	2737	2716
Mean	2550	2490	2503	2473	2555	2514
M <sub>1</sub>	2422	2389	2609			
M <sub>2</sub>	2679	2590	2396			

**Crop :- Barley (Rabi).**

**Ref :- Rj. 63(91), 63(115).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'D'.**

Object :—To test the relative efficacy of seed dressing fungicides on the yield and vigour of Barley.

## 1. BASAL CONDITIONS :

(i) (a) Fallow-Barley. (b) Fallow. (c) Nil. (ii) [Sandy loam. (iii) 2.11.1963. (iv) (a) 7 ploughings for 63(91); N.A. for 63(115). (b) Dibbling. (c) 1386 seeds/plot for 63(91); N.A. for 63(115). (d) 23 cm. × 15 cm. for 63(91); N.A. for 63(115). (e) 3 for 63(91); N.A. for 63(115). (v) 33.6 Kg/ha. of N as A/S broadcast + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> drilled for 63(91); N.A. for 63(115). (vi) R.S.—17. (vii) Irrigated. (viii) 1 to 2 weedings. (ix) N.A. (x) 1.4.1964.

## 2. TREATMENTS :

10 fungicidal treatments : F<sub>0</sub>=Control, F<sub>1</sub>=Agrosan at 2 gm., F<sub>2</sub>=Ceresan at 2 gm.; F<sub>3</sub>=Lunasan at 2 gm., F<sub>4</sub>=Thiram at 3 gm., F<sub>5</sub>=Harvasan at 2 gm., F<sub>6</sub>=Tillex at 2 gm., F<sub>7</sub>=Shell seed dresser at 2 gm., F<sub>8</sub>=Tritisan at 4 gm. and F<sub>9</sub>=Beej powder at 2 gm.

Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6 for 63(91); 3 for 63(115). (iv) (a) 5.0 m. × 3.2 m. (b) 4.6 m. × 2.7 m. (v) 23 cm. × 23 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Incidence of plant leaf stripe disease for 63(91); Nil for 63(115). (iii) Yield of grain and germination analysis for 63(91); yield of grain for 63(115). (iv) (a) 1963 only. (b) No. (c) Results of combined analysis are given under 5. (v) Mandore. (vi) N.A. (vii) Error variances are homogeneous Treatments × years interaction is absent.

## 5. RESULTS :

(i) 2993 Kg/ha. (ii) 403.2 Kg/ha. [based on 72 d.f. made up of Treatments × years interaction and pooled error]. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>	F <sub>8</sub>	F <sub>9</sub>
Av. yield	3106	3015	3126	3267	3016	2590	3251	3014	2653	2891

C.D.=379.3 Kg/ha.

**Germination 63(91)**

(i) 49.7 degrees. (ii) 4.1 degrees. (iii) Treatment differences are significant. (iv) Av. germination in degrees.

Treatment	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>	F <sub>8</sub>	F <sub>9</sub>
Av. germination	48.7	49.5	48.2	47.6	52.6	51.0	52.0	49.52	43.43	54.28

C.D.=4.8 dgrees.

**Crop :- Barley (Rabi).**

**Ref :- Rj. 60(32).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'D'.**

**Object :-**To study the effect of different doses and formulations of weedicides in controlling of weeds in Barley.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Fallow. (c) N.A. (ii) Sandy loam. (iii) 17.11.60. (iv) (a) 8 ploughings. (b) Dibbling (c) to (e) N.A. (v) N.A. (vi) R.S. 17. (vii) Irrigated. (viii) and (ix) N.A. (x) 28.3.61.

**2. TREATMENTS :**

**Main-plot treatments :**

4 types of weedicides : W<sub>1</sub>=Sodium salt of 2, 4-D, W<sub>2</sub>=Ethylester of 2, 4-D, W<sub>3</sub>=Amine salt of 2, 4-D and W<sub>4</sub>=Sodium salt of M.C.P.A.

**Sub-plot treatments :**

5 levels of weedicides : D<sub>0</sub>=0, D<sub>1</sub>=0.6 Kg/ha., D<sub>2</sub>=0.8 Kg/ha., D<sub>3</sub>=1.1 Kg/ha. and D<sub>4</sub>=1.4 Kg/ha. of acid equivalent.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/block; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.3 m. x 5.5 m. (b) 5.5 m. x 3.7 m. (v) 91 cm. x 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1958-1960. (b) No. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 2228 Kg/ha. (ii) 610.0 Kg/ha. (b) 500.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
W <sub>1</sub>	—	2402	3405	2854	3031	2909
W <sub>2</sub>	—	2557	2980	2409	2494	2700
W <sub>3</sub>	—	3193	2535	2995	2931	2797
W <sub>4</sub>	—	3037	2960	2642	2698	2906
Mean	2859	2797	2970	2725	2788	2828

**Crop :- Barley (Rabi).**

**Ref :- Rj. 60(24).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'D'.**

**Object :-**To find out the economic way of controlling weeds in Barley.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 17.11.60. (iv) (a) 8 ploughings. (b) Dibbling. (c) to (e) N.A. (v) N.A. (vi) R.S. 17. (vii) Irrigated. (viii) and (ix) N.A. (x) 27.3.61.

## 2. TREATMENTS :

5 methods of controlling weeds:  $W_0$ =Control (No weeding),  $W_1$ =Local method of weeding,  $W_2$ =Post emergence application weedicides (once),  $W_3$ =Post emergence application of weedicides (twice) and  $W_4$ =Post emergence application of weedicides +weeding.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 7.3 m.×5.5 m. (b) 5.5 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 3324 Kg/ha. (ii) 307.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$W_0$	$W_1$	$W_2$	$W_3$	$W_4$
Av. yield	3268	3363	3466	3151	3372

**Crop :- Barley (Rabi).**

**Ref :- Rj. 60(30).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'D'.**

Object :- To test the relative efficacy of seed dressing fungicides on the yield and vigour of Barley.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Maize. (c) 28.0 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of N. (ii) (a) Sandy loam. (iii) 13.11.60. (iv) (a) 8 ploughings. (b) Dibbling. (c) N.A. (d) 23 cm.×15 cm. (e) N.A. (v) N.A. (vi) R.S.—17. (vii) Irrigated. (viii) and (ix) N.A. (x) 2.4.61.

## 2. TREATMENTS :

10 fungicidal treatments:  $F_0$ =Control,  $F_1$ =Agrosan G.N. at 3 gm.,  $F_2$ =Ceresan at 2 gm.,  $F_3$ =Ceresan at 3 gm.,  $F_4$ =Lunasan at 2 gm.,  $F_5$ =Thiram at 2 gm.,  $F_6$ =Hervasan at 2 gm.,  $F_7$ =Tillex at 2 gm.,  $F_8$ =Copper carbonate at 4 gm. and  $F_9$ =Sulphur at 4 gm.

Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R. B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) 4.6 m.×2.7 m. (b) N.A. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—63 (Treatments modified every year). (b) N.A. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 4857 Kg/ha. (ii) 422.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$F_0$	$F_1$	$F_2$	$F_3$	$F_4$	$F_5$	$F_6$	$F_7$	$F_8$	$F_9$
Av. yield	4875	4626	4611	4777	4761	5123	4860	5003	5048	4882



**Crop :- Barley (Rabi).****Ref :- Rj. 61(25).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'D'.**

Object :—To test the relative efficacy of seed dressing fungicides on the yield and vigour of Barley.

**1. BASAL CONDITIONS :**

(i) (a) Fallow—Wheat. (b) Wheat. (c) 22.4 Kg/ha. of N+28.0 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 1.12.61. (iv) (a) 8 ploughings. (b) Dibbling. (c) N.A. (d) 23 cm.  $\times$  15 cm. (e) N.A. (v) N.A. (vi) R.S.—17. (vii) Irrigated. (viii) N.A. (ix) 2 cm. (x) 5.4.62.

**2. TREATMENTS :**

10 fungicidal treatments :  $F_0$ =Control,  $F_1$ =Agrosan G.N. at 3 gm.,  $F_2$ =Ceresan at 2 gm.,  $F_3$ =Ceresan at 3 gm.,  $F_4$ =Lunasan at 2 gm.,  $F_5$ =Thiram at 3 gm.,  $F_6$ =Hervasan at 2 gm.,  $F_7$ =Tillex at 2 gm.,  $F_8$ =Shell B at 4 gm. and  $F_9$ =Tritisan at 4 gm.

Treatments applied to per Kg. of seed at dressing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 6. (iv) (a) and (b) 4.6 m.  $\times$  2.7 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—63 (treatments modified every year). (b) N.A. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 4636 Kg/ha. (ii) 566.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$F_0$	$F_1$	$F_2$	$F_3$	$F_4$	$F_5$	$F_6$	$F_7$	$F_8$	$F_9$
Av. yield	4265	4480	4697	4690	4671	4712	4611	4677	4677	4882

**Crop :- Barley (Rabi).****Ref :- Rj. 62(111).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'D'.**

Object :—To test the relative efficacy of seed dressing fungicides on the yield and vigour of Barley.

**1. BASAL CONDITIONS :**

(i) (a) Barley—Fallow—Barley. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 5.11.62. (iv) (a) 8 ploughings. (b) Dibbling. (c) N.A. (d) 23 cm.  $\times$  15 cm. (e) N.A. (v) N.A. (vi) R.S.—17. (vii) Irrigated. (viii) 1 weeding. (ix) 1 cm. (x) 20.3.63.

**2. TREATMENTS :**

10 fungicidal treatments :  $F_0$ =Control,  $F_1$ =Agrosan G.N. at 2 gm.,  $F_2$ =Ceresan at 2 gm.,  $F_3$ =Lunasan at 2 gm.,  $F_4$ =Thiram at 3 gm.,  $F_5$ =Hervasan at 2 gm.,  $F_6$ =Tillex at 2 gm.,  $F_7$ =Shell seed dresser at 4 gm.,  $F_8$ =Tritisan at 4 gm., and  $F_9$ =Beej powder at 3 gm.

Treatments applied to per Kg. of seed as dressing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) and (b) 4.6 m.  $\times$  2.7 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1960—63 (Treatments modified every year). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 4057 Kg/ha. (ii) 337.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>	F <sub>8</sub>	F <sub>9</sub>
Av. yield	3551	4085	4144	4051	4572	3851	3902	4301	4072	4040

**Crop :- Barley (Rabi).**

**Ref :- Rj. 63(80).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

Object :—To test the relative efficacy of seed dressing fungicides on the yield, vigour and incidence of covered smut of Barley.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Bajra. (c) N.A. (ii) Sandy loam. (iii) 3 to 5.12.63. (iv) (a) Ploughing. (b) Dibbling. (c) N.A. (d) 23 cm.×15 cm. (e) 3. (v) Town compost+22 Kg/ha. of N as A/S. (vi) R.S.—17. (vii) Irrigated. (viii) 1 weeding and thinning. (ix) N.A. (x) 4.4.64.

## 2. TREATMENTS :

Same as in expt. no. 62(111) on page 142.

Doses of shell seed dresser and Beej powder are 2 gm/Kg.

## 3. DESIGN :

(i) Incomplete L. Sq. (ii) 3 plots/block, 10 blocks/Sq., 3 Sqs. (b) N.A. (iii) 9. (iv) (a) and (b) 5.5 m.×3.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Fair. (ii) Infection of covered smuts. (iii) No. of plants germinated. (iv) (a) 1962—contd. (b) No. (c) Nil. (v) Bassi and Durgapura. (vi) N.A. (vii) Nil.

## 5. RESULTS :

(i) 74.3 degrees. (ii) 4.0 degrees. (iii) Treatment differences are not significant. (iv) Av. no. of plants germinated.

Treatment	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>	F <sub>8</sub>	F <sub>9</sub>
Degrees	72.5	74.7	74.9	74.6	76.8	75.3	70.9	74.2	73.1	73.5

**Crop :- Jowar (Kharif).**

**Ref :- Rj. 81(38).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'M'.**

Object :—To study the effect of N, P and K applied at different levels on the yield of Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 24.7.61. (iv) (a) 7 ploughings. (b) N.A. (c) 11 Kg/ha. (d) 30 cm.×23 cm. (e) N.A. (v) N.A. (vi) R.S.-1. (vii) Unirrigated. (viii) and (ix) Nil. (x) 12, 13.12.1961.

## 2. TREATMENTS :

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

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 2 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>0</sub>=0 and K<sub>1</sub>=33.6 Kg/ha.

## 3. DESIGN :

- (i) 3<sup>2</sup> × 2 confd. (ii) (a) 6 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1961 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

- (i) 787 Kg/ha. (ii) 436.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	447	728	651	651	567	609
N <sub>1</sub>	682	917	913	834	841	837
N <sub>2</sub>	802	845	1101	939	892	916
Mean	644	830	888	808	767	787
K <sub>0</sub>	556	958	910			
K <sub>1</sub>	732	702	866			

**Crop :- Jowar (Kharif).**

**Ref :- Rj. 60(41).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'M'.**

**Object :-** To study the effect of different types of trace elements at different levels on the yield of Jowar.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 20.7.60. (iv) (a) 1 ploughing. (b) N.A. (c) 11 Kg/ha. (d) 30 cm. × 23 cm. (e) N.A. (v) and (vi) N.A. (vii) Unirrigated. (viii) Weeding and hoeing. (ix) N.A. (x) 11, 12.12.60.

## 2. TREATMENTS:

All combinations of (1) and (2) with 2 extra treatments

- (1) 3 levels of trace elements : L<sub>1</sub>=5.6, L<sub>2</sub>=11.2 and L<sub>3</sub>=16.8 Kg/ha.

- (2) 5 types of trace elements : T<sub>1</sub>=Cu. Sul, T<sub>2</sub>=Zn. Sul., T<sub>3</sub>=Borax, T<sub>4</sub>=Mn. Sul. and T<sub>5</sub>=Fe. Sul.

2 extra treatments : E<sub>0</sub>=Control (2 plots, and E<sub>1</sub>=22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.

22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super were applied to all treatments, except extra treatments.

## 3. DESIGN :

- (i) Fact. in R. B. D. (ii) (a) 18. (b) N. A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Crop was damaged due to pigs. (ii) Bettels were noticed, B.H.C. dusting was done. (iii) Yield of grain and fodder. (iv) (a) 1958 and 1960. (b) N.A. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

- (i) 1010 Kg/ha. (ii) 454.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

$E_0=939$  Kg/ha. and  $E_1=1023$  Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
L <sub>1</sub>	968	1073	986	635	1005
L <sub>2</sub>	1171	1331	1159	1060	1079
L <sub>3</sub>	968	722	1208	993	925
Mean	1036	1042	1118	896	1003

**Crop :- Jowar (Kharif).**

**Ref :- Rj. 62(29).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'M'.**

**Object :-** To study the effect of different types of trace elements at different levels on the yield of Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 14.7.62. (iv) (a) 3 ploughings. (b) N.A. (c) 9 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) R.S.—1. (vii) N.A. (viii) 1 weeding. (ix) N.A. (x) 18, 19.12.62.

**2. TREATMENTS :**

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

(1) 3 levels of trace elements : L<sub>1</sub>=5.6, L<sub>2</sub>=11.2 and L<sub>3</sub>=16.8 Kg/ha.

(2) 6 trace elements : T<sub>1</sub>=Cu. Sul., T<sub>2</sub>=Zn. Sul., T<sub>3</sub>=Borax, T<sub>4</sub>=Mn. Sul., T<sub>5</sub>=Fe. Sul. and T<sub>6</sub>=Molybdate.

2 extra treatments : E<sub>0</sub>=Control (2 plots) and E<sub>1</sub>=57.2 Kg/ha. of N as A/S+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+33.6 Kg/ha. of K<sub>2</sub>O as Mur. of Potash.

**3. DESIGN:**

(i) Fact. in R.B.D. (ii) (a) 21. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 455 Kg/ha. (ii) 251.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha. E<sub>0</sub>=227 Kg/ha. and E<sub>1</sub>=560 Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
L <sub>1</sub>	277	371	568	531	272	346
L <sub>2</sub>	396	593	433	359	560	322
L <sub>3</sub>	615	640	962	581	437	264
Mean	429	535	654	490	423	311

**Crop :- Jowar (Kharif).**

**Ref :- Rj. 60(82).**

**Site :- Soil Cons. Res. Demons. & Trg. Centre, Kota.**

**Type :- 'M'.**

**Object :-** To find out the best manuring dose for Jowar under rainfed conditions.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Jowar. (c) Nil. (ii) Clay loam. (iii) N.A. (iv) (a) 1 ploughing and 3 *bakherings*. (b) Sowing behind the plough. (c) 8 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) R.S. 1. (vii) Unirrigated. (viii) 2 weedings. (ix) and (x) N.A.

## 2. TREATMENTS :

4 levels of N as F.Y.M. :  $N_0=0$ ,  $N_1=22.4$ ,  $N_2=44.8$  and  $N_3=89.7$  Kg/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 1/247 ha. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959–1963. (b) Yes. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 212 Kg/ha. (ii) 96.0 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$N_0$	$N_1$	$N_2$	$N_3$
Av. yield	134	210	210	295

C.D.=132.2 Kg/ha.

**Crop :- Jowar (*Kharif*).**

**Ref :- Rj, 62(39).**

**Site :- Govt. Agri. Farm, Sawai Madhopur.**

**Type :- 'M'.**

Object :—To study the effect of N, P and K on the yield of Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Fallow-Jowar. (b) Fallow. (c) Nil. (ii) N.A. (iii) July, 62. (iv) (a) 2 ploughings. (b) and (c) N.A. (d) 46 cm. between rows. (e) N.A. (v) and (vi) N.A. (vii) Unirrigated. (viii) 1 weeding. (ix) N.A. (x) Nov., 62.

## 2. TREATMENTS :

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

(1) 4 levels of N :  $N_0=0$ ,  $N_1=28.0$ ,  $N_2=56.0$  and  $N_3=84.1$  Kg/ha.

(2) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=28.0$  and  $P_2=56.0$  Kg/ha.

(3) 3 levels of  $K_2O$  :  $K_0=0$ ,  $K_1=28.0$  and  $K_2=56.0$  Kg/ha.

## 3. DESIGN :

(i)  $3^2 \times 4$  confd. (ii) (a) 12 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 6.1 m.  $\times$  4.6 m. (b) 5.5 m.  $\times$  3.7 m. (v) 30 cm.  $\times$  45 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) to (vii) N.A.

## 5. RESULTS :

(i) 2070 Kg/ha. (ii) 522.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	1893	2170	1892	1984	1829	2141	1985
N <sub>1</sub>	2188	2242	2206	2430	2147	2058	2212
N <sub>2</sub>	1959	2209	1850	2190	1961	1867	2006
N <sub>2</sub>	1947	2212	2072	2072	2312	1847	2077
Mean	1997	2208	2005	2169	2062	1978	2070
K <sub>0</sub>	2033	2280	2198				
K <sub>1</sub>	2103	2246	1838				
K <sub>2</sub>	1854	2097	1984				

**Crop :- Jowar (Kharif).**

**Ref :- Rj. 62, 63, 64, 65(S.F.T.) for Kota and  
63(S.F.T.) for Pali.**

**Site :- (District) : Kota and Pali.**

**Type :- 'M'.**

**Object :-** To study the response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with other nutrients (Type : A<sub>1</sub>).

**1. BASAL CONDITIONS :**

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

**2. TREATMENTS :**

8 manurial treatments.

O = Control (no manure).

N<sub>1</sub> = 33.6 Kg/ha. of N.

N<sub>2</sub> = 67.2 Kg/ha. of N.

P<sub>1</sub> = 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N<sub>1</sub>P<sub>1</sub> = 33.6 Kg/ha. of N + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N<sub>2</sub>P<sub>1</sub> = 67.2 Kg/ha. of N + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N<sub>2</sub>P<sub>2</sub> = 67.2 Kg/ha. of N + 67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N<sub>2</sub>P<sub>2</sub>K<sub>1</sub> = 67.2 Kg/ha. of N + 67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 33.6 Kg/ha. of K<sub>2</sub>O.

N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

**3. DESIGN :**

A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50—100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A<sub>1</sub>, 11 of type A<sub>2</sub>, 11 of type A<sub>3</sub> and 3 are of type C. The eleven experiments under type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are distributed as 3 on a kharif cereal, 3 on a rabi cereal, 3 on a cash crop, and 2 on oil seed. All the three type—C experiments are conducted on a legume crop. For the purpose of conducting the A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are laid out. For conducting the three type—C trials three villages are randomly selected in each block.

**4. GENERAL :**

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Kota and 1963 to 1966 for Pali. [1964 and 1965 N.A.] (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

**Kota****62 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	129	261	116	297	437	492	577	46.5

Control yield=470 Kg/ha. ; No. of trials=11.

**63 (S.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	121	230	107	267	381	460	508	32.4

Control yield=338 Kg/ha. ; No. of trials=11.

**64 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	90	159	74	187	229	317	387	27.8

Control yield=347 Kg/ha. ; No. of trials=12.

**65 (S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	111	217	77	215	350	377	442	67.2

Control yield=484 Kg/ha. ; No. of trials=7.

**Pali****63(S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	33	61	52	90	152	1075	313	77.6

Control yield=315 Kg/ha. ; No. of trials=4.

**Crop :- Jowar.****Ref :- Rj. 62, 63, 64, 65(S.F.T.)for Kota and 63(S.F.T.) for Pali.****Site :- (District) : Kota and Pali.****Type :- 'M'.**Object :—To study the response curves of important cereal, cash and oil seed crops to phosphorus applied singly and in combination with other nutrients (Type : A<sub>1</sub>).

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and black ; Grey brown. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

O =Control (no manure).

N<sub>1</sub> =33.6 Kg/ha. of N.P<sub>1</sub> =33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.P<sub>2</sub> =67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>1</sub> =33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>2</sub> =33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub> =67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O:N applied as A/S ; P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in Type A<sub>1</sub> (Unirrigated) on page no. 147.

## 4. GENERAL :

(1) to (iii) N.A. (iv) (a) 1962 to 1966 for Kota and 1963 to 1966 for Pali [1964 and 1965 N.A. for Pali].  
(b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Kota

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	47	-12	12	164	205	296	277	91.4

Control yield=548 Kg/ha. ; No. of trials=11.

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	135	53	86	159	215	360	448	28.5

Control yield=357 Kg/ha. ; No. of trials=10.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	117	119	107	197	261	324	399	56.9

Control yield=389 Kg/ha. ; No. of trials=9.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S. E.
Av. response of grain in Kg/ha.	189	101	169	247	362	443	544	39.8

Control yield=400 Kg/ha. ; No of trials=7.

## Pali

## 63(S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	126	169	171	183	214	254	509	59.1

Control yield=271 Kg/ha. ; No. of trials=4.

Crop :- Jowar (Kharif).

Ref :- Rj. 62, 63, 64, 65(S.F.T.) for Kota  
and 63(S.F.T.) for Pali.

Site :- (District) Kota and Pali.

Type :- 'M'.

Object :- To study the response curves of important cereal, cash and oilseed crops to potash applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Red and black ; Grey brown. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.



## 2. TREATMENTS :

8 manurial treatments

O = Control (no manure)

N<sub>1</sub> = 33.6 Kg/ha of NK<sub>1</sub> = 33.6 Kg/ha of K<sub>2</sub>OK<sub>2</sub> = 67.2 Kg/ha of K<sub>2</sub>ON<sub>1</sub>K<sub>1</sub> = 33.6 Kg/ha of N + 33.6 Kg/ha of K<sub>2</sub>O.N<sub>1</sub>K<sub>2</sub> = 33.6 Kg/ha of N + 67.2 Kg/ha of K<sub>2</sub>ON<sub>2</sub>K<sub>2</sub> = 67.2 Kg/ha of N + 67.2 Kg/ha of K<sub>2</sub>ON<sub>1</sub>P<sub>1</sub>K<sub>1</sub> = 33.6 Kg/ha of N + 33.6 Kg/ha of P<sub>2</sub>O<sub>5</sub> + 33.6 Kg/ha of K<sub>2</sub>ON applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in Type A<sub>1</sub> (unirrigated) on page no. 147.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Kota and 1963 to 1966 for Pali [1964 and 1965 N.A. for Pali]. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Kota

## 62(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	122	95	120	237	326	475	496	44.1

Control yield=406 Kg/ha. ; No. of trials=10.

## 63(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	117	16	49	191	241	351	345	29.3

Control yield=367 Kg/ha. ; No. of trials=10.

## 64(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	77	17	83	177	185	291	326	23.5

Control yield=382 Kg/ha. ; No. of trials=11.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha	169	00	76	179	264	323	333	45.4

Control yield=439 Kg/ha. ; No. of trials=7.

## Pali

## 63(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	30	42	119	92	148	206	132	30.6

Control yield=495 Kg/ha. ; No. of trials=3.

**Crop :- Jowar.****Ref :- Rj. 60 (S.F.T).****Site :- (District) Kota.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

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

**2. TREATMENTS :**

O=Control (no manure).

n=22.4 Kg/ha. of N as A/S.

p=22.4 Kg/ha. of  $P_2O_5$  as Super.k=22.4 Kg/ha. of  $K_2O$  as Mur. Pot.np=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super.nk=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of  $K_2O$  as Mur. Pot.pk=22.4 Kg/ha. of  $P_2O_5$  as Super+22.4 Kg/ha. of  $K_2O$  as Mur. Pot.npk=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super+22.4 Kg/ha.  $K_2O$  as Mur. Pot.**3. DESIGN :**

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the four zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

**4. GENERAL :**

N.A.

**5. RESULTS :**

Treatment	N	P	K	S.E.	NP	NK	PK	NPK	S.E.
Av. response of grain in Kg/ha.	190	50	0	33.0	10	—40	10	30	14.0

Control yield=450 Kg/ha. ; No. of trials=10.

**Crop :- Jowar.****Ref :- Rj. 60(SFT).****Site :- (District) : Kota.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

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

**2. TREATMENTS :**

O=Control (no manure).

n<sub>1</sub>=22.4 Kg/ha. of N as A/Sn<sub>2</sub>=44.8 Kg/ha of N as A/Sn<sub>1</sub>'=22.4 Kg/ha. of N as Urean<sub>2</sub>'=44.8 Kg/ha. of N as Urean<sub>1</sub>"=22.4 Kg/ha. of N as A/S/N.n<sub>2</sub>"=44.8 Kg/ha. of N as A/S/N.

## 3. DESIGN :

Same as in Type A<sub>1</sub> on page no. 151.

## 4. GENERAL :

N.A.

## 5. RESULTS :

Treatment :	$n_1$	$n_2$	$n_1'$	$n_2'$	$n_1''$	$n_2''$	SE/mean
Av. yield of grain in Kg/ha.	970	1060	980	970	960	1060	966

Control yield=760 Kg/ha.

**Crop :- Jowar (Kharif).**

**Ref :- Rj. 64(105), 65(55).**

**Site :- Soil Cons. Res. Demons and Trg. Centre,**

**Kota.**

**Type :- 'C'.**

Object :—To find out suitable combination of seed rate and spacing for Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) Nil. (ii) Clay loam. (iii) 8.7.1964; 29.7.1965. (iv) (a) Ploughing and bakhering. (b) Behind the plough. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) R.S. 1. (vii) Un-irrigated. (viii) 2 weedings. (ix) N.A. (x) 5.12.1964; 8.11.1965.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 seed rates :  $R_1=4$  ;  $R_2=8$  and  $R_3=12$  Kg/ha.

(2) 3 spacings :  $S_1$ =Broadcasting.  $S_2=30$  cm. and  $S_3=60$  cm. between rows.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4 for 64(105) ; 8 for 65(55). (iv) (a) N.A. (b) 12.5 m.  $\times$  10.0 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Good for 64(105) ; Fair for 65(55). (ii) N.A. (iii) Yield of grain. (iv) (a) 1964 to 1965. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) Since the error variances are heterogeneous and the Treatments  $\times$  years interaction is absent results of individual years are presented under 5. Results.

## 5. RESULTS :

64(105)

(i) 658 Kg/ha. (ii) 160.0 Kg/ha. (iii) None of effects is significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$R_1$	679	672	586	646
$R_2$	640	812	746	733
$R_3$	618	562	603	594
Mean	646	682	645	658

65(55)

(i) 398 Kg/ha. (ii) 105.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	503	413	397	438
R <sub>2</sub>	424	427	371	407
R <sub>3</sub>	372	361	319	351
Mean	433	400	362	398

**Crop :- Jowar (Kharif).**

**Ref :- Rj. 63(27).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'CMV'.**

**Object :-** To find out the suitable spacing and fertilizer requirements of different varieties of Jowar.

**1. BASAL CONDITIONS:**

(i) (a) N.A. (b) Wheat. (c) Nil. (ii) Clay loam. (iii) 17.7.63. (iv) (a) 2 bakherings, 1 ploughing and patta. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and 33.6 Kg/ha. of K<sub>2</sub>O as Mur. Pot. (vi) As per treatments. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 29.11.63.

**2. TREATMENTS :**

**Main-plot treatments :**

2 varieties : V<sub>1</sub>=R.S. 1 and V<sub>2</sub>=Texas.

**Sub-plot treatments**

**Strips in one direction :**

6 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=28, N<sub>2</sub>=56, N<sub>3</sub>=84, N<sub>4</sub>=112 Kg/ha. as fertilizer and N<sub>5</sub>=56 Kg/ha. as compost.

**Strips in perpendicular direction :**

3 spacings between rows : S<sub>1</sub>=30, S<sub>2</sub>=61 and S<sub>3</sub>=91 cm.

N applied at planting.

**3. DESIGN:**

(i) Strip-cum-Split-plot. (ii) (a) 2 main-plots/replication, 18 sub-plots/main-plot (6 strips in one direction and 3 strips in perpendicular direction). (b) N.A. (iii) 4. (iv) (a) 3.7 m. × 3.7 m. (b) 3.1 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 1530 Kg/ha. (ii) (a) 389.0 Kg/ha. (b) S.E.(N)=515.0 Kg/ha., S.E.(S)=305.0 Kg/ha. and S.E.(S×N)=594.0 Kg/ha. (iii) Main effect of V is significant and that of N is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
V <sub>1</sub>	952	1447	1730	2043	1737	1862	1576	1777	1558	1637
V <sub>2</sub>	1022	1245	1615	1605	1518	1536	1454	1555	1261	1423
Mean	987	1346	1697	1824	1627	1699	1515	1666	1410	1530
S <sub>1</sub>	1106	1157	1828	1781	1519	1697				
S <sub>2</sub>	944	1488	1882	2001	1787	1894				
S <sub>3</sub>	910	1393	1382	1690	1576	1507				

Control=816 Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
C <sub>1</sub>	1579	1356	1622	1640	1304	1508	1492	1500
C <sub>2</sub>	1439	1222	1458	1572	1333	1404	1405	1405
C <sub>3</sub>	1245	1327	1400	1151	1352	1293	1297	1295
Mean	1421	1302	1493	1454	1330	1402	1398	1400
P <sub>0</sub>	1471	1300	1416	1500	1322			
P <sub>1</sub>	1370	1304	1570	1408	1338			

C.D. for control vs others =434.7 Kg/ha.

**Crop :- Jowar (Kharif).****Ref :- Rj. 61(89).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'DV'.**

Object :—To study the effect of weedicides on different varieties of Jowar.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Fallow. (c) 628 Kg/ha. of F.Y.M. (ii) Clay loam. (iii) 8.7.61. (iv) (a) 1 ploughing and 1 bakhering. (b) N.A. (c) 13 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) and (ix) N.A. (x) 12.12.61.

**2. TREATMENTS :****Main-plot treatments :**

7 weedicial treatmentsal : W<sub>0</sub>=Control, W<sub>1</sub>=3.9 Kg/ha. of Altrazine, W<sub>2</sub>=7.9 Kg/ha. of Altrazine, W<sub>3</sub>=3.9 Kg/ha. of Propazine, W<sub>4</sub>=7.9 Kg/ha. of propazine, W<sub>5</sub>=2, 4-D and W<sub>6</sub>=Hand weeding.

**Sub-plot treatments :**

2 varieties : V<sub>1</sub>=R.S. 1 and V<sub>2</sub>=Texas-630.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 7 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 8. (ix) (a) and (b) 5.5 m. × 0.9 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Poor growth due to excess of rain and water standing in plots. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961 only. (b) and (c) N.A. (v) to (vii) Nil.

**5. RESULTS :**

(i) 270 Kg/ha. (ii) (a) 125.2 Kg/ha. (b) 133.3 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	W <sub>5</sub>	W <sub>6</sub>	Mean
V <sub>1</sub>	368	436	292	392	467	424	429	401
V <sub>2</sub>	139	155	112	155	153	124	131	138
Mean	253	295	202	273	310	274	280	270

C.D. for V marginal means=50.7 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- Rj. 60(38), 61(48), 62(19).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'M'.**

**Object :-** To study the effect of different sources and levels of N with different levels of P on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow for 60(38), 61(48) ; Oats+Pea for 62(19). (c) Nil. (ii) Sandy loam. (iii) 8.7.1960 ; 10.7.1961 ; 25.7.1962. (iv) (a) 3 ploughings. (b) N.A. (c) 4.5 Kg/ha. (d) 30 cm.×23 cm. (e) N.A. (v) N.A. (vi) R.S. Karoli. (vii) Unirrigated. (viii) 2 weedings and hoeing. (ix) N.A. (x) 27.10.1960 ; 24.10.1961 ; 9.11.1962.

**2. TREATMENTS :**

All combinations of (1), (2), (3) with 3 extra treatments.

(1) 3 sources of N :  $S_1=A/S$ ,  $S_2=A/S/N$  and  $S_3=Urea$ .

(2) 2 levels of N :  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.

(3) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=16.8$  and  $P_2=33.6$  Kg/ha.

Extra treatments :  $E_0=0$ ,  $E_1=16.8$  and  $E_2=33.6$  Kg/ha. of  $P_2O_5$  as Super.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 21. (b) N.A. (iii) 3. (iv) (a) 9.2 m.×5.5 m. (b) 7.4 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil for 60(38) ; Betals insects attack controlled by B.H.C. 5% for 61(48) ; N.A. for 62(19). (iii) Yield of grain and fodder. (iv) (a) 1960—1962. (b) No. (c) Results of combined analysis given under 5. Results. (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments×years interaction is present.

**5. RESULTS :**

(i) 969 Kg/ha. (ii) 188.4 Kg/ha. [based on 40 d.f. made up of Treatments×years interaction]. (iii) Main effect of N and extra vs. others' are highly significant and main effect of P is significant. (iv) Av. yield of grain in Kg/ha.

$E_0=725$ ,  $E_1=735$  and  $E_2=827$  Kg/ha.

	$P_0$	$P_1$	$P_2$	$N_1$	$N_2$	Mcan
$S_1$	993	981	1091	919	1124	1022
$S_2$	959	982	1036	921	1064	992
$S_3$	942	947	1101	928	1066	996
Mean	965	970	1076	923	1085	1004
$N_1$	873	891	1004			
$N_2$	1057	1049	1147			

C.D. for N marginal means=59.8 Kg/ha.

C.D. for P marginal means=73.3 Kg/ha.

C.D. for extra treatments vs others=45.7 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- Rj. 63(14), 64(101).****Site :- Govt. Agri. Exptl. Farm, Durgapur.****Type :- 'M'.**

**Object :-** To study the effect of different sources and levels of N with different levels of P on the yield of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Linseed; Fallow. (c) N.A. (ii) Sandy loam. (iii) 21.7.1963 ; 11.7.1964. (iv) (a) 4 ploughings. (b) N.A. (c) 7.6 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) N.A. (vi) R.S.K. (vii) Unirrigated. (viii) 2 weedings by hand khurpi. (ix) 25 cm. ; N.A. (x) 4, 5.11.1963 ; 22, 23.10.1964.

## 2. TREATMENTS :

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

(1) 3 sources of N :  $S_1=A/S$ ,  $S_2=C/A/N$  and  $S_3=Urea$ .

(2) 3 levels of N :  $N_0=0$ ,  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.

(3) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=16.8$  and  $P_2=33.6$  Kg/ha.

## 3. DESIGN :

(i)  $3^3$  confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good ; fair. (ii) Damage by cut worm ; N.A. (iii) Yield of grain. (iv) (a) 1961 to 1964. Experiment failed in 1962. (b) No. (c) Presented under 5 results. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

## 1963

(i) 397 Kg/ha. (ii) 184.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	Mean	$S_1$	$S_2$	$S_3$
$N_0$	291	353	327	324	—	—	—
$N_1$	427	376	461	421	425	401	438
$N_2$	428	445	469	448	418	475	450
Mean	382	391	419	—	422	438	444
$S_1$	467	314	425				
$S_2$	347	447	425				
$S_3$	333	413	405				

## 1964

(i) 196 Kg/ha. (ii) 76.5 Kg/ha. (iii) Only the main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	Mean	$S_1$	$S_2$	$S_3$
$N_0$	128	101	153	127	—	—	—
$N_1$	280	165	184	210	182	269	177
$N_2$	211	232	308	250	267	229	255
Mean	206	166	215	—	224	249	216
$S_1$	172	189	235				
$S_2$	255	169	201				
$S_3$	192	139	210				

C.D. for N marginal means = 52.9 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Rj. 63(2), 64(85).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'M'.**

**Object :-** To study the effect of different methods of application of N, P and K on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) N.A. for 63(2); Nil for 64(85). (b) Fallow for 63(2); Wheat for 64(85). (c) Nil. (ii) Sandy loam. (iii) 19.7.1963; 14.7.1964. (iv) (a) N.A. (b) Line sowing. (c) 6 Kg/ha. (d) 30 cm. × 23 cm. for 63(2); 30 cm. between lines for 64(85). (e) N.A. (v) N.A. for 63(2); Nil for 64(85). (vi) R.S.K. (vii) Unirrigated. (viii) 4 hand weedings for 63(2); 1 hand weeding for 64(85). (ix) 65 cm.; 52 cm. (x) 7 to 9.11.1963 for 63(2); 12 to 14.10.1964 for 64(85).

**2. TREATMENTS :**

**Main-plot treatments:**

2 methods of application :  $M_1$ =Broadcasting and  $M_2$ =Drilling.

**Sub-plot treatments:**

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

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.

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

(3) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=18.8$  Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication; 12 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Good for 63(2); N.A. for 64(85). (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1962 to 1964 (Expt. failed in 1962). (b) No. (c) Nil. (v) Tabiji. (vi) Heavy rainfall damaged the crop for 63(2); N.A. for other. (vii) Since the sub-plot error variances are heterogeneous, the results of individual years are presented under 5 Results.

**5. RESULTS :**

**63(2)**

(i) 313 Kg/ha. (ii) (a) N.A. (b) 110.0 Kg/ha. (iii) Main effect of N is highly significant. Main effect of P and interactions  $N \times P$ , and  $M \times P$ ,  $M \times K$  are significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$K_0$	$K_1$	Mean
$M_1$	197	304	432	246	376	321	301	311
$M_2$	200	341	402	315	313	266	362	314
Mean	199	322	417	281	345	294	332	313
$K_0$	180	321	379	237	350			
$K_1$	217	324	455	324	339			
$P_0$	203	298	342					
$P_1$	194	348	492					

C.D. for N marginal means=64.0 Kg/ha.

C.D. for P marginal means=52.1 Kg/ha.

C.D. for  $N \times P$  table =90.2 Kg/ha.

C.D. for P or K means at the same level of  $M=73.9$  Kg/ha.

**64(85)**

(i) 257 Kg/ha. (ii) (a) 223.0 Kg/ha. (b) 216.0 Kg/ha. (iii) Main effect of N is highly significant and interaction  $M \times P$  is significant. (iv) Av. yield of grain in Kg/ha.



	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
M <sub>1</sub>	74	328	281	245	210	225	230	228
M <sub>2</sub>	172	290	396	197	374	236	336	286
Mean	123	309	339	221	292	231	283	257
K <sub>0</sub>	111	353	228	206	255			
K <sub>1</sub>	135	265	449	237	329			
P <sub>0</sub>	109	227	328					
P <sub>1</sub>	137	390	349					

C.D. for N marginal means = 125.4 Kg/ha.

C.D. for two P means at the same level of M = 144.9 Kg/ha.

C.D. for M means at the same level of P = 162.6 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Rj. 61(49).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'M'.**

Object :- To study the effect of different levels of N and P on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Bajra. (c) No. (ii) Sandy loam. (iii) 15.7.1961. (iv) (a) 4 ploughings. (b) N.A. (c) 6 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) R.S.J. (vii) Unirrigated. (viii) and (ix) N.A. (x) 22 to 24.10.61.

**2. TREATMENTS :**

All combinations of (1) and (2) with 2 extra treatments

(1) 4 levels of N : N<sub>0</sub>=No N, N<sub>1</sub>=16.8 Kg/ha. of N as A/S, N<sub>2</sub>=N<sub>1</sub>+16.8 Kg/ha. of N as F.Y.M. and N<sub>3</sub>=33.6 Kg/ha. of N as A/S.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super: P<sub>0</sub>=0, P<sub>1</sub>=16.8 and P<sub>2</sub>=33.6 Kg/ha.

Extra treatments are : E<sub>1</sub>=16.8 and E<sub>2</sub>=33.6 Kg/ha. of N as F.Y.M.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.1 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 232 Kg/ha. (ii) 95.4 Kg/ha. (iii) Main effect of N and 'extra treatments vs. others' are highly significant. Interaction N × P is significant. (iv) Av. yield of grain in Kg/ha.

E<sub>1</sub>=91 and E<sub>2</sub>=105 Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
P <sub>0</sub>	91	371	206	553	305
P <sub>1</sub>	94	328	307	378	277
P <sub>2</sub>	97	419	531	378	356
Mean	94	373	348	436	313

C.D. for N marginal means = 93.3 Kg/ha.  
 C.D. for 'Extra vs. others' = 88.6 Kg/ha.  
 C.D. for means in the body of N×P table = 161.8 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Rj. 61(1).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'M'.**

**Object :—**To study the effect of different sources and levels of N at different levels of P on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 17.7.61. (iv) (a) 4 ploughings. (b) N.A. (c) 6 Kg/ha. (d) 30.5 cm. between row. (e) N.A. (v) N.A. (vi) R.S.J. (vii) Unirrigated. (viii) and (ix) N.A. (x) 26 to 28.10.61.

**2. TREATMENTS :**

All combinations of (1), (2) and (3) with 3 extra treatments

(1) 3 sources of N :  $S_1=A/S$ ,  $S_2=C/A/N$  and  $S_3=Urea$ .

(2) 2 levels of N :  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.

(3) 3 levels of  $P_2O_5$  as super :  $P_0=0$ ,  $P_1=16.8$  and  $P_2=33.6$  Kg/ha.

3 extra treatments are :  $E_0=0$ ,  $E_1=16.8$  and  $E_2=33.6$  Kg/ha. of  $P_2O_5$  as Super.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 21. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) 1961—1963. (b) No. (c) Nil. (v) and (vii) N.A.

**5. RESULTS :**

(i) 318 Kg/ha. (ii) 127.1 Kg/ha. (iii) 'E vs. others' is highly significant. Main effects of N, P and S and interaction P×S are significant. (iv) Av. yield of grain in Kg/ha.

$E_0=77$ ,  $E_1=77$  and  $E_2=109$  Kg/ha.

	$P_0$	$P_1$	$P_2$	$N_1$	$N_2$	Mean
$S_1$	314	364	304	296	359	327
$S_2$	266	460	573	421	445	433
$S_3$	294	252	378	235	380	308
Mean	291	359	418	317	395	356
$N_1$	240	297	415			
$N_2$	342	420	422			

C.D. for P or S marginal means = 85.7 Kg/ha.

C.D. for N marginal means = 69.7 Kg/ha.

C.D. for body of P×S table = 148.3 Kg/ha.

C.D. for extra vs. others = 92.3 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- Rj. 61(46), 62(22), 63(1).****Site :- Govt. Agri. Farm. Mandora.****Type :- 'M'.****Object :-**To study the effect of inorganic and organic manure with and without P on the yield of Bajra.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 20.7.1961 ; 16.7.1962 ; 8.8.1963. (iv) (a) 2 ploughings. (b) Line sowing. (c) 6 Kg/ha. for 61(44) ; 9 Kg/ha. for others. (d) 30 cm.  $\times$  23 cm. (e) N.A. (v) N.A. (vi) Local for 61(46), 62(22) ; Sikar for 63(1). (vii) Unirrigated. (viii) One weeding and thinning. (ix) N.A. (x) 17, 18.10.1961 ; 14, 15.10.1962 ; 30.10.1963.

**2. TREATMENTS :**

All combinations of (1) and (2) with two extra treatments

(1) 4 levels of N :  $N_0$ =No manure,  $N_1$ =16.8 Kg/ha. of N as A/S,  $N_2$ =16.8 Kg/ha. of N as A/S+16.8 Kg/ha. of N as F.Y.M. and  $N_3$ =33.6 Kg/ha. of N as A/S.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0$ =0,  $P_1$ =16.8 and  $P_2$ =33.6 Kg/ha.

2 Extra treatments :  $E_1$ =16.8 and  $E_2$ =33.6 Kg/ha. of N as F.Y.M.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 3. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) N.A. (ii) Nil for 61(46) ; N.A. for others. (iii) Yield of grain and fodder. (iv) (a) 1961 to 63. (b) No. (c) Results of combined analysis given under 5. (v) and (vi) N.A. (vii) Error variances are homogeneous, Treatments  $\times$  years interaction is absent.

**5. RESULTS :**

(i) 403 Kg/ha. (ii) 137.8 Kg/ha. (based on 104 d.f. made up of Treatments  $\times$  years interaction and pooled error). (iii) Main effect of N and 'Extra treatment vs. others' are highly significant. (iv) Av. yield of grain in Kg/ha.

 $E_1=319$  and  $E_2=317$  Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	Mean
$P_0$	234	410	450	422	379
$P_1$	290	468	490	528	444
$P_2$	291	536	413	470	427
Mean	272	471	451	473	417

C.D. for N marginal means = 74.2 Kg/ha.

C.D. for extra treatments vs. others = 69.5 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- 61(45), 62(27), 63(7).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'M'.****Object :-**To study the effect of N and P applied as mixture on the yield of Bajra.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 20.7.1961 ; 21.7.1962 ; 6.8.1963. (iv) (a) 2 ploughings. (b) N.A. for 61(45), 62(27) ; Line sowing for 63(7). (c) 6 to 9 Kg/ha. (d) 30 cm.  $\times$  23 cm. (e) N.A. (v) N.A. (vi) Local for 61(45), 62(27) ; Sikar for 63(7). (vii) Unirrigated. (viii) Thinning and weeding. (ix) N.A. (x) 22, 23.10.1961 ; 12, 13.10.1962 ; 30.10.1963.

## 2. TREATMENTS :

Treatments in one direction :

2 types of application :  $A_1$ =Separate and  $A_2$ =Applied as a mixture.

Treatments in perpendicular direction :

5 manurial treatments :  $M_0$ =Control,  $M_1$ =16.8 Kg/ha. of N as A/S+16.8 Kg/ha. of  $P_2O_5$ ,  $M_2$ =16.8 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ ,  $M_3$ =33.6 Kg/ha. of N+16.8 Kg/ha. of  $P_2O_5$  and  $M_4$ =33.6 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .N applied as A/S and  $P_2O_5$  as Super.

## 3. DESIGN :

(i) Strip-plot. (ii) (a) 2 main-plots/replication ; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1961 to 1963. (b) N.A. (v) and (vi) N.A. (vii) Since the error variances for (A  $\times$  M) are heterogeneous, results of individual years are presented under 5.

## 5. RESULTS :

61(45)

(i) 628 Kg/ha. (ii) (a) 254.3 Kg/ha. for A. (b) 254.5 Kg/ha. for M. (c) 165.2 Kg/ha. for A  $\times$  M. (iii) Main effect of M alone is significant. (iv) Av. yield of grain in Kg/ha.

	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	Mean
$A_1$	307	637	733	679	852	642
$A_2$	288	642	798	709	639	615
Mean	297	639	765	694	745	628

C.D. for M marginal means=277.2 Kg/ha.

62(27)

(i) 646 Kg/ha. (ii) (a) 173.5 Kg/ha. for A. (b) 117.6 Kg/ha. for M. (c) 123.9 Kg/ha. for A  $\times$  M. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	Mean
$A_1$	496	788	553	712	746	659
$A_2$	416	709	718	713	610	633
Mean	456	749	635	712	678	646

C.D. for M marginal means=128.1 Kg/ha.

63(7)

(i) 283 Kg/ha. (ii) (a) 52.6 Kg/ha. for A. (b) 66.1 Kg/ha. for M. (c) 62.3 Kg/ha. for A  $\times$  M. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	Mean
$A_1$	180	238	268	386	423	299
$A_2$	147	264	269	398	264	268
Mean	164	251	268	392	344	284

C.D. for M marginal means=71.9 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- Rj. 62(75).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'M'.**

Object :—To study the effect of different methods of application of N, P and K on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy. (iii) 23.7.62. (iv) (a) 2 ploughings with tractor. (b) Line sowing. (c) 9 Kg/ha. (d) 30 cm. × 23 cm. (e) N.A. (v) Nil. (vi) R.S.K. (vii) Unirrigated. (viii) 1 weeding. (ix) N.A. (x) 21, 23.10.62.

**2. TREATMENTS :****Main-plot treatments :**

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

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=16.8$  Kg/ha.(3) 2 levels of  $K_2O$  as Mur, Pot. :  $K_0=0$  and  $K_1=16.8$  Kg/ha.**Sub-plot treatments :**2 methods of application :  $M_1$ =Broadcasting and  $M_2$ =Drilling.**3. DESIGN :**

(i) Split-plot. (ii) (a) 12 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 m. × 91 m. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 2119 Kg/ha. (ii) (a) 564.3 Kg/ha. (b) 317.7 Kg/ha. (iii) Main effects of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$K_0$	$K_1$	Mean
$M_1$	1762	2156	2443	2089	2149	2080	2158	2119
$M_2$	1765	2174	2416	2019	2217	2183	2052	2118
Mean	1763	2165	2429	2054	2183	2132	2105	2119
$K_0$	1733	2247	2417	2040	2223			
$K_1$	1794	2083	2442	2068	2143			
$P_0$	1666	2072	2426					
$P_1$	1861	2258	2433					

C.D. for N marginal means=287.3 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- Rj. 63(4).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'M'.**

Object :—To study the effect of different methods of application of N, P and K on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow, (c) N.A. (ii) Sandy. (iii) 10.8.1963. (iv) (a) 1 ploughing. (b) Line sowing. (c) 9 Kg/ha. (d) 30 cm. × 23 cm. (e) N.A. (v) N.A. (vi) R.S.K. (vii) Unirrigated. (viii) hand weeding. (ix) N.A. (x) 31.10.63 and 1.11.63.

## 2. TREATMENTS :

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

- (1) 2 methods of application :  $M_1$ =Broadcasting and  $M_2$ =Drilling.
- (2) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.
- (3) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=16.8$  Kg/ha.
- (4) 2 levels of  $K_2O$  as Mur. Pot :  $K_0=0$  and  $K_1=16.8$  Kg/ha.

## 3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 24. (b) N.A. (iii) 4. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL:

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

## 5. RESULTS :

- (i) 583 Kg/ha. (ii) 206.0 Kg/ha. (iii) Main effect of N, K are highly significant and interactions  $N \times K$  and  $N \times P$  are significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$K_0$	$K_1$	Mean
$M_1$	527	566	761	581	656	545	692	618
$M_2$	467	603	576	553	544	496	602	548
Mean	497	584	669	567	600	520	647	583
$K_0$	343	578	640	525	516			
$K_1$	652	591	698	609	684			
$P_0$	457	513	731					
$P_1$	537	656	606					

C.D. for N marginal means = 102.8 Kg/ha.

C.D. for K marginal means = 83.9 Kg/ha.

C.D. for means in the body of  $N \times P$  or  $N \times K$  table = 145.4 Kg/ha.

**Crop :- Brjra (Kharif).**

**Ref :- Rj. 60(37), 61(47), 62(18).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'M'.**

**Object :-** To study the effect of different types and levels of nitrogenous fertilizers and different levels of P on Bajra.

## 1. BASAL CONDITIONS :

- (i) (a) Nil, (b) Gram for 60(37); Wheat for 61(47); 62(18). (c) Nil. (ii) Sandy loam. (iii) 8.7.1960; 6.7.1961; 15.7.1962. (iv) (a) 3 to 4 ploughings. (b) Drilling. (c) 5 Kg/ha. (d) 30 cm.  $\times$  23 cm. (e) N.A. (v) N.A. (vi) N.A. for 60(37); R.S.J. for others. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 13, 14.10.1960; 9 to 11.10.1961; 18, 19.10.1962.

## 2. TREATMENTS :

All combinations of (1), (2) and (3) with 3 extra treatments

- (1) 3 sources of N :  $S_1=A/S$ ,  $S_2=A/S/N$  and  $S_3=Urea$ .
- (2) 2 levels of N :  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.
- (3) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=16.8$  and  $P_2=33.6$  Kg/ha.

Extra treatments are :  $E_0=0$ ,  $E_1=16.8$  and  $E_2=33.6$  Kg/ha. of  $P_2O_5$  as Super.

## 3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 21. (b) N.A. (iii) 3. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 60(37); 62(18); lodging in some plots for 61(47). (ii) N.A. for 60(37) ; 62(18); Nil for 61(47). (iii) Yield of grain and fodder. (iv) (a) 1960 to 1962. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Heavy rainfall for 61(47) resulted some loss in yield in some plots. (vii) Error variances are homogeneous, Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 1449 Kg/ha. (ii) 239.9 Kg/ha. [based on 160 d.f. made up of interaction of various components of treatments with years and pooled error]. (iii) Main effect of N, interaction P  $\times$  N and 'extra treatments vs. others' are highly significant and within extra treatments is significant. (iv) Av. yield of grain in Kg/ha.

$$E_0=1221. E_1=1168 \text{ and } E_2=1465 \text{ Kg/ha.}$$

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	1524	1374	1531	1336	1616	1476
P <sub>1</sub>	1533	1402	1492	1484	1468	1476
P <sub>2</sub>	1492	1496	1450	1453	1506	1479
Mcan	1516	1424	1491	1424	1530	1477
N <sub>1</sub>	1507	1355	1411			
N <sub>2</sub>	1526	1493	1571			

C.D. for N marginal means = 73.9 Kg/ha.  
 C.D. for means in the body of P  $\times$  N table = 127.9 Kg/ha.  
 C.D. for 'extra vs. others' = 98.2 Kg/ha.  
 C.D. for extra treatments = 221.7 Kg/ha.

**Crop :- Bajra (*Kharif*).**

**Ref :- Rj. 62(25), 63(3), 64(83).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'M'.**

**Object :-** To study the effect of different methods of application of N, P and K on the yield of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) N.A. for 62(25), 63(3); Nil for 64(83). (b) Wheat for 62(25), 63(3); Fallow for 64(83). (c) Nil. (ii) Sandy loam. (iii) 23.7.1962; 9.7.1963; 28.7.1964. (iv) (a) 3 to 4 ploughings. (b) N.A. for 62(25), 63(3); Behind the plough for 64(83). (c) 6 Kg/ha; (d) 30 cm.  $\times$  23 cm. (e) N.A. (v) N.A. for 62(25), 63(3); Nil for 64(83). (vi) R.S.J. (vii) Unirrigated. (viii) 1 to 2 weedings. (ix) N.A.; 21 cm.; 30 cm. (x) 22, 23.10.1965; 22 to 24.10.1963; 1.11.1964.

## 2. TREATMENTS :

**Main-plot treatments :**

2 methods of application of fertilizers : M<sub>1</sub>=Broadcasting and M<sub>2</sub>=Drilling.

**Sub-plot treatments :**

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

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=16.8 and N<sub>2</sub>=33.6 Kg/ha.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0 and P<sub>1</sub>=16.8 Kg/ha.

(3) 2 levels of K<sub>2</sub>O : K<sub>0</sub>=0 and K<sub>1</sub>=16.8 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication, 12 sub-plots/main-plot. (c) N.A. (iii) 4. (iv) (a) 7.4 m.  $\times$  5.5 m. for 62(25), 63(3); 9.2 m.  $\times$  5.5 m. for 64(83). (b) 6.2 m.  $\times$  4.3 m. for 62(25), 63(3); 7.4 m.  $\times$  3.7 m. for 64(83). (v) 61 cm.  $\times$  61 cm. for 62(25), 63(3); 91 cm.  $\times$  91 cm. for 64(83). (vi) Yes.

## 4. GENERAL :

(i) N.A. for 62(25), 63(3); Good for 64(83). (ii) N.A. for 62(25), 63(3); Nil for 64(83). (iii) Yield of grain and fodder. (iv) (a) 1962 to 1964. (b) No. (c) Nil. (v) Mandore and Durgapura. (vi) N.A. for 62(25), 63(3); Draught conditions due to lack of rainfall for 64(83). (vii) Since the sub-plot error variances are heterogeneous, the results of individual years are presented under 5 Results.

## 5. RESULTS :

## 62(25)

(i) 951 Kg/ha. (ii) (a) 73.0 Kg/ha. (b) 328.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
M <sub>1</sub>	744	993	1119	946	958	938	966	952
M <sub>2</sub>	844	958	1050	943	959	1023	879	951
Mean	794	975	1084	944	958	980	922	951
K <sub>0</sub>	781	1059	1101	967	994			
K <sub>1</sub>	806	892	1068	920	924			
P <sub>0</sub>	789	970	1073					
P <sub>1</sub>	799	982	1096					

## 63(3)

(i) 1533 Kg/ha. (ii) (a) 596.0 Kg/ha. (b) 267.0 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
M <sub>1</sub>	1443	1497	1668	1547	1525	1489	1584	1536
M <sub>2</sub>	1417	1585	1588	1517	1542	1565	1495	1530
Mean	1430	1541	1628	1532	1534	1527	1540	1533
K <sub>0</sub>	1372	1595	1614	1520	1533			
K <sub>1</sub>	1488	1488	1642	1544	1534			
P <sub>0</sub>	1405	1559	1633					
P <sub>1</sub>	1455	1523	1623					

C.D. for N marginal means=133.3 Kg/ha.

## 64(83)

(i) 357 Kg/ha. (ii) (a) 346.7 Kg/ha. (b) 195.7 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
M <sub>1</sub>	323	344	456	345	403	404	244	374
M <sub>2</sub>	222	375	419	317	361	328	350	339
Mean	272	359	437	331	382	366	347	356
K <sub>0</sub>	300	375	423	361	371			
K <sub>1</sub>	245	344	452	300	393			
P <sub>0</sub>	238	292	462					
P <sub>1</sub>	306	427	413					

C.D. for N marginal means=97.7 Kg/ha.



**Crop :- Bajra (Kharif).****Ref :- Rj. 61(16).****Site :- Amer (Jaipur, c.f.).****Type :- 'M'.**

Object :—To study the effect of N, P and K on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Barley. (c) N.A. (ii) Sandy. (iii) N.A. (iv) Local. (v) (a) 1 ploughing. (b) to (e) N.A. (vi) 5.7.1961. (vii) N.A. (viii) Weeding. (ix) N.A. (x) 11.10.1961.

**2. TREATMENTS :**5 manurial treatments :  $M_0$ =Control,  $M_1$ =22.4 Kg/ha. of N,  $M_2$ =22.4 Kg/ha. of  $P_2O_5$ ,  $M_3$ =22.4 Kg/ha. of  $K_2O$  and  $M_4$ =22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +22.4 Kg/ha. of  $K_2O$ .**3. DESIGN :**

(i) R.B.D. 5 plots/block and 4 replications. (ii) N.A. (iii) (a) 4.6 m.×3.7 m. (b) 2.7 m.×1.8 m. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 651 Kg/ha. (ii) 116.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$
Av. yield	494	857	551	539	813

**Crop :- Bajra,****Ref :- Rj. 62, 64, 65(SFT).****Site -- (District) Pali.****Type :- 'M'.**Object :—To study the response curves of important, cereal, cash and oil seed crops to nitrogen applied singly and in combination with other nutrients (Type  $A_1$ ).**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Grey brown (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

8 manurial treatments

0 = Control (no manure)

 $n_1$  = 33.6 Kg/ha. of N $n_2$  = 67.2 Kg/ha. of N $p_1$  = 33.6 Kg/ha. of  $P_2O_5$  $n_1p_1$  = 33.6 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$  $n_2p_1$  = 67.2 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$  $n_2p_2$  = 67.2 Kg/ha. of N+67.2 Kg/ha. of  $P_2O_5$  $n_2p_2k_2$  = 67.2 Kg/ha. of N+67.2 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of  $K_2O$ N applied as  $A_1S$ ;  $P_2O_5$  as Super and  $K_2O$  as Mur. of Pot.**3. DESIGN :**

A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50–100 villages. In each block 36 experiments are conducted in a year of which 11 are of type  $A_1$ , 11 of type  $A_2$ , 11 of type  $A_3$  and 3 are of type C. The eleven experiments under type  $A_1$ ,  $A_2$  and  $A_3$  are distributed as 3 on a *kharif* cereal, 3 on a *rabi* cereal, 3 on a cash crop and 2 on oilseed. All the three type—C experiments are conducted on a legume crop. For the purpose of conducting the  $A_1$ ,  $A_2$  and  $A_3$  experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type  $A_1$ ,  $A_2$  and  $A_3$  are laid out. For conducting the three type—C trials three villages are randomly selected in each block.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 [1963—N.A.]. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	153	122	114	171	133	168	195	62.4

Control yield=527 Kg/ha. ; No. of trials=3.

## 64(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	84	115	34	110	166	196	230	22.6

Control yield=522 Kg/ha. ; No. of trials=6.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	25	30	24	36	60	70	74	11.0

Control yield=99 Kg/ha. ; No. of trials=5

**Crop :- Bajra.**

**Ref :- Rj. 62, 64, 65(SFT).**

**Site :- (District) Pali.**

**Type :- 'M'.**

**Object :-**To study response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

(i) (a) to N.A. (ii) Grey brown. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

0=Control (no manure).

n<sub>1</sub>=33.6 Kg/ha. of N

p<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

p<sub>2</sub>=67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

n<sub>1</sub>p<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

n<sub>1</sub>p<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

n<sub>2</sub>p<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

n<sub>2</sub>p<sub>2</sub>k<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+ 67.2Kg/ha. of K<sub>2</sub>O

N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (unirrigated) on page 168.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 [1963—N.A.]. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 62(S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	112	104	90	127	109	123	149	56.0

Control yield=335 Kg/ha. ; No. of trials=4.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	75	77	126	144	182	242	289	20.2

Control yield=485 Kg/ha. ; No. of trials=6.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	15	10	20	22	37	52	62	7.7

Control yield=122 Kg/ha. ; No. of trials=4.

**Crop :- Bajra (Kharif).**

**Ref :- Rj. 62, 64, 65(SFT).**

**Site :- (District) Pali.**

**Type :- 'M'.**

**Object :-**To study the response curves of important cereal, cash and oilseed crops to potash applied singly and in combination with other nutrients (Type : A<sub>3</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Grey brown. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments :

0=Control (no manure).

n<sub>1</sub>=33.6 Kg/ha. of N.

k<sub>1</sub>=33.6 Kg/ha. of K<sub>2</sub>O.

k<sub>2</sub>=67.2 Kg/ha. of K<sub>2</sub>O.

n<sub>1</sub>k<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>O.

n<sub>1</sub>k<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.

n<sub>2</sub>k<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.

n<sub>1</sub>p<sub>1</sub>k<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.

N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in Type A<sub>1</sub> (unirrigated) on page 168.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 [1963-N.A.] (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 62(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	184	115	237	199	188	175	231	73.5

Control yield=488 Kg/ha. ; No. of trials=3.

## 64(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	67	65	103	102	120	159	156	22.5

Control yield=538 Kg/ha. ; No. of trials=6.

65(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	37	27	25	45	47	72	82	12.2

Control yield=65 Kg/ha. ; No. of trials=3.

**Crop :- Bajra.****Ref :- Rj. 60(SFT).****Site :- (District) Pali and Sriganganagar.****Type :- 'M'.**

Object :—To study the response of Bajra to levels of N, P and K applied individually and in combinations (Type : A).

**1. BASAL CONDITIONS :**

(i) N.A. (ii) Desert soil. (iii) to (x) N.A.

**2. TREATMENTS :**

0 =Control (no manure).

n =22.4 Kg/ha. of N as A/S.

p =22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.k =22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.np =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.nk =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.pk =22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.npk=22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+22.4 Kg/ha. K<sub>2</sub>O as Mur. Pot.**3. DESIGN :**

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on *khartif* cereal, 8 on a *rabi* creal, 8 on cash crop, 4 on an oilseed crop and 3 on a legumenuous 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 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 villages. (iii) (a) 1/98.8 ha. (b) 1/197.6 ha. (iv) Yes.

**4. GENERAL :**

(i) to (vii) N.A.

**5. RESULTS :**

District	No. of trials	Control yield	Av. response in Kg/ha.								
			N	P	K	S.E.	NP	NK	PK	NPK	S.E.
Pali	3	650	120	70	110	53.0	—30	—50	20	0	45.0
Sriganganagar	3	820	170	40	—10	25.0	—30	—20	—20	40	22.0

**Crop :- Bajra.****Ref :- Rj. 60(SFT).****Site :- (District) Pali and Sriganganagar.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) N.A. (ii) Desert soil. (iii) to (x) N.A.

## 2. TREATMENTS :

o =Control (no manure)	$n_1'' = 22.4$ Kg/ha. of N as A/S/N.
$n_1 = 22.4$ Kg/ha. of N as A/S	$n_2'' = 44.8$ Kg/ha. of N as A/S/N.
$n_2 = 44.8$ Kg/ha. of N as A/S	$n_1''' = 22.4$ Kg/ha. of N as C/A/N.
$n_1' = 22.4$ Kg/ha. of N as Urea.	$n_2''' = 44.8$ Kg/ha. of N as C/A/N.
$n_2' = 44.8$ Kg/ha. of N as Urea.	

## 3. DESIGN :

Same as in type A on page 171.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

Av. yield of grain in Kg/ha.

District	No. of trial	Control yield	$n_1$	$n_2$	$n_1'$	$n_2'$	$n_1''$	$n_2''$	$n_1'''$	$n_2'''$	G.M.	S.E. mean
Pali	2	480	—	—	620	680	720	570	920	1060	721	86.7
Sriganganagar	3	920	1100	1300	880	1100	—	—	1110	1180	1084	79.9

**Crop :- Bajra (Kharif).**

**Ref :- Rj. 63(37), 64(31), 65(9).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'MV'.**

Object :- To study the effect of different methods of application of N and P on different varieties of Bajra.

## 1. BASAL CONDITIONS:

(i) (a) Nil. (b) Wheat for 63(37); Fallow for 64(31); N.A. for 65(9). (c) N.A. for 63(37), 65(9); Nil for 64(31). (ii) Sandy loam, (iii) 8.8.1963; 10.7.1964; 20.7.1965. (iv) (a) 1 discing and 2 cultivations for 63(37); 2 ploughings and discing for others. (b) Line sowing behind the plough. (c) 8 Kg/ha. for 63(37), 64(31); 4.4 Kg/ha. for 65(9). (d) 23 to 30 cm. between rows for 63(37), 64(31); N.A. for 65(9). (e) N.A. (v) N.A. for 63(37), 65(9); Nil for 64(31). (vi) As per treatments. (vii) Unirrigated. (viii) One weeding. (ix) N.A. for 63(37), 65(9); 20 cm. for 64(31). (x) 24 to 27.10.1963; 5, 6.10.1964; 29.10.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 2 varieties :  $V_1$ =Local and  $V_2$ =R.S.J.

(2) 2 methods of applications :  $M_1$ =Broadcasting and  $M_2$ =Placement before the seed.

**Sub-plot treatments :**

8 manurial treatments :  $F_0$ =Control,  $F_1=16.8$  Kg/ha. of N,  $F_2=33.6$  Kg/ha. of N,  $F_3=16.8$  Kg/ha. of  $P_2O_5$ ,  $F_4=F_1+F_3$ ,  $F_5=F_2+F_3$ ,  $F_6=16.8$  Kg/ha. of N+16.8 Kg/ha. of N as top dressing and  $F_7=16.8$  Kg/ha. of N+16.8 Kg/ha. of  $P_2O_5$ +16.8 Kg/ha. of N as top dressing.

N as A/S applied in 2 splits,  $\frac{1}{2}$  at sowing and  $\frac{1}{2}$  one month after sowing,  $P_2O_5$  as super applied at sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication; 8 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 9.1 m.  $\times$  5.5 m. (b) 8.5 m.  $\times$  4.9 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 63(37); Good for 64(31); poor for 65(9). (ii) N.A. for 63(37); Nil for others. (iii) Yield of grain. (iv) (a) 1963 to 1965. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Both the error variances and homogeneous, interaction main-plot Treatments  $\times$  years interaction is absent while sub-plot Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 651 Kg/ha. (ii) (a) 261.0 Kg/ha. (based on 24 d.f. made up of Treatments  $\times$  years interactions and pooled error). (b) 177.5 Kg/ha. (based on 42 d.f. made up of various components of Treatments  $\times$  years interactions). (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
V <sub>1</sub>	548	690	718	602	670	758	680	711	686	657	671
V <sub>2</sub>	538	607	714	552	647	707	622	658	645	617	637
Mean	543	648	716	577	658	732	651	684	665	637	651
M <sub>1</sub>	545	637	712	632	678	746	660	713			
M <sub>2</sub>	541	660	720	522	640	718	642	956			

C.D. for F marginal means = 84.5 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Rj. 64(30).**

**Site :- Govt. Agri. Farm, Hemawas.**

**Type :- 'MV'.**

Object :- To study the effect of different levels of N and P on the yield of different varieties of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) (a) Heavy. (iii) 2.7.64. (iv) (a) and (b) N.A. (c) 10 Kg/ha. (d) Between lines 30 cm. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) weeding. (ix) N.A. (x) 4.10.64.

## 2. TREATMENTS :

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

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=16.8 and N<sub>2</sub>=33.6 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=16.8 and P<sub>2</sub>=33.6 Kg/ha.

(3) 2 varieties : V<sub>1</sub>=Local and V<sub>2</sub>=R.S.J.

## 3. DESIGN :

(i) 3<sup>2</sup>  $\times$  2 confd. (ii) (a) 6 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) 5.5 m.  $\times$  3.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Good ; lodging in plots of higher levels of N. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964—N.A. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1038 Kg/ha. (ii) 187.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
N <sub>0</sub>	869	1090	944	926	1010	968
N <sub>1</sub>	1068	1099	1196	1158	1084	1121
N <sub>2</sub>	1190	994	891	1084	966	1025
Mean	1042	1061	1010	1056	1020	1038
V <sub>1</sub>	1127	982	1059			
V <sub>2</sub>	957	1140	962			

**Crop :- Bajra (Kharif).****Ref :- Rj. 60(72), 61(74).****Site :- Govt. Agri. Farm, Durgapur.****Type :- 'C'.**

Object :—To study the effect of different seed rates and spacings on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) *Bajra*-Fallow. (b) Fallow. (c) 16.8 Kg/ha. of N. (ii) N.A. (iii) July, 1960 for 60(72) ; 10.7.1961 for 61(74). (iv) (a) 2 ploughings. (b) N.A. (c) and (d) As per treatments. (e) N.A. (v) N.A. (vi) R.S.K. for 60(72) ; R.S.J. for 61(74). (vii) Unirrigated. (viii) 1 weeding. (ix) N.A. (x) Sept., 1960 for 60(72) ; 26.10.1961 for 61(74).

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 4 seed rates :  $R_1=2$ ,  $R_2=4$ ,  $R_3=7$  and  $R_4=9$  Kg/ha.(2) 4 spacing between rows :  $S_1=23$ ,  $S_2=30$ ,  $S_3=38$  and  $S_4=46$  cm.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) 6.1 m.  $\times$  4.6 m. (b) 5.5 m.  $\times$  4.0 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 1961. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) N.A. (vii) Error variances are heterogeneous, Treatments  $\times$  years interaction is present.

**5. RESULTS :**

(i) 401 Kg/ha. (ii) 281.4 Kg/ha. based on (15 d.f. made up of Treatments  $\times$  years interaction). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	Mean
$R_1$	607	544	382	329	465
$R_2$	448	565	494	393	475
$R_3$	377	274	392	290	333
$R_4$	456	338	277	258	332
Mean	472	430	386	318	401

**Crop :- Bajra (Kharif).****Ref :- Rj. 62(35), 63(38).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'C'.**

Object :—To study the effect of different seed rates and spacings on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Fallow-*Bajra* for 62(35) ; Nil for 63(38). (b) Fallow for 62(35) ; Wheat for 63(38). (c) Nil for 62(35) ; N.A. for 63(38). (ii) Sandy loam. (iii) 23.7.1962 ; 6.8.1963. (iv) (a) 2 ploughings for 62(35) ; 1 discing and 2 cultivations for 63(38). (b) Line sowing behind the plough. (c) and (d) As per treatments. (e) N.A. (v) 33.6 Kg/ha. of N as A/S + 16.8 Kg/ha. of  $P_2O_5$  as Super. (vi) R.S.J. for 62(35) ; Chadi (local) for 63(38). (vii) Unirrigated. (viii) 1 weeding. (ix) N.A. (x) 3.10.1962 ; 20.10.1963.

**2. TREATMENTS and 3. DESIGN :**

Same as in expts. no. 60(72), 61(74) above

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1962 to 1963. (b) N.A. (c) Results of combined analysis are given under 5. (v) and (vi) N.A. (vii) Error variances are heterogeneous, Treatments  $\times$  years interaction is present.

## 5. RESULTS:

(i) 743 Kg/ha. (ii) 246.2 Kg/ha. (based on 15 d.f. made up of Treatments  $\times$  years interaction). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	Mean
S <sub>1</sub>	735	788	723	622	717
S <sub>2</sub>	934	797	798	727	814
S <sub>3</sub>	700	781	778	639	724
S <sub>4</sub>	740	749	724	654	717
Mean	777	779	756	661	743

**Crop :- Bajra (Kharif).**

**Ref :- 61(75), 62(38).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'CM'.**

**Object :-** To study the effect of N, P and spacings on the yield of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Fallow-Bajra. (b) Fallow. (c) Nil. (ii) N.A. (iii) 22.7.1961 ; 21.7.1962. (iv) (a) 2 to 3 ploughings. (b) Drilling. (c) 2 to 3 Kg/ha. (d) As per treatments. (e) N.A. (v) N.A. (vi) R.S.K. and R.S.J. (vii) Unirrigated. (viii) 1 weeding. (ix) N.A. (x) 22.10.1961 ; 1.10.1962.

## 2. TREATMENTS and 3. DESIGN :

Same as in expts. nos. 60(71), 61(76) on page 176.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) to (vi) N.A. (vii) Both the error variances are homogeneous and main and sub-plot Treatments  $\times$  years interactions are absent.

## 5. RESULTS :

(i) 1282 Kg/ha. (ii) (a) 344.6 Kg/ha. (based on 24 d.f. on account of pooled error and main-plot Treatments  $\times$  years interactions). (b) 149.5 Kg/ha. (based on 46 d.f. on account of pooled error and various interactions with years). (iii) Main effect of N and interaction P  $\times$  S are significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
N <sub>0</sub>	1222	1253	1212	1248	1205	1234	1229
N <sub>1</sub>	1325	1247	1310	1246	1327	1308	1294
N <sub>2</sub>	1318	1377	1278	1315	1395	1263	1324
Mean	1288	1292	1267	1270	1309	1268	1282
S <sub>1</sub>	1293	1436	1081				
S <sub>2</sub>	1261	1350	1316				
S <sub>3</sub>	1311	1090	1404				

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

C.D. for body of P  $\times$  S table = 290.4 Kg/ha.



**Crop :- Bajra (Kharif).**

**Ref :- Rj. 60(71), 61(76).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'CM'.**

**Object :-** To study the effect of N, P and spacings on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Bajra-Fallow. (b) Fallow. (c) N.A. (ii) N.A. (iii) 18.7.1960 ; 13.7.1961. (iv) (a) 3 ploughings. (b) Drilling. (c) 2 Kg/ha. (d) As per treatments. (e) N.A. (v) N.A. (vi) R.S.J. (vii) Unirrigated. (viii) One weeding. (ix) N.A. (x) 15.10.1960 ; 24.10.1961.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=16.8$  and  $P_2=33.6$  Kg/ha.

(2) 3 row spacings :  $S_1=30$ ,  $S_2=38$  and  $S_3=46$  cm.

**Sub-plot treatments :**

3 levels of N as A/S :  $N_0=0$ ,  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.

N applied in 2 splits,  $\frac{1}{2}$  at sowing and  $\frac{1}{2}$  one month after sowing and P applied at the time of sowing.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 9 main-plots/block ; 3 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 9.1 m.  $\times$  5.5 m. (b) 8.5 m.  $\times$  4.9 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-1961. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Both the error variances are homogeneous. Main-plot Treatments  $\times$  years interaction is present while sub-plot Treatments  $\times$  years interaction is absent.

**5. RESULTS :**

(i) 625 Kg/ha. (ii) (a) 338.1 Kg/ha. (based on 8 d.f. on account of interaction main-plot Treatments with years). (b) 131.2 Kg/ha. (based on 46 d.f. on account of interaction of sub-plot Treatments with years and pooled error). (iii) Main effect of N and interaction N  $\times$  P are highly significant. (iv) Av. yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	$S_0$	$S_1$	$S_2$	Mean
$N_0$	518	500	564	486	557	539	527
$N_1$	461	624	744	628	612	588	609
$N_2$	563	762	892	736	772	710	739
Mean	514	629	733	617	647	612	625
$S_0$	464	670	717				
$S_1$	488	644	810				
$S_2$	590	572	669				

C.D. for N marginal means = 62.3 Kg/ha.

C.D. for N means at the same level of P = 107.9 Kg/ha.

C.D. for P means at the same level of N = 203.5 Kg/ha.

Crop :- Bajra (Kharif).

Ref :- Rj. 61(9), 62(10).

Site :- Govt. Agri. Farm, Bassi.

Type :- 'D'.

Object :—To study the effect of doses and formulations of weedicides in the control of weeds in Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Moong-Bajra for 61(9); Fallow-Green-Bajra for 62(10). (b) Moong for 61(9); Gram for 62(10). (c) N.A. for 61(9); Nil for 62(10). (ii) Sandy loam. (iii) 15.7.1961; 26.7.1962. (iv) (a) 3 ploughings. (b) N.A. (c) 4 to 7 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) R.S.K. (vii) Unirrigated. (viii) and (ix) N.A. (x) 28.10.1961; 17.11.1962.

## 2. TREATMENTS :

All combinations of (1) and (2) with 2 extra treatments

(1) 4 types of weedicides :  $W_1$ =Sodium salt of 2, 4-D,  $W_2$ =Ethylester of 2, 4-D,  $W_3$ =Amine salt of 2, 4-D and  $W_4$ =Sodium salt of M.C.P.A.

(2) 3 doses of weedicides :  $D_1=0.6$ ,  $D_2=1.1$  and  $D_3=1.7$  Kg/ha. of acid equivalent.

Extra treatments are :  $E_0$ =Control and  $E_1$ =Hand weeding.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 7.3 m.  $\times$  5.5 m. (b) 5.5 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1961 to 1962. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Since the error variances are heterogeneous and the Treatments  $\times$  years interaction is absent, results of individual years are presented under 5. Results.

## 5. RESULTS :

## 61(9)

(i) 387 Kg/ha. (ii) 234.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

 $E_0=318$  and  $E_1=544$  Kg/ha.

	$W_1$	$W_2$	$W_3$	$W_4$	Mean
$D_1$	400	472	371	474	429
$D_2$	544	346	160	215	316
$D_3$	232	474	386	486	394
Mean	392	431	306	392	380

## 62(10)

(i) 586 Kg/ha. (ii) 169.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

 $E_0=492$  and  $E_1=704$  Kg/ha.

	$W_1$	$W_2$	$W_3$	$W_4$	Mean
$D_1$	462	492	598	523	519
$D_2$	598	511	692	709	628
$D_3$	598	704	554	560	604
Mean	553	569	615	597	584

**Crop :- Bajra (Kharif).****Ref :- Rj. 60(20), 62(5).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'D'.**

Object :—To find out the economic way of controlling weeds in Bajra.

**1. BASAL CONDITIONS :**

(i) (a) N.A. for 60(20) ; Fallow-Gram-Bajra for 62(5). (b) Bajra for 60(20) ; Gram for 62(5). (c) N.A. for 60(20) ; Nil for 62(5). (ii) Sandy loam. (iii) 7.7.1960 ; 26.7.1962. (iv) (a) 3 to 4 ploughings. (b) N.A. (c) 7 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) T5 for 60(20) ; R.S.K. for 62(5). (vii) Unirrigated. (viii) and (ix) N.A. (x) 28.10.1960 ; 16.11.1962.

**2. TREATMENTS :**

9 methods of controlling weeds :  $W_0$ =Control (no weeding),  $W_1$ =Local methods of weeding,  $W_2$ =Pre-emergence application,  $W_3$ =Post emergence application (once),  $W_4$ =Post emergence application (twice),  $W_5$ =Pre emergence+Post emergence application,  $W_6$ =Pre emergence application+weeding,  $W_7$ =Post emergence application+weeding and  $W_8$ =Pre emergence+Post emergence application+weeding.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 7.3 m.  $\times$  5.5 m. (b) 5.5 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—1962 (Expt. for 1961 N.A.). (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) N.A. (vii) Error variances are heterogeneous, Treatments  $\times$  years interaction is present.

**5. RESULTS :**

(i) 378 Kg/ha. (ii) 190.0 Kg/ha. (based on 8 d.f. made up of Treatments  $\times$  years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$W_0$	$W_1$	$W_2$	$W_3$	$W_4$	$W_5$	$W_6$	$W_7$	$W_8$
Av. yield	344	532	332	302	364	264	474	398	394

**Crop :- Bajra (Kharif).****Ref :- Rj. 60(19).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'D'.**

Object :—To study the effect of fungicides in controlling the disease in Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Bajra. (c) Nil. (ii) Sandy. (iii) 8.7.60. (iv) (a) 4 ploughings. (b) Dibbling. (c) N.A. (d) Row to row 30 cm. (e) N.A. (v) N.A. (vi) T 5. (vii) Unirrigated. (viii) and (ix) N.A. (x) 27.10.60.

**2. TREATMENTS :**

8 fungicidal treatments :  $T_0$ =Control (no application),  $T_1$ =Agrosan G.N. at 4 gm.,  $T_2$ =Ceresan at 3 gm.,  $T_3$ =Tillex at 3 gm.,  $T_4$ =Lunasan at 3 gm.,  $T_5$ =Hervasan at 3 gm.,  $T_6$ =Fernasan at 4 gm. and  $T_7$ =Sulphur at 6 gm.

Treatments given to per Kg. of seed as dressing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 4.6 m.  $\times$  1.8 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) N.A. (ii) Incidence of green ear and smut-disease and control measures as per treatments. (iii) Yield of grain. (iv) (a) 1958 to 1961. (b) No. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 566 Kg/ha. (ii) 99.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	503	548	593	593	604	633	548	509

**Crop :- Bajra (Kharif).**

**Ref :- Rj. 61(11).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'D'.**

Object :—To study the effect of fungicides in controlling the disease in Bajra.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 17.7.61. (iv) (a) 4 ploughings. (b) Dibbling. (c) N.A. (d) Row to rows 30 cm. (e) N.A. (v) N.A. (vi) R.S.K. (vii) Unirrigated. (viii) Weeding and thinning. (ix) N.A. (x) 1.11.61.

## 2. TREATMENTS :

8 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Agrosan G.N. at 4 gm., T<sub>2</sub>=Cerésan at 3 gm., T<sub>3</sub>=Tillex at 3 gm., T<sub>4</sub>=Lunasan at 3 gm., T<sub>5</sub>=Hervasan at 3 gm., T<sub>6</sub>=Thiram at 4 gm. and T<sub>7</sub>=Sulphur at 4 gm.

Treatments : given to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 4.6 m. x 2.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1958 to 1961. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Experiment conducted during 1960 N.A.

## 5. RESULTS :

(i) 817 Kg/ha. (ii) 311.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	781	707	794	894	1015	650	853	843

**Crop :- Bajra (Kharif).**

**Ref :- Rj. 62(9).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

Object :—To study the effect of different doses and formulations of weedicides in the control of weeds in Bajra.

## 1. BASAL CONDITIONS :

(i) (a) *Til-Fallow-Bajra*. (b) *Til*. (c) Nil. (ii) Sandy loam. (iii) 20.7.62. (iv) (a) 2 ploughings. (b) N.A. (c) 5 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) R.S.K. (vii) Unirrigated. (viii) and (ix) N.A. (x) 3.11.62.

## 2. TREATMENTS and 3. DESIGN :

Same as in expt. no. 61(9), 62(10) on page 177.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 321 Kg/ha. (ii) 259.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

E<sub>0</sub>=80 and E<sub>1</sub>=378 Kg/ha.

	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	Mean
D <sub>1</sub>	238	314	502	359	353
D <sub>2</sub>	277	314	299	484	344
D <sub>3</sub>	326	314	254	349	311
Mean	280	314	352	397	336

**Crop :- Bajra (Kharif).****Ref :- Rj. 60(2), 61(18), 62(7).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'D'.**

Object : -To find out the economic way of controlling weeds in Bajra.

**1. BASAL CONDITIONS :**

(i) N.A. for 60(2), 61(18); *Guar-Fallow-Bajra* for 62(7). (b) Fallow for 60(2); Nil for 61(18); *Guar* for 62(7). (c) Nil. (ii) Sandy loam. (iii) July, 1960 for 60(2); 23.7.1961 for 61(18); 21.7.1962 for 62(7). (iv) (a) 1 to 4 ploughings. (b) N.A. (c) 5 to 7 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) Local for 60(2), 62(7); Sikar for 61(18). (vii) Unirrigated. (viii) and (ix) N.A. (x) Oct., 1960 for 60(2); 31.10.1961; 22.10.1962.

**2. TREATMENTS :**

9 methods of controlling weeds : W<sub>0</sub>=Control (unweeded), W<sub>1</sub>=Local method of weeding, W<sub>2</sub>=Pre emergence application, W<sub>3</sub>=Post emergence application (once), W<sub>4</sub>=Post emergence application (twice), W<sub>5</sub>=Pre+Post emergence (once), W<sub>6</sub>=Pre emergence+weeding (once), W<sub>7</sub>=Post emergence+weeding (once) and W<sub>8</sub>=Pre emergence+Post emergence application+weeding.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 7.3 m.×5.5 m. (b) 5.5 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 1962. (b) No. (c) Nil. (v) Bassi and Tabiji. (vi) N.A. (vii) Since the error variances are heterogeneous and the interaction of Treatments with years is absent, therefore, individual years results are presented under 5. Results.

**5. RESULTS :****60(2)**

(i) 127 Kg/ha. (ii) 52.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	W <sub>5</sub>	W <sub>6</sub>	W <sub>7</sub>	W <sub>8</sub>
Av. yield	141	162	92	205	120	99	113	95	120

**61(18)**

(i) 344 Kg/ha. (ii) 201.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	W <sub>5</sub>	W <sub>6</sub>	W <sub>7</sub>	W <sub>8</sub>
Av. yield	393	371	215	368	363	314	420	406	247

**62(7)**

(i) 962 Kg/ha. (ii) 276.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	W <sub>5</sub>	W <sub>6</sub>	W <sub>7</sub>	W <sub>8</sub>
Av. yield	1033	1204	1020	853	1008	823	853	1171	697

**Crop :- Bajra (Kharif).****Ref :- Rj. 61(20), 62(1).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'D'.**

Object :—To study the effect of fungicides in controlling the disease in Bajra.

**1. BASAL CONDITIONS :**

(i) (a) N.A. for 61(22); *Guar-Fallow-Bajra* for 62(1). (b) N.A. for 61(20); *Guar* for 62(1). (c) N.A. for 61(20); Nil for 62(1). (ii) Sandy loam. (iii) 24.7.1961; 18.7.1962. (iv) (a) 1 to 2 ploughings. (b) Dibbling. (c) 11 Kg/ha. (d) 30 cm. × 11 cm.; 30 cm. × 23 cm. (e) 3. (v) N.A. (vi) N.A. for 61(20); Local for 62(1). (vii) Unirrigated for 61(20); Irrigated for others. (viii) N.A. for 61(20); 1 weeding for other. (ix) N.A. (x) 9.11.1961; 16.10.1962.

**2. TREATMENTS :**

8 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Agrosan G.N. at 4 gm., T<sub>2</sub>=Ceresan at 3 gm., T<sub>3</sub>=Tiller at 3 gm., T<sub>4</sub>=Lunasan at 3 gm., T<sub>5</sub>=Hervasan at 3 gm., T<sub>6</sub>=Thiram at 4 gm., T<sub>7</sub>=Beej powder No. 1 at 3 gm.

Treatments given to per Kg. of seed as dressing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 4.6 m. × 2.7 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) N.A. (ii) Incidence of green ear and smelt disease control measures as per treatments. (iii) Yield of grain. (iv) (a) 1961 to 1963 (modified in 1963). (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) N.A. (vii) Error variances are homogeneous, Treatments × years interaction is present.

**5. RESULTS :**

(i) 1316 Kg/ha. (ii) 205.1 Kg/ha. [based on 7 d.f. made up of Treatments × years interaction]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	1474	1445	1194	1280	1223	1234	1430	1250

**Crop :- Bajra (Kharif).****Ref :- Rj. 63(73).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'D'.**

Object :—To study the effect of fungicides in controlling green ear and smut diseases of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy. (iii) 5 to 7.8.63. (iv) (a) 2 ploughings. (b) Dibbling. (c) 11 kg/ha. (d) 30 cm. × 23 cm. (e) 3. (v) N.A. (vi) Local *chaddy*. (vii) Unirrigated. (viii) 1 hand weeding. (ix) N.A. (x) 22, 23.10.63.

**2. TREATMENTS :**

10 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Agrosan G.N. at 4 gm., T<sub>2</sub>=Ceresan at 3 gm., T<sub>3</sub>=Tillex at 3 gm., T<sub>4</sub>=Lunasan at 3 gm., T<sub>5</sub>=Harvasan at 3 gm., T<sub>6</sub>=Thiram at 4 gm., T<sub>7</sub>=Shell seed dresser at 4 gm., T<sub>8</sub>=Trotitan at 4 gm., T<sub>9</sub>=Beej powder no. 1 at 3 gm.

**3. DESIGN :**

(i) Incomplete L. sq. (ii) (a) 3 plots/block; 10 blocks/Sq and 3 sqs. (b) N.A. (iii) 9. (iv) (a) and (b) 4.6 m. × 2.7 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) N.A. (ii) Incidence of green ear and smut disease. (iii) No. of seeds germinated, No. of plants left after thinnings. No. of plants counted just before harvesting. No. of plants affected by green ear disease, yield of grain and fodder. (iv) (a) 1961—63 (modified in 63). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Nil.

## 5. RESULTS :

(i) 49.3. (ii) 3.0 (iii) Treatment differences are not significant. (iv) Av. percentage of germination in degrees.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Means degrees	47.89	49.45	51.69	47.34	49.13	49.87	48.16	50.50	48.51	50.30

**Crop:- Bajra (Kharif).**

**Ref :- Rj. 60(11).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

Object :—To study the effect of different doses and formulations of weedicides in the control of weeds in Bajra.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Fallow. (c) N.A. (ii) Sandy. (iii) July, 1960. (iv) (a) 4 ploughings. (b) N.A. (c) 23 kg/ha. (d) Row to row 30 cm. (e) N.A. (v) N.A. (vi) Local. (vii) Unirrigated. (viii) and (ix) N.A. (x) Oct., 1960.

## 2. TREATMENTS:

**Main-plot treatments :**

4 types of weedicides : W<sub>1</sub>=Sodium salt of 2, 4-D, W<sub>2</sub>=Ethylester of 2, 4-D, W<sub>3</sub>=Amine salt of 2, 4-D, and W<sub>4</sub>=Sodium salt of M.C.P.A.

**Sub-plot treatments :**

5 doses of weedicides : D<sub>0</sub>=0, D<sub>1</sub>=0.6, D<sub>2</sub>=0.8, D<sub>3</sub>=1.1 and D<sub>4</sub>=1.4 Kg/ha. of acid equivalents.

## 3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/block ; 5 sub-plots/main plot. (b) N.A. (iii) 4. (iv) 7.3 m × 5.5 m. (v) 5.5 m. × 3.7 m. (vi) 91 cm. × 91 cm. (vii) Yes.

## 4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960-N.A. (b) No. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 89 Kg/ha. (ii) (a) 53.1 Kg/ha. (b) 40.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
W <sub>1</sub>	92	77	85	120	120	99
W <sub>2</sub>	85	85	56	85	71	76
W <sub>3</sub>	92	92	85	92	127	98
W <sub>4</sub>	77	120	85	71	71	85
Mean	87	94	78	92	97	89

**Crop :- Bajra (Kharif).**

**Ref :- Rj. 61(17).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

Object :—To study the effect of different doses and formulation of weedicides in the control of weeds in Bajra.

## 1. BASAL CONDITIONS:

(i) (a) N.A. (b) Fallow. (c) N.A. (ii) Sandy loam. (iii) 22.7.61. (iv) (a) 2 ploughings. (b) N.A. (c) 9 Kg/ha. (d) Row to row 30 cm. (e) N.A. (v) N.A. (vi) *Siket*. (vii) Unirrigated. (viii) to (ix) N.A. (x) 28.10.61.

## 2. TREATMENTS: and 3 DESIGN:

Same as in expts. no. 61(9), 62(10) on page

## 4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—N.A. (Design changed in 1961). (b) No. (c) Nil. (v) (a) Bassi, Tabiji and Durgapura. (b) Nil. (vi) and (vii) N.A.

## 5. RESULTS:

(i) 686 Kg/ha. (ii) 513.2 Kg/ha. (iii) Main effect of D alone is significant. (iv) Av. yield of grain in Kg/ha.

$E_0=445$  and  $E_1=786$  Kg/ha.

	$W_1$	$W_2$	$W_3$	$W_4$	Mean
$D_1$	595	133	818	862	602
$D_2$	449	638	420	289	449
$D_3$	1176	1038	843	971	1007
Mean	740	603	694	707	686

C.D. for D marginal means 366.2 Kg/ha.

**Crop :- Bajra (*Kharif*).**

**Ref :- 60(3), 61(2).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'D'.**

Object :—To find out the economic way of controlling weeds in Bajra.

## 1. BASAL CONDITIONS:

(i) (a) N.A. (b) Gram for 60(3); Barley for 61(2). (c) N.A. for 60(3); 44.8 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 7.7.1960; 20.7.1961. (iv) (a) 3 to 5 ploughings. (b) N.A. (c) 6 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) Local for 60(3); R.S.J. for 61(2). (vii) Unirrigated. (viii) and (ix) N.A. (x) 30.9.1960; Oct., 1961.

## 2. TREATMENTS:

9 methods of controlling weeds:  $W_0$ =Control (unweeded),  $W_1$ =Local methods of weeding,  $W_2$ =Pre emergence application of weedicides,  $W_3$ =Post emergence application of weedicides (once),  $W_4$ =Post emergence (twice),  $W_5$ =Pre emergence + post emergence,  $W_6$ =Pre emergence + weeding,  $W_7$ =Post emergence + weeding and  $W_8$ =Pre emergence + Post emergence + weeding.

## 3. DESIGN:

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL:

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1959 to 1961. (b) No. (c) Results of combined analysis given under 5. (v) Bassi and Mandore. (vi) Nil. (vii) Results of Expt. no. 59(8) has also been included while giving combined results. Error variances are heterogeneous. Treatments × years interaction is present.



## 5. RESULTS :

(i) 1107 Kg/ha. (ii) 376.6 Kg/ha. [based on 16 d.f. made up of treatments×years interaction]. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	W <sub>5</sub>	W <sub>6</sub>	W <sub>7</sub>	W <sub>8</sub>
Av. yield	736	1500	850	964	1009	815	1018	1452	1623

C.D.=325.8 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Rj. 60(7), 61(5), 62(12).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'D'.**

**Object :-**To study the effects of different doses and formulation of weedicides in the control of weeds.

## 1. BASAL CONDITIONS:

(i) (a) N.A. for 60(7), 61(5); Fallow-Wheat-Bajra for 62(12). (b) Gram for 60(7); Barley for 61(5); Wheat for 62(12). (c) Nil for 60(7); 44.8 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy loam. (iii) 8.7.1960; 25.6.1961; 15.7.1962. (iv) (a) 3 to 5 ploughings. (b) N.A. (c) 6 Kg/ha. (d) 30 cm between rows. (e) N.A. (v) N.A. (vi) Local for 60(7); R.S.J. for others. (vii) Unirrigated. (viii) and (ix) N.A. (x) 29.9.1960; 10.10.1961; 1.11.1962.

## 2. TREATMENTS and 3. DESIGN :

Same as in Expts no. 61(9), 62(10) on page

Extra treatments are : E<sub>0</sub>=Control and E<sub>1</sub>=Weeding.

In expt. no. 60(7) the extra treatment is control (2 plots).

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 1962. (b) No. (c) Results of combined analysis given under 5. (v) and (vi) N.A. (vii) Expts. 61(5) and 62(12) have been pooled and their combined results presented below. Error variances are homogeneous and Treatments×years interaction' is absent.

## 5. RESULTS :

## 60(7)

(i) 905 Kg/ha. (ii) 209.9 Kg/ha. (iii) Main effect of W is significant. Interaction D×W and 'control vs. others' are highly significant. (iv) Av. yield of grain in Kg/ha.

Control=546 Kg/ha.

	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	Mean
D <sub>1</sub>	908	767	731	1138	886
D <sub>2</sub>	972	1038	770	1021	950
D <sub>3</sub>	1172	1360	950	755	1059
Mean	1017	1055	817	971	965

C.D. for W marginal means=173.4 Kg/ha.

C.D. for means in the body of D×W table=300.0 Kg/ha.

C.D. for 'control vs. others' =161.7 Kg/ha.

## Combined results of 61(5), 62(12)

(i) 1367 Kg/ha. (ii) 274.0 Kg/ha. (based on 91 d.f. made up of various components of treatments with years interaction and pooled error). (iii) Main effect of W and 'extra treatments vs. others' are significant. (iv) Av. yield of grain in Kg/ha.

E<sub>0</sub>=1198, E<sub>1</sub>=1550 Kg/ha.

	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	Mean
D <sub>1</sub>	1410	1356	1501	1570	1459
D <sub>2</sub>	1270	1314	1294	1469	1337
D <sub>3</sub>	1406	1080	1278	1440	1301
Mean	1362	1250	1358	1493	1366

C.D. for W marginal means=156.5 Kg/ha.

C.D. for 'extra vs. others' =146.8 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- Rj. 60(10).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'DV'.**

Object :-To study the effect of fungicides in controlling the disease in two varieties of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Fallow. (c) N.A. (ii) Sandy. (iii) July, 1960. (iv) (a) 4 ploughings. (b) Dibbling. (c) N.A. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) and (ix) N.A. (x) October, 1960.

**2. TREATMENTS :****Main-plot treatments :**2 varieties : V<sub>1</sub>=T<sub>5</sub> and V<sub>2</sub>=Local.**• Sub-plot treatments :**

8 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Agrosan G.N. at 4 gm., T<sub>2</sub>=Hervasan at 3 gm., T<sub>3</sub>=Tillex at 3 gm., T<sub>4</sub>=Lunasan at 3gm., T<sub>5</sub>=Hervasan at 4 gm., T<sub>6</sub>=Fervasan at 4 gm. and T<sub>7</sub>=Sulphur at 6 gm.

Treatments are applied to per Kg. of seed as dressing.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/block ; 8 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) and (b) 4.6 m. x 1.8 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 only. (b) No. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 103 Kg/ha. (ii) (a) 28.1 Kg/ha. (b) 38.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	Mean
V <sub>1</sub>	102	102	91	91	102	102	113	113	102
V <sub>2</sub>	91	102	102	102	113	113	102	113	105
Mean	96	102	96	96	107	107	107	113	103

**Crop :- Bajra (Kharif).****Ref :- Rj. 61(15).****Site :- Amer (Jaipur)(c.f.)****Type :- 'D'.**

Object :—To find out a suitable dose and time of dusting of Sodium salt of 2, 4—D for the control of striga in Bajra.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Barley. (c) N.A. (ii) Sandy. (iii) N.A. (iv) Local. (v) (a) 1 ploughing. (b) to (e) N.A. (vi) 5.7.1961. (vii) Unirrigated. (viii) and (ix) N.A. (x) 12.10.1961.

**2. TREATMENTS :**

14 weedicidal treatments :  $T_0$ =Control,  $T_1$ =2.2 Kg/ha. after 3 weeks of sowing,  $T_2$ =2.2 Kg/ha. after 5 weeks of sowing,  $T_3$ =2.2 Kg/ha. after emergence,  $T_4$ =3.4 Kg/ha. after 3 weeks of sowing,  $T_5$ =3.4 Kg/ha. after 5 weeks of sowing,  $T_6$ =3.4 Kg/ha. after emergence,  $T_7$ =4.5 Kg/ha. after 3 weeks of sowing,  $T_8$ =4.5 Kg/ha. after 5 weeks of sowing,  $T_9$ =4.5 Kg/ha. after emergence,  $T_{10}$ =2.2 Kg/ha. 3 and 5 weeks after emergence,  $T_{11}$ =2.2 Kg/ha. 3 and 5 weeks after sowing,  $T_{12}$ =2.2 Kg/ha. after 3 weeks and after emergence and  $T_{13}$ =2.2 Kg/ha. after 5 weeks and after emergence.

**3. DESIGN :**

(i) R.B.D. ; 14 plots/block and 4 replications. (ii) N.A. (iii) (a) N.A. (b) 4.6 m. × 1.8 m. (iv) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 417 Kg/ha. (ii) 263.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	324	514	445	359	375	393	445
Treatment	$T_7$	$T_8$	$T_9$	$T_{10}$	$T_{11}$	$T_{12}$	$T_{13}$
Av. yield	375	455	418	393	355	514	470

**Crop :- Maize (Kharif).****Ref :- Rj. 63(5).****Site :- Govt. Agri. Farm, Banswara.****Type :- 'M'.**

Object :—To study the effect of N, P and K on the yield of Maize.

**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) N.A. (iii) 12.7.63. (iv) (a) and (b) N.A. (c) 18 Kg/ha. (d) 61 cm. × 30 cm. (e) N.A. (v) N.A. (vi) Hybrid. (vii) Irrigated. (viii) and (ix) N.A. (x) 27.10.63.

**2. TREATMENTS :**

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

(1) 3 levels of N as A/S. :  $N_0=0$ ,  $N_1=67.3$  and  $N_2=134.5$  Kg/ha,

(2) 3 levels of  $P_2O_5$  as super :  $P_0=0$ ,  $P_1=44.8$  and  $P_2=89.7$  Kg/ha.

(3) 3 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$ ,  $K_1=44.8$  and  $K_2=89.7$  Kg/ha.

**3. DESIGN :**

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1963—N.A. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1670 Kg/ha. (ii) 107.2 Kg/ha. (iii) All the main effects and two factors interactions are highly significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	919	1119	925	823	1077	1064	988
N <sub>1</sub>	1487	1676	1869	1739	1711	1581	1677
N <sub>2</sub>	2169	2620	2246	2557	2611	1866	2345
Mean	1525	1805	1680	1706	1800	1604	1670
K <sub>0</sub>	1625	1742	1751				
K <sub>1</sub>	1617	1847	1936				
K <sub>2</sub>	1333	1825	1354				

C.D. for N, P or K marginal means = 74.0 Kg/ha.

C.D. for means in the body of any table = 128.3 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 65(40).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'M'.**

**Object :-** To study the effect of N, P and K on the yield and uptake of nutrients by Maize.

## 2. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N. (ii) Sandy loam. (iii) 29.7.65. (iv) (a) Ploughing and planking. (b) N.A. (c) 17.9 Kg/ha. (d) 46 cm. × 61 cm. (e) N.A. (v) N.A. (vi) Maize B.S. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) 27 to 29.10.65.

## 2. TREATMENTS :

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

(1) 4 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=44.8, N<sub>2</sub>=89.7 and N<sub>3</sub>=134.5 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=44.8 and P<sub>2</sub>=89.7 Kg/ha.

(3) 3 levels of K<sub>2</sub>O as Mur. of Pot. : K<sub>0</sub>=0, K<sub>1</sub>=22.4 add K<sub>2</sub>=44.8 Kg/ha.

## 3. DESIGN :

(i) 4 × 3 × 3 confd. (ii) (a) 9 plots/block ; 4 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.2 cm. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Fair. (ii) Stem borer. (iii) Yield of grain and fodder. (iv) (a) 1964—N.A. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1546 Kg/ha. (ii) 395.8 Kg/ha. (iii) Main effect of K alone is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	1356	1441	1542	1220	1870	1249	1446
N <sub>1</sub>	1452	1631	1372	1210	1508	1737	1485
N <sub>2</sub>	1563	1581	1544	1382	1594	1714	1563
N <sub>3</sub>	1888	1671	1513	1710	1799	1563	1691
Mean	1565	1581	1493	1380	1693	1566	1546
K <sub>0</sub>	1250	1326	1566				
K <sub>1</sub>	1901	1868	1309				
K <sub>2</sub>	1544	1549	1604				

C.D. for K marginal means=231.9 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 61(44), 62(21), 63(9).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'M'.**

**Object :-** To study the effect of different types of trace elements at different levels on the yield of Maize.

#### 1. BASAL CONDITIONS :

(i) (a) Nil for 61 (44); N.A. for others. (b) Fallow for 61 (44); Wheat for others. (c) Nil for 61 (44), 62 (21); G.M. for 63 (9). (ii) Sandy loam. (iii) 15.7.1951; 27.7.1952 17.7.1953. (iv) (a) 3 to 5 ploughings. (b) N.A. (c) 18 to 22 Kg/ha. (d) 61 cm. × 15 cm. for 61 (44); 61 cm. × 45 cm. for others. (e) N.A. (v) Nil. (vi) Bassi selected. (vii) Unirrigated for 61 (44), 63 (9); Irrigated for 62 (21). (viii) 2 to 4 weedings. (ix) N.A. (x) 7.10.61; 23.10.62; 18, 19.10 63.

#### 2. TREATMENTS :

All combinations of (1) and (2) with 2 extra treatments

(1) 3 levels of trace elements: L<sub>1</sub>=5.6, L<sub>2</sub>=11.2 and L<sub>3</sub>=22.4 Kg/ha.

(2) 5 trace elements: T<sub>1</sub>=Cu. Sul., T<sub>2</sub>=Zn. Sul., T<sub>3</sub>=Boron, T<sub>4</sub>=Mn. Sul., and T<sub>5</sub>=Fe. Sul.

All the (LT) combinations received 67.2 Kg/ha. of N as A'S + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as super + 33.6 Kg/ha. of K<sub>2</sub>O as Mur. Pot. as basal dressing.

Extra treatments: E<sub>0</sub>=No fertilizers (2 plots) and E<sub>1</sub>=67.2 Kg/ha. of N as A'S + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super + 33.6 Kg/ha. of K<sub>2</sub>O as Mur. Pot.

#### 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 18. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. for 61 (44) and 63 (9); 7.4 m. × 5.5 m. for 62 (21) (b) 7.4 m. × 3.7 for 61 (44) a and 63 (9); 6.5 m. × 2.7 for 62 (21). (v) 91 cm. × 91 cm. for 61 (44), 63 (9); 46 cm. × 137 cm. for 62 (21). (vi) Yes.

#### 4. GENERAL :

(i) Growth was poor for 61 (44) and 62 (21); Good for 63 (9). (ii) Attack of stem borer for 61 (44), Endrin 20% was sprayed; N.A. for others. (iii) Yield of grain and fodder. (iv) 1951 to 1953, (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Because the error variances are heterogeneous and Treatments × years interaction is absent, results of individual years are presented under 5 Results.

#### 5. RESULTS :

##### 61(44)

(i) 1522 Kg/ha. (ii) 268.6 Kg/ha. (iii) Main effect of T is significant. E effect and 'E vs. others' are highly significant. (iv) Av. yield of grain in Kg/ha.

$E_0=194$  and  $E_1=1783$  Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	Mean
L <sub>1</sub>	1783	1654	1468	1596	1417	1584
L <sub>2</sub>	1697	1934	1581	1934	1640	1757
L <sub>3</sub>	1863	2013	1373	1546	1726	1704
Mean	1781	1867	1474	1692	1594	1682

C.D. for T marginal means=257.4 Kg/ha.

C.D. for 'E vs others' =198.7 Kg/ha.

C.D. for E means =386.2 Kg/ha.

62(21)

- (i) 1052 Kg/ha. (ii) 301.6 Kg/ha. (iii) Main effect of T is significant. 'E vs. others' is highly significant.  
 (iv) Av. yield of grain in Kg/ha.

$E_0=684$  and  $E_1=820$  Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	Mean
L <sub>1</sub>	536	1149	864	897	1620	1013
L <sub>2</sub>	1074	1335	1356	1160	1083	1202
L <sub>3</sub>	832	1280	1302	1029	1215	1132
Mean	814	1255	1174	1029	1306	1116

C.D. for T marginal means=289.1 Kg/ha.

C.D. for 'E vs. others' =223.0 Kg/ha.

63(9)

- (i) 2761 Kg/ha. (ii) 166.0 Kg/ha. (iii) Main effect of T, interaction L×T, E effect and 'E vs. others' are highly significant. (iv) Av. yield of grain in Kg/ha.

$E_0=1829$  and  $E_1=2504$  Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	Mean
L <sub>1</sub>	2633	3100	2562	2755	3006	2811
L <sub>2</sub>	2806	3114	3085	3186	2727	2984
L <sub>3</sub>	2949	3042	2770	3042	2769	2914
Mean	2796	3085	2806	2994	2834	2903

C.D. for T marginal means =159.1 Kg/ha.

C.D. for means in the body of L×T table =275.6 Kg/ha.

C.D. for 'E vs. others' =122.8 Kg/ha.

C.D. for E means =238.8 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 61(117), 62(106), 63(10).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'M'.**

**Object :-** To study the effect of N, P and K at different levels alone and in combinations on the yield and quality of Maize.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 61 (117), 62 (106) ; N.A. for 63 (10). (b) Fallow for 61 (117) ; Wheat for 62 (106) ; Wheat+Zeera for 63 (10). (c) Nil for 61 (117), 62 (106) ; N.A. for 63 (10). (ii) Sandy loam. (iii) 11.7.61 ; 21.7.62 ; 17.7.1963. (iv) (a) 2 to 3 ploughings. (b) N.A. (c) 18 to 20 Kg/ha. (d) 61 cm.×46 cm. for 61 (117), 62 (106) ; N.A. for 63 (10). (e) N.A. (v) N.A. (vi) Bassi for 61 (117), 63 (10) ; Maize B.S. for 62 (106). (vii) Unirrigated for 61 (117), 62 (106) ; Irrigated for 63 (10). (viii) 2 to 3 weedings. (ix) N.A. (x) 6.10.61 ; 22.10.62 ; 18.10.63.

## 2. TREATMENTS :

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

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=50.4$  and  $N_2=100.9$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

(3) 3 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$ ,  $K_1=33.6$  and  $K_2=67.2$  Kg/ha.

P and K levels were tried in expt. no. 61 (117) at 0, 50 and 100 Kg/ha.

## 4. DESIGN :

(i)  $3^3$  Fact. confd. (ii) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9.2 m.×5.5 m. (b) 7.4 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

(i) Poor for 61 (117) : Fair for others. (ii) Stem borer attack controlled by spraying 20% Endrin for 61 (117) ; N.A. for others. (iii) Yield of grain and fodder. (iv) (a) 1961 to 1963 (treatments levels modified in 62). (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments×years interaction is absent. Therefor results of individual years are presented under 5. Results.

## 5. RESULTS :

## 61(117)

(i) 800 Kg/ha. (ii) 293.9 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$N_0$	107	301	251	295	136	229	220
$N_1$	726	1035	1164	892	956	1078	975
$N_2$	885	1482	1249	1424	1144	1048	1205
Mean	573	939	888	870	745	785	800
$K_0$	418	1115	1078				
$K_1$	467	892	877				
$K_2$	833	812	710				

C.D. for N marginal means=339.1 Kg/ha.

## 62(106)

(i) 1986 Kg/ha. (ii) 444.9 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant. (iv) Av. yield of garin in Kg/ha.

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$N_0$	885	1223	1157	920	1115	1230	1088
$N_1$	1509	2164	2574	1977	1905	2365	2082
$N_2$	2373	2969	3019	2797	2732	2833	2787
Mean	1589	2119	2250	1898	1917	2143	1986
$K_0$	1604	2085	2005				
$K_1$	1345	2035	2372				
$K_2$	1819	2237	2372				

C.D. for N or P marginal means=513.1 Kg/ha.

60(10)

(i) 2445 Kg/ha. (ii) 147.0 Kg/ha. (iii) Main effect of N, P and interaction  $P \times K$  are highly significant. Interaction  $N \times P$  and  $N \times K$  are significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	1880	2106	2368	2034	2329	1991	2118
N <sub>1</sub>	2375	2547	2540	2497	2734	2231	2487
N <sub>2</sub>	2701	2336	3154	2820	2569	2802	2730
Mean	2319	2330	2687	2450	2544	2341	2445
K <sub>0</sub>	2475	2188	2688				
K <sub>1</sub>	2476	2684	2472				
K <sub>2</sub>	2005	2117	2902				

C.D. for N or P marginal means

=169.6 Kg/ha.

C.D. for means in the body of  $N \times P$  or  $N \times K$  or  $P \times K$  table = 293.8 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref. :- Rj. 60(78).**

**Site :- Govt. Agri. Res. Farm, Borekhera.**

**Type :- 'M'.**

**Object :-** To study the effect of different methods of application of sources and levels of N with and without P on the yield of Maize.

#### 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Fallow. (c) N.A. (ii) N.A. (iii) 7.7.1960. (iv) (a) 4 ploughings. (b) and (c) N.A. (d) 46 cm. between rows. (e) N.A. (v) N.A. (vi) Bassi (selected). (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 28.9.1960.

#### 2. TREATMENTS :

**Main-plot treatments :**

3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0. P<sub>1</sub>=44.8 and P<sub>2</sub>=89.7 Kg/ha.

**Sub-plot treatments :**

All combinations of (1), (2) and (3) with a control (No N)

(1) 2 levels of N : N<sub>1</sub>=50.4 and N<sub>2</sub>=100.9 Kg/ha.

(2) 2 sources of N : S<sub>1</sub>=A/S and S<sub>2</sub>=A/S/N.

(3) 2 methods of application of N : T<sub>1</sub>=Applied in 3 doses and T<sub>2</sub>=Applied in 2 doses.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 10.5 m. × 3.2 m. (b) 9.6 m. × 2.3 m. (v) 45 cm. × 45 cm. (vi) Yes.

#### 4. GENERAL :

(i) N.A. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-1961 (experiment failed in 1961). (b) No. (c) Nil. (v) to (vii) Nil.

#### 5. RESULTS :

(i) 1380 Kg/ha. (ii) (a) 542.2 Kg/ha. (b) 528.5 Kg/ha. (iii) Main effect of N is significant and 'control vs. others' is highly significant. (iv) Av. yield of grain in Kg/ha.



$P_0N_0=700$ ,  $P_1N_0=1156$  and  $P_2N_0=1018$  Kg/ha.

	$N_1$	$N_2$	$S_1$	$S_2$	$T_1$	$T_2$	Mean
$P_0$	1163	1331	1247	1247	1234	1260	1247
$P_1$	1479	1706	1793	1492	1695	1590	1642
$P_2$	1218	1597	1476	1339	1499	1316	1407
Mean	1320	1545	1505	1359	1476	1389	1432
$T_1$	1329	1623	1594	1358			
$T_2$	1311	1467	1417	1361			
$S_1$	1374	1637					
$S_2$	1266	1453					

C.D. for N marginal means = 215.4 Kg/h.  
C.D. for 'control vs. rest' = 322.6 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 62(85).**

**Site :- Govt. Agri. Farm, Dhakerkhedi.**

**Type :- 'M'.**

Object :—To study the effect of different methods of application of sources and levels of N with and without P on Maize.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) N.A. (iv) (a) 2 discings. (b) Line sowing. (c) N.A. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) Bassi (selected). (vii) Unirrigated. (viii) 2 weedings. (ix) and (x) N.A.

**2. TREATMENTS and 3. DESIGN :**

Same as in expt. no. 60 (78) on page 191.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Growth observations and yield of grain. (iv) (a) and (b) N. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 1527 Kg/ha. (ii) (a) 232.2 Kg/ha. (b) 490.8 Kg/ha. (iii) Main effect of P and control vs. others are highly significant. Main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

$P_0N_0=831$  Kg/ha.,  $P_1N_0=1052$  Kg/ha. and  $P_2N_0=1026$  Kg/ha.

	$N_1$	$N_2$	$S_1$	$S_2$	$T_1$	$T_2$	Mean
$P_0$	1309	1387	1374	1321	1399	1297	1348
$P_1$	1611	1907	1783	1735	1752	1766	1759
$P_2$	1520	1848	1757	1611	1750	1618	1684
Mean	1480	1714	1638	1556	1634	1560	1597
$T_1$	1523	1745	1705	1563			
$T_2$	1438	1683	1571	1550			
$S_1$	1505	1771					
$S_2$	1455	1658					

C.D. for P marginal means=142.0 Kg/ha.  
 C.D. for N marginal means=199.9 Kg/ha.  
 C.D. for 'control vs. others'=299.6 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 63(22).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'M'.**

**Object :-** To study the effect of different methods of application, source and levels of N with and without P on Maize.

**1. BASAL CONDITIONS :**

(i) (a) Fallow—Maize. (b) Fallow. (c) Nil. (ii) N.A. (iii) 14.7.1963. (iv) (a) One ploughing, 2 bakherings and planking. (b) N.A. (c) 18 Kg./ha. (d) 46 cm. × 46 cm. (e) N.A. (v) N.A. (vi) Bassi. (selected) (vii) Un-irrigated. (viii) 2 weedings. (ix) N.A. (x) 8.10.1963.

**2. TREATMENTS and 3. DESIGN :**

Same as in expt. no. 60(78) on page 191.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 1518 Kg/ha. (ii) (a) 213.0 Kg/ha. (b) 369.0 Kg/ha. (iii) Main effect of P and control vs other's are highly significant. Main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

Control=1259 kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	Mean
N <sub>1</sub>	1370	1667	1402	1501	1458	1454	1505	1480
N <sub>2</sub>	1466	1681	1854	1680	1654	1642	1692	1667
Mean	1418	1674	1628	1590	1556	1458	1598	1573
T <sub>1</sub>	1324	1697	1622	1630	1466			
T <sub>2</sub>	1512	1650	1633	1551	1646			
S <sub>1</sub>	1483	1724	1564					
S <sub>2</sub>	1353	1623	1693					

C. D. for P marginal means =130.2 Kg/ha.  
 C. D. for N marginal means=150.3 Kg/ha.  
 C. D. for control vs. others =225.1 Kg/ha.

**Corp :- Maize (Kharif).**

**Ref :- Rj. 65(42).**

**Site :- Govt. Agri. Farm, Sumerpur.**

**Type :- 'M'.**

**Object :-** To study the effect of different levels of phosphorus with different methods of placement on Maize yield and grain quality.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N and 44.8 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 24.7.65. (iv) (a) Ploughing and planking. (b) Sowing behind the plough. (c) 12 Kg/ha. (d) 50 cm.  $\times$  30 cm. (v) N.A. (vi) Bassi selected. (vii) Irrigated. (viii) 2 weedings. (ix) 46.4 cm. (x) 26.10.65.

## 2. TREATMENTS :

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

(1) 3 levels of  $P_2O_5$  as Super :  $P_1=33.6$  ;  $P_2=50.4$  and  $P_3=67.2$  kg/ha.

(2) 3 methods of application :  $M_1$ =Broadcast,  $M_2$ =Below the seed, and  $M_3$ =Side hand placement.

$P_2O_5$  applied at sowing.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 10.0 m.  $\times$  5.0 m. (b) 9.3 m.  $\times$  4.3 m. (v) 35 cm.  $\times$  35 cm. (vi) Yes.

## 4. GENERAL :

(i) Fair. (ii) Attack of stemborer, 1.1 Kg in 897 litres/ha. spray of 20% Elarin on 17.8.65. (iii) Height measurement and yield of grain. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1204 Kg/ha. (ii) 292.3 Kg/ha. (iii) Main effect of P and interaction  $M \times P$  are significant. (iv) Av. yield of grain in kg/ha.

Control=965 Kg/ha.

	$P_1$	$P_2$	$P_3$	Mean
$M_1$	794	1646	1362	1267
$M_2$	1362	1475	1135	1324
$M_3$	1021	1135	1135	1097
Mean	1059	1419	1211	1230

C. D. for P marginal means=244.9 Kg/ha.

C. D. for body of  $M \times P$  table=423.9 Kg/ha.

**Crop :- Maize (Kharif).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Ref :- Rj. 62(17).**

**Type :- 'M'.**

Object :—To study the effect of different types of trace elements at different levels with the basal dose of N, P and K on the yield of Maize.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Barley. (c) Nil. (ii) Sandy loam. (iii) 21.7.62. (iv) (a) 5 ploughings. (b) N.A. (c) 17 Kg/ha. (d) 61 cm.  $\times$  46 cm. (e) N.A. (v) N.A. (vi) Bassi selected. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 17.10.62.

## 2. TREATMENTS :

All combinations of (1) and (2) with 2 extra treatments

(1) 3 levels of micronutrients :  $L_1=5.6$ ,  $L_2=11.2$  and  $L_3=22.4$  Kg/ha.

(2) 5 micronutrients :  $M_1=C/S$ ,  $M_2=ZnSul.$ ,  $M_3=Borax$ ,  $M_4=MnSul.$  and  $M_5=FeSul.$

2 Extra treatments :  $E_0$ =Control (2 plots) and  $E_1=67.3$  Kg/ha. of N as A/S + as 33.6 Kg/ha. of  $P_2O_5$  as Super + 33.6 Kg/ha. of  $K_2O$  as Mur. Pot.

67.3 kg/ha. of N as A/s + 33.6 Kg/ha. of  $P_2O_5$  as Super + 33.6 Kg/ha. of  $K_2O$  as Mur. Pot. applied to all treatments except  $E_0$  as basal dressing.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. (ii) Attack of stem borer. (iii) Yield of grain and fodder. (iv) (a) 1962 only. (b) and (c) N.A. (v) to (vii) Nil.

## 5. RESULTS:

(i) 2752 Kg/ha. (ii) 414.2 Kg/ha. (iii) E effect and 'E vs others, are highly significant. (iv) Av. yield of grain in Kg/ha.

$E_0 = 1584$  Kg/ha and  $E_1 = 2503$  Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$
$L_1$	2441	3081	3081	2847	2751
$L_2$	2995	2835	2775	3118	3229
$L_3$	2664	2859	3069	2978	3143
Mean	2700	2925	2975	2981	3041

C. D. for E means = 686.5 Kg/ha.

C. D. for 'E vs. others' = 307.5 kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 60(36).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Wheat. (c) Nil. (ii) Sandy loam. (iii) 9.7.60. (iv) (a) 3 ploughings. (b) N.A. (c) 17 Kg/ha. (d) 61 cm.  $\times$  15 cm to 23 cm. (e) N.A. (v) N.A. (vi) Bassi (selection). (vii) Irrigated. (viii) 3 weedings. (ix) N.A. (x) 7.10.1960.

## 2. TREATMENTS :

All combinations of (1) and (2) with a control (no manure).

(1) 2 levels of N :  $N_1 = 33.6$  and  $N_2 = 67.3$  Kg/ha.

(2) 3 sources of N :  $S_1 = T.C.$ ,  $S_2 = F.Y.M.$  and  $S_3 = A/S.$

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. (ii) Effect of stem borer. (iii) Yield of grain and fodder. (iv) (a) 1960—1962 (modified in 1961). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2052 Kg/ha. (ii) 229.9 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of grain in Kg/ha.

Control = 1892 Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$N_1$	2076	1854	2189	2040
$N_2$	2311	1757	2290	2119
Mean	2193	1805	2239	2079

C. D. for S marginal means = 241.4 Kg/ha.

**Crop :- Maize (Kharif).****Ref :- Rj. 61(42), 62(24).****Site :- Govt. Agri. Farm, Tabiji.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) (a) Nil for 61(42); Maize-Wheat for 62(24). (b) Wheat. (c) Nil. (ii) Sandy loam. (iii) 9.7.1961; 13.7.1962. (iv) (a) 4 ploughings. (b) N.A. (c) 17 Kg/ha. (d) 61 cm. × 46 cm. (e) N.A. (v) N.A. (vi) Bassi selected. (vii) Irrigated. (viii) 2 to 3 weedings. (ix) N.A. (x) 7.10.1961; 15.10.1962.

**2. TREATMENTS:**

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

(1) 3 sources of N :  $S_1=T.C.$ ,  $S_2=F.Y.M.$  and  $S_3=A/S$ .(2) 2 levels of N :  $N_1=50.4$  and  $N_2=100.9$  Kg/ha.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Poor growth in few plots due to poor soil fertility for 61(42); N.A. for other. (ii) Slight attack of stem borer, control measures N.A. (iii) Yield of grain and fodder. (iv) (a) 1960-1962 (treatments levels changed in 61). (b) N.A. (c) Results of combined analysis are given under 5. (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments × years interaction is present.

**5. RESULTS :**

(i) 1469 Kg/ha. (ii) 733.0 Kg/ha. (based on 6 d.f. made up of Treatments × years interaction). (iii) Main effect of S alone is significant. (iv) Av. yield of grain in Kg/ha.

Control = 1318 Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$N_1$	1491	1198	1864	1518
$N_2$	1231	1072	2110	1471
Mean	1361	1135	1987	1494

C.D. for S marginal means = 634.0 Kg/ha.

**Crop :- Maize (Kharif).****Ref :- Rj. 60(35), 61(43), 62(20).****Site :- Govt. Agri. Farm, Tabiji.****Type :- 'M'.**

Object :- To study the effect of N, P and K applied individually and in combinations on the yield of Maize,

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Barley for 60(35) and 62(20); Wheat for 61(43). (c) Nil. (ii) Sandy loam. (iii) 9.7.1960; 10.7.1961; 15.7.1962. (iv) (a) 3 to 5 ploughings. (b) N.A. (c) 17 Kg/ha. (d) 61 cm. × 15 to 23 cm. for 63(35); 61 cm. × 46 cm. for others. (e) N.A. (v) N.A. (vi) Bassi selected. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) N.A. : 9.10.1961; 16.10.1962.

**2. TREATMENTS :**

Treatments in one direction :

2 methods of application :  $M_1=Mixture$  and  $M_2=Separate$ .

Treatments in perpendicular direction :

All combinations of (1), (2) and (3) + a control

(1) 2 levels of N as A/S :  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.(2) 2 levels of  $P_2O_5$  as Super :  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.(3) 2 levels of  $K_2O$  as Mur. Pot. :  $K_1=33.6$  and  $K_2=67.2$  Kg/ha.

## 3. DESIGN :

(i) Strip-plot. (ii) (a) 2 plots in one direction and 9 plots in perpendicular direction. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 60(35), 62(20); Poor growth in few plots due to poor soil fertility for 61(43). (ii) Slight attack of stem borer. (iii) Yield of grain. (iv) (a) 1960 to 1962. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous results of individual years are presented under 5. Results.

## 5. RESULTS :

## 60(35)

(i) 1480 Kg/ha. (ii) (a) 1520.0 Kg/ha. (b) 505.7 Kg/ha. (c) 251.7 Kg/ha. (iii) Interaction M × K alone is highly significant. (iv) Av. yield of grain in Kg/ha.

Control=1152 Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
M <sub>1</sub>	1403	1401	1420	1383	1430	1373	1402
M <sub>2</sub>	1615	1664	1558	1722	1383	1897	1640
Mean	1509	1532	1489	1552	1406	1635	1521
K <sub>1</sub>	1440	1373	1432	1381			
K <sub>2</sub>	1578	1692	1546	1724			
P <sub>1</sub>	1467	1511					
P <sub>2</sub>	1552	1553					

C.D. for M means at the same level of K=1334.1 Kg/ha.

C.D. for K means at the same level of M =346.2 Kg/ha.

## 61(43)

(i) 1525 Kg/ha. (ii) (a) 468.1 Kg/ha. (b) 1001.7 Kg/ha. (c) 493.3 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

Control=1571 Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
M <sub>1</sub>	1013	1669	1321	1361	1246	1436	1341
M <sub>2</sub>	1287	2107	1569	1826	1611	1784	1697
Mean	1150	1888	1445	1593	1428	1610	1519
K <sub>1</sub>	1215	1641	1506	1351			
K <sub>2</sub>	1085	2135	1384	1836			
P <sub>1</sub>	1014	1876					
P <sub>2</sub>	1286	1900					

C.D. for N marginal means=613.1 Kg/ha.

## 62(20)

(i) 2537 Kg/ha. (ii) (a) 1158.0 Kg/ha. (b) 677.8 Kg/ha. (c) 552.1 Kg/ha. (iii) 'Control vs. others' alone is highly significant. (iv) Av. yield of grain in Kg/ha.

Control=972 Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>1</sub>	2593	2922	2666	2849	2858	2657	2757
N <sub>2</sub>	2581	2838	2442	2976	2997	2421	2709
Mean	2587	2880	2554	2912	2927	2539	2733
K <sub>1</sub>	2871	2994	2584	3271			
K <sub>2</sub>	2303	2776	2525	2554			
P <sub>1</sub>	2364	2744					
P <sub>2</sub>	2810	3015					

C.D. for 'control vs. others'=622.0 Kg/ha.

**Crop :- Maize (Kharif).****Ref :- Rj. 61(37), 62(28).****Site :- Govt. Agri. Farm, Tabiji.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat for 61(37) ; Barley for 62(28). (c) Nil. (ii) Sandy loam. (iii) 8.7.1961 ; 14.7.1962. (iv) (a) 4 to 5 ploughings. (b) N.A. (c) 17 Kg/ha. (d) 61 cm. x 46 cm. (e) N.A. (v) N.A. (vi) Bassi (selected). (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 8.10.1961 ; 16.10.1962.

**2. TREATMENTS :**

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

- (1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.  
 (2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.  
 (3) 3 levels of K<sub>2</sub>O : K<sub>0</sub>=0, K<sub>1</sub>=33.6 and K<sub>2</sub>=67.2 Kg/ha.

**3. DESIGN :**

(i) 3<sup>3</sup> Fact. confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9.2 m. x 5.5 m. (b) 7.4 m. x 3.7 m. (v) 91 cm. x 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Stem borer attack, control measures N.A. (iii) Yield of grain and fodder. (iv) (a) 1961 to 1962. (b) No. (c) Results of combined analysis given under 5. (v) to (vi) Nil. (vii) Error variances are homogeneous, Treatments x years interaction is absent.

**5. RESULTS :**

(i) 1810 Kg/ha. (ii) 506.9 Kg/ha. (based on 18 d.f. made up of various components of Treatments x years interaction). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	1247	1415	1512	1562	1196	1415	1391
N <sub>1</sub>	1625	1868	1856	1796	1826	1728	1783
N <sub>2</sub>	2111	2176	2480	2257	2285	2226	2256
Mean	1661	1820	1949	1872	1769	1789	1810
K <sub>0</sub>	1792	1698	2125				
K <sub>1</sub>	1589	1695	2024				
K <sub>2</sub>	1602	2066	1699				

C.D. for N marginal means=354.8 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 64(97).**

**Site :- Rj. College of Agri. Udaipur.**

**Type :- 'M'.**

**Object :-** To study the effect of different levels of N, P and K alone and in combinations on the yield of Maize.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 29.6.64. (iv) (a) Ploughed with the soil inverting plough and disc. harrow. (b) Drilling. (c) 25 Kg/ha. (d) 45 cm. × 25 to 35 cm. (e) N.A. (v) N.A. (vi) Malan. (vii) Irrigated. (viii) and (ix) N.A., (x) 3.10.64.

**2. TREATMENTS :**

All combinations of (1), (2) and (3) with one control

(1) 5 levels of N : N<sub>1</sub>=49.4, N<sub>2</sub>=98.8, N<sub>3</sub>=148.3, N<sub>4</sub>=197.7 and N<sub>5</sub>=247.1 Kg/ha.

(2) 4 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=37.1 P<sub>2</sub>=61.8 and P<sub>3</sub>=86.5 Kg/ha.

(3) 3 levels of K<sub>2</sub>O : K<sub>0</sub>=0, K<sub>1</sub>=61.8 and K<sub>2</sub>=86.5 Kg/ha.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 61. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 8.0 m. × 4.5 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) 1964 only. (c) Nil. (v) (vii) Nil.

**5. RESULTS :**

(i) 2270 Kg/ha. (ii) 169.0 Kg/ha. (iii) Main effect of N, P, and 'control vs. others' are significant. (iv) Av. yield of grain in Kg/ha.

Control=1041 Kg/h.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	1903	1883	2069	2939	2456	2470	2344	1936	2250
P <sub>1</sub>	2479	2083	2197	2426	2888	2621	2381	2242	2415
P <sub>2</sub>	1806	2236	2041	2755	2769	2285	2400	2279	2321
P <sub>3</sub>	1721	1941	2416	2507	2281	2244	2047	2229	2173
Mean	1977	2036	2181	2657	2598	2405	2293	2172	2290
K <sub>0</sub>	1834	2128	2212	3003	2848				
K <sub>1</sub>	1968	2115	2160	2756	2465				
K <sub>2</sub>	2130	1864	2170	2212	2482				



C.D. for N marginal means =97.6 Kg/ha.  
 C.D. for P marginal means =87.1 Kg/ha.  
 C.D. for 'control vs. others'=239.7 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 63(15).**

**Site :- Vidhya Bhavan Rural Ins. Farm, Udaipur.**

**Type :- 'M'.**

**Object :-** To study the effect of different levels of N, P K alone and in combinations on the yield of Maize.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 13.7.63. (iv) (a) and (b) N.A. (c) 13 Kg/ha. (d) 61 cm.  $\times$  30 cm. (v) N.A. (vi) Hybrid. (vii) Unirrigated. (viii) and (ix) N.A. (x) 7.11.63.

**2. TREATMENTS :**

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

(1) 4 levels of N as A/S :  $N_0=0$ ,  $N_1=67.3$ ,  $N_2=134.5$  and  $N_3=201.8$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.3$  Kg/ha.

(4) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=44.8$  Kg/ha.

**3. DESIGN :**

(i)  $4 \times 3 \times 2$  Fact. confd. (ii) 12 plots/block, 2 blocks/replication. (b) N.A. (iii) 3. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1963—contd. (b) No. (c) Nil. (v) to (viii) Nil.

**5. RESULTS :**

(i) 1497 Kg/ha. (ii) 104.0 Kg/ha. (iii) All the main effects and two factors interactions are highly significant. (iv) Av. yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	Mean
$N_0$	586	943	1356	842	1081	962
$N_1$	984	1554	1655	1340	1457	1398
$N_2$	1236	1615	2044	1648	1615	1632
$N_3$	1671	1954	2367	1964	2030	1997
Mean	1119	1516	1855	1448	1546	1497
$K_0$	1005	1872	1968			
$K_1$	1233	1661	1743			

C.D. for N marginal mean =69.8 Kg/ha.

C.D. for P marginal mean =60.5 Kg/ha.

C.D. for K marginal mean =49.4 Kg/ha.

C.D. for means in the body of  $N \times P$  table =121.3 Kg/ha.

C.D. for means in the body of  $N \times K$  table =99.0 Kg/ha.

C.D. for means in the body of  $P \times K$  table =85.6 Kg/ha.

**Crop :- Maize (Kharif).****Ref :- Rj. 63(23).****Site :- Govt. Agri. College Farm, Udaipur.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Clay loam. (iii) 22, 23.7.62. (iv) (a) and (b) N.A. (c) 17 Kg/ha. (d) 61 cm. × 30 cm. (e) N.A. (v) Nil. (vi) *Malan*. (vii) Unirrigated. (viii) and (ix) N.A. (x) 3.11.62.**2. TREATMENTS :**8 manurial treatments :  $M_0$  = Control.  $M_1$  = 44.8 Kg/ha. of  $P_2O_5$  as Super + 44.8 Kg/ha. of  $K_2O$  as Mur. Pot.,  $M_2 = M_1 + 22.4$  Kg/ha. of N (as A/S),  $M_3 = M_1 + 44.8$  Kg/ha. of N as A/S,  $M_4 = M_1 + 67.3$  Kg/ha. of N as A/S,  $M_5 = M_1 + 89.7$  Kg/ha. of N as A/S,  $M_6 = M_1 + 112.1$  Kg/ha. of N as A/S and  $M_7 = M_1 + 134.5$  Kg/ha. of N as A/S.**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 5. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) to (vii) N.A.

**5. RESULTS :**

(i) 1768 Kg/ha. (ii) 310 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	1602	1787	1653	1912	1853	1698	1827	1816

**Crop :- Maize (Kharif).****Ref :- Rj. 60, 61, 62, 63, 64(M.A.E).****Site :- M.A.E. Centre, Sriganganagar.****Type :- 'M'.**

Object : Type II —To study the residual effects of different levels of N, P, K and F.Y.M. on the yield of Maize.

**1. BASAL CONDITIONS :**

(i) (a) Maize-Wheat-Cotton-Senji. (b) Senji. (c) N.A. (ii) Sandy loam. (iii) N.A., 20.6.61, N.A., 30.6.63 and 12.6.64. (iv) (a) 1 ploughing and Cross discing by tractor. (b) Drilling in lines. (c) 27.7 Kg/ha. (d) 46 cm. between rows. (e) Nil. (v) N.A. (vi) Bassi (for 61, 63), Local for 64, N.A. for others. (vii) Irrigated. (viii) Hoeing and weeding. (ix) Nil. (x) N.A., 24 to 26.9.61, N.A., 3.10.63 and 12.9.64.

**2. TREATMENTS :**

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

(1) 2 levels of F.Y.M. :  $F_0 = 0$  and  $F_1 = 5600$  Kg/ha.(2) 3 levels of N as A/S :  $N_0 = 0$ ,  $N_1 = 22.4$  and  $N_2 = 44.8$  Kg/ha.(3) 3 levels of  $P_2O_5$  as Super :  $P_0 = 0$ ,  $P_1 = 22.4$  and  $P_2 = 44.8$  Kg/ha.(4) 3 levels of  $K_2O$  as Mur. Pot. :  $K_0 = 0$ ,  $K_1 = 22.4$  and  $K_2 = 44.8$  Kg/ha.**3. DESIGN :**(i)  $3^3 \times 2$  Fact. confd. (ii) (a) 9 plots/block and 6 blocks/replication. (3 blocks receiving  $F_0$  and 3 blocks receiving  $F_1$  treatment). (iii) 1. (iv) (a) 10.1 m. × 5.0 m. (b) 8.8 m. × 4.1 m. (v) 61 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Attack of birds. (iii) Grain yield. (iv) (a) 1957 to 64. (b) and (c) N.A. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatments  $\times$  years interaction is absent. Results of individual years are presented under 5 Results.

## 5. RESULTS :

## Rj. 60(M.A.E.)

(i) 1207 Kg/ha. (ii) 24.0 Kg/ha. (iii) Main effect of N and interaction  $N \times P$  and  $F \times N$  are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	1040	1068	1456	1145	1167	1252	1223	1106	1235	1188
F <sub>1</sub>	1142	1298	1238	1147	1251	1280	1203	1168	1307	1226
Mean	1091	1183	1347	1146	1209	1266	1213	1137	1271	1207
K <sub>0</sub>	1161	1098	1380	1180	1218	1241				
K <sub>1</sub>	990	1222	1199	1148	1005	1258				
K <sub>2</sub>	1122	1229	1462	1110	1404	1299				
P <sub>0</sub>	1140	1033	1265							
P <sub>1</sub>	1125	1314	1191							
P <sub>2</sub>	1008	1202	1588							

C.D. for N marginal means = 171.3 Kg/ha.

C.D. for means in the body of  $F \times N$  table = 242.2 Kg/ha.

C.D. for means in the body of  $N \times P$  table = 296.7 Kg/ha.

## 61(M.A.E.)

(i) 344 Kg/ha. (ii) 161.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	332	433	378	350	378	415	295	397	451	381
F <sub>1</sub>	338	261	322	240	322	359	283	249	389	307
Mean	335	347	350	295	350	387	289	323	420	344
K <sub>0</sub>	277	332	258	212	286	369				
K <sub>1</sub>	369	277	323	314	321	334				
K <sub>2</sub>	359	432	469	359	443	458				
P <sub>1</sub>	276	332	277							
P <sub>2</sub>	397	303	350							
P <sub>3</sub>	332	406	423							

## 62(M.A.E.)

(i) 306 Kg/ha. (ii) 88.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	310	287	285	272	307	303	298	304	279	294
F <sub>1</sub>	306	333	315	336	289	329	327	350	276	318
Mean	308	310	300	304	298	316	314	327	277	306
K <sub>0</sub>	353	294	295	290	306	346				
K <sub>1</sub>	299	347	335	367	297	317				
K <sub>2</sub>	272	289	270	255	291	287				
P <sub>0</sub>	292	304	316							
P <sub>1</sub>	280	305	309							
P <sub>2</sub>	352	321	275							

**63(M.A.E.)**

(i) 531 Kg/ha. (ii) 58.1 Kg/ha. (iii) Main effect of N is highly significant. Interaction N×K and F×N are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	445	551	573	496	530	542	500	536	532	523
F <sub>1</sub>	509	574	534	551	515	551	528	527	563	539
Mean	477	563	553	524	523	547	514	532	548	531
K <sub>0</sub>	458	568	516	530	496	516				
K <sub>1</sub>	428	568	599	536	508	551				
K <sub>2</sub>	545	553	545	505	565	573				
P <sub>0</sub>	493	542	536							
P <sub>1</sub>	456	562	551							
P <sub>2</sub>	482	585	573							

C.D. for N marginal means = 40.0 Kg/ha.

C.D. for means in the body of F×N table = 56.6 Kg/ha.

C.D. for means in the body of N×K table = 69.1 Kg/ha.

**64(M.A.E.)**

(i) 644 Kg/ha. (ii) 221.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Mean	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	M
F <sub>0</sub>	616	693	650	672	664	623	639	677	643	653
F <sub>1</sub>	538	664	706	592	615	701	708	591	609	636
Mean	577	678	678	632	639	662	673	634	626	644
K <sub>0</sub>	625	693	702	599	608	812				
K <sub>1</sub>	499	730	673	731	542	630				
K <sub>2</sub>	608	611	659	565	768	545				
P <sub>0</sub>	554	628	714							
P <sub>1</sub>	608	699	611							
P <sub>2</sub>	570	707	710							

**Crop :- Maize.****Ref :- 62, 63(S.F.T.).****Site :- (District) : Pali.****Type :- 'M'.**

Object :—To study the response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with other nutrients (Type : A<sub>1</sub>).

**1. BASAL CONDITIONS :**

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

**2. TREATMENTS :**

8 manurial treatments

O=Control (no manure).

N<sub>1</sub>=33.6 Kg/ha. of N.N<sub>2</sub>=67.2 Kg/ha. of N.P<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>1</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.N applied as A/S ; P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.**3. DESIGN :**

A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A<sub>1</sub>, 11 of type A<sub>2</sub>, 11 of type A<sub>3</sub> and 3 are of type C. The eleven experiments under type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are distributed as 3 on a kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are laid out. For conducting the three type-C trials three villages are randomly selected in each block.

**4. GENERAL :**

(i) to (iii) N.A. (iv) (a) 1962 to 1966 (1964 and 1965 N.A.). (b) and (c) N.A. (v) to (vii) N.A.

**5. RESULTS :****62(S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	190	306	133	282	664	375	554	131.0

Control yield=812 Kg/ha. ; No. of trials=2.

**63(S.F.T.)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	133	127	94	160	198	230	233	42.9

Control yield=382 Kg/ha. ; No. of trials=3.

**Crop :- Maize (Kharif).****Ref :- Rj. 62, 63, 64, 65(SFT).****Site :- (District) : Banswara.****Type :- 'M'.**

Object :—To study the response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with other nutrients (Type : A<sub>1</sub>).

**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Red and yellow ; Grey brown. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

O=Control (no manure)

 $N_1=33.6$  Kg/ha. of N $N_2=67.2$  Kg/ha. of N $P_1=33.6$  Kg/ha. of  $P_2O_5$  $N_1P_1=33.6$  Kg/ha. of N+ $33.6$  Kg/ha. of  $P_2O_5$  $N_2P_1=67.2$  Kg/ha. of N+ $33.6$  Kg/ha. of  $P_2O_5$  $N_2P_2=67.2$  Kg/ha. of N+ $67.2$  Kg/ha. of  $P_2O_5$  $N_2P_2K_1=67.2$  Kg/ha. of N+ $67.2$  Kg/ha. of  $P_2O_5$ + $33.6$  Kg/ha. of  $K_2O$   
N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. of Pot.

## 3. DESIGN :

Same as in type  $A_1$  (Irrigated) on page 204.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Banswara and 1962 to 1965 for Pali. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS.

## Banswara

## 62 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	140	399	—19	538	668	879	859	120.1

Control yield=903 Kg/ha. ; No. of trials=7.

## 63 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	131	419	170	296	474	616	673	95.2

Control yield=737 Kg/ha. ; No. of trials=7.

## 64 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	523	783	167	959	976	1307	1464	94.4

Control yield=806 Kg/ha. ; No. of trials=7.

## 65 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	266	470	116	520	656	822	908	77.8

Control yield=602 Kg/ha. ; No. of trials=5.

## Pali

## 63 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	5	63	11	92	120	155	242	42.2

Control yield= 1231 Kg/ha ; No. of trials=2.

**Pali****63 (S.F.T.)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	23	6	5	52	79	69	256	56.0

Control yield=1187.0 Kg/ha. ; No. of trials=2.

**64 (S.F.T.)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	34	23	45	88	119	253	276	40.2

Control yield=506 Kg/ha. ; No. of trials=4.

**65 (S.F.T.)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	96	30	10	96	136	198	246	21.9

Control yield=669 Kg/ha. ; No. of trials=6.

**Crop :- Maize (Kharif).****Ref :- 62(S.F.T.).****Site :- (District) : Pali.****Type :- 'M'.**Object :- To study response curves of important cereal, cash and oilseed crops to Potash applied singly and in combination with other nutrients (Type : A<sub>3</sub>).**1. BASAL CONDITIONS :**

(i) N.A. (ii) Grey brown (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

8 manurial treatments

O=Control (no manure)

N<sub>1</sub>=33.6 Kg/ha. of NK<sub>1</sub>=33.6 Kg/ha. of K<sub>2</sub>OK<sub>2</sub>=67.2 Kg/ha. of K<sub>2</sub>ON<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>ON<sub>1</sub>K<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>ON<sub>2</sub>K<sub>1</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>ON<sub>1</sub>P<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.**3. DESIGN :**Same as in type A<sub>1</sub>(Irrigated) on page 204.**4. GENERAL :**

(i) to (iii) N.A. (iv) (a) 1962 and 1963. (b) and (c) N.A. (v) to (vii) N.A.

**5. RESULTS :****62 (S.F.T.)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	208	133	109	294	127	466	317	122.5

Control yield=985 Kg/ha ; No. of trials=2.

Crop :- Maize (*Kharif*).Ref :- Rj. 62, 63, 64, 65(S.F.T.) for Banswara and  
63, 64, 65(S.F.T.) for Pali.

Site :- (District) Banswara and Pali.

Type :- 'M'.

Object :—To study the response curves of important cereal, cash and oilseed crops to potash applied singly and in combination with other nutrients (Type : A<sub>3</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Red and yellow; Grey brown. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

O=Control (no manure).

N<sub>1</sub>=33.6 Kg/ha. of N.K<sub>1</sub>=33.6 Kg/ha. of K<sub>2</sub>O.K<sub>2</sub>=67.2 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.N<sub>2</sub>K<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page 204.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1952 to 1966 for Banswara and 1963 to 1966 for Pali. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

Banswara  
62(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	98	-50	-1	327	327	513	411	118.3

Control yield=700 Kg/ha. ; No. of trials=9.

## 63(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	251	34	37	270	277	509	350	72.6

Control yield=610 Kg/ha. ; No. of trials=9.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	555	74	114	542	688	868	1038	87.9

Control yield=733 Kg/ha. ; No. of trials=7.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	268	42	102	336	434	656	678	65.8

Control yield=556 Kg/ha. ; No. of trials=5.

## Pali

## 63(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	17	17	17	63	89	127	172	29.1

Control yield=1221 Kg/ha.; No. of trials=2.



## 64 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	53	-15	-1	13	100	155	133	35.8

Control yield=569 Kg/ha. ; No. of trials=4.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	58	-21	26	111	139	174	105	30.9

Control yield=716 Kg/ha. ; No. of trials=6.

**Crop :- Maize.****Site :- As per results.****Ref :- Rj. 60(S.F.T.).****Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) N.A. (ii) As per results. (iii) to (x) N.A.

## 2. TREATMENTS :

O = Control (no manure)

n = 22.4 Kg/ha. of N as A/S

p = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Superk = 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.np = 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Supernk = 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.pk = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super + 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.npk = 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super + 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.  
N applied as A/S ; P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year 8 on kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a legume-crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of Type C. Residual effects of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

District	Soil class	No. of trials	Av. response in to Kg/ha.					Interaction effects in Kg/ha.				
			Control yield	N	P	K	S.E.	NP	NK	PK	NPK	S.E.
Banaswara	Red and black	8	830	270	150	30	72.0	20	-60	10	-50	5.70
Pali	Desert	4	720	140	-40	0	56.0	20	-20	20	-30	48.0

**Crop :- Maize.****Ref :- Rj. 60(S.F.T.).****Site :- (District) Banaswara and Pali.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) N.A. (ii) Red and black ; Desert soil. (iii) to (x) N.A.

**2. TREATMENTS :**

O =Control (no manure).

 $n_1$  =22.4 Kg/ha. of N as A/S. $n_2$  =44.8 Kg/ha. of N as A/S. $n_1'$  =22.4 Kg/ha. of N as Urea. $n_2'$  =44.8 Kg/ha. of N as Urea. $n_1''$  =22.4 Kg/ha. of N as C/A/N. $n_2''$  =44.8 Kg/ha. of N as C/A/N.**3. DESIGN :**

Same as in type A on page no. 210.

**4. GENERAL :**

(i) to (vii) N.A.

**5. RESULTS :**

Av. yield of grain in Kg/ha.

District	No. of trials	O	$n_1$	$n_2$	$n_1'$	$n_2'$	$n_1''$	$n_2''$	G.M.	S.E./mean
Banaswara	8	780	1082	1210	1110	1150	1080	1320	1104	47.4
Pali	3	660	790	870	690	910	960	830	816	57.3

**Crop :- Maize (Kharif).****Ref :- Rj. 61(77).****Site :- Govt. Agri. Farm, Tabiji.****Type :- 'C'.**

Object :—To find out the effect of detasseling Maize at different stages on the yield of Maize.

**1. BASAL CONDITIONS :**

(i) (a) Maize-Wheat. (b) Wheat. (c) 67.3 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 20.7.61. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) 61 cm. between rows. (e) N.A. (v) N.A. (vi) *Bassi* (selected). (vii) Un-irrigated. (viii) and (ix) N.A. (x) Sept., 61.

**2. TREATMENTS :**

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

(1) 2 types of detasseling :  $D_1$ =Partial detasseling and  $D_2$ =Detasseling in alternate rows.(2) 2 periods of detasseling :  $T_1$ =0.15 week after emergence and  $T_2$ =2 weeks after emergence.**3. DESIGN :**

(i) L. Sq. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a) 9.8 m. × 6.1 m. (b) 9.2 m. × 5.5 m. (v) 30 cm. × 30 cm. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 3005 Kg/ha. (ii) 4191 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control= 3013 Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	Mean
D <sub>1</sub>	3104	2783	2943
D <sub>2</sub>	3187	2946	3066
Mean	3145	2864	3004

**Crop :- Maize (Kharif).****Ref :- Rj. 62(40).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'CM'.**

Object :—To study the effect of different spacings and fertilizers on the yield of Maize.

**1. BASAL CONDITIONS :**

(i) (a) Wheat-Maize. (b) Wheat. (c) Nil. (ii) Sandy loam. (iii) 19.7.62. (iv) (a) 2 ploughings. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) Bassi selected. (vii) Un-irrigated. (viii) 1 weeding. (ix) N.A. (x) 16.11.62.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 3 spacings between rows : S<sub>1</sub>=46, S<sub>2</sub>=61 and S<sub>3</sub>=76 cm.(2) 3 levels of fertilizers : M<sub>0</sub>=0, M<sub>1</sub>=67.3 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of K<sub>2</sub>O and M<sub>2</sub>=89.7 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of K<sub>2</sub>O.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 9.1 m.×6.1 m. (b) 8.2 m.×5.5 m. (v) 46 cm. ×30 cm. (vi) Yes.

**4. GENERAL :**

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

**5. RESULTS :**

(i) 2926 Kg/ha. (ii) 491.7 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>0</sub>	2202	1622	1626	1817
M <sub>1</sub>	2917	3287	3234	3146
M <sub>2</sub>	4158	3795	3491	3815
Mean	3092	2901	2784	2926

C. D. for M marginal means=414.2 Kg/ha.

**Crop :- Maize (Kharif).****Ref :- Rj. 62(34).****Site :- Govt. Agri. Farm, Sriganganagar.****Type :- 'CM'.**

Object :—To study the effect of different spacings and fertilizers on the yield of Maize.

## 1. BASAL CONDITIONS :

(i) (a) Wheat-Maize. (b) Wheat. (c) N.A. (ii) Sandy loam. (iii) 10.7.62. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) Bassi (selected). (vii) Irrigated. (viii) and (ix) N.A. (x) 22.10.62.

## 2. TREATMENTS :

Same as in expt. no. 62(40) conducted at Bassi on page no. 212.

## 3. DESIGN

(i) Fact in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) and (b) 12.2 m. × 9.1 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 464 Kg/ha. (ii) 120.2 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>0</sub>	364	379	357	367
M <sub>1</sub>	576	501	427	501
M <sub>2</sub>	613	487	473	524
Mean	518	456	419	464

C. D. for M marginal means = 101.2 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj.63 (MAE).**

**Site :- M.A.E. Centre, Sriganaganagar.**

**Type :- 'CMV'.**

Object :—Type XIII. To study the effect of different spacings and fertilizers on the yield of Maize.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Desert soil. (iii) 16.7.63. (iv) (a) to (e) N.A. (v) N.A. (vi) (147 days) As per treatments. (vii) Irrigated. (viii) and (ix) N.A. (x) 9.12.1963.

## 2. TREATMENTS :

**Main-plot treatments :**

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

(1) 3 dates of sowing : D<sub>1</sub>=1.7.63, D<sub>2</sub>=16.7.63 and D<sub>3</sub>=2.8.63.

(2) 3 varieties : V<sub>1</sub>=Local, V<sub>2</sub>=Hybrid and V<sub>3</sub>=Bassi.

(3) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=57.2 and N<sub>2</sub>=134.4 Kg/ha.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0 and P<sub>1</sub>=112 Kg/ha.

(2) 2 levels of K<sub>2</sub>O : K<sub>0</sub>=0 and K<sub>1</sub>=89.6 Kg/ha.

## 3. DESIGN :

(i) Split-plot contd. (ii) (a) 3 blocks/replication ; 9 main-plots/block, 4 sub-plots main-plot. (b) N.A. (iii) 1. (iv) (a) and (b) N.A. (v) and (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 233 Kg/ha. (ii) (a) 55.2 Kg/ha. (b) 29.0Kg/ha. (iii) Main effects of V, P and K are highly significant. Main effect of N is significant. (iv) Av. yield of grain Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
K <sub>0</sub>	238	219	220	166	238	273	207	214	256	201	250	226
K <sub>1</sub>	243	245	233	178	250	292	215	231	275	210	270	240
Mean	240	232	226	172	244	282	211	222	265	206	260	233
P <sub>0</sub>	203	211	203	147	218	253	186	189	243			
P <sub>1</sub>	278	253	250	198	270	312	236	256	288			
N <sub>0</sub>	230	212	192	154	215	264						
N <sub>1</sub>	238	208	221	183	230	254						
N <sub>2</sub>	253	277	265	179	287	329						
V <sub>1</sub>	163	178	175									
V <sub>2</sub>	278	231	223									
V <sub>3</sub>	279	287	281									

C.D. for N or V marginal means=32.0 Kg/ha.

C.D. for P or K marginal means=12.0 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 64(8).**

**Site :- Govt. Agri. Farm, Banswara,**

**Type :- 'D'.**

**Object :-**To determine the relative efficacy of seed dressing fungicides in relation to yield and germination of Maize.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize. (c) 33.6 Kg/ha. of N. (ii) Black cotton soil. (iii) 18.7.64. (iv) (a) 2 ploughings, 2 bakherings, 1 discing and 4 plankings. (b) Dibbling. (c) As per treatments. (d) 61 cm. x 30 cm. (e) 1. (v) 7.4 C.L./ha. of F.Y.M. (vi) Local. (vii) Unirrigated. (viii) 4 weedings. (ix) N.A. (x) 22, 23.10.64.

## 2. TREATMENTS :

10 seed dressing treatments : T<sub>0</sub>=Control, T<sub>1</sub>=3 gm. of Agrosan, T<sub>2</sub>=2 gm. of cerasan, T<sub>3</sub>=2 gm. of Tillex, T<sub>4</sub>=2 gm. of Lunasan, T<sub>5</sub>=2 gm. of Harvasan, T<sub>6</sub>=3 gm. of Thiram, T<sub>7</sub>=2 gm. of Phygon XL., T<sub>8</sub>=2 gm of shell seed dresser and T<sub>9</sub>=2 gm. of Merculine.

Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) Incomplete L. Sq. (ii) (a) 3 plots/block, 10 blocks/sq. and 35 sq. (b) N.A. (iii) 9. (iv) (a) and (b) 2.7 m. x 1.8 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 2721 Kg/ha. (ii) 743.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. yield	2757	3110	2304	3026	3064	2623	2982	2709	2845	1790

**Crop :- Maize (Kharif).**

**Ref :- Rj. 60(8), 61(3), 62(4).**

**Site :- Govt. Agri. Farm, Tabiji.**

**Type :- 'D'.**

**Object :-** To study the effect of different levels and formulations of weedicides in the control of weeds in Maize.

### 1. BASAL CONDITIONS :

(i) (a) N.A. for 60(8); Wheat-Maize for others. (b) Wheat. (c) 44.8 Kg/ha. of N for 60(8); 44.8 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for others. (ii) Sandy loam. (iii) 6.7.1960; 9.7.1961; 13.7.1962. (iv) (a) 5 ploughings for 60(8); 3 ploughings for others. (b) N.A. (c) 22 Kg/ha. for 60(8); 18 Kg/ha. for others. (d) 46 cm. for 60(8) and 61 cm. between rows for others. (e) N.A. (v) N.A. (vi) Local for 60(8); Bassi (selected) for others. (vii) Unirrigated for 60(8), 62(4); Irrigated for 61(3). (viii) and (ix) N.A. (x) 1.10.1960; 7.10.1961; 26.10.1962.

### 2. TREATMENTS :

All combinations of (1) and (2) with 2 extra treatments

(1) 4 types of weedicides : W<sub>1</sub>=Sodium salt of 2, 4-D, W<sub>2</sub>=Ethyl ester of 2, 4-D, W<sub>3</sub>=Amine salt of 2, 4-D and W<sub>4</sub>=Sodium salt of M.C.P.A.

(2) 3 levels of weedicides : L<sub>1</sub>=0.56, L<sub>2</sub>=1.12 and L<sub>3</sub>=1.68 Kg/ha. 2 extra treatments tried in 61(3), 62(4) are E<sub>0</sub>=Control and E<sub>1</sub>=Hand weeding. An extra treatment control (2 plots) was tried in expt. no. 60(8).

### 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

### 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 to 1962. (b) No. (c) Results of combined analysis given under 5. Results. (v) and (vi) N.A. (vii) Error variances are homogeneous and the Treatments × years interaction is present.

### 5. RESULTS :

(i) 2310 Kg/ha. (ii) 626.0 Kg/ha. [22 d.f. made up of Treatments × years interaction]. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	Mean
L <sub>1</sub>	2395	2525	2189	2173	2321
L <sub>2</sub>	2331	2217	2304	2155	2252
L <sub>3</sub>	2485	2294	2493	2158	2357
Mean	2404	2345	2329	2162	2310

Av. yield for extra treatments.

	E <sub>0</sub>	E <sub>1</sub>
For 61(3)	1105	2074 Kg/ha.
For 62(4)	3776	4572 Kg/ha.
For 60(8)	Control (2 plots)=881 Kg/ha.	

**Crop :- Maize (Kharif).****Ref :- Rj. 60(4), 61(4), 62(11).****Site :- Govt. Agri. Farm, Tabiji.****Type :- 'D'.**

Object :—To find out the economic method of controlling weeds in Maize.

**1. BASAL CONDITIONS :**

(i) (a) Wheat-Maize. (b) Wheat. (c) 44.8 Kg/ha. of N for 60(4); 44.8 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$  for others. (ii) Sandy loam. (iii) 6.7.1960; 10.7.1961; 13.7.1962. (iv) (a) 3 to 5 ploughings. (b) N.A. (c) 22 Kg/ha. for 60(4); 18 Kg/ha. for 61(4); 9 Kg/ha. for 62(11). (d) 46 to 61 cm. between rows. (e) N.A. (v) N.A. (vi) Local for 60(4); Bassi (selected) for others. (vii) Irrigated. (viii) and (ix) N.A. (x) 1.10.1960; 8.10.1961; 25.10.1962.

**2. TREATMENTS :**

9 weedicidal treatments :  $W_0$ =Control,  $W_1$ =Local method of weeding,  $W_1$ =Pre-emergence spray of weedicides,  $W_3$ =Post-emergence spray of weedicides,  $W_4$ =Post-emergence spray of weedicides (twice),  $W_5$ =Pre-emergence+Post-emergence spray of weedicides,  $W_6$ = $W_1+W_2$ ,  $W_7$ = $W_1+W_3$  and  $W_8$ = $W_1+W_2+W_3$ .

**3. DESIGN :**

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 7.3 m.  $\times$  5.5 m. (b) 5.5 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 to 1962. (b) No. (c) Results of combined analysis given under 5. Results. (v) Udaipur. (vi) Nil. (vii) Error variances are heterogeneous and Treatments  $\times$  years interaction is present.

**5. TREATMENTS :**

(i) 3043 Kg/ha. (ii) 891.2 Kg/ha. [based on 16 d.f. made up of Treatments  $\times$  years interaction.] (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$W_0$	$W_1$	$W_2$	$W_3$	$W_4$	$W_5$	$W_6$	$W_7$	$W_8$
Av. yield	2471	3424	2404	2760	3387	2697	2820	3678	3742

C.D. = 771.3 Kg/ha.

**Crop :- Maize (Kharif).****Ref :- Rj. 60(5).****Site :- Govt. Agri. Farm, Udaipur.****Type :- 'D'.**

Object :—To study the effect of different levels and formulations of weedicides in the control of weeds in Maize.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Wheat. (c) 44.8 Kg/ha. of N. (ii) Clay loam. (iii) 14.7.60. (iv) (a) 4 ploughings. (b) N.A. (c) 22 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) N.A. (vi) Bassi (selected). (vii) Irrigated. (viii) and (ix) N.A. (x) 11.10.60.

**2. TREATMENTS :****Main-plot treatments :**

4 weedicides :  $W_1$ =Sodium Salt of 2, 4—D,  $W_2$ =Ethylester of 2, 4—D,  $W_3$ =Amine salt of 2, 4—D and  $W_4$ =Sodium salt of M.C.P.A.

**Sub-plot treatments :**

5 doses of weedicides :  $D_0$ =0,  $D_1$ =0.56,  $D_2$ =0.84,  $D_3$ =1.12 and  $D_4$ =1.40 Kg/ha. of acid equivalent.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main plots/replication 5 sub-plots/main plot. (b) N.A. (iii) 2. (iv) (a) 7.3 m.  $\times$  5.5 m. (b) 5.5 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1958 to 1962. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1069 Kg/aa. (ii) (a) 445.1Kg/ha. (b) 482.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

$D_0=978$  Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
W <sub>1</sub>	1653	622	1441	1653	1342
W <sub>2</sub>	1215	1243	1342	481	1070
W <sub>3</sub>	1412	1003	988	1144	1137
W <sub>4</sub>	975	368	1074	862	820
Mean	1314	809	1211	1035	1092

**Crop :- Maize (Kharif).**

**Ref :- Rj. 61(7).**

**Site :- Govt. Agri. Farm, Udaipur.**

**Type :- 'D'.**

Object :—To study the effect of different levels and formulations of weedicides in the control of weeds in Maize.

## 1. BASAL CONDITIONS :

(i) (a) Wheat-Maize. (b) Wheat. (c) 44.8 Kg/ha. (ii) Clay loam. (iii) 13.7.61. (iv) (a) 3 ploughings. (b) N.A. (c) 22 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) Malan. (vii) Irrigated. (viii) and (ix) N.A. (x) 5.11.61.

## 2. TREATMENTS :

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

(1) 4 weedicides : W<sub>1</sub>=Sodium salt of 2, 4-D, W<sub>2</sub>=Ethyl Ester of 2, 4-D, W<sub>3</sub>=Amine salt of 2, 4-D and W<sub>4</sub>=Sodium salt of M.C.P.A.

(2) 3 doses of weedicides : D<sub>1</sub>=0.60, D<sub>2</sub>=1.12 and D<sub>3</sub>=1.68 Kg/ha. acid equivalent.

Extra treatments : E<sub>0</sub>=Control and E<sub>1</sub>=Local method of weeding.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (i) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1958-1962. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2135 Kg/ha. (ii) 488.0 Kg/ha. (iii) E effect alone is highly significant. (iv) Av. yield of grain in Kg/ha.

E<sub>0</sub>=1328 Kg/ha. and E<sub>1</sub>=2719 Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	Mean
W <sub>1</sub>	1808	1533	2642	1994
W <sub>2</sub>	2232	2105	2074	2137
W <sub>3</sub>	2232	2218	2353	2268
W <sub>4</sub>	2381	1900	2369	2217
Mean	2163	1939	2359	2154

C.D. for E means=697.1 Kg/ha.



**Crop :- Maize (Kharif).****Ref :- Rj. 64(100)****Site :- Rajasthan College of Agri., Udaipur.****Type :- 'D'.**

Object :- To study the effect of soil applied herbicides on the yield of Maize forage.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) 15.4.64. (iv) (a) Ploughed and cross-ploughed. (b) Drilling. (c) 30 Kg/ha. (d) and (e) N.A. (v) N.A. (vi) Milan. (vii) Unirrigated. (viii) and (ix) N.A. (x) 14.7.64.

**2. TREATMENTS :**

All combinations of (1) and (2) with one control.

(1) 8 herbicidal treatments : H<sub>1</sub>=Sodium salt of 2, 4-D @ 10.0 Kg/ha., H<sub>2</sub>=Sodium salt of 2, 4-D @ 20.0 Kg/ha., H<sub>3</sub>=Sodium salt of 2, 4-D with Borax @ 1.0 Kg/ha., H<sub>4</sub>=Sodium salt of 2, 4-D with Borax @ 2.0 Kg/ha., H<sub>5</sub>=T.C.A. @ 10.0 Kg/ha., H<sub>6</sub>=T.C.A. @ 20.0 Kg/ha., H<sub>7</sub>=Simazine @ 1.8 Kg/ha. and H<sub>8</sub>=Simazine @ 3.6 Kg/ha.(2) 3 times of spraying : T<sub>1</sub>=Pre-planting (one), T<sub>2</sub>=Pre-planting (twice) and T<sub>3</sub>=Pre-mergence.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 25. (b) N.A. (iii) 2. (iv) (a) N.A. (b) 8 m. x 5 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Fair. (ii) Nil. (iii) Yield of grain. (iv) (a) 1954 only. (b) —. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 2251 Kg/ha. (ii) 510.0 Kg/ha. (iii) Main effect of H alone is significant. (iv) Av. yield of grain in Kg/ha.

Control=2110 Kg/ha.

	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	H <sub>5</sub>	H <sub>6</sub>	H <sub>7</sub>	H <sub>8</sub>	Mean
T <sub>1</sub>	2020	2300	1980	1740	2200	2580	2790	2500	2264
T <sub>2</sub>	2060	2290	1860	2290	2110	2620	2350	2480	2257
T <sub>3</sub>	1940	1990	1860	1540	1620	1970	3080	4000	2250
Mean	2007	2193	1900	1857	1977	2390	2740	2993	2257

C.D. for H marginal means=607.6Kg/ha.

**Crop :- Maize (Kharif).****Ref :- Rj. 64(98).****Site :- Rajasthan College of Agri., Udaipur.****Type :- 'D'.**

Object :- To evaluate herbicidal efficiency of a few weedicide in the control of weeds in Maize under varying soil fertility.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Gram. (c) N.A. (ii) Clay loam. (iii) 28.6.64. (iv) (a) Ploughed and cross ploughed. (b) Drilled. (c) 25 Kg/ha. (d) and (e) N.A. (v) 60 Kg/ha. of N as A.S. (vi) Milan. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 7.10.64.

## 2. TREATMENTS :

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

- (1) 6 herbicidal treatments :  $H_0$ =Hand weeding (no herbicide),  $H_1$ =Simazine 1 Kg/ha. ;  $H_2$ =2,4-D Sodium salt 1 Kg/ha.+2, 4-D Amine salt 0.5 Kg/ha.,  $H_3$ =2, 4-D Sodium salt 1 Kg/ha.+P.C.P. 1.5 Kg/ha.,  $H_4$ =T.C.A. 2 Kg/ha.+2, 4-D Amine salt 0.5 Kg/ha. and  $H_5$ =T.C.A. 2 Kg/ha.+P.C.P. 1.5 Kg/ha.
- (2) 3 levels of manures :  $M_0$ =Control (no manure),  $M_1$ =62 Kg/ha. of N+17 Kg/ha. of  $P_2O_5$ +20 Kg/ha. of  $K_2O$  and  $M_2$ =75 Kg/ha. of N+20 Kg/ha. of  $P_2O_5$ +35 Kg/ha. of  $K_2O$ .
- (3) 2 stages of spraying of herbicides :  $C_1$ =Pre-emergence and  $C_2$ =Post-emergence.

## 3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 36. (b) 51.5 m.×85.0 m. (iii) 4. (iv) (a) 9.0 m.×6.0 m. (b) 8.0 m.×5.0 m. (v) 50 cm.×50 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Nil. (iii) Observation on weeds, crop plants, dry matter production, yield of grain and its attributes. (iv) (a) to (c) No. (v) to (vii) Nil.

## 5. RESULTS :

- (i) 1345 Kg/ha. (ii) 298 Kg/ha. (iii) Main effects of H, C, M, and interaction  $H \times C$  are significant. (iv) Av. yield of grain in Kg/ha.

	$H_0$	$H_1$	$H_2$	$H_3$	$H_4$	$H_5$	$C_1$	$C_2$	Mean
$M_0$	1000	1768	938	750	1437	844	1037	1208	1123
$M_1$	1250	2062	964	1156	1318	1031	1280	1314	1297
$M_2$	1750	2462	1344	1438	1312	1381	1435	1793	1614
Mean	1333	2097	1082	1114	1356	1085	1251	1438	1345
$C_1$	854	1758	1184	1124	1354	1229			
$C_2$	1812	2437	979	1104	1358	941			

C.D. for H marginal means =170.7 Kg/ha.  
 C.D. for M marginal means =120.7 Kg/ha.  
 C.D. for C marginal means =98.5 Kg/ha.  
 C.D. for means in the body of  $H \times C$  table =241.4 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 60(14), 61(6), 62(8).**

**Site :- Govt. Agri. Farm, Udaipur.**

**Type :- 'D'.**

**Object :-**To find out the economic way of controlling weeds in Maize.

## 1. BASAL CONDITIONS :

- (i) (a) N.A. for 60 (14), 62 (8) ; Wheat-Maize for 61 (6). (b) Wheat. (c) 44.8 Kg/ha. of N for 60 (14), 62 (8) ; 37 C.L./ha. of F.Y.M. for 62 (8). (ii) Clay loam. (iii) 18.7.60 ; 12.7.61 ; 22.7.62. (iv) (a) 3 to 4 ploughings. (b) N.A. (c) 22 Kg/ha. (d) 30 to 46 cm. between rows. (e) N.A. (v) N.A. (vi) Bassi (selected) for 60 (14) ; Malan for others. (vii) Irrigated for 60 (14) ; Unirrigated for others. (viii) and (ix) N.A. (x) 16.10.60 ; 31.10.61 ; N.A. for 62 (8).

## 2. TREATMENTS :

- 9 methods of controlling weeds :  $W_0$ =Control (unweeded),  $W_1$ =Local method of weeding,  $W_2$ =Pre-emergence application (once),  $W_3$ =Post-emergence application (once),  $W_4$ =Post-emergence application (twice),  $W_5$ =Pre+Post-emergence (once),  $W_6$ =Pre-emergence application+weeding,  $W_7$ =Post emergence +weeding and  $W_8$ =Pre+Post-emergence application+weeding.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. for 60 (14), 61 (6) ; 5.5 m. × 5.5 m. for 62 (8). (b) 5.5 m. × 3.7 m. for all (v) 91 cm. × 91 cm. for 60 (14), 61 (6) ; 91 cm. on either side for 62 (8). (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1959 to 1962. (b) No. (c) Results of combined analysis given under 5. Results. (v) Tabiji. (vi) Nil. (vii) Expt. no. 59 (7) has also been included while giving combined results. Error variances are homogeneous and the Treatments × years interaction is absent.

## 5. RESULTS :

(i) 2141 Kg/ha (ii) 630.9 Kg/ha. (based on 120 d. f. made up of Treatments × years interaction and pooled error). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	W <sub>5</sub>	W <sub>6</sub>	W <sub>7</sub>	W <sub>8</sub>
Av. yield	1724	2496	2041	2172	1967	2169	2311	2021	2369

C.D. = 441.6 Kg/ha.

**Crop :- Maize (Kharif).**

**Ref :- Rj. 60(15), 61(8).**

**Site :- Govt. Agri. Farm, Udaipur.**

**Type :- 'D'.**

Object :- To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Maize.

## 1. BASAL CONDITIONS :

(i) (a) N.A. for 60(15) : Nil for 61(8). (b) Wheat. (c) 44.8 Kg/ha. of N. (ii) Clay loam. (iii) 14.7.1960 ; 12.7.1961. (iv) (a) 3 ploughings. (b) Dibbling. (c) N.A. (d) 46 cm. × 30 cm. (e) 3. (v) N.A. (vi) Malan (vii) Irrigated. (viii) and (ix) N.A. (x) 20.10.1960 ; 28.10.1961.

## 2. TREATMENTS :

8 fungicidal treatments : T<sub>0</sub> = Control, T<sub>1</sub> = 3 gm. of Agrosan G.N., T<sub>2</sub> = 2 gm. of Ceresan, T<sub>3</sub> = 2 gm. of Tillex, T<sub>4</sub> = 2 gm. of Lunasan, T<sub>5</sub> = 2 gm. of Hervasan, T<sub>6</sub> = 3 gm. of Thiram and T<sub>7</sub> = 4 gm. of Sulphur.

Treatments applied per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 4.6 m. × 2.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960 to 1962 (treatment modified in 62). (b) No. (c) Results of combined analysis are given under 5 Results. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is present.

## 5. RESULTS :

(i) 1991 Kg/ha. (ii) 980.9 Kg/ha. [based on 7 d.f. made up of Treatments × years interaction]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	1756	2577	2106	1984	1767	1990	1851	1884

**Crop :- Maize (Kharif).****Ref :- Rj. 62(2).****Site :- Govt. Agri. Farm, Udaipur.****Type :- 'D'.**

Object :- To determine the relative efficiency of seed dressing fungicides in relation to germination and yield of Maize.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Wheat. (c) 44.8 Kg/ha. of N. (ii) Clay loam. (iii) 23.7.62. (iv) (a) 4 ploughings. (b) Dibbling. (c) N.A. (d) 46 cm. x 30 cm. (e) 3. (v) N.A. (vi) Malan. (vii) Unirrigated. (viii) and (ix) N.A. (x) 5.11.62.

**2. TREATMENTS :**

8 fungicidal treatments :  $T_0$  = Control,  $T_1$  = 3 gm. of Agrosan G.N.,  $T_2$  = 2 gm. of Ceresan,  $T_3$  = 2 gm. of Tillex,  $T_4$  = 2 gm. of Lunasan,  $T_5$  = 2 gm. of Hervasan,  $T_6$  = 3 gm. of Thiram and  $T_7$  = 2 gm. of Beej powder.

**3. DESIGN: and 4. GENERAL :**

Same as in Expt. No. 60(15) on page no. 220.

**5. RESULTS :**

(i) 3843 Kg/ha. (ii) 625.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield	3394	3858	3941	4107	4114	3684	3836	3812

**Crop :- Gram (Rabi).****Ref :- Rj. 64(75).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 11.10.64. (iv) (a) 5 ploughings and planking. (b) Line sowing. (c) 56 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) R.S. 10. (vii) Irrigated. (viii) Nil. (ix) Negligible. (x) 1; 2.4.65.

**2. TREATMENTS :**

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

(1) 2 levels of N as A/S :  $N_0$  = 0 and  $N_1$  = 22.4 Kg/ha.

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

(3) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0$  = 0 and  $K_1$  = 22.4 Kg/ha.

**3. DESIGN :**

(i)  $3 \times 2^2$  confd. (ii) (a) 6 plots/block; 2 blocks/replication. (b) N.A. (iii) 3. (iv) (a) 9.2 m. x 5.5 m. (b) 7.4 m. x 3.7 m. (v) 91 cm. x 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964 contd. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 1895 Kg/ha. (ii) 404.1 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of grain in Kg/ha.

## 2. TREATMENTS :

## Main-plot treatments :

3 methods of application :  $M_1$ =Full dose as soil application,  $M_2$ =Half as soil + half as foliar and  $M_3$ = Full dose as foliar in two splits.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of N :  $N_0=0$  and  $N_1=18.5$  Kg/ha.

(2) 3 levels of P :  $P_0=0$ ,  $P_1=18.5$  and  $P_2=37.1$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.5 m.  $\times$  3.7 m. (b) 4.9 m.  $\times$  3.1 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964—contd. (treatments modified). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2195 Kg/ha. (ii) (a) 341.8 Kg/ha. (b) 338.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$M_1$	$M_2$	$M_3$	$N_0$	$N_1$	Mean
$P_0$	2318	2168	1963	2147	2150	2149
$P_1$	2206	2157	2325	2152	2189	2229
$P_2$	2129	2366	2124	2309	2222	2206
Mean	2217	2230	2137	2202	2187	2195
$N_0$	2377	2193	2037			
$N_1$	2057	2267	2237			

**Crop :- Gram (Rabi).**

**Ref :- Rj. 63(63).**

**Site :- Govt. Agri. Res. Farm, Sriganaganar.**

**Type :- 'M'.**

Object :- To study the effect of N, P and molybdenum on the yield of gram.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 31.10.63. (iv) (a) Ploughing. (b) Drilling. (c) 62 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) R.S.—10. (vii) Irrigated. (viii) 2 weeding. (ix) N.A. (x) 6.4.64.

## 2. TREATMENTS :

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

(1) 2 levels of molybdenum :  $M_0=0$  and  $M_1=1.1$  Kg/ha.

(2) 3 levels of N :  $N_0=0$ ,  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.

(3) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

## 3. DESIGN :

(i)  $3^2 \times 2$  Fact. confd. (ii) 6 plots/block, 3 blocks/replication. (b) N.A. (iii) 4. (iv) (a) 5.5 m.  $\times$  3.7 m. (b) 4.9 m.  $\times$  3.1 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1952—1954 (b) No. (c) Nil. (v) to (vii) Nil.

**RESULTS :**

(i) 948 Kg/ha. (ii) 218.0 Kg/ha. (iii) Main effect of P is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
M <sub>0</sub>	775	979	946	764	813	1124	900
M <sub>1</sub>	1013	1044	928	846	1003	1136	995
Mean	894	1012	937	805	908	1130	948
P <sub>0</sub>	616	858	942				
P <sub>1</sub>	897	1019	807				
P <sub>2</sub>	1169	1158	1063				

C.D. for P marginal means=126.9 Kg/ha.

**Crop :- Gram (Rabi).**

**Ref :- Rj. 64(52).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'M'.**

Object :—To study the effect of N and P with and without molybdenum on Gram.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 27.10.64. (iv) (a) 2 ploughings. (b) Drilling. (c) 62 Kg/ha. (d) 30 cm. between rows. (v) Nil. (vi) R.S—10. (vii) Irrigated. (viii) 2 hand hoeings. (ix) N.A. (x) 5.4.65.

**2. TREATMENTS :**

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

- (1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=18.5 and N<sub>2</sub>=37.1 Kg/ha.  
 (2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=37.1 and P<sub>2</sub>=74.1 Kg/ha.  
 (3) 2 levels of Molybdenum : M<sub>0</sub>=0 and M<sub>1</sub>=1.2 Kg/ha.

**3. DESIGN and 4. GENERAL :**

Same as in expt. no. 63(63) on page no. 224.

**5. RESULTS :**

(i) 1963 Kg/ha. (ii) 312.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
M <sub>0</sub>	1950	1890	1929	1919	1931	1920	1923
M <sub>1</sub>	2099	1920	1991	2055	1936	2019	2003
Mean	2025	1905	1960	1987	1934	1970	1963
P <sub>0</sub>	2009	1964	1987				
P <sub>1</sub>	2076	1778	1947				
P <sub>2</sub>	1989	1974	1947				

**Crop :- Gram (Rabi).****Ref :- Rj. 62(76).****Site :- Govt. Agri. Res. Farm, Sultanpur.****Type :- 'M'.**

Object :—To study the effect of split application of different levels of P on Gram.

**1. BASAL CONDITIONS :**

(i) (a) to (c) Nil. (ii) (a) Black cotton soil. (b) N.A. (iii) 21.10.62. (iv) 2 bakherings and 2 ploughings with desi plough. (b) Behind the plough. (c) 74 Kg/ha. (d) 30 cm between rows. (e) N.A. (v) Nil. (vi) RS.—10. (vii) Irrigated. (viii) Hoeing. (ix) N.A. (x) 1st week of April, 63.

**2. TREATMENTS :****Main-plot treatments :**3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.**Sub-plot treatments :**

10 methods of applications :  $M_1$ =Full dose at sowing by broadcast,  $M_2$ =Full dose at sowing by drilling,  $M_3$ =Half at sowing by broadcast +half as top dressing,  $M_4$ =Half at sowing by drilling +half as top dressing,  $M_5$ = $\frac{1}{2}$  dose at sowing by broadcast + $\frac{1}{2}$  as top dressing,  $M_6$ = $\frac{1}{2}$  dose at sowing by drilling + $\frac{1}{2}$  as top dressing,  $M_7$ = $\frac{1}{2}$  dose at sowing by broadcast + $\frac{1}{2}$  as top dressing,  $M_8$ = $\frac{1}{2}$  dose at sowing by drilling + $\frac{1}{2}$  as top dressing,  $M_9$ = $\frac{1}{2}$  dose at sowing by broadcast + $\frac{1}{2}$  as top dressing after a month + $\frac{1}{2}$  as top dressing at flowering and  $M_{10}$ = $\frac{1}{2}$  at sowing by drilling + $\frac{1}{2}$  as top dressing after a month + $\frac{1}{2}$  as top dressing at flowering.

**3. DESIGN :**

(i) Split-plot, (ii) (a) 3 main-plots/replication, 10 sub-plots/main-plot. (b) Nil. (iii) 4. (iv) (a) 3.1 m.  $\times$  2.4 m. (b) 2.4 m  $\times$  1.8 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—contd. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 1466 Kg/ha. (ii) (a) 505.0 Kg/ha. (b) 236.4 Kg/ha. (iii) Main effect of P and interaction  $P \times M$  are highly significant and main effect of M is significant. (iv) Av. yield of grain in Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$	$M_8$	$M_9$	$M_{10}$	Mean
$P_0$	—	—	—	—	—	—	—	—	—	—	1054
$P_1$	1486	1374	1626	1738	1934	1514	1514	1289	1388	1542	1540
$P_2$	1822	2186	1626	1766	1570	1682	1724	1878	2046	1724	1802
Mean	1654	1780	1626	1752	1752	1598	1619	1584	1717	1633	

C.D. for P marginal means = 276.3 Kg/ha.

C.D. for M marginal means = 192.4 Kg/ha.

C.D. for M means at the same level of P = 333.2 Kg/ha.

C.D. for P means at the same level of M = 417.6 Kg/ha.

**Crop :- Gram (Rabi).****Ref :- Rj. 60(73)****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'MV'.**

Object :—To study the effect of different levels of N and P on different varieties of Gram.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) 22.4 Kg/ha. of N as A/S. (ii) Clay loam. (iii) 7.10.60. (iv) (a) 3 ploughings. (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) 1 weeding. (ix) and (x) N.A.

## 2. TREATMENTS :

## Main-plot treatments :

3 varieties :  $V_1$ =R.S. 10,  $V_2$ =Kabuli and  $V_3$ =Local.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of  $P_2O_5$ :  $P_0=0$ ,  $P_1=16.8$  and  $P_2=33.6$  Kg/ha.

(2) 2 levels of N :  $N_0=0$  and  $N_1=16.8$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 10.1 m  $\times$  5.0 m. (b) 9.6 m.  $\times$  4.3 m. (v) 22 cm.  $\times$  38 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—1962 (Treatments modified from 1961). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 717 Kg/ha. (ii) (a) 230.4 Kg/ha. (b) 118.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$V_1$	$V_2$	$V_3$	$N_0$	$N_1$	Mean
$P_0$	714	755	606	681	703	692
$P_1$	794	833	656	769	754	761
$P_2$	741	774	576	696	698	697
Mean	750	787	613	715	718	717
$N_0$	775	780	590			
$N_1$	724	795	635			

**Crop :- Gram (*Rabi*).**

**Ref :- Rj. 61(104), 62(67).**

**Site :- Govt. Agri. Farm, Borekhera.**

**Type :- 'MV'.**

Object :- To find out the effect of different levels of N, P and K on the yield of different varieties of Gram.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Fallow. (c) N.A. (ii) Clay loam. (iii) 26.10.1961 ; 12.10.1962. (iv) (a) 1 ploughing and 2 bakherings. (b) Drilling. (c) 56 Kg/ha for  $V_1$  and  $V_2$  and 34 Kg/ha. for  $V_3$  for 61(104) ; 67 Kg/ha. for 62(67). (d) 30 cm. between rows. (e) —. (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) Nil for 61(104) ; weedings for 62(67). (ix) N.A. (x) N.A. for 61(104) ; 26.3.63 for 62(67).

## 2. TREATMENTS :

## Main-plot treatments :

3 varieties :  $V_1$ =R.S.—10 ;  $V_2$ =Local and  $V_3$ =Kabuli.

## Sub-plot treatments :

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

(1) 2 levels of N :  $N_0=0$ ,  $N_1=33.6$  Kg/ha.

(2) 3 levels of  $P_2O_5$  :  $P_0=0$  ;  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

(3) 3 levels of  $K_2O$  :  $K_0=0$ ,  $K_1=33.6$  and  $K_2=67.2$  Kg/ha.



## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 18 sub-plots/main-plots. (b) N.A. (iii) 2 for 61(104) ; 4 for 62(67). (iv) 4.9 m. × 3.1 m. for 61(104) ; 4.9 m. × 2.4 m. for 62(17). (b) 4.3 m. × 2.4 m. (v) 30 cm. × 30 cm. for 61(104) and 62(67). (vi) Yes.

## 4. GENERAL

(i) Germination and growth affected by low temperatures and clouds for 61(104) ; N.A. for 62(67). (ii) White ant attack observed for 61(104) , N.A. for 62(67). (iii) Yield of grain. (iv) 1960 to 1962. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

## 5. RESULTS :

## 61(104)

(i) 1545 Kg/ha. (ii) (a) 52.8 Kg/ha. (b) 153.1 Kg/ha. (iii) Main effects of V, N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	1376	1639	1197	1380	1417	1416	1127	1519	1567	1404
N <sub>1</sub>	1649	2030	1379	1642	1743	1672	1477	1827	1753	1686
Mean	1513	1835	1288	1511	1580	1544	1303	1673	1660	1545
P <sub>0</sub>	288	1470	1151	1260	1309	1339				
P <sub>1</sub>	1652	2024	1344	1642	1711	1665				
P <sub>2</sub>	1599	2010	1370	1632	1720	1627				
K <sub>0</sub>	1456	1840	1237							
K <sub>1</sub>	1539	1844	1354							
K <sub>2</sub>	1543	1816	1273							

C.D. for V marginal means=53.4 Kg/ha.

C.D. for N marginal means=59.3 Kg/ha.

C.D. for P marginal means=72.6 Kg/ha.

## 62(67)

(i) 1374 Kg/ha. (ii) (a) 234.5 Kg/ha. (b) 254.7 Kg/ha. (iii) Main effects of V, N, P are highly significant. Interaction N × P is significant. (iv) Av. yield grain in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	1236	1393	934	1991	1213	1209	934	1289	1390	1204
N <sub>1</sub>	1644	1779	1209	1488	1606	1539	1343	1722	1566	1544
Mean	1440	1586	1097	1340	1409	1374	1139	1506	1478	1374
P <sub>0</sub>	1185	1288	943	1125	1143	1148				
P <sub>1</sub>	1544	1791	1184	1455	1561	1502				
P <sub>2</sub>	1590	1680	1163	1439	1522	1473				
K <sub>0</sub>	1367	1623	1029							
K <sub>1</sub>	1518	1568	1141							
K <sub>2</sub>	1435	1568	1120							

C.D. for V marginal means=95.7 Kg/ha.

C.D. for N marginal means=68.0 Kg/ha.

C.D. for P marginal means=83.1 Kg/ha.

C.D. for means in the body of (N×P) table=117.5 Kg/ha.

**Crop :- Gram (Rabi).**

**Ref :- Rj. 63(79).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'C'.**

Object :—To study the effect of different isolates of Rhyzobia on the growth and yield of Gram.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 14.11.63. (iv) (a) Ploughings. (b) Behind the plough. (c) 37Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) 22.4 Kg/ha. of  $P_2O_5$ . (vi) Local. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) 20.4.64.

**2. TREATMENTS :**

6 seed culture treatments :  $T_0$ =Control,  $T_1$ =Rhyzobium Kota,  $T_2$ =Rhyzobium Sriganganagar,  $T_3$ =Rhyzobium Ajmer,  $T_4$ =Rhyzobium Durgapura and  $T_5$ =Rhyzobium IARI.

**3. DESIGN :**

(i) B.I.B.D. (ii) (a) 2 plots/block ; 15 blocks. (b) N.A. (iii) 5. (iv) (a) and (b) 7.3 m.×5.5 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Very good. (ii) Mild effect of rust. (iii) Yield of grain and fodder. (iv) (a) 1963 only. (b) No. (c) Nil. (v) Durgapura, Mandore, Sriganganagar and Kota. (vi) Heavy frost. (vii) Nil.

**5. RESULTS :**

(ii) 2081 Kg/ha. (ii) 217.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av.yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Av. yield.	1861	2287	2011	2119	2272	1936

**Crop :- Gram (Rabi).**

**Ref - Rj. 62(46).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'CV'.**

Object :—To find out suitable variety and period of sowing for Gram under Rajasthan canal conditions.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 2 ploughings. (b) Drilling. (c) 37 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 1, 9 and 17.4.63.

**2. TREATMENTS :**

**Main-plot treatments :**

3 dates of sowing :  $D_1$ =5.10.1962,  $D_2$ =26.10.1962 and  $D_3$ =16.11.1962.

**Sub-plot treatments :**

3 varieties :  $V_1$ =Kabuli,  $V_2$ =R.S. 10 and  $V_3$ =Local.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.2 m.×4.0 m. (b) 8.4 m.×3.4 m. (v) 41 cm.×30 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and *Bhusa*. (iv) to (vii) N.A.

## 5. RESULTS :

(i) 2643 Kg/ha. (ii) (a) 1541.2 Kg/ha. (b) 859.7 Kg/ha. (iii) Main effect of D alone is significant. (iv) Av. yield of grain in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	Mean
D <sub>1</sub>	2555	3367	3049	2990
D <sub>2</sub>	3058	3853	3596	3503
D <sub>3</sub>	909	1869	1533	1437
Mean	2174	3030	2726	2643

C.D. for D marginal means=1539.4 Kg/ha.

**Crop :- Gram (*Rabi*).**

**Ref :- Rj. 63(36), 64(55).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'CM'.**

Object :—To study the effect of different dates of sowing, seed rates and levels of N and P on the yield of Gram.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. for 63(36); Fallow for 64(55). (c) N.A. for 63(36); Nil for 64(55). (ii) Sandy loam. (iii) As per treatments. (iv) (a) Ploughings with *desi* plough and tractor. (b) Drilling for 63(36); Behind the plough for 64(55). (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) N.A. for 63(36); Nil for 64(55). (vi) R.S. 10. (vii) Irrigated. (viii) 2 weedings for 63(36); 2 hoeings for 64(55);. (ix) N.A. for 63(36); 1 cm. for 64(55). (x) 8.4.1964; 30.3.1965 and 23.4.65.

## 2. TREATMENTS :

**Main-plot treatments :**

3 dates of sowing : D<sub>1</sub>=1st week of Oct., D<sub>2</sub>=3rd week of Oct. and D<sub>3</sub>=2nd week of November.

**Sub-plot treatments :**

3 seed rates : S<sub>1</sub>=37, S<sub>2</sub>=62 and S<sub>3</sub>=86 Kg/ha.

**Sub-sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of N : N<sub>0</sub>=0 and N<sub>1</sub>=37.1 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=37.1 and P<sub>2</sub>=74.1 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot, 6 sub-sub-plots/sub-plot. (b) N.A. (iii) 2. (iv) (a) 5.5 m. × 3.7 m. (b) 4.9 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963 to 1964. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

## 5. RESULTS :

63 36)

(i) 2021 Kg/ha. (ii) (a) 1155.0 Kg/ha. (b) 567.0 Kg/ha. (c) 439.0 Kg/ha. (iii) Main effect of P alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	2072	1852	2022	1917	1983	2046	1598	2039	2310	1982
N <sub>1</sub>	2044	1970	2164	2029	1973	2175	1970	2003	2205	2059
Mean	2058	1911	2093	1973	1978	2011	1784	2021	2257	2021
P <sub>0</sub>	1685	1833	1833	1867	1659	1825				
P <sub>1</sub>	2105	1900	2057	1858	2097	2108				
P <sub>2</sub>	2385	1999	2388	2195	2178	2399				
S <sub>1</sub>	1931	2055	1934							
S <sub>2</sub>	2150	1755	2029							
S <sub>3</sub>	2094	1923	2315							

C.D. for P marginal means=208.7 Kg/ha.

64(55)

(i) 1292 Kg/ha. (ii) (a) 300.6 Kg/ha. (b) 232.2 Kg/ha. (c) 293.7 Kg/ha. (iii) Main effect of D alone is significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	1345	1435	1046	1168	1332	1326	1250	1256	1320	1275
N <sub>1</sub>	1486	1467	974	1303	1325	1298	1378	1276	1273	1309
Mean	1415	1451	1010	1235	1328	1312	1314	1266	1296	1292
P <sub>0</sub>	1381	1474	1088	1294	1305	1344				
P <sub>1</sub>	1427	1521	849	1205	1306	1286				
P <sub>2</sub>	1438	1357	1093	1206	1375	1307				
S <sub>1</sub>	1453	1325	928							
S <sub>2</sub>	1441	1529	1015							
S <sub>3</sub>	1351	1498	1088							

C.D. for D marginal means=304.6 Kg/ha.

**Crop :- Gram (Rabi).**

**Ref :- Rj. 61(91).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'CMV'.**

**Object :-** To study the effect of different levels of P and different stages of tapping on Gram varieties.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) *Jowar*. (c) Nil. (ii) Clay loam. (iii) 20.10.61. (iv) (a) 1 ploughing and 2 bakherings. (b) Drilling. (c) 56 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Un-irrigated. (viii) Nil. (ix) and (x) N.A.

**2. TREATMENTS :**

**Main-plot treatments :**

(1) 3 stages of topping : T<sub>0</sub>=Control (no topping), T<sub>1</sub>=Topping after 40 days and T<sub>2</sub>=Topping after 60 days.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 varieties of Gram :  $V_1$ =Local and  $V_2$ =R.S. 10.(2) 4 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=16.8$ ,  $P_2=33.6$  and  $P_3=50.4$  Kg/ha.**3. DESIGN :**(i) Split-plot. (ii) (a) 3 main-plots/replication, 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 7.3 m.  $\times$  5.5 m. (v) N.A. (vi) Yes.**4. GENERAL :**

(i) Low temperature and clouds affected the crop adversely. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1963 [design changed in 1962]. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 340 Kg/ha. (ii) (a) 60.7 Kg/ha. (b) 63.8 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	$P_3$	$T_0$	$T_1$	$T_2$	Mean
$V_1$	272	319	365	360	343	322	322	329
$V_2$	304	337	393	370	363	346	344	351
Mean	288	328	379	365	353	334	333	340
$T_0$	300	342	418	352				
$T_1$	295	312	369	360				
$T_2$	269	330	350	383				

C.D. for P marginal means=36.8 Kg/ha.

**Crop :- Gram (Rabi).****Ref :- Rj. 62(58), 63(49).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'CMV'.**

Object :- To find out the effect of different levels of phosphates in topping on different varieties of Gram.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 13.10.1962; 15.10.1963. (iv) (a) 1 ploughing and 2 to 3 bakherings. (b) Drilling. (c) 67 to 74 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. for 62(58); Nil for 63(49). (vi) As per treatments. (vii) Unirrigated. (viii) 1 weeding for 62(58); Nil for other. (ix) N.A. for 62(58); 140 cm. for 63(49). (x) 8.3.1963 : 24.3.1964.

**2. TREATMENTS :****Main-plot treatments :**3 stages of topping :  $T_0$ =Control (no topping),  $T_1$ =Topping after 40 days and  $T_2$ =Topping after 60 days.**Sub-plot treatments :**2 varieties :  $V_1$ =Local and  $V_2$ =R.S. 10.**Sub-sub plot treatments :**4 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=16.8$ ,  $P_2=33.6$  and  $P_3=50.4$  Kg/ha.**3. DESIGN :**(i) Split-plot. (ii) (a) 3 main-plots/replication ; 2 sub-plots/main-plot; 4 sub-sub-plots sub-plot. (b) N.A. (iii) 4. (iv) (a) 8.0 m.  $\times$  6.1 m. (b) 7.4 m.  $\times$  5.5 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.**4. GENERAL :**

(i) Normal. (ii) N.A. (iii) Yield of grain. (iv) (a) 1961-1963 [Design changed in 62]. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are spreented under 5. Results.

## 5. RESULTS :

62(58)

(i) 820 Kg/ha. (ii) (a) 280.7 Kg/ha. (b) 362.0 Kg/ha. (c) 832.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	Mean
V <sub>1</sub>	746	786	935	912	817	879	839	845
V <sub>2</sub>	621	809	874	876	786	798	801	795
Mean	684	797	904	894	801	838	820	820
T <sub>0</sub>	686	783	874	861				
T <sub>1</sub>	728	832	910	883				
T <sub>2</sub>	637	777	929	938				

63(49)

(i) 944 Kg/ha. (ii) (a) 99.7 Kg/ha. (b) 183.0 Kg/ha. (c) 132.0 Kg/ha. (iii) Main effect of P alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	Mean
V <sub>1</sub>	692	932	1186	1092	936	1012	978	975
V <sub>2</sub>	725	878	1057	992	879	941	920	913
Mean	708	905	1122	1042	908	976	949	844
T <sub>0</sub>	713	849	1050	1019				
T <sub>1</sub>	731	961	1176	1036				
T <sub>2</sub>	681	905	1139	1071				

C.D. for P marginal means = 76.5 Kg/ha.

**Crop :- Gram (Rabi).**

**Ref :- Rj. 63(65).**

**Site :- Govt. Agri. Res. Farm, Sriganagar.**

**Type :- 'IM'.**

Object :- To study the effect of different levels of P and irrigation on Gram.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 15.10.63. (iv) (a) Nil. (b) Drilling. (c) 56 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) Nil. (vi) R.S.-10. (vii) As per treatments. (viii) 2 weedings. (ix) N.A. (x) 27.3.64.

## 2. TREATMENTS :

## Main-plot treatments :

7 irrigational treatments : I<sub>0</sub>=No irrigation, I<sub>1</sub>=One irrigation after 1½ months, I<sub>2</sub>=2 irrigations 1st after 1½ and 2nd at flowering stage, I<sub>3</sub>=1 irrigation at flowering stage, I<sub>4</sub>=3 irrigations 1st after 1½ months, 2nd at flowering stage and 3rd at seed formation stage, I<sub>5</sub>=1 irrigation at seed formation stage, I<sub>6</sub>=2 irrigations 1st after 1½ months and 2nd at seed formation stage.

## Sub-plot treatments :

3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=37.1 and P<sub>2</sub>=74.1 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 7 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m. × 4.6 m. (b) 4.3 m. × 3.4 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963-65 (modified in 1964). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1514 Kg/ha. (ii) (a) 276.0 Kg/ha. (b) 222.0 Kg/ha. (iii) Main effects of I and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	Mean
P <sub>0</sub>	815	1165	1468	1095	1375	746	1666	1190
P <sub>1</sub>	1072	1724	1841	1514	2213	1142	2143	1664
P <sub>2</sub>	1433	1677	1945	1631	2097	955	2074	1687
Mean	1107	1522	1751	1413	1895	948	1961	1514

C.D. for I marginal means=283.5 Kg/ha.

C.D. for P marginal means=140.3 Kg/ha.

**Crop :- Gram (Rabi).**

**Ref :- Rj. 64(53), 65(32).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'IM'.**

Object :- To study the effect of irrigations and different levels of P on the yield of Gram.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 27.10.64 ; 27.10.65. (iv) (a) 1 to 2 ploughings. (b) Drilling for 64 (53) ; Behind the plough for 65 (32). (c) 37 Kg/ha. for 64 (53) ; 62 Kg/ha. for 65(32). (d) 30 cm. × 15 cm. (e) N.A. (v) 18.5 Kg/ha. of N. (vi) R.S.-10. (vii) As per treatments. (viii) 2 hand hoeings. (ix) N.A. (x) 8.4.65 ; 28.3.66.

## 2. TREATMENTS :

**Main-plot treatments :**

8 irrigational treatments : I<sub>0</sub>=No irrigation, I<sub>1</sub>=One irrigation after 45 days and the 2nd at flowering stage, I<sub>2</sub>=One irrigation at flowering stage, I<sub>3</sub>=One irrigation after 45 days at 2nd and flowering stage and 3rd at seed formation, I<sub>4</sub>=One irrigation at seed formation, I<sub>5</sub>=One irrigation after 45 days and 2nd at seed formation and I<sub>6</sub>=One irrigation at flowering and 2nd at seed formation.

**Sub-plot treatments :**

3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=37.1 and P<sub>2</sub>=74.1 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 8 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m. × 3.7 m. for 64 (53) ; 5.5 m. × 5.5 m. for 65 (32). (b) 4.9 m. × 2.7 m. for 64 (53) ; 4.9 m. × 4.6 m. for 65(32). (v) 30 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) N.A. for 64 (53) ; Nil for 65(32). (iii) Yield of grain. (iv) (a) 1963 to 1965 (modified in 64). (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Both the error variances are homogeneous and main and sub-plot Treatments × years interaction is absent.

## 5. RESULTS :

(i) 1444 Kg/ha. (ii) (a) 338.6 Kg/ha. (based on 35 d. f. made up of Treatments×years interaction and pooled error). (b) 299.5 Kg/ha. (based on 80 d. f. made up of various components of Treatments×years interaction and pooled error). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	I <sub>7</sub>	Mean
P <sub>0</sub>	1066	1400	1435	1402	1505	1054	1577	1409	1356
P <sub>1</sub>	1104	1628	1742	1573	1667	1179	1847	1352	1511
P <sub>2</sub>	976	1374	1515	1470	1922	1235	1864	1366	1465
Mean	1049	1467	1564	1482	1698	1156	1763	1376	1444

**Crop :- Moth (Kharif).**

[Ref :- Rj. 64(26).

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'CMV'**

**Object :-** To study the response of different levels of P and row spacings on the yield of different varieties of Moth.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) N.A. (iv) (a) One summer ploughing and one ploughing at the time of sowing and 2 times cultivation. (b) N.A. (c) 11 Kg/ha. (d) As per treatments. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) 1 weeding. (ix) 20 cm. (x) 21.10.64.

## 2. TREATMENTS :

**Main-plot treatments :**

3 spacings between rows : S<sub>1</sub>=46 cm., S<sub>2</sub>=61 cm. and S<sub>3</sub>=91 cm.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

(2) 2 varieties : V<sub>1</sub>=B19-54 and V<sub>2</sub>=Local.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) and (b) 5.5 m. × 3.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Stand, height, no. of leaves, no. of branches and yield of grain and fodder. (iv) (a) 1964 only. (b) No. (c) N.A. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 112 Kg/ha. (ii) (a) 40.2 Kg/ha. (b) 23.9 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
V <sub>1</sub>	94	94	98	102	93	90	95
V <sub>2</sub>	118	133	134	129	125	132	129
Mean	106	114	116	116	109	111	112
P <sub>0</sub>	114	113	118				
P <sub>1</sub>	97	117	113				
P <sub>2</sub>	105	111	118				

C.D. for V marginal means=17.0 Kg/ha.



**Crop :- Moong (Kharif).****Ref :- Rj. 64(25).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'MV'.**

Object :—To study the effect of different levels of P on different varieties of Moong.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) N.A. (iv) (a) 2 ploughings and 2 cultivations at the time of sowing. (b) Dibbling. (c) 15 Kg/ha. (d) 61 cm. between rows. (e) 3. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) 2 weedings. (ix) 20 cm. (x) 28.9.64.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 3 varieties of Moong :  $V_1$ =R.S. 4,  $V_2$ =China Moong and  $V_3$ =Local.(2) 4 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=16.8$ ,  $P_2=33.6$  and  $P_3=50.4$  Kg/ha.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 5.5 m. × 3.7 m. (b) 4.9 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Yield of grain and fodder ; stand, height, no. of branches/plant, no. of leaves/plant. (iv) (a) 1964 only. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 181 Kg/ha. (ii) 148.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$P_0$	$P_1$	$P_2$	$P_3$	Mean
$V_1$	84	73	160	166	121
$V_2$	171	187	150	259	192
$V_3$	274	231	163	256	231
Mean	176	164	158	227	181

**Crop :- Moong (Kharif).****Ref :- Rj. 65(17).****Site :- Govt. Agri. Farm, Durgapura.****Type :- 'CM'.**

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

**1. BASAL CONDITIONS :**

(i) (a) No. (b) Barley. (c) N.A. (ii) Sandy loam (iii) 23.7.65. (iv) (a) 2 ploughings. (b) Behind the plough. (c) 15 kg/ha. (d) As per treatments × 10 cm. between plants. (e) N.A. (v) N.A. (vi) R.S.—4. (vii) Irrigated. (viii) One hand weeding with *khurpi*. (ix) N.A. (x) 18.10.65.

**2. TREATMENTS :****Main-plot treatments :**3 spacings between rows :  $S_1=30$ ,  $S_2=46$  and  $S_3=61$  cm.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of N :  $N_0=0$ ,  $N_1=11.2$  and  $N_2=22.4$  Kg/ha.(2) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.5 m. (b) 6.4 m. × 4.6 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Hairy caterpillar, hand picking and dusting of D.D.T. (iii) Growth observations and yield of grain. (iv) (a) 1965—N.A. (b) No. (c) Nil. (v) (a) No. (b) Nil. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 267 kg/ha. (ii) (a) 389.2 Kg/ha, (b), 116.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>
N <sub>0</sub>	244	374	182	267	231	260	309
N <sub>1</sub>	268	307	194	257	231	269	270
N <sub>2</sub>	219	333	280	277	261	312	252
Mean	244	338	219	267	243	280	277
P <sub>0</sub>	231	310	189				
P <sub>1</sub>	247	364	229				
P <sub>2</sub>	254	340	237				

Crop :- Moong. (*Kharif*).

Ref :- Rj. 60(6).

Site :- Govt. Agri. Farm, Bassi.

Type :- 'D'.

Object :—To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Moong.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) *Moong*. (c) Nil. (ii) 1 sandy. (iii) 9.7.60. (iv) (a) 4 ploughings. (b) Dibbling. (c) 4 Kg/ha. (d) 46 cm. between rows. (e) 1. (v) N.A. (vi) R.S—4. (vii) Unirrigated. (viii) Weeding and thinning. (ix) N.A. (x) 27.10.60.

## 2. TREATMENTS :

8 fungicidal treatments : T<sub>0</sub> Control, T<sub>1</sub>=3.8 gm., of Agrosan G.N., T<sub>2</sub>=2.8 gm. of cerasan, T<sub>3</sub>=2 gm. of Tillex, T<sub>4</sub>=2 gm. of Lunasan, T<sub>5</sub>=2 gm. of Hervasan, T<sub>6</sub>=3 gm. of Fernasan and T<sub>7</sub>=4 gm. of sulphur.

Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) 6.1 m. × 1.8 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960—contd. (Treatments modified). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 313 Kg/ha. (ii) 113.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment.	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield.	242	309	326	364	326	305	356	280.

**Crop :- Moong. (Kharif).****Ref :- Rf. 61(10).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'D'.**

Object :—To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Moong.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Fallow. (c) N.A. (ii) Sandy loam. (iii) 18.7.61. (iv) (a) 4 ploughings. (b) Dibbling. (c) 4 Kg/ha. (d) 46 cm. between rows. (e) 1. (v) N.A. (vi) R.S—4. (vii) Unirrigated. (viii) Weeding and thinning. (ix) N.A. (x) 24.10.61.

**2. TREATMENTS :**

8 fungicidal treatments :  $T_0$ =Control,  $T_1$ =3 gm. of Agrosan,  $T_2$ =2 gm. of cerasan,  $T_3$ =2 gm. of Tillex,  $T_4$ =2 gm. of Lunasan,  $T_5$ =2 gm. of Hervasan,  $T_6$ =3 gm. of Thiram and  $T_7$ =4 gm. of sulphur.

Treatments applied to per Kg. of seed as dressing.

**3. DESIGN : and 4. GENERAL :**

Same as in expt. no. 60(6) on page 237.

**5. RESULTS :**

(i) 254 Kg/ha. (ii) 59.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment.	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield.	217	228	240	269	257	285	250	285

**Crop :- Moong (Kharif).****Ref :- Rj. 62(6).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'D'.**

Object :—To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Moong.

**1. BASAL CONDITIONS :**

(i) (a) Fallow—Gram—Moong. (b) Gram. (c) Nil. (ii) Sandy loam. (iii) 22.7.62. (iv) (a) 3 ploughings. (b) Dibbling. (c) 4 Kg/ha. (d) 46 cm. × 30 cm. (e) 1. (v) N.A. (vi) R.S—4. (vii) Unirrigated. (viii) Weeding and thinning. (ix) N.A. (x) 30.10.62.

**2. TREATMENTS :**

8 fungicidal treatments :  $T_0$ =Control,  $T_1$ =3 gm. of Agrosan G.N.  $T_2$ =2 gm. of cerasan,  $T_3$ =2 gm. of Tillex,  $T_4$ =2 gm. of Lunasan,  $T_5$ =2 gm. of Hervasan,  $T_6$ =3 gm. of Thiram and  $T_7$ =2 gm. of Beej powder.

Treatments applied to per Kg. of seed as dressing.

**3. DESIGN : and 4. GENERAL :**

Same as in expt. no. 60(6) on page 237.

**5. RESULTS :**

(i) 1484 Kg/ha. (ii) 152.5 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment.	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield.	1393	1473	1421	1508	1648	1386	1614	1430

C.D.=178.6 Kg/ha.

**Crop :- Moong. (Kharif).****Ref :- Rj. 63(70).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'D'.**

**Object :-**To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Moong.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 2.9.63. (iv) (a) 4 ploughings. (b) Dibbling (c) 4 Kg/ha. (d) 46 cm. x 23 cm. (e) 1. (v) N.A. (vi) R.S.—4. (vii) Unirrigated. (viii) Thinning (ix) N.A. (x) 1.11.63.

**2. TREATMENTS :**

10 fungicidal treatments :  $T_0$ =Control,  $T_1$ =3 gm. of Agrosan G.N.  $T_2$ =2 gm. of Ceresan,  $T_3$ =2 gm. of Tillex,  $T_4$ =2 gm., of Lunasan.  $T_5$ =2 gm. of Harvasan,  $T_6$ =3 gm. of Thiram,  $T_7$ =4 gm. of Shell seed dresser,  $T_8$ =4 gm. of Tritisan and  $T_9$ =2 gm. of Beej Power

Treatments applied to per Kg. of seed as dressing.

**3. DESIGN :**

(i) Incomplete L. Sq. (ii) (a) 3 plots/block ; 10 blocks/Sq. and 3 Sqs. (b) N.A. (iii) 9. (iv) 4.6 m. x 2.7 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Germination % and yield of grain. (iv) (a) 1960—contd. (Design changed in 1963). (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

**5. RESULTS :**

(i) 63.0 degree. (ii) 5.1 degree. (iii) Treatment differences are not significant. (iv) Av. percentage germination in degrees.

Treatment.	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Mean angle	67.1	63.3	64.3	65.2	64.2	63.5	59.9	61.7	61.5	58.7

**Crop :- Moong (Kharif).****Ref :- Rj. 64(11).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'D'.**

**Object :-**To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Moong.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 16.6.64; (iv) (a) 2 ploughings. (b) Dibbling. (c) 4 Kg/ha. (d) 30 cm. x 23 cm. (e) 1. (v) Nil. (vi) R.S.—4. (vii) Unirrigated. (viii) 2 hand weedings. (ix) N.A. (x) 17.10.64.

**2. TREATMENTS :**

10 fungicidal treatments.  $T_0$ =Control,  $T_1$ =3 gm. of Agrosan G.N.,  $T_2$ =2 gm. of Ceresan,  $T_3$ =2 gm. of Tillex,  $T_4$ =2 gm. of Lunasan,  $T_5$ =2 gm. of Hervasan,  $T_6$ =3 gm. of Thiram,  $T_7$ =4 gm. of shell seed dresser,  $T_8$ =4 gm. of Tritisan and  $T_9$ =4 gm. of Beej Powder.

Treatments applied to per Kg. of seed as dressing.

**3. DESIGN :**

(i) Incomplete L Sq. (ii) (a) 3 plots/block ; 10 blocks/Sq. and 3 Sqs. (b) N.A. (iii) 9. (iv) (a) and (b) 4.6 m. x 2.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Germination % and grain yield. (iv) (a) 1960—contd. (treatments and design modified). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

## Grain yield :

(i) 945 Kg/ha. (ii) 172.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment.	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. yield.	810	1061	1016	920	911	1037	920	925	933	916

## Germination analysis :

(i) 43.6 degree. (ii) 3.8 degree. (iii) Treatment differences are not significant. (iv) Av. percentage germination in degrees.

Treatment.	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>	F <sub>8</sub>	F <sub>9</sub>
Mean angle.	44.4	44.8	44.3	44.8	38.3	42.6	45.5	45.4	42.9	43.4

**Crop :- Moong. (Kharif).**

**Ref :- Rj. 61(13).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

Object :—To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Moong.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Barley. (c) Nil. (ii) Sandy. (iii) 12.7.61. (iv) (a) 4 ploughings. (b) Dibbling. (c) 4 Kg/ha. (d) 46 cm. × 30 cm. (e) 1. (v) N.A. (vi) R.S.—4. (vii) Unirrigated. (viii) Weeding. (ix) N.A. (x) 15.10.61.

## 2. TREATMENTS :

8 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=3 gm. of Agrosan G.N., T<sub>2</sub>=2 gm. of Ceresan, T<sub>3</sub>=2 gm. of Tillex, T<sub>4</sub>=2 gm. of Lunasan, T<sub>5</sub>=2 gm. of Hervasan, T<sub>6</sub>=3 gm. of Thiram and T<sub>7</sub>=4 gm of sulphur.

Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 6.1 m. × 1.8 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1959 to 1961. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

## Grain yield :

(i) 158 Kg/ha. (ii) 41.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment.	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield.	102	183	157	195	148	140	178	161

C.D. =48.3 Kg/ha.

**Crop :- Moong (Kharif).****Ref :- Rj. 62(109).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'D'.**

Object :- To study the effect of different fungicides on the yield of Moong.

**BASAL CONDITIONS :**

(i) (a) Nil. (b) Bajra. (c) Nil. (ii) Sandy loam. (iii) 22.7.62. (iv) (a) 1 ploughing. (b) Dibbling. (c) 15 Kg/ha. (d) 46 cm. x 30 cm. (e) 3. (v) N.A. (vi) Local. (vii) Unirrigated. (viii) 2. weedings. (ix) 30 cm. (x) 15:10.62.

**2. TREATMENTS :**

8 fungicidal treatments :  $T_0$ =Control,  $T_1$ =Agrosan G.N. at 3 gm.,  $T_2$ =Ceresan at 2 gm.,  $T_3$ =Tillex at 2 gm.,  $T_4$ =Lunasan at 2 gm.,  $T_5$ =Heneasan at 2 gm.,  $T_6$ =Thiram at 3 Kg. and  $T_7$ =Beej powder at 2 gm.

Treatments applied to per Kg. of seed as dressing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 6:1 m. x 1:8 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Plant count and yield of Grain. (iv) (a) 1961—N.A. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 1230 Kg/ha. (ii) 196.4 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment.	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield.	1282	1166	1178	1005	1323	1162	1450	1274

C.D.=230.2 Kg/ha.

**Crop :- Moong (Kharif).****Ref :- Rj. 63(116), 64(103),****Site :- Govt. Agri. Farm, Mandore.****Type :- 'D'.**

Object :- To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Moong.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 8, 10, 11.8:1963; 29.7.1964. (iv) (a) 2 ploughings. (b) Dibbling. (c) N.A. (d) Between lines 46 cm. and between plants 23 cm. (e) 3 seeds/hole for 63 (116) and 1 seed/hole for 64 (103). (v) Nil. (vi) Local. (vii) Unirrigated. (viii) 1-2 weedings and 1 hoeing. (ix) N.A. (x) 23, 24.10.63; 19.10.64.

**2. TREATMENTS :**

10 Seed dressing Treatments :

 $T_0$ =Control.

$T_1$ =Agrosan G. N at the rate of 2.8 gm./kg.,  $T_2$ =Ceresan at the rate of 1.9 gm./kg.,  $T_3$ =Tillex at the rate of 1.9 gm./kg.,  $T_4$ =Lunasan at the rate of 1.9 gm./kg.,  $T_5$ =Herasan at the rate of 1.9 gm./kg.,  $T_6$ =Thiram at the rate of 2.8 gm./kg.,  $T_7$ =Shell seed dresser at the rate of 4 gm./kg.,  $T_8$ =Tritisan at the rate of 4 gm./kg.,  $T_9$ =Beej powder at the rate of 2 gm./kg.

**3. DESIGN :**

(i) Incomplete. L Sq. (ii) (a) 3 plots/block; 10 blocks/Sq. and 3 Sqs. (b) N.A. (iii) 9. (iv) (a) and (b) 4.6 m. x 2.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961 to 1962. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 278.3 Kg/ha. (ii) 56.8 Kg/ha. (based on 86 d. f. made up of pooled error) (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatments	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. yield	288.5	276.0	272.5	286.0	265.5	283.0	260.0	273.5	285.0	293.0

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**Crop :- Moong (Kharif).**

**Ref :- Rj. 61(19), 62(3).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

**Object :-** To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Moong.

## 2. BASAL CONDITIONS :

(i) (a) N.A. for 61 (19) ; Bajra-Fallow-Moong. for 62 (3). (b) N.A. for 61 (19) ; Bajra for 62 (3). (c) N.A. (ii) Sandy loam. (iii) 29.7.61 ; 22.7.62. (iv) (a) 1 ploughing. (b) Dibbling. (c) 15 Kg/ha. (d) 46 cm.  $\times$  30 cm. (e) 3. (v) N.A. (vi) Local. (vii) Unirrigated. (viii) Weedings. (ix) N.A. (x) 6.11.61 ; 15.10.62.

## 2. TREATMENTS :

8 fungicidal treatments : T<sub>0</sub>=Control ; T<sub>1</sub>=2 gm. of Agrosan, T<sub>2</sub>=2 gm. of Ceresan ; T<sub>3</sub>=2 gm. of Tillex ; T<sub>4</sub>=2 gm. of Lumasan, T<sub>5</sub>=2 gm. of Hervasan ; T<sub>6</sub>=3 gm. of Thiram and T<sub>7</sub>=2 gm. of Beej Powder.

Treatments applied to per kg of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 6.1 m.  $\times$  1.8 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of gram. (iv) (a) 1961 to 1962. (b) No. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 1076 Kg/ha. (ii) 219.5 Kg/ha. (based on 77 d. f. made up of pooled error and Treatments  $\times$  years interaction). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	1087	990	1062	912	1148	1007	1238	1168

C.D. = 178.3 Kg/ha.

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**Crop :- Moong (Kharif).**

**Ref :- Rj. 63(72), 64(3).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

**Object :-** To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Moong.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 8, 10, 11.8.63 ; 29.7.64. (iv) (a) 2 ploughings. (b) Dibbling. (c) 15 Kg/ha. (d) 46 cm.  $\times$  23 cm. (e) 3 for 63 (72) ; 1 for 64 (3). (v) Nil. (vi) Local. (vii) Unirrigated. (viii) 2 hand weedings and thinning for 63 (72) ; 2 hand weedings and hoeing for 64 (3). (x) 23, 24.10.63 for 63 (72) ; 19.10.64 for 64 (3).

## 2. TREATMENTS :

10 fungicidal treatments:  $T_0=0$ ;  $T_1=3$  gm. of Agrosan G.N.;  $T_2=2$  gm. of Ceresan;  $T_3=2$  gm. of Tillex,  $T_4=2$  gm. of Lunasan;  $T_5=2$  gm. of Hervasan,  $T_6=3$  gm. of Thiram;  $T_7=1$  gm. of shell seed dresser,  $T_8=1$  gm. of Tritisan and  $T_9=0.6$  gm. of Beej powder.

Treatments applied to per Kg of seed as dressing.

## 3. DESIGN :

(i) Incomplete L. Sq. (ii) (a) 3 plots/block ; 10 blocks/sq., 3 Sqs. (b) N.A. (iii) 9. (iv) (a) and (b) 4.6 m.  $\times$  2.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 63 (72) ; Good for 64 (3). (ii) N.A. for 63 (72) ; Nil for 64 (3). (iii) Germination % and yield of grain. (iv) (a) 1963 to 1964. (b) No. (v) N.A. (vi) Nil. (vii) Since the error variances are heterogeneous and Treatments  $\times$  years interaction is absent, results of individual years are presented under 5 results.

## 5. RESULTS :

## 63(72)

Germination.

(i) 62.0 degrees. (ii) 4.7 degrees. (iii) Treatment differences are not significant. (iv) Av. germination in degrees.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Mean angle	60.4	63.6	63.7	61.5	59.9	62.8	63.5	59.7	62.8	61.7

## 64(3)

Germination.

(i) 57.8 degrees. (ii) 7.4 degrees. (iii) Treatment differences are not significant. (iv) Av. germination in degrees.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Mean angle	58.9	60.8	60.3	56.4	56.8	60.7	56.2	51.5	60.4	56.5

Yield.

(i) 268 Kg/ha. (ii) 65.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Av. yield	269	281	249	296	273	286	245	249	254	273

**Crop :- Urad (Kharif).**

**Ref :- Rj. 65(12).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- M.**

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

## 1. BASAL CONDITIONS :

(i) (a) No. (b) Cotton. (c) N.A. (ii) N.A. (iii) 12.7.65. (iv) (a) One disc ploughing. (b) Drilling. (c) N.A. (d) Between lines 30 cm. (e) N.A. (v) N.A. (vi) Local. (vii) Irrigated. (viii) 2 hoeings and weedings. (ix) N.A. (x) 23.10.65.

## 2. TREATMENTS :

**Main-plot treatments**

3 methods of placements :  $M_1$ =Broadcast,  $M_2$ =Drilled below the seed and  $M_3$ =Band placement.

**Sub-plot treatments**

All combinations of (1) and (2).

(1) 2 levels of N :  $N_0=0$  and  $N_1=33.6$  Kg/ha.

(2) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.



## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 Sub-plots/main-plot. (b) N.A. (ii) 3. (iv) (a) 4.6 m. × 3.7 m. (b) 4.0 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Stand, height, no. of branches and yield of grain. (iv) 1965-N.A. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 997 Kg/ha. (ii) (a) 330.0 Kg/ha. (b) 261.0 Kg/ha. (iii) Main effects of N, P are significant and interaction  $M \times N \times P$  is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	Mean
P <sub>0</sub>	875	752	916	726	970	848
P <sub>1</sub>	866	1012	1051	1003	950	976
P <sub>2</sub>	877	1322	1250	939	1394	1166
Mean	873	1045	1072	889	1105	927
N <sub>0</sub>	734	909	1024			
N <sub>1</sub>	941	1217	1156			

C.D. for N marginal means=145.0 Kg/ha.

C.D. for P marginal means=179.6 Kg/ha.

**Crop :- Urad.**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Ref :- Rj. 61(118).**

**Type :- 'D'.**

**Object :-** To study the effect of different fungicides on the yield of Urad.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) Ploughing. (b) Dibbling. (c) 15 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 22.11.1961.

## 2. TREATMENTS :

8 fungicidal treatments: T<sub>0</sub>=Control, T<sub>1</sub>=3 gm. of Agrosan, T<sub>2</sub>=2 gm. of Ceresan, T<sub>3</sub>=2 gm. of Tillex, T<sub>4</sub>=2 gm. of Lunasan, T<sub>5</sub>=2 gm. of Hervasan, T<sub>6</sub>=3 gm. of Thiram and T<sub>7</sub>=4 gm. of Sulphur.

Treatments applied to per Kg. of seed as dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 6.1 m. × 1.8 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1960-1962 [Treatments are modified in 1962]. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Experiment for 1960 failed.

## 5. RESULTS :

(i) 145 Kg/ha. (ii) 86.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	135	109	157	141	140	231	101	146

**Crop :- Urad (Kharif).****Ref :- Rj. 62(13).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'D'.****Object :-**To determine the relative efficiency of different fungicides on the yield of Urad.**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) 28.7.62 (iv) (a) Ploughing. (b) Dibbling. (c) 15 Kg/ha. (d) 46 cm. x 30 cm. (e) N.A. (v) N.A. (vi) Local. (vii) Unirrigated. (viii) Weeding. (ix) N.A. (x) 22.11.62.

**2. TREATMENTS :**8 fungicidal treatments :  $T_0$ =Control,  $T_1$ =Agrosan G.N. at 3 gm.,  $T_2$ =Ceresan at 2 gm.,  $T_3$ =Tillex at 2 gm.,  $T_4$ =Lunasan at 2 gm.,  $T_5$ =Hervasan at 2 gm.,  $T_6$ =Thiram at 3 gm. and  $T_7$ =Beej powder at 2 gm.

Treatments applied to per Kg. of seed as dressing.

**3. DESIGN : and 4. GENERAL :**

Same as in Expt. No. 61(118) on page 244.

**5. RESULTS :**

(i) 664 Kg/ha. (ii) 352.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield	591	568	657	759	707	732	794	502

**Crop :- Urad (Kharif).****Ref :- Rj. 61(14).****Site :- Govt. Agri. Res. Farm, Sriganganagar.****Type :- 'D'.****Object :-**To determine the relative efficiency of different fungicides on the yield of Urad.**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Cotton. (c) 44.8 Kg/ha. of N. (ii) Sandy loam. (iii) 22.7.61. (iv) (a) 3 ploughings. (b) Dibbling. (c) 17 Kg/ha. (d) 46 cm. x 30 cm. (e) N.A. (v) N.A. (vi) Local. (vii) Irrigated. (viii) weeding. (ix) N.A. (x) December, 1961.

**2. TREATMENTS :**8 fungicidal treatments :  $T_0$ =Control,  $T_1$ =Agrosan G.N. at 3 gm.,  $T_2$ =Ceresan at 2 gm.,  $T_3$ =Tillex at 2 gm.,  $T_4$ =Lunasan at 2 gm.,  $T_5$ =Hervasan at 2 gm.,  $T_6$ =Thiram at 3 gm. and  $T_7$ =Sulphur at 4 gm.

Treatments applied to per Kg. of seed as dressing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 6.1 m. x 1.8 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1961 to 1963. (b) No. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 1225 Kg/ha. (ii) 232.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield	940	1195	1399	1263	1123	1254	1237	1390

C.D.=272.0 Kg/ha.

**Crop :- Urad (Kharif).****Ref :- Rj. 62(110).****Site :- Govt. Agri. Res. Farm, Sriganganagar.****Type :- 'D'.**

Object :—To determine the relative efficacy of seed dressing fungicides on the yield of Urad.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of N. (ii) Sandy loam. (iii) 28.7.62. (iv) (a) 3 ploughings. (b) Dibbling. (c) 17 Kg/ha. (d) 46 cm. × 30 cm. (e) N.A. (v) N.A. (vi) Local. (vii) Irrigated. (viii) 2 hoeings and 2 weedings. (ix) N.A. (x) 4.12.62.

**2. TREATMENTS :**8 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Agrosan G.N. at 3 gm., T<sub>2</sub>=Ceresan at 2 gm., T<sub>3</sub>=Tillex at 2 gm., T<sub>4</sub>=Lunasan at 2 gm., T<sub>5</sub>=Hervasan at 2 gm., T<sub>6</sub>=Thiram at 3 gm. and T<sub>7</sub>=Beej powder at 0.6 gm.

Treatments applied to per Kg. of seed as dressing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 6.1 m. × 1.8 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Yield of grain and fodder. (iv) (a) 1961 to 1963. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 678 Kg/ha. (ii) 148.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	534	593	839	661	610	687	661	839

C.D.=174.5 Kg/ha.

**Crop :- Urad (Kharif).****Ref :- Rj. 63(76).****Site :- Govt. Agri. Res. Farm, Sriganganagar.****Type :- 'D'.**

Object :—To determine the relative efficacy of different fungicides on the yield of Urad.

**1. BASAL CONDITIONS :**

(i) (a) to (c) Nil. (ii) Sandy loam. (iii) 16.7.63. (iv) (a) Ploughings. (b) Dibbling. (c) 17 Kg/ha. (d) 46 cm. × 30 cm. (e) 3. (v) N.A. (vi) Local. (vii) Irrigated. (viii) 1 hoeings and thinning. (ix) 7 cm. (x) 16, 17.10.63.

**2. TREATMENTS :**10 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Agrosan G.N. at 3 gm., T<sub>2</sub>=Ceresan at 2 gm., T<sub>3</sub>=Tillex at 2 gm., T<sub>4</sub>=Lunasan at 2 gm., T<sub>5</sub>=Hervasan at 2 gm., T<sub>6</sub>=Thiram at 3 gm., T<sub>7</sub>=Shell seed dresser at 1 gm., T<sub>8</sub>=Tritisan at 1 gm. and T<sub>9</sub>=Beej powder No. 1 at 0.6 gm.

Treatments applied 15 per Kg. of seed as dressing.

**3. DESIGN :**

(i) Incomplete L. sq. (ii) (a) 3 plots/block, 10 blocks/sq. and 3 sqs. (b) N.A. (iii) 9. (iv) (a) and (b) 6.1 m. × 1.8 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Germination percentage and yield of grain. (iv) (a) 1951—1953 [modified]. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

## 5. RESULTS :

(i) 61.94%. (ii) 6.54%. (iii) Treatment differences are highly significant. (iv) Av. germination of seed in percentage.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. percentage	67.4	69.4	70.5	64.2	59.6	64.5	43.7	50.7	67.2	62.2

C.D.=6.0%.

**Crop :- Urad (Kharif).**

**Ref :- Rj. 63(75).**

**Site :- Govt. Agri. Res. Farm, Sriganaganar.**

**Type :- 'DM'.**

Object :- To study the effect of Rhyzobia on the yield and growth of Urad with artificial inoculation.

## 1. BASAL CONDITIONS :

(i) (a) to (c) Nil. (ii) Sandy loam. (iii) 16.7.63. (iv) (a) Ploughing. (b) Dibbling. (c) 17 Kg/ha. (d) 46 cm. x 30 cm. (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) 1 hoeing. (ix) 7 cm. (x) 26, 27.10.63.

## 2. TREATMENTS :

**Main-plot treatments :**

2 types of inoculation : T<sub>0</sub>=No inoculation and T<sub>1</sub>=Rhyzobia inoculation.

**Sub-plot treatments :**

3 manurial treatments : M<sub>0</sub>=Control, M<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as super and M<sub>2</sub>=1.1 Kg/ha. of Sodium molybdate.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 7.3 m. x 5.5 m. (b) 5.5 m. x 3.7 m. (v) 91 cm. x 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) N.A. (iii) Grain and fodder yield. (iv) (a) 1963 only. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

## 5. RESULTS :

(i) 1668 Kg/ha. (ii) (a) 172.0 Kg/ha. (b) 162.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
T <sub>0</sub>	1628	1800	1670	1699
T <sub>1</sub>	1740	1672	1495	1636
Mean	1684	1736	1582	1667

**Crop :- Cow pea (Kharif).**

**Ref :- Rj. 63(74).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'CM'.**

Object :- To study the effect of Rhyzobia on growth and yield of crop with artificial inoculation.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Barley. (c) N.A. (ii) Sandy. (iii) 30.7.63. (iv) (a) 5 ploughings. (b) to (e) N.A. (v) N.A. (vi) 9. (vii) Unirrigated. (viii) and (ix) N.A. (x) 20.10.63.

## 2. TREATMENTS : and 3. DESIGN :

Same as in expt. no. Rj. 63(75) on page 247.

## 4. GENERAL :

(i) and (ii) N.A. (iii) No. of modules in the middle two row per Kg. plants and plant height. (iv) (a) 1963 only. (b) No. (c) N.A. (v) and (vi) N.A. (vii) Nil.

## 5. RESULTS :

(i) 571 modules/ten plants. (ii) (a) 5.29 modules/ten plants. (b) 11.5 modules/ten plants. (iii) None of the effects is significant. (iv) Av. No. of modules/ten plants.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
T <sub>0</sub>	551	584	569	568
T <sub>1</sub>	569	568	584	574
Mean	560	576	576	571

**Crop :- Potato (Rabi).**

**Ref :- Rj. 62(65), 63(41).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'M'.**

Object :—To study the effects of fertilizers and sources of N on the yield of Potato.

## 1. BASAL CONDITIONS :

(i) (a) Wheat—Fallow—Potato for 62(65) ; Nil for other. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 26.11.1962 ; 19.10.1963. (iv) (a) Cross ploughings, cross discs, pata for 62(65) ; 2 bakherings, 1 ploughing and planking for 63(41). (b) N.A. for 62(65) ; sowing on ridges for 63(41) (c) 7.4 Q/ha. for 62(65) ; 11.1 Q/ha. (d) 46 cm. between lines. (e) N.A. (v) N.A. (vi) *Safeda*. (vii) Irrigate 1. (viii) 2 weedings with earthing. (ix) N.A. (x) Digging on 13 to 15.3.1964 for 62(65), 12 to 15.2.1964 for 63(41).

## 2. TREATMENTS :

**Main-plot treatments :**

3 manurial treatments : M<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of K<sub>2</sub>O, M<sub>2</sub>=89.7 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+44.8 Kg/ha. of K<sub>2</sub>O and M<sub>3</sub>=134.5 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O.

**Sub-plot treatments :**

7 sources of N : S<sub>1</sub>=Complete inorganic, S<sub>2</sub>=½ F.Y.M. +½ inorganic, S<sub>3</sub>=½ oil cake+½ inorganic, S<sub>4</sub>=¼ oil cake+¼ F.Y.M. +½ inorganic, S<sub>5</sub>=¼ F.Y.M. +¾ inorganic, S<sub>6</sub>=¼ oil cake+¾ inorganic and S<sub>7</sub>=½ oil cake +½ F.Y.M. +¾ inorganic.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 7 sub-plots/main-plot. (b) N.A. (iii) 2 for 62(65) ; 3 for 63(41). (iv) (a) N.A. for 62(65) ; 4.3 m. × 4.3 m. for 63(41). (b) 3.7 m. × 3.7 m. for 62(65) and 63(41). (v) N.A. for 62(65) ; 30 cm. × 30 cm. for other. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 62(65) ; Normal for 63(41). (ii) N.A. for 62(65) ; Infected by late blight and controlled by spraying cupramar for 63(41). (iii) Yield of potato. (iv) (a) 1962—1963. (b) No. (c) Nil. (v) N.A. (vi) N.A. for 62(65) ; Light effect of frost for 63(41). (viii) Since the sub-plot error variances are heterogeneous results of individual years are presented under 5. Results.

## 5. RESULTS :

62(65).

(i) 259.2 Q/ha. (ii) (a) 41.2 Q/ha. (b) 51.7 Q/ha. (iii) Main effects of S is highly significant and that of M is significant. (iv) Av. yield of potato in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	Mean
M <sub>1</sub>	158.2	226.0	223.4	223.4	180.8	175.7	185.8	196.2
M <sub>2</sub>	200.9	301.3	313.8	371.6	286.2	256.1	286.2	288.0
M <sub>3</sub>	168.2	263.6	384.1	426.8	271.2	256.1	283.2	293.4
Mean	175.8	263.6	307.1	340.6	246.1	229.3	251.9	259.2

C.D. for M marginal means = 67.1 Q/ha.

C.D. for S marginal means = 62.6 Q/ha.

63(41)

(i) 186.3 Q/ha. (ii) (a) 13.8 Q/ha. (b) 14.3 Q/ha. (iii) Main effects of M and S are highly significant and interaction M × S is significant. (iv) Av. yield of potato in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	Mean
M <sub>1</sub>	124.6	179.1	187.4	195.3	171.8	158.0	125.1	163.0
M <sub>2</sub>	117.1	183.6	156.0	261.8	188.9	187.4	153.7	184.4
M <sub>3</sub>	160.3	225.0	248.5	287.2	217.5	176.8	165.4	211.5
Mean	124.0	196.6	210.6	248.1	192.7	174.1	148.1	186.3

C.D. for M marginal means = 11.7 Q/ha.

C.D. for S marginal means = 13.6 Q/ha.

C.D. for two S means at the same level of M = 23.8 Q/ha.

C.D. for two M means at the same level of S = 24.7 Q/ha.

**Crop :- Potato (Rabi).**

**Ref :- Rj. 60(49).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'M'.**

Object :—To study the effect of N, P and K on the yield of Potato.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajra*. (c) Nil. (ii) Sandy loam. (iii) 6.11.10. (iv) (a) 2 ploughings. (b) N.A. (c) 9.2 to 13.8 Q/ha. (d) 61 cm. × 23 cm. (e) N.A. (v) N.A. (vi) *Phulva*. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 21 to 25.3.61.

#### 2. TREATMENTS :

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

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=50.4 and N<sub>2</sub>=100.9 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=50.4 and P<sub>2</sub>=100.9 Kg/ha.

(3) 3 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>0</sub>=0, K<sub>1</sub>=50.4 and K<sub>2</sub>=100.9 Kg/ha.

#### 3. DESIGN :

(i) 3<sup>3</sup> Fact confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.5 m. × 4.3 m. (b) 8.9 m. × 3.1 m. (v) 61 cm. × 30 cm. (vi) Yes.

#### 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of potato. (iv) (a) 1960—N.A. (b) and (c) N.A. (v) and (vi) N.A. (vii) The plants were frozen due to cold.

#### 5. RESULTS :

(i) 47.0 Q/ha. (ii) 9.8 Q/ha. (iii) Main effect of N alone is highly significant. (vi) Av. yield of potato in Q/ha.

	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	23.8	22.6	20.1	20.5	21.7	24.1	22.2
N <sub>1</sub>	52.0	48.4	50.5	51.2	46.5	53.1	50.3
N <sub>2</sub>	69.4	72.1	64.1	65.8	73.7	66.2	68.5
Mean	48.4	47.7	44.9	45.8	47.3	47.8	47.0
K <sub>0</sub>	47.2	46.0	44.3				
K <sub>1</sub>	50.4	50.0	41.5				
K <sub>2</sub>	47.6	47.1	48.8				

C.D. for N marginal mean=6.74 Q/ha.

**Crop :- Potato (Rabi).**

**Ref :- Rj. 60(66).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'M'.**

**Object :-** To study the effect of different levels and sources of N on the yield of Potato.

**1. BASAL CONDITIONS :**

(i) (a) Maize-Potato. (b) Fallow. (c) N.A. (ii) N.A. (iii) Nov., 60. (iv) (a) 3 ploughings. (b) N.A. (c) N.A. (d) Row to row 61 cm. (e) N.A. (v) N.A. (vi) Phulwa. (vii) Irrigated. (viii) and (ix) N.A. (x) March, 61.

**2. TREATMENTS :**

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

(1) 2 levels of N : N<sub>1</sub>=50.4 and N<sub>2</sub>=100.9 Kg/ha.

(2) 4 sources of N : S<sub>1</sub>=A/S, S<sub>2</sub>=Cake and A/S in 1 : 1 ratio, S<sub>3</sub>=Cake and A/S in 1 : 2 ratio and S<sub>4</sub>=Cake and A/S in 1 : 3 ratio.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 8.0 m. × 4.9 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of Potato. (iv) to (vii) N.A.

**5. RESULTS :**

(i) 79.5 Q/ha. (ii) 21.1 Q/ha. (iii) Main effect of N and 'control vs. others' are highly significant. (iv) Av. yield of Potato in Q/ha.

Control=34.5 Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	Mean
N <sub>1</sub>	79.1	68.5	71.8	62.3	70.4
N <sub>2</sub>	117.3	72.1	96.5	113.1	99.7
Mean	98.2	70.3	84.1	87.7	85.1

C.D. for N marginal means=15.8 Q/ha.

C.D. for 'control vs. others'=23.7 Q/ha.

**Crop :- Potato.****Ref :- Rj. 60(1).****Site :- Govt. Seed Multiplication Farm, Sardar Garh.****Type :- 'M'.**

Object :—To study the effect of F.Y.M. and different levels and sources of N on the yield of Potato.

**1. BASAL CONDITIONS :**

(i) (a) to (c) Nil. (ii) Loamy. (iii) 16.1.60. (iv) (a) 4 ploughings. (b) N.A. (c) 11.1 Q/ha. (d) Row to row 46 cm. (e) N.A. (v) N.A. (vi) Shimla. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 18.5.60.

**2. TREATMENTS :**

All combinations of (1) and (2) with 2 extra treatments

(1) 2 levels of N :  $N_1=50.4$  and  $N_2=100.9$  Kg/ha.(2) 3 sources of N :  $S_1=G.N.$  (De-oiled),  $S_2=G.N.$  (expeller) and  $S_3=A/S$ .Extra treatments are :  $E_0=Control$  and  $E_1=5604$  Kg/ha. of F.Y.M.

5604 Kg/ha. of F.Y.M. applied in all the treatment combinations except control plot.

**3. DESIGN :**(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) 8.3 m.  $\times$  4.9 m. (b) 7.4 m.  $\times$  3.7 m. (v) 61 cm.  $\times$  46 cm. (vi) Yes.**4. GENERAL :**

(i) Good. (ii) No. (iii) Yield of Potato. (iv) (a) 1960 N.A. (b) and (c) N.A. (v) to (vii) N.A.

**5. RESULTS :**

(i) 33.2 Q/ha. (ii) 10.15 Q/ha. (iii) 'Control vs. others' alone is significant. (iv) Av. yield of Potato in Q/ha.

 $E_0=20.9$  and  $E_1=27.2$  Q/ha.

	$S_1$	$S_2$	$S_3$	Mean
$N_1$	36.8	39.3	36.2	37.4
$N_2$	42.6	30.8	32.3	35.2
Mean	39.7	35.0	34.2	36.3

C.D. for 'Control vs. others' = 13.5 Kg/ha.

**Crop :- Potato (Rabi).****Ref :- Rj. 60(65), 61(87).****Site :- Govt. Agri. Farm, Sewar.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**(i) (a) Fallow-Potato for 60(65) ; N.A. for 61(87). (b) Fallow. (c) Nil. (ii) N.A. (iii) Oct., 1960; 14.11.1961. (iv) (a) 3 to 4 ploughings. (b) and (c) N.A. (d) 61 cm. between rows. (e) N.A. (v) N.A. for 60(65); 50.4 Kg/ha. of each of  $P_2O_5$  and  $K_2O$  for 61(87) (vi) Phulwa. (vii) Irrigated. (viii) N.A. for 60(65); 2 weedings for other. (ix) N.A. (x) March, 1961 ; 18.4.1962.**2. TREATMENTS :**

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

(1) 4 sources of N :  $S_1=A/S$ ,  $S_2=Cake$  and A/S in 1 : 1,  $S_3=Cake$  and A/S in 1 : 2 ratio,  $S_4=Cake$  and A/S in 1 : 3 ratio.(2) 2 levels of N :  $N_1=50.4$  and  $N_2=100.9$  Kg/ha.



## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) N.A. for 60(65); 8.9 m. × 6.1 m. for 61(87). (b) 8.0 m. × 4.9 m. for 60(65) and 61(87). (v) N.A. for 60(65); 46 cm. × 61 cm. for 61(87). (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of tuber. (iv) (a) 1960 to 1961. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) Since error variances are heterogeneous and the Treatments × years interaction is absent. Results of individual years are presented under 5. Results.

## 5. RESULTS :

## 60(65)

(i) 186.1 Q/ha. (ii) 45.8 Q/ha. (iii) 'Control vs. others' effect alone is significant. (iv) Av. yield of Potato in Q/ha.

Control = 126.5 Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	Mean
N <sub>1</sub>	180.8	175.5	198.0	201.1	188.9
N <sub>2</sub>	204.1	200.6	202.2	185.7	198.1
Mean	192.4	188.0	200.1	193.4	193.5

C.D. for 'control vs. others' = 50.3 Q/ha.

## 61(87)

(i) 126.0 Q/ha. (ii) 29.8 Q/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of Potato in Q/ha.

Control = 97.6 Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	
N <sub>1</sub>	129.1	115.4	102.0	143.3	122.4
N <sub>2</sub>	145.5	114.4	123.5	160.0	136.8
Mean	139.3	114.9	112.7	151.6	129.6

C.D. for S marginal means = 30.7 Q/ha.

**Crop :- Potato (Rabi).**

**Ref :- Rj. 63(95), 64(40).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'D'.**

**Object :-** To study the effect of insecticidal spraying on the incidence of pests and virus transmitting of Potato.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) G.M. for 63(95); Fallow for 64(40). (c) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63(95); Nil for other. (ii) Clay loam. (iii) 30, 31.10.1963; 12, 13.11.1964. (iv) (a) N.A. (b) Dibbling. (c) 8 Q/ha. (d) 61 cm. × 23 cm. (e) 1. (v) 89.7 Kg/ha. of N + 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 44.8 Kg/ha. of K<sub>2</sub>O for 63(95); 44.8 Kg/ha. of N + 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 44.8 Kg/ha. of K<sub>2</sub>O by drilling along the rows for 64(40). (vi) Nil. (vii) Irrigated. (viii) Hand weedings, hoeing and earthing. (ix) N.A. for 63(95); Nil for 64(40). (x) 6.2.1964, 10.3.1965.

## TREATMENTS :

7 insecticidal treatments :  $T_0$ =Control,  $T_1$ =2 sprayings of Endrin 0.02%,  $T_2$ =3 sprayings of Endrin 0.02%,  $T_3$ =2 dustings of sevin at 44.8 Kg/ha.,  $T_4$ =3 dustings of sevin at 44.8 Kg/ha.,  $T_5$ =2 sprayings of B.H.C. 0.3% and  $T_6$ =3 sprayings of B.H.C. 0.3%.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) and (b) 6.4 m.  $\times$  4.3 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Satisfactory. (ii) Incidence of pests and control measures as per treatments. (iii) Yield of tuber. (iv) (a) 1963 to 1964. (b) No. (c) Nil. (v) Nil. (vi) A cold wave and heavy frost in the month of January for 63(95); Nil for other. (vii) Since error variances are heterogeneous and Treatments  $\times$  years interaction is absent, results of individual years are presented under 5. Results.

## 5. RESULTS :

63(95)

(i) 64.9 Q/ha. (ii) 6.2 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of potato in Q/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	64.1	65.0	66.4	59.0	68.2	63.6	68.2

64(40)

(i) 117.1 Q/ha. (ii) 10.5 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of potato in Q/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	109.8	115.8	119.0	116.2	119.4	112.6	127.2

**Crop :- Carrot (*Rabi*).**

**Ref :- Rj. 60(85).**

**Site :- S.K.N. Agri. College, Jobner.**

**Type :- 'M'.**

**Object :-** To study the response of Carrot to different doses of N and P alone and in combination.

## 1. BASAL CONDITIONS :

(i) (a) Fallow-Carrot. (b) Bajra in last year. (c) Nil. (ii) Sandy loam. (iii) 6.10.60. (iv) (a) 4 ploughings. (b) Broadcast. (c) 11 Kg/ha. (d) and (e) —. (v) 56.0 Kg/ha. of N. (vi) Local. (vii) 8 Irrigated. (viii) 1 weeding. (ix) Nil. (x) 6.3.61.

## 2. TREATMENTS :

All combinations of (1) and (2)

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

(2) 4 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=33.6$ ,  $P_2=67.2$  and  $P_3=100.9$  Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 4.6 m.  $\times$  3.7 m. (b) 4.0 m.  $\times$  3.1 m. (v) 46 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) Nil. (iii) Yield of the roots and foliage. (iv) (a) 1960 only. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 1. Roots.

(i) 446 Q/ha. (ii) 118.1 Q/ha. (iii) Main effect of N and interaction N  $\times$  P are significant. (iv) Av. yield of roots in Q/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>0</sub>	471	599	419	357	461
N <sub>1</sub>	565	396	445	583	497
N <sub>2</sub>	396	317	431	380	381
Mean	477	437	432	440	446

C.D. for N marginal means = 84.9 Q/ha.

C.D. for means in the body of N×P table = 70.0 Q/ha.

## 2. Foliage.

(i) 734 Q/ha. (ii) 120.3 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of foliage in Q/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>0</sub>	687	777	783	630	719
N <sub>1</sub>	778	704	701	873	764
N <sub>2</sub>	720	686	785	681	718
Mean	728	722	758	728	734

**Crop :- Brinjal (Rabi).**

**Ref :- Rj. 64(39).**

**Site :- Govt. Nursery, Sriganganagar.**

**Type :- 'D'.**

**Object :-** To study the effect of insecticidal spraying on the control of Brinjal.

### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 11.7.64. (iv) (a) 2 ploughings. (b) Dibbling. (c) N.A. (d) 61 cm.×61 cm. (e) 2. (v) N.A. (vi) Local. (vii) Irrigated. (viii) 3 hoeings. (ix) N.A. (x) Pluckings on 17, 27.11.64 and 15.12.64.

### 2. TREATMENTS :

5 insecticidal sprayings : T<sub>0</sub>=Control, T<sub>1</sub>=Endrin E.C. 0.5%, T<sub>2</sub>=Sevin W.P. 0.2%, T<sub>3</sub>=Telodrin E.C. 0.03% and T<sub>4</sub>=B.H.C.+D.D.T. (1 : 1) W.P. 0.3%.

### 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) and (b) 3.7 m.×2.4 m. (v) Nil. (vi) Yes.

### 4. GENERAL :

(i) Normal. (ii) Incidence of pests and control measures as per treatments. (iii) Yield of Brinjal. (iv) (a) 1962 only. (b) No. (c) N.A. (v) Nil. (vi) Frost appeared. (vii) Nil.

### 5. RESULTS :

(i) 4139 Kg/ha. (ii) 1834 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Brinjal in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	3387	3976	4384	4373	4575

**Crop :- Pea (Rabi).****Ref :- Rj. 63(17), 64(80), 65(39).****Site :- Govt. Agri. Res. Farm, Sriganaganagar. Type :- 'M'.****Object :-**To study the effect of different levels of N and P on the yield of Pea.**BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow for 63 (17), 64 (80); Cotton for 65 (39). (c) Nil for 63 (17), 64 (80); N.A. for 65(39). (ii) Sandy loam. (iii) 20.11.63; 20.11.64; 18.11.65. (iv) (a) 5 ploughings for 63 (17); 2 cultivations with tractor and 2 ploughings with bullocks for 64 (80); ploughings and planking for 65 (39). (b) line sowing (c) 17 Kg/ha. (d) 61 cm. × 8 cm. for 63 (17); 61 cm. × 23 cm. for others. (e) N.A. (v) Nil. (vi) N.P. -29 for 63 (17), 64 (80); Bonavella for 65 (39). (vii) Irrigated. (viii) 2 to 5 hoeings and weedings. (ix) N.A.; 1 cm.; N.A. (x) 10.4.1964; 15.4.65; 8.4.1966.

**TREATMENTS :**

All combinations of (1) and (2)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=33.6$  Kg/ha.(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.Levels of  $P_2O_5$  tried in 64 (80) are  $P_0=0$ ,  $P_1=22.4$  and  $P_2=33.6$  Kg/ha.Fertilizers were applied before sowing, N broadcast and  $P_2O_5$  drilled for 64 (80).**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. for 63 (17), 64 (80); 6.5 m. × 4.3 m. for 65 (39). (v) 91 cm. × 91 cm. for 63 (17), 64 (80); 122 cm. × 61 cm. for 65 (39). (vi) Yes.

**4. GENERAL :**

(i) Poor for 63 (17); Normal for others. (ii) B.H.C. was applied before sowing for 63 (17); Nil for 64 (80); 0.02% solution of Aldrin was sprayed for 65 (39). (iii) Yield of pea. (iv) (a) 1963 to 1965 (treatments modified in 64). (b) No. (c) Nil. (v) and (vi) Nil. (vii) Expt. no. 63 (17) and 65 (39) have been pooled. Error variances are heterogeneous and Treatments × years interaction is present.

**5. RESULTS :****64(80)**

(i) 725 Kg/ha. (ii) 217.1 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of pea in Kg/ha.

	$P_0$	$P_1$	$P_2$	Mean
$N_0$	456	513	678	551
$N_1$	764	703	925	797
$N_2$	727	974	777	826
Mean	649	732	793	725

C.D. for N marginal means = 217.1 Kg/ha.

Combined results of 63 (17) and 65 (39)

(i) 927 Kg/ha. (ii) 447.7 Kg/ha. (8 d. f. made up of interaction of Treatments with years.) (iii) Main effect of N alone is significant. (iv) Av. yield of pea in Kg/ha.

	$P_0$	$P_1$	$P_2$	Mean
$N_0$	459	754	549	654
$N_1$	710	1035	1204	983
$N_2$	809	1226	1397	1144
Mean	726	1005	1050	927

C.D. for N marginal means = 344.1 Kg/ha.

**Crop :- Pea (Rabi).****Ref :- Rj. 63(86).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'C',**

Object :—To study the effect of different isolates of Rhyzobia on the growth and yield of Pea.

**1. BASAL CONDITIONS :**(i) (a) Nil. (b) *Jowar*. (c) N.A. (ii) Clay loam. (iii) 4.12.63. (iv) (a) 2 ploughings. (b) Behind the plough. (c) 35 Kg/ha. (d) 46 cm. × 15 cm. (e) N.A. (v) N.A. (vi) N.P.-27. (vii) N.A. (viii) 1 weeding and 1 earthing up. (ix) N.A. (x) 1.4.64.**2. TREATMENTS :**7 seed culture treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Rhyzobium Kota, T<sub>2</sub>=Rhyzobium Sriganganagar, T<sub>3</sub>=Rhyzobium Ajmer, T<sub>4</sub>=Rhyzobium Durgapura, T<sub>5</sub>=Rhyzobium I.A.R.I. and T<sub>6</sub>=Rhyzobium Udaipur.**3. DESIGN :**

(i) Youden Sq. (ii) (a) 3 plots/block, 7 blocks/sq., 2 sqs. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 4.6 m. × 3.7 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) and (b) 1963 only. (c) Nil. (v) Sriganganagar, Mandore and Durgapura. (vi) N.A. (vii) Nil.

**5. RESULTS :**

(i) 875 Kg/ha. (ii) 382 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	892	803	638	983	951	813	1048

**Crop :- Pea (Rabi).****Ref :- Rj. 65(23).****Site :- Govt. Agri. Farm, Durgapura****Type :- 'C'.**

Object :—To study the effect of different mulching materials on the growth and yield of Pea.

**1. BASAL CONDITIONS :**(i) (a) Nil. (b) *Moong*. (c) N.A. (ii) Sandy soils. (iii) 23.10.65. (iv) (a) Dist ploughing and harrowing. (b) Behind the plough. (c) 40 Kg/ha. (d) 45 cm. × 15 cm. (e) N.A. (v) N.A. (vi) Bonivilla. (vii) Irrigated. (viii) 3 weedings. (ix) N.A. (x) 2.3.1966.**2. TREATMENTS :**8 cultural treatments : T<sub>0</sub>=Control (cultivators practice), T<sub>1</sub>=Well decomposed cowdung, T<sub>2</sub>=Straw of wheat of Karbi, T<sub>3</sub>=Alkathene sheet, T<sub>4</sub>=Handhoe after each irrigation, T<sub>5</sub>=ENCAP, T<sub>6</sub>=Oil emulsion and T<sub>7</sub>=Foliage of wild weeds.**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) 4.5 m. × 2.3 m. (b) 3.5 m. × 1.3 m. (v) 50 cm. × 50 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 3024 Kg/ha. (ii) 1234.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	3368	2552	3227	3292	3535	2937	2526	2751

**Crop :- Pea (Rabi).**

**Ref :- Rj. 63(87).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'C'.**

Object :- To study to the effect of different isolates of rhyzobia on the growth and yield of Pea.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Ground nut, *Guar* and Cowpea. (c) N.A. (ii) Sandy loam. (iii) 26.11.63. (iv) (a) 2 ploughings and 2 plankings. (b) Behind the plough. (c) 30 Kg/ha. (d) 46 cm. × 23 cm. (e) N.A. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) NP-29. (vii) Irrigated. (viii) 3 weedings. (ix) N.A. (x) 2.4.64.

**2. TREATMENTS :**

7 seed culture treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Rhyzobium Kota, T<sub>2</sub>=Rhyzobium Sriganganagar, T<sub>3</sub>=Rhyzobium Mandore, T<sub>4</sub>=Rhyzobium Durgapura, T<sub>5</sub>=Rhyzobium I.A.R.1. and T<sub>6</sub>=Rhyzobium Udaipur.

**3. DESIGN :**

(i) Youden sq. (ii) (a) 3 plots/block ; 7 blocks/sq., 2 sqs. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 7.3 m. × 5.5 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Av. height of plants and yield of pea. (iv) (a) 1963 only. (b) No. (c) Nil. (v) Sriganganagar, Borkhera and Mandore. (vi) Heavy attack of frost. (vii) Nil.

**5. RESULTS :**

(i) 1160 Kg/ha. (ii) 116.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	1157	1110	1092	1194	1302	1165	1102

**Crop :- Pea (Rabi).**

**Ref :- Rj. 63(78).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'C'.**

Object :- To study the effect of different isolates of rhyzobia on the growth and yield of Pea.

**1. BASAL CONDITIONS .**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 14.11.63. (iv) (a) N.A. (b) Behind the plough. (c) 22 Kg/ha. (d) 61 cm. between rows. (e) N.A. (v) 22.4 Kg/ha. of N. (vi) T-19. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) 8.4.64.

**2. TREATMENTS :**

7 seed culture treatments : T<sub>0</sub>=Control (local), T<sub>1</sub>=Rhyzobium Kota, T<sub>2</sub>=Rhyzobium Sriganganagar, T<sub>3</sub>=Rhyzobium Jodhpur, T<sub>4</sub>=Rhyzobium Durgapura, T<sub>5</sub>=Rhyzobium I.A.R.I. and T<sub>6</sub>=Rhyzobium Udaipur.

**3. DESIGN :**

(i) Youden sq. (ii) (a) 7 blocks/sq ; 3 plots/block and 2 sqs. (b) N.A. (iii) 6. (iv) (a) and (b) 7.3 m. × 5.5 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Heavy infection of powdery mildew ; sporing of spores 0.5%. (iii) Yield of pea. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) Borkhera, Mandore and Durgapura. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 971 Kg/ha. (ii) 239.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	687	815	1100	1077	986	1072	1058

**Crop :- Pea (Rabi).**

**Ref :- Rj. 61(93) ; 62(59) ; 63(40).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'CM'.**

**Object :-** To study the effect of different levels of P and K with different spacings on the yield of Pea.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Maize-Pea for 61(93) ; N.A. for others. (b) Maize for 61(93) and 62(59) ; Fallow for 63(40). (c) Nil. (ii) Clay loam. (iii) 30.10.61 ; 20.10.62 ; 19.11.63. (iv) (a) Two ploughings and two bakherings. (b) Behind the plough. (c) 35 Kg/ha. for 61(93) and 62(59) ; 34 Kg/ha. for 63(40). (d) As per treatments. (e) N.A. (v) N.A. (vi) N.P. 29. (vii) Irrigated. (viii) N.A. for 61(93) ; 1 weeding for 62(59) ; 2 hoeings by kudali for 63(40). (ix) N.A. for 61(93) and 62(59) ; 7 cm. for 63(40). (x) N.A.

## 2. TREATMENTS :

**Main-plot treatments :**

4 spacings between rows : S<sub>1</sub>=30, S<sub>2</sub>=46, S<sub>3</sub>=61 and S<sub>4</sub>=91 cm.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of K<sub>2</sub>O : K<sub>0</sub>=0, K<sub>1</sub>=33.6 and K<sub>2</sub>=67.2 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.2 m. × 4.3 m. for 61(93) and 62(59) ; 5.5 m. × 4.6 m. for 63(40). (b) 4.6 m. × 3.7 m. (v) 30 cm. × 30 cm. for 61(93) and 62(59) ; 46 cm. × 46 cm. for 63(40). (vi) Yes.

## 4. GENERAL :

(i) N.A. for 61(93) ; Good for 62(59) ; Normal for 63(40). (ii) Effected by mildew, control measure for 61(93) ; N.A. for 62(59) ; Incidence of cut worm ; controlled by spraying B.H.C. for 63(40). (iii) Yield of pea. (iv) (a) 1961-1963. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

## 5. RESULTS:

**61(93)**

(i) 12337 Kg/ha. (ii) (a) 1261.7 Kg/ha. (b) 1489.0 Kg/ha. (iii) Main effect of S, P, K and interaction P × S are highly significant. (iv) Av. yield of pea in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	10440	10370	9907	7191	8820	9612	10043	9492
P <sub>1</sub>	14661	17377	13191	9628	13253	14015	13874	13714
P <sub>2</sub>	14980	17013	13669	9558	12774	14463	14176	13804
Mean	13360	14920	12276	8792	11616	12697	12698	12337
K <sub>0</sub>	12807	14227	11307	8123				
K <sub>1</sub>	13993	14900	12687	9209				
K <sub>2</sub>	13280	15633	12832	9044				

C.D. for S marginal means = 672.7 Kg/ha.  
 C.D. for P or K marginal means = 604.8 Kg/ha.  
 C.D. for P means at the same level of S = 1209.7 Kg/ha.  
 C.D. for S means at the same level of P = 1196.5 Kg/ha.

62(59)

(i) 5536 Kg/ha. (ii) (a) 1465.1 Kg/ha. (b) 1219.9 Kg/ha. (iii) Main effects of S, P and K are highly significant. (iv) Av. yield of pea in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	5708	5567	4936	3132	4164	4778	5565	4836
P <sub>1</sub>	6604	7036	5988	3617	5754	5546	6133	5811
P <sub>2</sub>	6146	7402	6209	4089	5418	6155	6311	5961
Mean	6153	6668	5711	3613	5112	5493	6003	5536
K <sub>0</sub>	5365	6453	5320	3311				
K <sub>1</sub>	6438	6420	5656	3458				
K <sub>2</sub>	6654	7133	6157	4068				

C.D. for S marginal means = 781.1 Kg/ha.  
 C.D. for P or K marginal means = 495.5 Kg/ha.

63(40)

(i) 13301 Kg/ha. (ii) (a) 2215 Kg/ha. (b) 1686 Kg/ha. (iii) Main effect of S, P and K are highly significant and interaction S × P is significant. (iv) Av. yield of pea in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	10510	10059	9715	8017	8895	9836	9994	9575
P <sub>1</sub>	15817	18812	14496	10545	14473	14970	15309	14918
P <sub>2</sub>	16517	18712	15172	11242	14384	15759	16092	15412
Mean	14281	15861	13128	9935	12584	13522	13798	13301
K <sub>0</sub>	13512	15136	12195	9493				
K <sub>1</sub>	15152	15050	13706	10179				
K <sub>2</sub>	14180	17397	13482	10133				

C.D. for S marginal means = 1181.0 Kg/ha.  
 C.D. for P or K marginal means = 684.8 Kg/ha.  
 C.D. for P means at the same level of S = 1368.3 Kg/ha.  
 C.D. for S means at the same level of P = 621.9 Kg/ha.

**Crop :- Pea (Rabi).**

**Ref :- Rj. 65(22).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'IM'.**

**Object :-** To study the effect of fertility, moisture relationship with initial growth, germination and yield of Pea.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Moong*. (c) N.A. (ii) Sandy loam. (iii) 1.11.65. (iv) (a) Disk ploughing and harrowing, mould board ploughing. (b) Behind the plough. (c) 57.6 Kg/ha. (d) 45 cm. × 15 cm. (e) N.A. (v) 33.6 Kg/ha. of K<sub>2</sub>O. (vi) Boneville. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) 3, 4.3.1966.



## 2. TREATMENTS:

**Main-plot treatments :**

4 cultural treatments :  $S_1$ =Dry sowing and post irrigation with normal seeds,  $S_2$ =Pre irrigation and post sowing with normal seeds,  $S_3$ =Dry sowing and post irrigation with 12 hrs. soaked seeds, and  $S_4$ =Pre irrigation and post sowing with 12 hrs. soaked seeds.

**Sub-plot treatments :**

4 manural treatments :  $F_1$ =20 Kg/ha. of N+40 Kg/ha. of  $P_2O_5$ ,  $F_2$ =Twice  $F_1$ ,  $F_3$ =40 Kg/ha. of N+40 Kg/ha. of  $P_2O_5$  and  $F_4$ =Twice  $F_3$ .

## 3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 4.5 m.  $\times$  2.3 m. (b) 3.5 m.  $\times$  1.3 m. (v) 50 cm.  $\times$  50 cm. (vi) Yes.

## 4. GENERAL:

(i) Good. (ii) Nil. (iii) Germination count, stand, height and yield of pea etc. (iv) (a) 1965 - N.A. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS:

(i) 3339 Kg/ha. (ii) (a) 723.2 Kg/ha. (b) 782.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pea in Kg/ha.

	$F_1$	$F_2$	$F_3$	$F_4$	Mean
$S_1$	2606	3709	3143	2720	3044
$S_2$	3691	3417	4549	3463	3780
$S_3$	2886	3046	3691	3251	3218
$S_4$	3051	3343	3629	3234	3314
Mean	3058	3379	3753	3167	3339

**Crop :- Pea (Rabi).**

**Ref :- Rj. 62(86).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'IM'.**

Object :—To study the effect of different levels of irrigation under different levels of fertilisers on Pea.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) N.A. (iii) 4.11.62. (iv) (a) 2 bakherings with Bukhar and 2 ploughings with *desi* plough. (b) Behind the plough in rows. (c) 58 Kg/ha. (d) 30 cm. between lines (e) N.A. (v) Nil. (vi) Bonevilla. (vii) Irrigated. (viii) 1 hoeing. (ix) N.A. (x) 15.3.63.

## 2. TREATMENTS :

**Main-plot treatments :**

3 times of irrigation :  $T_1$ =Every 15th day,  $T_2$ =Every 22nd day and  $T_3$ =Every 29th day.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 intensities of irrigation :  $I_1$ =1.5 acre inches,  $I_2$ =2.0 acre inches and  $I_3$ =2.5 acre inches.

(2) 3 fertility levels :  $M_1$ =33.6 Kg/ha. of  $P_2O_5$  as Super.  $M_2$ =16.8 Kg/ha of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super + 16.8 Kg/ha. of  $K_2O$  as Mur. Pot. and  $M_3$ =Twice  $M_2$ .

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 9 sub-plots/main-plot. (b) 12.2 m.  $\times$  10.4 m. (iii) 4. (iv) (a) 3.7 m.  $\times$  3.1 m. (b) 3.1 m.  $\times$  2.4 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL:

(i) Normal. (ii) Nil. (iii) Growth observations and yield of pea (iv) (a) 1962—contd. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 851 Kg/ha. (ii) (a) 183.9 Kg/ha. (b) 285.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pea in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
T <sub>1</sub>	858	975	880	835	975	903	904
T <sub>2</sub>	796	774	959	872	844	813	843
T <sub>3</sub>	785	818	813	667	987	762	805
Mean	813	856	884	791	935	826	851
M <sub>1</sub>	757	839	779				
M <sub>2</sub>	931	905	970				
M <sub>3</sub>	751	824	903				

**Crop :- Pea (Rabi).**

**Ref :- Rj. 63(46).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'IM'.**

**Object :-** To find out the irrigation requirement under varying levels of fertilizers for Pea.

## 1. BASAL CONDITIONS :

(i) (a) to (c) Nil. (ii) N.A. (iii) 26.10.63. (iv) (a) 2 ploughings and 2 bakherings. (b) Behind the plough in rows. (c) 58 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) N.A. (vi) V. Bonevillia. (vii) Irrigated. (viii) 1 hoeing. (ix) N.A. (x) 9.3.64.

## 2. TREATMENTS :

**Main-plot treatments :**

3 times of irrigation : T<sub>1</sub>=Every 15th day, T<sub>2</sub>=Every 22nd day and T<sub>3</sub>=Every 29th day.

**Sub-plot treatments :**

3 levels of fertilizers : M<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, M<sub>2</sub>=16.8 Kg/ha. of N as A/S+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+16.8 Kg/ha. of K<sub>2</sub>O as Mur. Pot. and M<sub>3</sub>=Twice M<sub>2</sub>.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 3.7 m. × 3.1 m. (b) 3.1 m. × 2.4 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of pea. (iv) (a) 1962—contd. (Modified in 63). (b) No. (c) N.A. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1432 Kg/ha. (ii) (a) 373.0 Kg/ha. (b) 301.0 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of pea in Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	Mean
M <sub>1</sub>	1155	1076	1256	1162
M <sub>2</sub>	1379	1390	1469	1413
M <sub>3</sub>	1626	1627	1906	1720
Mean	1387	1364	1544	1432

C.D. for M marginal means = 204.8 Kg/h a.

**Crop :- Pea (Rabi).****Ref :- Rj. 64(68).****Site :- Govt. Agri. Res. Farm, Sultanpur.****Type :- 'IM'.**

Object :—To find out the irrigation requirement under different fertility levels for Pea.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) N.A. (iii) 25.10.64. (iv) (a) 3 bakherings before sowing with Bakher. (b) Drilling. (c) N.A. (d) 46 cm. between lines. (e) N.A. (v) Nil. (vi) Bonevilla. (vii) Irrigated. (viii) 1 weeding. (ix) Negligible. (x) 26.2.65.

**2. TREATMENTS :****Main-plot treatments :**3 times of irrigation :  $T_1$ =Every 15th day,  $T_2$ =Every 22nd day and  $T_3$ =Every 29th day.**Sub-plot treatments :**3 levels of fertilizers :  $M_1$ =33.6 Kg/ha. of  $P_2O_5$  as Super,  $M_2$ =16.8 Kg/ha. of N as A/S+33.6 Kg/ha. of  $P_2O_5$  as Super+16.8 Kg/ha. of  $K_2O$  as Pot. Sul. and  $M_3$ =33.6 Kg/ha. of N as A/S+67.2 Kg/ha. of  $P_2O_5$  as Super+16.8 Kg/ha. of  $K_2O$  as Pot. Sul.**3. DESIGN and 4. GENERAL:**

Same as in expt. no. 63(46) on page 261.

**5. RESULTS :**

(i) 2326 Kg/ha. (ii) (a) 605.6 Kg/ha. (b) 329.9 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of pea in Kg/ha.

	$M_1$	$M_2$	$M_3$	Mean
$I_1$	1751	2106	2563	2140
$I_2$	2090	2668	2817	2525
$I_3$	2005	2386	2547	2313
Mean	1949	2387	2642	2326

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

**Crop :- Pea (Rabi).****Ref :- Rj. 63(47), 64(71); 65(7).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'IMV'.**

Object :—To study the effect of different times of irrigation and levels of P on different varieties of Pea.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Jowar for 63(47); G.M. for 64(71); Fallow for 65(7). (c) Nil. (ii) Clay loam. (iii) 11.11.1963 ; 24.10.1964; 28.10.1965. (iv) (a) Ploughing, bakhering and planking for 63(47) and 64(71); Harrowing by disc harrow for 65(7). (b) Behind the plough for 63(47); Drilling for 64(71) and 65(7). (c) 58 Kg/ha. for 63(47) ; 49 Kg/ha. for 64(71); 86 Kg/ha. for 65(7). (d) Between lines 30 cm. for 63(47) and 65(7); between lines 46 cm. for 64(71). (e) N.A. (v) 56 Kg/ha. of N as A/S broadcast on 10.11.63 for 63(47); G.M. for 64(71); N.A. for 65(7). (vi) As per treatments. (vii) Irrigated. (viii) 1 hceing for 63(47); 1-2 weedings for 64(71) and 65(7). (ix) 29 cm. for 63(47); Negligible for 64(71) and N.A. for 65(7). (x) 4.3.64 for 63(47); 4 and 5.3.65 for 64(71) ; 23.2.66 for 65(7).

**2. TREATMENTS :****Main-plot treatments :**6 times of irrigations :  $I_1$ =Irrigation after 30 days,  $I_2$ =Irrigation after 60 days,  $I_3$ =Irrigation after 90 days,  $I_4$ =Irrigations after 30 and 60 days,  $I_5$ =Irrigations after 30 and 90 days and  $I_6$ =Irrigations after 60 and 90 days.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 varieties :  $V_1$ =Chleabra,  $V_2$ =Bonevilla and  $V_3$ =N.P. 29.(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=44.8$  and  $P_2=89.7$  Kg/ha.

## 3. DESIGN:

(i) Split-plot. (ii) (a) 6 main-plots/replication, 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 5.5 m. × 4.3 m. for 63(47); 4.3 m. × 3.7 m. for 64(71) and 65(7). (b) 4.9 m. × 3.7 m. for 63(47); 3.7 m. × 3.1 m. for 64(71) and 65(7). (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Effect of powdery mildew in latter stages for 63(47); incidence of borers for 64(71); N.A. for 65(7). (iii) Yield of Pea. (iv) (a) 1963–1965. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the main-plot errors are heterogeneous and the main-plot Treatments × years interaction is absent, results of individual years are presented under 5. Results.

## 5. RESULTS :

## 63(47)

(i) 765 Kg/ha. (ii) (a) 136.0 Kg/ha. (b) 254.0 Kg/ha. (iii) Main effects of I, V and interaction  $I \times V$  are highly significant and main effect of P is significant. (iv) Av. yield of pea in Kg/ha.

	$I_1$	$I_2$	$I_3$	$I_4$	$I_5$	$I_6$	$V_1$	$V_2$	$V_3$	Mean
$P_0$	799	467	378	841	603	776	729	448	754	644
$P_1$	972	528	416	1051	659	1042	948	575	811	778
$P_2$	995	570	364	1051	906	1345	1028	949	939	872
Mean	922	522	386	981	723	1054	902	557	835	765
$V_1$	1219	392	341	1350	785	1322				
$V_2$	579	472	196	733	537	827				
$V_3$	967	701	621	860	846	1014				

C.D. for I marginal means = 116.5 Kg/ha.

C.D. for V or P marginal means = 120.5 Kg/ha.

C.D. for V means at the same level of I = 295.1 Kg/ha.

C.D. for I means at the same level of V = 266.0 Kg/ha.

## 64(71)

(i) 557 Kg/ha. (ii) (a) 683.3 Kg/ha. (b) 268.6 Kg/ha. (iii) Main effect of P is highly significant and that of V is significant. (iv) Av. yield of Pea in Kg/ha.

	$I_1$	$I_2$	$I_3$	$I_4$	$I_5$	$I_6$	$P_0$	$P_1$	$P_2$	Mean
$V_1$	436	315	311	507	414	692	318	392	628	446
$V_2$	1066	374	224	698	453	990	473	592	837	634
$V_3$	915	292	208	646	740	740	389	691	690	590
Mean	806	327	248	617	536	807	393	558	718	557
$P_0$	592	293	227	510	351	389				
$P_1$	872	306	194	568	556	852				
$P_2$	954	381	321	773	700	1181				

C.D. for P or V marginal means = 127.4 Kg/ha.

65(7)

(i) 993 Kg/ha. (ii) (a) 496.4 Kg/ha. (b) 290.5 Kg/ha. (iii) Main effect of I is significant and that of V is highly significant. (iv) Av. yield of Pea in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
V <sub>1</sub>	741	558	481	1773	860	1029	776	859	1086	907
V <sub>2</sub>	1050	822	359	1506	1167	1055	834	977	1168	993
V <sub>3</sub>	1054	1223	353	1447	1157	1238	886	1025	1325	1079
Mean	948	868	398	1575	1061	1107	832	954	1193	993
P <sub>0</sub>	764	755	414	1375	819	864				
P <sub>1</sub>	940	885	360	1360	1066	1109				
P <sub>2</sub>	1141	963	419	1990	1299	1349				

C.D. for I marginal means=425.4 Kg/ha.

C.D. for V marginal means=137.8 Kg/ha.

**Crop :- Pea (Rabi).**

**Ref :- Rj. 63(88).**

**Site :- Govt. Agri. Farm, Banswara.**

**Type :- 'D'.**

Object :—To study the efficiency of different fungicides in the control of powdery mildew of Pea.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Red loam. (iii) N.A. (iv) (a) 2 ploughings, 1 bakherings and 1 plaking. (b) N.A. (c) 39 Kg/ha. (d) 30 cm. between plants. (e) N.A. (v) 10 Kg. of Urea for whole of the experiment. (vi) N.P. 29. (vii) Irrigated. (viii) 1 hand weeding. (ix) N.A. (x) 25.2.64; 6, 16.3.64.

**2. TREATMENTS :**

9 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Sersul 0.5%, T<sub>2</sub>=Elosal 0.5%, T<sub>3</sub>=Spersul 0.3%, T<sub>4</sub>=Karathane 0.2%, T<sub>5</sub>=B.P. wettable sulphur 0.5%, T<sub>6</sub>=Ultra Sulphur 0.25%, T<sub>7</sub>=Sulphur dust at 11.2 Kg/ha.+ash at 5.6 Kg/ha. and T<sub>8</sub>=Sulphur dust at 16.8 Kg/ha.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 5.5 m.×3.7 m. (b) 4.6 m.×2.7 m. (v) 46 cm.×46 cm. (vi) Yes.

**4. GENERAL :**

(i) N.A. (ii) Attack of powdery mildew, control measures as per treatments. (iii) Percentage disease index and weight of green pods. (iv) (a) 1963—N.A. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

**5. RESULTS :**

(i) 47.3 degrees. (ii) 5.17 degree. (iii) Treatment differences are highly significant. (iv) Av. of disease index in degrees.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>
Mean angle	56.8	46.5	48.0	48.0	49.4	46.5	48.0	39.2	43.6

C.D.=7.53 degrees.

**Crop :- Pea (Rabi).****Ref :- Rj. 62 (73).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'D'.**

Object :—To study the effect of different fungicides in the control of Powdery Mildew of Pea.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Fallow. (c) N.A. (ii) Sandy. (iii) 10.11.62. (iv) (a) 3 ploughings. (b) N.A. (c) 2 kg. for the experiment. (d) 46 cm. between rows. (e) N.A. (v) and (vi) N.A. (vii) Irrigated. (viii) 3 weedings. (xi) N.A. (x) 15, 23.3.63.

**2. TREATMENTS :**

8 fungicidal treatments :  $T_0$ =Control,  $T_1$ =Spersul 5%,  $T_2$ =Elosal 5%,  $T_3$ =Thiovit 5%,  $T_4$ =Ultra Sulphur 25%,  $T_5$ =Karathane W.D. 2%,  $T_6$ =Wettable sulphur 5% and  $T_7$ =Sulphur dust at 16.8 Kg/ha.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) and (b) 5.5 m. × 3.7 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) N.A. (ii) Attack of powdery mildew of Pea ; control measures are taken as per treatments. (iii) Yield of pea. (iv) (a) 1962-N.A. (Treatments modified in 63). (b) No. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 999 Kg/ha. (ii) 201.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield	1014	1021	1021	798	948	1070	978	1141

**Crop :- Pea (Rabi).****Ref :- Rj. 63(12).****Site :- Govt. Agri. Farm, Mandore.****Type :- 'D'.**

Object :—To study the effect of different fungicides in the control of powdery mildew of Pea.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 12.11.63. (iv) (a) 2 ploughings. (b) Behind the plough. (c) 37 Kg/ha. (d) 46 cm. between lines. (e) N.A. (v) 0.07 cu. meters/ha. of T.C. and 44.8 Kg/ha. of A/S. (vi) Bonevillia. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 10.3.64.

**2. TREATMENTS :**

9 fungicidal treatments :  $T_0$ =Control,  $T_1$ =Sper sul 0.5%,  $T_2$ =Elosal 0.5%,  $T_3$ =Spersul 0.3%,  $T_4$ =Karathane W.D. 0.2 %,  $T_5$ =B.P. wettable sulphur 0.25%,  $T_6$ =Ultra sulphur 0.25%,  $T_7$ =Sulphur dust at 11.2 Kg/ha. + fine ash per at 5.6 Kg/ha. and  $T_8$ =Sulphur dust at 16.8 Kg/ha.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 5.5 m. × 3.7 m. (b) 4.6 m. × 2.7 m. (v) 46 cm. × 46 cm. (v) Yes.

**4. GENERAL :**

(i) Normal. (ii) Effect of powdery mildew ; Control measures are taken as per treatments. (iii) No. of plants effected by powdery mildew/plot and yield of pea. (iv) (a) 1962-N.A. (b) No. (c) N.A. (v) (a) Durgapura, Sriganganagar and Kota. (vi) N.A. (vii) Nil.

## 5. RESULTS :

(i) 290 Kg/ha. (ii) 167 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>
Av. yield	197	287	234	263	339	257	341	438	257

**Crop :- Pea (Rabi).**

**Ref :- Rj. 62(74).**

**Site :- Govt. Agri. Farm, Sriganagar.**

**Type :- 'D'.**

Object :—To study the efficacy of different fungicides in the control of powdery mildew of Pea.

## 1. BASAL CONDITIONS :

(i) (a) No. (b) Cotton. (c) 44.8 Kg/ha. of N. (ii) Sandy loam. (iii) 14.11.62. (iv) (a) 3 ploughings (b) and (c) N.A. (d) 61 cm. between rows. (e) N.A. (v) N.A. (vi) Local. (vii) Irrigated. (viii) 3 hoeings and weeding. (ix) N.A. (x) 12.4.63.

## 2. TREATMENTS :

8 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=5 persul 0.5%, T<sub>2</sub>=Elozal 0.5%. T<sub>3</sub>=Taiovit 0.5%. T<sub>4</sub>=Nitrasulphur 0.25%, T<sub>5</sub>=Karathane W.D. 0.2%, T<sub>6</sub>=Wettable sulphur 0.5% and T<sub>7</sub>=Sulphur dust at 16.8 Kg/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 5.5 m. × 3.7 m. (v) N.A. (vi) Yes,

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of Pea. (iv) (a) 1952-Contd. (Treatments modified in 63). (b) and (c) N.A. (v) (a) Banswara and Mandore. (b) N.A. (vi) and (vii) N.A.

## 5. RESULTS :

(i) 673 Kg/ha. (ii) 140.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	599	797	499	897	648	648	598	697

**Crop :- Pea (Rabi).**

**Ref :- Rj. 63(84).**

**Site :- Govt. Agri. Res. Farm, Sriganagar.**

**Type :- 'D'.**

Object :—To find out the efficacy of different fungicides in the control of powdery mildew of Pea.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 14.12.63, (iv) (a) and (b) N.A. (c) 22 Kg/ha. (d) 61 cm. between lines (e) N.A. (v) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, (vi) T-19. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) 1.4.64.

## 2. TREATMENTS :

9 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Spersul 0.5%, T<sub>2</sub>=Elozal 0.5%. T<sub>3</sub>=Spersul 0.3%. T<sub>4</sub>=Karathane W.D. 0.2%, T<sub>5</sub>=B.P. Wettable Sulphur, T<sub>6</sub>=Ultra Sulphur 0.25%. T<sub>7</sub>=Sulphur dust at 11.2 Kg/ha. mixed with ash at 5.6 Kg/ha. and T<sub>8</sub>=Sulphur dust 16.8 Kg/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 5.5 m. × 3.7 m. (b) 4.6 m. × 2.7 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of powdery mildew; Control measures as per treatments. (iii) Yield of pea and Fodder. (iv) (a) 1962-contd. (b) No. (c) N.A. (v) (a) Mandore, Durgapura and Banswara. (vi) N.A. (vii) Nil.

## 5. RESULTS :

(i) 2155 Kg/ha. (ii) 478 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>
Av. yield	1495	2312	2193	2372	2392	1934	2452	2292	1953

**Crop :- Pea (Rabi).**

**Ref :- Rj. 65(3).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'D'.**

Object :—To find out the optimum dose and time of spersul application for the control of powdery mildew of Pea.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Pea. (c) N.A. (ii) Sandy loam. (iii) 17.11.65. (iv) (a) Ploughing and planking with tractor and plank. (b) Local method of sowing. (c) N.A. (d) 46 cm. between lines. (e) N.A. (v) 33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Vovevilla. (vii) Irrigated, (viii) 3 weedings. (ix) N.A. (x) 14.4.66.

## 2. TREATMENTS :

8 spraying treatments : T<sub>0</sub>=Control (no spray), T<sub>1</sub>=Spray of spersul 2% at 10 days interval, T<sub>2</sub>=Spray of spersul 3% at 10 days interval, T<sub>3</sub>=Spray of spersul 4% at 10 days interval, T<sub>4</sub>=Spray of spersul 2% at 15 days interval, T<sub>5</sub>=Spray of spersul 3% at 15 days interval, T<sub>6</sub>=Spray of spersul 4% at 15 days interval

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 5. (iv) (a) 3.7 m. × 2.7 m. (b) 2.7 m. × 1.8 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of pea etc. (iv) (a) 1965. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1861 Kg/ha. (ii) 642 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pea in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	1440	1873	1814	2239	1848	1922	1973	1778

**Crop :- Sugarcane.**

**Ref :- Rj. 61(36), 63(11).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'M'.**

Object :—To study the effect of different types of fertilizers at different levels and their combination on the yield and quality of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Nil, Wheat. (c) Nil, N.A. (ii) Sandy loam. (iii) 13.3.1961; 29.3.1963. (iv) (a) 5 ploughings. (b) N.A. (c) N.A. ; 55.3 Q/ha. (d) 91 cm. between rows ; 91 cm. × 30 cm. in 1963. (e) N.A. (v) N.A. (vi) Co-312. (vii) Irrigated. (viii) 4 to 5 weedings. (ix) N.A. (x) 23.12.1961; 9, 10.1.1964.

## 2. TREATMENTS:

All combinations of (1), (2), (3) and (4)+3 extra treatments (in each block)

(1) 3 levels of N as A/S : N<sub>1</sub>=67.2, N<sub>2</sub>=134.5 and N<sub>3</sub>=201.7 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=56.0 and P<sub>2</sub>=112.1 Kg/ha.



(3) 3 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$ ,  $K_1=56.0$  and  $K_2=112.1$  Kg/ha.

(4) 3 levels of F.Y.M. :  $F_0=0$ ,  $F_1=11208$  and  $F_2=22417$  Kg/ha.

Extra treatments are :  $E_1=269$  Kg/ha. of N as A/S+112.1 Kg/ha. of  $P_2O_5$  as Super+112.1 Kg/ha. of  $K_2O$  as Mur. Pot.,  $E_2=134.5$  Kg/ha. of N as A/S+131.5 Kg/ha. of N as oil cake+56.0 Kg/ha. of  $P_2O_5$  as Super+56.0 Kg/ha. of  $K_2O$  as Mur. Pot. and  $E_3=67.2$  Kg/ha. of N as A/S+67.2 Kg/ha. of N as oil cake+56.0 Kg/ha. of  $P_2O_5$  as Super+56.0 Kg/ha. of  $K_2O$  as Mur. Pot.

### 3. DESIGN :

(i)  $3^4+3$  fact. confd. (ii) (a) 12 plots/block; 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 61 cm.  $\times$  91 cm. (vi) Yes.

### 4. GENERAL :

(i) Poor growth of the plants in 1961; Poor. (ii) Heavy effect of the top borer in 1961. Crop affected badly by top borer in 1963. Dusting of B.H.C 5% to control it. (iii) Yield of Sugarcane. (iv) (a) 1961—contd. (b) No. (c) N.A. (v) and (vi) N.A. (vii) Error variances are homogeneous. Treatments  $\times$  years interaction is absent.

### 5. RESULTS :

(i) 384.0 Q/ha. (ii) 109.0 Q/ha. [based on 162 d.f. made up of pooled error and various components of Treatments  $\times$  years interaction]. (iii) Main effect of N is highly significant. 'Extra treatments vs. Others' is also highly significant. (iv) Av. yield of cane in Q/ha.

$$E_1=444.6. E_2=460.0 \text{ and } E_3=422.4 \text{ Q/ha.}$$

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	$F_0$	$F_1$	$F_2$	Mean
$N_0$	283.2	311.4	365.5	343.0	326.6	290.6	315.3	341.8	303.0	320.0
$N_1$	364.1	350.0	353.3	340.7	390.6	336.0	376.8	322.4	368.2	355.8
$N_2$	393.4	438.8	421.6	415.9	419.8	418.0	381.2	446.4	426.1	417.9
Mean	346.9	366.7	380.1	366.5	379.0	348.2	357.8	370.2	365.8	364.6
$F_0$	348.7	364.4	360.2	343.6	364.7	365.0				
$F_1$	367.9	364.1	378.6	371.6	389.6	349.4				
$F_2$	324.1	371.6	401.6	384.4	382.8	330.2				
$K_0$	354.0	374.0	371.6							
$K_1$	354.5	384.5	398.0							
$K_2$	332.1	341.6	370.9							

C.D. for N marginal means=41.6 Q/ha.

C.D. for extra treatments vs. others=33.9 Q/ha

**Crop :- Sugarcane.**

**Ref :- Rj. 63, 64, 65(S.F.T). for Sriganagar,  
Kota and 65(S.F.T.) for Banswara.**

**Site :- (District) : Sriganagar,  
Kota and Banswara.**

**Type :- 'M'.**

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

### 1. BASAL CONDITIONS :

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

## 2. TREATMENTS :

8 manurial treatments

O = Control (no manure).

 $N_1$  = 16.8 Kg/ha. of N. $N_2$  = 33.6 Kg/ha. of N. $P_1$  = 33.6 Kg/ha. of  $P_2O_5$ . $N_1P_1$  = 16.8 Kg/ha. of N + 33.6 Kg/ha. of  $P_2O_5$ . $N_2P_1$  = 33.6 Kg/ha. of N + 33.6 Kg/ha. of  $P_2O_5$ . $N_2P_2$  = 33.6 Kg/ha. of N + 67.2 Kg/ha. of  $P_2O_5$ . $N_2P_2K_1$  = 33.6 Kg/ha. of N + 67.2 Kg/ha. of  $P_2O_5$  + 33.6 Kg/ha. of  $K_2O$ .N applied as A/S ;  $P_2O_5$  as Super and  $K_2O$  as Mur. of Pot.

## 3. DESIGN:

A selected district is divided into four agriculturally homogenous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50—100 villages. In each block 36 experiments are conducted in a year of which 11 are of type  $A_1$ , 11 of type  $A_2$ , 11 of type  $A_3$  and 3 are of type C. The eleven experiments under type  $A_1$ ,  $A_2$  and  $A_3$  are distributed as 3 on a kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oilseed. All the three type—C experiments are conducted on a legume crop. For the purpose of conducting the  $A_1$ ,  $A_2$  and  $A_3$  experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type  $A_1$ ,  $A_2$  and  $A_3$  are laid out. For conducting the three type—C trials three villages are randomly selected in each block.

## 4. GENERAL :

(1) to (iii) N.A. (iv) (a) 1963 to 1965 for Sriganganagar, 1964 to 1965 for Kota and 1965 to 1966 for Banswara. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Sriganganagar

## 63 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of cane yield in Q/ha.	162.7	253.1	44.1	178.2	340.8	349.1	365.9	32.7

Control yield = 465.7 Q/ha. ; No. of trials = 8.

## 64 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of cane yield in Q/ha.	63.1	185.4	43.8	146.5	242.1	269.7	279.3	23.7

Control yield = 475.8 Q/ha. ; No. of trials = 9.

## 65 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of cane yield in Q/ha.	56.6	93.3	138.7	93.5	262.8	171.9	175.3	93.5

Control yield = 326.7 Q/ha. ; No. of trials = 11.

## Kota

## 63 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of cane yield in Q/ha.	47.1	94.1	27.2	123.0	178.4	214.7	252.6	51.2

Control yield = 558.2 Q/ha. ; No. of trials = 4.

## 64 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of cane yield in Q/ha.	62.8	88.1	36.8	139.4	199.4	272.5	269.9	91.5

Control yield = 523.2 Q/ha. ; No. of trials = 6.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cane yield in Q/ha.	101.6	156.4	29.2	114.1	168.3	228.7	234.5	12.3

Control yield=532.5 Q/ha. ; No. of trials=9.

## Banswara

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cane yield in Q/ha.	86.7	138.7	27.3	205.3	276.7	288.0	310.7	25.3

Control yield=452.7 Q/ha. ; No. of trials=3.

**Crop :- Sugar cane.****Ref :- Rj. 63, 64, 65(S.F.T.)****Site :- (District) . Banswara, Sriganaganagar and Kota.****Type :- 'M'.**

Object :—To study the response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Red and yellow ; Desert soil ; Red and black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A

## 2. TREATMENTS :

8 manurial treatments :

O=Control (no manure).

N<sub>1</sub>=16.8 Kg/ha. of N.P<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.P<sub>2</sub>=67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>1</sub>=16.8 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>2</sub>=16.8 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.N<sub>2</sub>P<sub>2</sub>K<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in Type A<sub>1</sub> (irrigated) on page no. 268.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a). 1953 to 1955 for Sriganaganagar and 1953 to 1965 for others. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

Banswara

## 63(S.F.T.)

Treatment :	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of cane yield in Q/ha.	110.7	15.8	207.6	251.0	361.8	375.6	359.8	38.6

Control yield=523.9 Q/ha. ; No. of trials=2.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of cane yield in Q/ha.	102.8	31.0	76.4	116.6	183.2	307.7	379.5	22.6

Control yield=510.0 Q/ha. ; No. of trials=3.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of cane yield in Q/ha.	108.7	44.7	78.0	168.7	215.3	290.7	318.7	16.1

Control yield=533.3 Q/ha. ; No. of trials=3.

## Sriganganagar

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cane yield in Q/ha.	117.2	22.3	59.2	169.1	156.2	284.5	287.3	25.6

Control yield=424.0 Q/ha. ; No. of trials=10.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cane yield in Q/ha.	109.4	21.5	58.5	148.6	179.0	225.3	252.9	21.1

Control yield=445.1 Q/ha. ; No. of trials=9.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cane yield in Q/ha.	66.7	22.3	39.0	87.8	82.9	150.8	143.7	16.3

Control yield=348.0 Q/ha. ; No. of trials=11.

## Kota

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of cane yield in Q/ha.	57.8	12.2	38.5	98.1	128.9	254.6	281.2	25.3

Control yield=737.1 Q/ha. ; No. of trials=4.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of cane yield in Q/ha.	108.4	75.3	139.8	180.9	223.8	268.8	312.7	6.1

Control yield=589.1 Q/ha. ; No. of trials=5.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of cane yield in Q/ha.	51.6	18.0	42.7	80.8	107.4	168.6	190.5	13.0

Control yield=457.7 Q/ha. ; No of trials=9.

Crop :- Sugarcane.

Ref :- Rj. 63, 64, 65(SFT).

Site :- (District) Banswara, Sriganganagar and Kota.

Type :- 'M'.

Object :- To study the response curves of important cereal, cash and oilseed crops to potash applied singly and in combination with other nutrients (Type : A<sub>3</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Red and yellow ; Desert soil ; Red and black. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O =Control (no manure).

$N_1$  =16.8 Kg/ha. of N.

$K_1$  =33.6 Kg/ha. of  $K_2O$ .

$K_2$  =67.2 Kg/ha. of  $K_2O$ .

$N_1K_1$  =16.8 Kg/ha. of N+33.6 Kg/ha. of  $K_2O$ .

$N_1K_2$  =16.8 Kg/ha. of N+67.2 Kg/ha. of  $K_2O$ .

$N_2K_2$  =33.6Kg/ha. of N+67.2 Kg/ha. of  $K_2O$ .

$N_1P_1K_1$ =16.8 Kg/ha.of N+33.6 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of  $K_2O$ .

N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. Pot.

## 3. DESIGN :

Same as in type  $A_1$ (Irrigated). on page no. 268.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1963 to 1965 for Banswara and Kota and 1963 to 1966 for Sriganganagar (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

**Banswara****63(S.F.T.)**

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cane yield in Q/ha.	102.8	39.5	70.2	108.7	205.6	249.1	251.1	38.1

Control yield=529.8 Q/ha. ; No. of trials=2.

**64(S.F.T.)**

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cane yield of Q/ha.	96.2	17.1	47.4	156.2	179.9	224.7	255.7	16.3

Control yield=470.0 Q/ha. ; No. of trials=3.

**65(S.F.T.)**

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cane yield in Q/ha.	80.0	18.0	28.7	136.0	181.3	210.0	235.3	21.4

Control yield=496.0 Q/ha. ; No. of trials=3.

**Sriganganagar****63(S.F.T.)**

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cane yield in Q/ha.	173.3	27.5	61.6	181.3	182.4	280.8	237.2	31.6

Control yield=516.2 Q/ha. ; No. of trials=8.

**64(S.F.T.)**

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cane yield in Q/ha.	72.2	27.4	45.0	125.2	134.7	196.4	154.8	31.9

Control yield=319.1 Q/ha. ; No. of trials=7.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of cane in Q/ha.	50.2	6.2	13.8	60.8	66.0	120.5	101.4	10.9

Control yield=309.7 Q/ha. No. of trials=9.

## Kota

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of cane in Q/ha.	72.7	7.2	19.5	90.7	102.6	190.9	137.8	25.6

Control yield=584.8 Q/ha. ; No. of trials=4.

## Pali

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of cane in Q/ha.	50.7	8.6	23.5	63.4	73.5	117.2	60.5	17.4

Control yield=367.7 Q/ha. ; No. of trials=9.

**Crop :- Sugarcane.**

**Site :- As per treatments.**

**Ref :- Rj. 60(SFT).**

**Type :- 'M'.**

Object (Type : A):—To study the response of Sugarcane to different levels of N, P and K applied individually and in combination.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) As per treatments. (iii) to (vi) N.A. (vii) As per treatments. (viii) to (x) N.A.

## 2. TREATMENTS :

- O =Control (no manure)  
 N =67.3 Kg/ha. of N as A/S  
 P =44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.  
 K =44.8 Kg/ha. of K<sub>2</sub>O as Mur. Pot.  
 NP = 67.3Kg/ha. of N as A/S+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.  
 NK =67.3 Kg/ha. of N as A/S+44.8 Kg/ha. of K<sub>2</sub>O as Mur. Pot.  
 PK =44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+44.8 Kg/ha. of K<sub>2</sub>O of as Mur. Pot.  
 NPK =67.3 Kg/ha. of N as A/S+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+44.8 Kg/ha. of K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4-zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

District	No. of trials	Control yield	Av. response in Q/ha.					Interaction effect				
			N	P	K	S.E.	NP	NK	PK	NPK	S.E.	
Banswara	5	414.6	90.8	23.2	30.6	31.5	-23.3	4.8	36.2	28.7	19.6	
Kota	9	323.2	78.4	69.0	27.4	10.5	-8.0	2.1	1.4	-13.7	7.0	
Sriganganagar	9	519.1	85.9	66.3	17.2	20.7	27.5	-6.9	11.1	10.1	17.7	

**Crop :- Sugarcane.****Ref :-Rj. 60(SFT).****Site :- (District) : Banswara, Sriganganagar and Kota.****Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and black ; Desert ; Medium black.. (iii) to (x) N.A.

## 2. TREATMENTS :

O=Control (No manure).

 $n_1=67.3$  Kg/ha. of N as A/S. $n_2=134.6$  Kg/ha. of N as A/S. $n_1'=67.3$  Kg/ha. of N as Urea. $n_2'=134.6$  Kg/ha. of N as Urea. $n_1''=67.3$  Kg/ha. of N as A/S/N. $n_2''=134.6$  Kg/ha. of N as A/S/N. $n_1'''=67.3$  Kg/ha. of N as C/A/N. $n_2'''=134.6$  Kg/ha. of N as C/A/N.

## 3. DESIGN :

Same as in type  $A_1$  (Irrigated) on page no. 268.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

District	No. of trials	Av. yield of Sugarcane in Q/ha.										
		O	$n_1$	$n_2$	$n_1'$	$n_2'$	$n_1''$	$n_2''$	$n_1'''$	$n_2'''$	G.M	S.E./mean
Banswara	2	400.3	407.7	467.6	322.8	409.5	—	—	487.9	448.3	420.6	60.0
Sriganganagar	8	479.1	616.7	671.0	542.3	684.0	—	—	599.6	714.6	615.3	24.9
Kota	9	300.2	371.6	419.1	349.9	417.9	357.8	430.5	—	—	378.1	23.6

**Crop :- Sugarcane (Kharif).****Ref :- Rj. 64(35).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'MV'.**

Object :—To study the effect of N on different varieties of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Paddy. (c) N.A. (ii) Black cotton soil. (iii) 28, 29.2.64. (iv) (a) N.A. (b) Flat planting. (c) 43243 three budded sets/ha. (d) Between lines 76 cm. (e) N.A. (v) 67 Kg/ha. of  $P_2O_5$  was applied at the time of planting in furrows. (vi) As per treatments. (vii) Irrigated. (viii) 2 hoeings and 3 weedings. (ix) N.A. (x) 13 to 18.4.65.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 varieties of Sugarcane :  $V_1=C_0-527$ ,  $V_2=C_0-1007$  and  $V_3=C_0-1111$ .

(2) 2 levels of N :  $N_1=112$  and  $N_2=224$  Kg/ha.

Each treatment is applied in 2 plots.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 3. (iv) (a) 9.8 m.  $\times$  6.1 m. (b) 8.2 m.  $\times$  4.6 m. (v) 76 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

(i) Satisfactory. (ii) Incidence of pyrilla controlled by spraying of 0.02% Endrix. (iii) Germination on %, tiller counts, height, stand, juice quality and yield of Sugarcane. (iv) (a) 1964—N.A. (b) No. (c) N.A. (v) and (vi) N.A. (vii) Nil.

## 5. RESULTS :

## I. Yield.

(i) 589.1 Q/ha. (ii) 108.2 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of sugarcane in Q/ha.

	$V_1$	$V_2$	$V_3$	Mean
$N_1$	500.6	414.1	493.3	469.3
$N_2$	616.5	711.0	799.2	708.9
Mean	558.6	562.6	646.2	589.1

C.D. for N marginal means = 74.6 Q/ha.

## II. Germination.

(i) 42.34 degrees. (ii) 6.38 degrees. (iii) Main effect of V alone is significant. (iv) Av. germination % in degrees.

	$V_1$	$V_2$	$V_3$	Mean
$N_1$	40.12	40.87	47.10	42.70
$N_2$	39.37	39.37	47.22	41.99
Mean	39.74	40.12	47.16	42.34

C.D. for V marginal means = 5.4 degrees.

**Crop :- Sugarcane (Kharif).**

**Ref :- Rj. 63(98).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'CV'.**

**Object :-** To study the effect of times of planting on different varieties of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Heavy black cotton soil. (iii) As per treatments. (iv) (a) N.A. (b) Furrow method of planting. (c) 43243 three budded sets/ha. (d) Between lines 76 cm, (e) 1 set. (v) 134 Kg/ha. of N half at the time of planting and half at top dressing. (vi) As per treatments. (vii) Irrigated. (viii) 4 hand weedings. (ix) N.A. (x) 4, 5.3.64.



## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 lines of planting :  $T_1$ =Autuman (23, 24.10.62) and  $T_2$ =Spring (9.2.63).

(2) 2 varieties :  $V_1$ =C<sub>9</sub>-419 and  $V_2$ =C<sub>9</sub>-527.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 10.1 m. × 6.9 m. (b) 8.5 m. × 5.3 m. (v) 76 cm. × 76 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Infection of aphids observed and spraying done with Endrine on 21.5.63. (iii) Yield of sugarcane. (iv) 1963 only. (b) No. (c) N.A. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 763.4 Q/ha. (ii) 195.2 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of sugarcane in Q/ha.

	$V_1$	$V_2$	Mean
$T_1$	909.7	770.0	839.8
$T_2$	661.1	712.9	687.0
Mean	785.4	741.4	763.4

**Crop :- Sugarcane (Kharif).**

**Ref :- Rj. 63(100).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'CM'.**

Object :- To study the effect of spacings and different levels of N on the yield of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram. (c) Nil. (ii) Black cotton heavy soil. (iii) 19, 20.3.63. (iv) (a) N.A. (b) Furrow method of planting. (c) 43243 three budded sets/ha. (d) As per treatments. (e) 1 set. (v) Nil. (vi) C<sub>9</sub>-419. (vii) Irrigated. (viii) 4 hand weedings. (ix) N.A. (x) 20 to 22.2.64.

## 2. TREATMENTS :

**Main-plot treatments :**

4 spacings between rows :  $S_1=61$ ,  $S_2=76$ ,  $S_3=91$  and  $S_4=107$  cm.

**Sub-plot treatments :**

5 levels of N :  $N_0=0$ ,  $N_1=56.0$ ,  $N_2=112.1$ ,  $N_3=168.1$  and  $N_4=224.2$  Kg/ha.

N applied in 3 doses.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 5 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) and (b) 10.7 m. × 5.5 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Satisfactory ; lodging in the month of September due to heavy winds. (ii) Free from pests and diseases but Endrine sprayed on 22.5.63. (iii) Yield of sugarcane. (iv) (a) 1963 to 1964. (b) No. (c) N.A. (v) N.A. (vi) Heavy winds in the month of September. (vii) Nil.

## 5. RESULTS :

(i) 738.2 Q/ha. (ii) (a) 193.5 Q/ha. (b) 120.4 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of sugarcane in Q/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	Mean
S <sub>1</sub>	409.2	630.8	864.8	968.2	1086.2	791.9
S <sub>2</sub>	456.8	629.8	778.6	853.8	890.7	902.4
S <sub>3</sub>	439.5	634.0	759.6	877.7	903.4	903.6
S <sub>4</sub>	443.4	475.5	771.8	948.0	942.1	895.2
Mean	437.2	592.5	793.7	912.0	955.6	738.2

C.D. for N marginal means=100.1 Q/ha.

**Crop :- Sugarcane (Kharif).**

**Ref :- Rj. 64(33).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'CM'.**

**Object :-** To study the effect of spacings and different levels of N on the yield of Sugarcane.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Paddy. (c) N.A. (ii) Black cotton soil. (iii) 23, 24.2.64. (iv) (a) N.A. (b) Flat planting. (c) 43243 three budded sets/ha. (d) As per treatments. (e) N.A. (v) 67 Kg/ha of P<sub>2</sub>O<sub>5</sub> in furrows, applied at the time of planting. (vi) C<sub>0</sub>-419 (late). (vii) Irrigated. (viii) 2 hoeings with blind hoe and 3 land weedings. (ix) N.A. (x) 20 to 25.4.65.

**2. TREATMENTS :**

**Main-plot treatments :**

4 spacings between rows : S<sub>1</sub>=61, S<sub>2</sub>=76, S<sub>3</sub>=91 and S<sub>4</sub>=107 cm.

**Sub-plot treatments :**

4 levels of N : N<sub>1</sub>=56, N<sub>2</sub>=112, N<sub>3</sub>=168 and N<sub>4</sub>=224 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) and (b) 10.4 m. x 5.5 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good ; lodging in plots with treatment Nil. (ii) Mild attack of pyrilla and spraying of 0.02% Endrin. (iii) Germination %, height, tiller counts, sugarcane yield, and juice analysis. (iv) (a) 1963-1964 (treatments modified in 1964). (b) No. (c) N.A. (v) (a) Sriganganagar. (b) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

**I. Yield.**

(i) 736.1 Q/ha. (ii) (a) 218.3 Q/ha. (b) 141.8 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of sugarcane in Q/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	Mean
S <sub>1</sub>	563.3	680.2	926.6	907.6	744.4
S <sub>2</sub>	473.4	747.6	974.1	933.4	757.1
S <sub>3</sub>	565.0	701.5	799.0	866.3	733.0
S <sub>4</sub>	487.5	776.1	810.2	765.5	736.1
Mean	522.3	726.4	827.5	868.2	736.1

C.D. for N marginal means=119.5 Q/ha.

**Crop :- Sugarcane (Kharif).****Ref :- Rj. 62(32), 62(33).****Site :- Govt. Agri. Res. Farm, Sriganaganagar.****Type :- 'CM'.**

Object :—To study the effect of different levels of N and P and different spacings on the yield of Sugarcane.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Cotton. (c) 37 C.L./ha. of F.Y.M. (ii) Sandy loam. (iii) 16.1.1962 ; 11.3.1962. (iv) (a) to (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) Co-312. (vii) Irrigated. (viii) Hoeing and weeding. (ix) N.A. (x) 12.1.63 ; 12.2.63.

**2. TREATMENTS :****Main-plot treatments**3 spacings between rows :  $S_1=61$ ,  $S_2=76$  and  $S_3=91$  cm.**Sub-plot treatments**

All combinations of (1) and (2).

(1) 3 levels of N :  $N_1=56.0$ ,  $N_2=112.1$  and  $N_3=168.1$  Kg/ha.(2) 2 levels of  $P_2O_5$  :  $P_1=56.0$  and  $P_2=112.1$  Kg/ha.**3. DESIGN :**(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 11.1 m.  $\times$  9.1 m. for 62 (32) ; 12.1 m.  $\times$  9.1 m. for 62 (33). (b) 11.1 m.  $\times$  9.1 m. for 62 (32) ; 10.6 m.  $\times$  7.6 m. for 62 (33). (v) Nil for 62 (32) ; N.A. for 62 (33). (vi) Yes.**4. GENERAL :**(i) and (ii) N.A. (iii) Yield of Sugarcane. (iv) (a) 1962 only. (b) N.A. (c) Results of combined analysis given under 5. (v) and (vi) N.A. (vii) Both the error variances are homogeneous, main-plot Treatments  $\times$  years interaction is present and sub-plot Treatments  $\times$  years interaction are absent.**5. RESULTS**(i) 593.6 Q/ha. (ii) (a) 233.9 Q/ha. (6 d. f. made up of  $\frac{1}{2}$  Treatment  $\times$  years interaction and pooled error). (b) 107.2 Q/ha. (based on 41 d. f. made up of various components of Treatments  $\times$  years interaction and pooled error). (iii) Main effect of P alone is significant. (iv) Av. yield of cane in Q/ha.

	$N_1$	$N_2$	$N_3$	$P_0$	$F_2$	Mean
$S_1$	557.9	651.2	710.6	640.4	639.3	639.9
$S_2$	551.9	565.1	633.1	547.4	619.3	583.4
$S_3$	570.0	562.0	540.4	505.9	609.1	557.5
Mean	559.9	592.8	628.0	564.6	622.6	593.6
$P_1$	541.4	536.7	615.7			
$P_2$	578.5	648.9	640.4			

C.D. for P marginal means=51.0 Q/ha.

**Crop :- Sugarcane (Kharif).****Ref :- Rj. 64(36), 65(44).****Site :- Vidhya Bhawan Rural Institute, Udaipur.****Type :- 'CM'.**

Object :—To study the effect of spacings and different levels of N on the yield of Sugarcane.

**1. BASAL CONDITIONS :**(i) (a) Nil. (b) Maize. (c) N.A. (ii) Red soil. (iii) 7 to 11.3.64 ; 7 to 9.3.65. (iv) (a) 6 ploughings and planking for 64 (36) ; 3 ploughings for 65 (44). (b) Flat planting for 64 (36) ; N.A. for others. (c) 43243 three budded setts/ha. (d) As per treatments. (e) N.A. (v) 67.2 Kg/ha. of  $P_2O_5$  as Super by drilling and 37 C.L./ha. of F.Y.M. by broadcasting for 64 (36) ; N.A. for other. (vi) Co. 419. (vii) Irrigated. (viii) 2 weedings and 1 hoeing. (ix) 63 cm. for 64 (36) ; N.A. for 65 (44). (x) 25 to 29.3.65 for 64 (36) ; 3, 4.3.66.

## 2. TREATMENTS :

## Main-plot treatments

4 spacings between rows :  $S_1=61$ ,  $S_2=76$ ,  $S_3=91$  and  $S_4=107$  cm.

## Sub-plot treatments

4 levels of N as A/S :  $N_1=56.0$ ,  $N_2=112.0$ ,  $N_3=168.0$  and  $N_4=224.0$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) and (b) 12.2 m.  $\times$  5.5 m. for 64 (36) ; 10.7 m.  $\times$  5.5 m for 65 (44). (v) Nil, (vi) Yes. j

## 4. GENERAL :

(i) Good for 64 (36) ; Normal for 65 (44). (ii) N.A. for 64 (36) ; Nil. for 65 (44). (iii) Height tillers count, length and girth of millable cane and yield of cane. (iv) (a) 1954 to 1965. (b) No. (c) Nil. (v) Borkhera and Sriganaganagar. (vi) Nil. (vii) Since the main-plot error variances are heterogeneous and the main-plot Treatments  $\times$  years interaction is absent, results of individual years are presented under 5. Results.

## 5. RESULTS :

## 64(36)

(i) 1243.7 Q/ha. (ii) (a) 381.9 Q/ha. (b) 239.8 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.

	$N_1$	$N_2$	$N_3$	$N_4$	Mean
$S_1$	1457.4	1724.1	1265.7	1190.4	1409.4
$S_2$	1365.3	1320.0	931.8	738.5	1088.9
$S_3$	1380.3	1350.3	1558.7	1011.5	1325.2
$S_4$	1039.4	1147.6	1665.4	753.4	1151.4
Mean	1310.6	1385.5	1355.4	923.4	1243.7

C.D. for N marginal means = 202.1 Q/ha.

## 65(44)

(i) 1025 Q/ha. (ii) (a) 136.2 Q/ha. (b) 164.1 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	$N_1$	$N_2$	$N_3$	$N_4$	Mean
$S_1$	1008	1021	1208	1231	1117
$S_2$	922	981	941	1160	1001
$S_3$	813	1024	1185	1050	1018
$S_4$	977	910	998	967	963
Mean	930	984	1083	1102	1025

Crop :- Sugarcane.

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

Ref :- Rj. 64(34), 65(48).

Type :- 'IM'.

Object :- To study the effect of different levels of N and interval of irrigation on the yield of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Paddy. (c) N.A. (ii) Black cotton soil. (iii) 8, 9.2.64 ; 9, 10.2.65. (iv) (a) N.A. for 64 (34) ; Ploughings and harrowing for 65 (48). (b) Flat planting. (c) 43243 three budded setts/ha. for 64 (34) ; 73.8 Q/ha. (d) 76 cm. between rows for 64.(34) : 76 cm.  $\times$  30 cm. for other. (e) N.A. (v) 67 Kg/ha. of  $P_2O_5$  at the time of planting in furrows for 64 (34) ; 185 Kg/ha. of  $P_2O_5$  for 65 (48). (vi) Co.419. (vii) Irrigated. (viii) 1 to 2 hoeings and 3 to 4 weedings. (ix) N.A. (x) 1 to 6.5.65 ; 28.2.66 to 3.3.66]

## 2. TREATMENTS :

**Main-plot treatments**

3 premonsoon irrigation interval :  $I_1=7$ ,  $I_2=14$  and  $I_3=21$  days interval.

**Sub-plot treatments**

4 levels of N as A/S :  $N_1=56$ ,  $N_2=112$ ,  $N_3=168$  and  $N_4=224$  Kg/ha.

N applied in 3 doses  $\frac{1}{3}$  at planting and other two doses as top dressing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 12.8 m.  $\times$  4.6 m. for 64 (34) ; 10.7 m.  $\times$  5.3 m. for 65 (48). (b) 11.3 m.  $\times$  3.1 m. for 64 (34) ; 9.1 m.  $\times$  3.8 m. for 65 (48). (v) 76 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

(i) Good but heavy lodging except in few plots for 64 (34) only. (ii) Heavy incidence of pyrilla which is controlled by spraying 0.5% Endrin twice for 64 (34) ; Nil for 65 (48). (iii) Germination %, height, tiller counts and yield of cane. (iv) (a) 1964-65. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Both the error variances are homogeneous and main-plot Treatments  $\times$  years interaction and sub-plot Treatments  $\times$  years interaction are absent.

## 5. RESULTS :

(i) 1160.1 Q/ha. (ii) (a) 198.4 Q/ha. (based on 10 d. f. made up of Treatments  $\times$  years interaction and pooled error). (b) 163.3 Q/ha. (based on 45 d. f. made up of various components of Treatments  $\times$  years interaction and pooled error). (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.

	$N_1$	$N_2$	$N_3$	$N_4$	Mean
$I_1$	945.5	1124.5	1280.0	1348.0	1174.5
$I_2$	917.0	1163.5	1212.0	1375.5	1167.0
$I_3$	977.0	1087.0	1222.0	1270.0	1139.0
Mean	946.5	1125.0	1238.0	1331.1	1160.1

C.D. for N marginal means = 109.6 Q/ha.

**Crop :- Sugarcane (Kharif).**

**Ref :- Rj. 63(96).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'IM'.**

Object : -To study the effect of different levels of N and intervals of irrigation on the yield of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize. (c) N.A. (ii) Sandy loam. (iii) 8.3.63. (iv) (a) N.A. (b) Behind the plough. (c) 12056 setts/ha. (d) Between lines 76 cm. (e) 3 budded set per running length of 30 cm. (v) 44.8 Kg/ha. of  $P_2O_5$  as Super and 25 C.L/ha. of F.Y.M. (vi) Co. 312. (vii) Irrigated. (viii) 8 weedings. (ix) N.A. (x) 23.3.64.

## 2. TREATMENTS :

**Main-plot treatments**

3 premonsoon irrigation intervals :  $I_1=7$  days,  $I_2=14$  days and  $I_3=21$  days.

**Sub-plot treatments**

5 levels of N as A/S :  $N_0=0$ ,  $N_1=56$ ,  $N_2=112$ ,  $N_3=168$  and  $N_4=224$  Kg/ha.

N applied in three doses,  $\frac{1}{3}$  at sowing,  $\frac{1}{3}$  on 28.5.63 and  $\frac{1}{3}$  on 16.7.1963.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 5 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 12.2 m.  $\times$  5.3 m. (b) 10.7 m.  $\times$  3.8 m. (v) 76 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal ; lodging in plots with higher doses of N. (ii) Effected by all types of borers ; One spray of 0.02% Endrin given. (iii) Yield of Sugarcane. (iv) (a) 1963-contd. (treatments modified in 64). (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) Severe attack of frost and low rainfall. (vii) Nil.

## 5. RESULTS :

(i) 579.5 Q/ha. (ii) (a) 118.2 Q/ha. (b) 88.6 Q/ha. (iii) Main effect of N and interaction I  $\times$  N are significant. (iv) Av. yield of Sugarcane in Q/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	Mean
I <sub>1</sub>	463.4	612.6	644.8	664.4	532.5	583.5
I <sub>2</sub>	541.5	633.7	654.4	671.5	513.8	603.0
I <sub>3</sub>	383.4	408.7	752.5	591.4	624.5	552.1
Mean	462.8	551.7	683.9	642.4	556.9	579.5

C.D. for N marginal means . . . . . 86.3 Q/ha.  
 C.D. for N means at the same level of I =149.2 Q/ha.  
 C.D. for I means at the same levels of N =177.6 Q/ha.

**Crop :- Sugarcane.**

**Ref :- Rj. 64(38), 65(46).**

**Site :- Reg. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'IM'.**

Object :-To find out the optimum dose of N and pre-monsoon irrigational interval of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat for 64(38); *Guar* for 65(46). (c) N.A. for 64(38); Nil for 65(46). (ii) Sandy loam. (iii) N.A.; 27.3.65. (iv) (a) 6 ploughings for 64(38); Ploughing and planking for 65(46). (b) Flat planting in rows for 64(38); Furrow planting for 65(46). (c) N.A. for 64(38); One three budded sett per running 0.3 m. (d) 76 cm. between rows. (e) N.A. (v) 12 C.L/ha. of F.Y.M. for 64(38); 67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and 24.7 C.L/ha. of F.Y.M. for 65(46). (vi) Co.312. (vii) As per treatments. (viii) Weedings and hoeings. (ix) 30.6 cm.; 19 cm. (x) N.A. for 64(38); 12, 13.4.66 for 65(46).

## 2. TREATMENTS :

## Main-plot treatments :

3 pre-monsoon irrigation interval : I<sub>1</sub>=7, I<sub>2</sub>=14 and I<sub>3</sub>=21 days.

## Sub-plot treatments :

4 levels of N as A/S : N<sub>1</sub>=56, N<sub>2</sub>=112, N<sub>3</sub>=168 and N<sub>4</sub>=224 Kg/ha.

N applied in 3 doses,  $\frac{1}{3}$  at planting and remaining two doses as top dressing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 12.2 m.  $\times$  5.3 m. for 64(38); 12.2 m.  $\times$  4.6 m. for 65(4). (b) 10.7 m.  $\times$  3.8 m. for 64(38); 10.7 m.  $\times$  3.1 m. for 65(46). (v) 76 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal but lodging in plots of N<sub>3</sub> and N<sub>4</sub> levels for 64(38); Good for 65(46). (ii) N.A. for 64(38); Nil for 65(46). (iii) Height, tiller counts and yield of cane. (iv) (a) 1963 to 1965 [Treatments modified in 1964]. (b) No. (c) Results of combined analysis of 64 and 65 are given under 5. Results. (v) N.A. (vi) Nil. (vii) Both the error variances are homogeneous and main-plot Treatments  $\times$  years interaction sub-plot Treatments  $\times$  years interaction are absent.

## 5. RESULTS :

(i) 750.5 Q/ha. (ii) (a) 261.8 Q/ha. [based on 10 d.f. made up of Treatments×years interaction and pooled error]. (b) 208.1 Q/ha. [based on 45 d.f. made up of various components of Treatments×years interaction and pooled error]. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	Mean
I <sub>1</sub>	785.8	858.2	721.6	890.6	814.1
I <sub>2</sub>	680.9	790.6	716.8	750.8	734.8
I <sub>3</sub>	640.5	678.6	782.7	708.2	702.5
Mean	702.4	775.8	740.4	783.2	750.5

**Crop :- Sugarcane (Kharif).**

**Ref :- Rj. 63(101).**

**Site :- Vidhya Bhavan Rural Institute Farm, Udaipur.**

**Type :- 'IM'.**

**Object :—**To study the effect of different levels of N and interval of irrigation on the yield of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) (a) Clay loam. (iii) 28.2.63 and 1, 2.3.63. (iv) (a) Field preparation interculture and 1 ploughing with *desi* plough and 3 phawra. (b) Furrow method of planking. (c) 43243 three budded setts/ha. (d) Between lines 76 cm. (e) N.A. (v) 67 Kg/ha. of P<sub>2</sub>O<sub>5</sub> by spreading in the furrows and 138.3 Q/ha. of F.Y.M. by broad casting (vi) Co.419. (vii) As per treatments. (viii) N.A. (ix) 80 cm. (x) 12.3.64.

## 2. TREATMENTS :

**Main-plot treatments :**

8 intervals of irrigation : I<sub>1</sub>=7 days, I<sub>2</sub>=14 days and I<sub>3</sub>=21 days.

**Sub-plot treatments :**

4 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=56, N<sub>2</sub>=112 and N<sub>3</sub>=168 Kg/ha.

N applied in 3 instalments at planting in top dressing and irrigation applied to a depth of 10 cm.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 12.2 m. × 5.3 m. (b) 10.7 m. × 3.8 m. (v) 76 cm. × 76 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Incidence of pyrilla and borer and control measures—N.A. (iii) Yield of Sugarcane. (iv) (a) 1963—contd. (b) No. (c) N.A. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1024.7 Q/ha. (ii) (a) 280.5 Q/ha. (b) 198.0 Q/ha. (iii) Main effect of I alone is significant. (iv) Av. yield of Sugarcane in Q/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
I <sub>1</sub>	1154.5	1254.1	1258.2	1331.6	1249.6
I <sub>2</sub>	1013.4	886.4	1039.0	983.7	980.6
I <sub>3</sub>	726.4	858.3	837.8	952.8	843.8
Mean	964.8	996.8	1045.0	1089.4	1024.7

C.D. for I marginal means=317.8 Q/ha.

**Crop :- Sugarcane.****Ref :- Rj. 64(37), 65(45).****Site :- Vidhya Bhawan Rural Instt., Udaipur.****Type :- 'IM'.****Object :-** To study the effect of different levels of N and intervals of irrigation on the yield of Sugarcane.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Pea for 64(37); Maize for 65(45). (c) N.A. (ii) Red soil. (iii) 27, 28.3.64; 5.4.65. (iv) (a) 3 to 10 ploughings. (b) Flat planting for 64(37); N.A. for 65(45). (c) 43243 three budded setts/ha. (d) 76 cm. between lines. (e) N.A. (v) 37 C.L/ha. of F.Y.M. for 64(37); 60.0 Kg/ha. of  $P_2O_5$  and 25 C.L/ha. of F.Y.M. for 65(45). (vi) Co.419. (vii) Irrigated. (viii) 2 hand weedings and 1 hoeing. (ix) 63 cm. for 64(37); N.A. for 65(45). (x) 1 to 8.4.65 for 64(37); 27, 28.3.66 for 65(45).

**2. TREATMENTS :****Main-plot treatments :**3 intervals of irrigation :  $I_1=7$  days,  $I_2=14$  days and  $I_3=21$  days.**Sub-plot treatments :**4 levels of N as A/S :  $N_1=56$ ,  $N_2=112$ ,  $N_3=168$  and  $N_4=224$  Kg/ha.N applied in 3 equal doses,  $\frac{1}{3}$  at planting and remaining doses as top dressing.**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 12.2 m.  $\times$  5.5 m. for 64(37); 12.2 m.  $\times$  4.6 m. for 65(45). (b) 10.7 m.  $\times$  4.0 m. for 64(37); 10.7 m.  $\times$  3.1 m. for 65(45). (v) 76 cm.  $\times$  76 cm. (vi) Yes.

**4. GENERAL :**

(i) Very good. (ii) Nil. (iii) Height, tiller counts and yield of cane. (iv) (a) 1964 to 1965. (b) No. (c) Nil. (v) Sriganaganagar. (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous results of individual years are presented under 5. Results.

**5. RESULTS :****64(37)**

(i) 2299.0 Q/ha. (ii) (a) 265.0 Q/ha. (b) 242.9 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.

	$N_1$	$N_2$	$N_3$	$N_4$	Mean
$I_1$	2073.5	2090.6	2245.5	2725.2	2283.7
$I_2$	1946.1	1907.5	2025.9	3077.1	2239.2
$I_3$	2224.8	2418.6	2274.1	2579.6	2374.3
Mean	2081.5	2138.9	2181.8	2794.0	2299.0

C.D. for N marginal means=240.6 Q/ha.

**65(45)**

(i) 1136 Q/ha. (ii) (a) 423.0 Q/ha. (b) 150.0 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.

	$N_1$	$N_2$	$N_3$	$N_4$	Mean
$I_1$	933	1071	1353	1143	1125
$I_2$	748	979	1112	1129	992
$I_3$	1087	1153	1502	1420	1290
Mean	923	1068	1322	1231	1136

C.D. for N marginal means=148.8 Q/ha.



**Crop :- Sugarcane.****Ref :- Rj. 65(47).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'IMV'.**

Object :—To determine the optimum doses of N and pre-monsoon irrigations for different promising varieties.

**1. BASAL CONDITIONS :**

(i) (a) No. (b) Paddy. (c) N.A. (ii) Black cotton soil. (iii) 18, 19.2.65. (iv) (a) Ploughing and harrowing. (b) Flat planting. (c) 64.5 to 73.8 Q/ha. (d) 76 cm. × 30 cm. (e) N.A. (v) 75 Kg/ha. of  $P_2O_5$ . (vi) and (vii) As per treatments: (viii) 4 weedings and hoeing. (ix) N.A. (x) 11 to 16.4.66.

**2. TREATMENTS :****Main-plot treatments :**

2 irrigational schedule:  $I_1$  = Irrigation at 10 days and  $I_2$  = Irrigation at 20 days.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 4 varieties:  $V_1$  = Co. 527,  $V_2$  = Co. 997,  $V_3$  = Co. 1007 and  $V_4$  = Co. 1111.

(2) 2 levels of N:  $N_1$  = 112.1 and  $N_2$  = 224.2 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication, 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 12.2 m. × 4.6 m. (b) 10.7 m. × 3.1 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Fair. (ii) Nil. (iii) Shoot height and tillering and yield of cane. (iv) (a) 1965 N.A. (b) No. (c) Nil (v) to (vii) Nil.

**5. RESULTS :**

(i) 646.2 Q/ha. (ii) (a) 87.6 Q/ha. (b) 167.4 Q/ha. (iii) Main effect of N is highly significant and main effect of V is significant. (iv) Av. yield of sugarcane in Q/ha.

	$N_1$	$N_2$	Mean	$V_1$	$V_2$	$V_3$	$V_4$
$I_1$	551.7	777.7	664.7	590.3	699.6	789.6	579.3
$I_2$	526.8	728.6	627.7	684.4	618.5	681.2	526.7
Mean	539.2	753.2	646.2	637.4	659.0	755.4	553.0
$V_1$	510.8	763.9					
$V_2$	529.3	788.8					
$V_3$	674.6	796.2					
$V_4$	442.3	663.7					

C.D. for N marginal means = 84.4 Q/ha.

C.D. for V marginal means = 119.5 Q/ha.

**Crop :- Sugarcane (Kharif).****Ref :- Rj. 63(99).****Site :- Govt. Agri. Res. Farm, Sriganganagar.****Type :- 'IC',**

Object :—To study the effect of different depths of planting and irrigations on the yield of Sugarcane.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (iii) 20.3.63. (iv) (a) N.A. (b) Behind the plough. (c) N.A. (d) Between lines 76 cm. (e) 3 budded set per running 30 cm. (v) 112 Kg/ha. of  $P_2O_5$ , 44.8 Kg/ha. of  $K_2O$  ( $\frac{1}{2}$  at the time of sowing and  $\frac{1}{2}$  at the time of monsoon) and 25 C.L/ha. of F.Y.M. (vi) Co.312. (vii) Irrigated. (viii) 6 weedings. (ix) N.A. (x) 15.4.64.

## 2. TREATMENTS :

**Main-plot treatments :**

3 times of irrigations :  $I_1$ =Planting without palewa and 1st irrigation after 3 weeks of planting,  $I_2$ =Planting without palewa and 1st irrigation after planting and  $I_3$ =Planting with palewa.

**Sub-plot treatments :**

3 depths of sowing below the surface :  $D_1=5$ ,  $D_2=10$  and  $D_3=15$  cm.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 12.2 m. × 4.6 m. (b) 10.7 m. × 3.1 m. (v) 76 cm. × 76 cm. (vi) Yes.

## 4. GENERAL :

(i) Poor. (ii) Crop was affected by all types of borers. (iii) Yield of Sugarcane. (iv) (a) and (b) No. (c) N.A. (v) N.A. (vi) Low rainfall and severe frost. (vii) Nil.

## 5. RESULTS :

(i) 396.3 Q/ha. (ii) (a) 142.6 Q/ha. (b) 118.7 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of Sugarcane in Q/ha.

	$I_1$	$I_2$	$I_3$	Mean
$D_1$	332.1	521.6	437.7	430.5
$D_2$	422.2	657.8	360.3	380.1
$D_3$	407.5	351.3	375.9	378.2
Mean	387.3	410.2	391.3	396.3

**Crop :- Sugarcane (Kharif).**

**Ref :- Rj. 62(31).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'ICM'.**

**Object :-** To find out the manurial doses and irrigational schedule for Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Cotton. (c) 37 C.L./ha. of F.Y.M. (ii) Sandy loam. (iii) 26.2.62. (iv) (a) N.A. (b) As per treatments. (c) N.A. (d) Row to row 76 cm. (e) N.A. (v) N.A. (vi) Co-312. (vii) As per treatment. (viii) Hoeing and weedings. (ix) N.A. (v) 23.2.63.

## 2. TREATMENTS :

**Main-plot treatments :**

2 depth of planting :  $D_1$ =Shallow and  $D_2$ =Deep planting.

**Sub-plot treatments :**

3 irrigation interval :  $I_1=14$ ,  $I_2=21$ ,  $I_3=28$  days.

**Sub-sub-plot treatments :**

3 levels of N :  $N_1=67$ ,  $N_2=134$  and  $N_3=201$  Kg/ha.

## 3. DESIGN :

(i) Split-split-plot. (ii) (a) 2 main-plots/block ; 3 sub-plots/main-plot ; 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 2. (iv) (a) 12.1 m. × 9.2 m. (b) 10.6 m. × 7.6 m. (v) 76 cm. × 76 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of sugarcane. (iv) (a) 1962 only. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

(i) 789.2 Q/ha. (ii) (a) 201.1 Q/ha. (b) 119.2 Q/ha. (c) 100.2 Q/ha. (iii) Main effect of I alone is significant. (iv) Av. yield of cane in Q/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
D <sub>1</sub>	942.0	790.9	742.9	736.1	865.9	874.0	825.3
D <sub>2</sub>	853.0	699.4	706.3	763.2	713.5	782.8	753.2
Mean	897.9	745.1	483.1	749.6	789.7	828.4	789.2
N <sub>1</sub>	876.2	712.0	660.6				
N <sub>2</sub>	918.4	720.8	730.1				
N <sub>3</sub>	899.3	802.9	782.8				

C.D. for I marginal means=135.2 Kg/ha.

**Crop :- Sugarcane.**

**Ref :- Rj. 62(30), 63(97), 64(32).**

**Site :- Govt. Agri. Farm, Borkhera.**

**Type:- 'DC'.**

**Object :-** To find out the efficacy of weedicides with and without weeding by implement on the yield of Sugarcane.

#### 1. BASAL CONDITIONS :

(i) (a) N.A. for 62(30), 64(32) ; Nil for 63(97). (b) *Jowar* for 62(30) ; *Sarson* for 63(97) ; Paddy for 64(32). (c) 44.8 Kg/ha. of N as A/S for 62(30) ; G.M. with *Sanai* for 63(97) ; N.A. for 64(32). (c) Black cotton soil (iii) February, 1962 ; 13, 14.2.1963 ; 14, 15.2.1964. (iv) (a) N.A. (b) In furrows for 62(30), 63(27) ; Flat planting for 64(32). (c) 43243 (3 budded) setts/ha. (d) 76 cm. between rows. (e) 1. (v) N.A. for 62(30) ; 134 Kg/ha. of N half at the time of planting and half as top dressing for 63(97) and 64(32) with an additional dose of 67 Kg/ha. of P<sub>2</sub>O<sub>5</sub> at the time of planting for 64(32). (vi) C<sub>0</sub>.—419. (vii) Unirrigated for 62(30) ; Irrigated for others. (viii) As per treatments. (ix) N.A. (x) February, 1963 ; 14 to 16.2.1964 ; 27 to 30.4.1965.

#### 2. TREATMENTS:

##### Main-plot treatments :

3 cultural treatments : C<sub>0</sub>=Control, C<sub>1</sub>=Hand weeding and C<sub>2</sub>=Weeding by bullocks driven implement.

##### Sub-plot treatments :

4 weedicidal treatments : W<sub>0</sub>=No weedicide, W<sub>1</sub>=Preemergence spraying of 2,4-D, W<sub>2</sub>=Post emergence of 2, 4-D, W<sub>3</sub>=Pre+Post emergence spraying of 2, 4-D.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 2 for 62(30) ; 3 for others. (iv) (a) N.A. for 62(30) ; 10.7 m. × 4.6 m. for 63(97) ; 10.1 m. × 4.6 m. for 64(32). (b) 6.5 m. × 4.6 m. for 62(30) ; 9.2 m. × 3.1 m. for 63(97) ; 8.5 m. × 3.1 m. for 64(32). (v) N.A. for 62(30) ; 76 cm. × 76 cm. for 63(96). (vi) Yes.

#### 4. GENERAL :

(i) N.A. for 62(30) ; Good for others. (ii) N.A. for 62(30) ; Endrin Sprayed for 63(97) ; Incidence of pyrilla controlled by spraying 0.02% Endrin. (iii) Yield of cane for 62(30), 63(97) ; yield of cane and germination % for 64(32). (iv) 1962—1964. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Both the error variances are homogeneous and main-plot treatments × years interaction and sub-plot Treatments × years interaction are present.

#### 5. RESULTS:

(i) 651.8 Q/ha. (ii) (a) 95.9 Q/ha. [based on 4 d.f. made up of treatments × years interaction]. (b) 101.8 Q/ha. [based on 18 d.f. made up of various components of treatments × years interaction. (iii) Main effect of C alone is significant. (iv) Av. yield of cane in Q/ha.

	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	Mean
C <sub>0</sub>	524.0	506.1	505.6	566.9	525.6
C <sub>1</sub>	741.4	731.4	809.9	716.5	749.8
C <sub>2</sub>	664.8	770.8	653.1	630.4	679.8
Mean	643.4	669.4	656.2	637.9	651.8

C.D. for C marginal mean = 108.7 Q/ha.

64(32).

**Germination analysis.**

(i) 45.85 degrees. (ii) (a) 2.99 degrees. (b) 2.53 degrees. (iii) None of the effects is significant. (iv) Av. germination in degrees.

	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	Mean
C <sub>0</sub>	47.34	47.70	45.84	45.90	46.70
C <sub>1</sub>	42.10	46.92	44.00	45.32	44.58
C <sub>2</sub>	45.78	45.32	47.92	46.09	46.28
Mean	45.07	46.65	45.92	45.77	45.85

**Crop :- Cotton (Kharif).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Ref :- Rj. 65(19).**

**Type :- 'M'.**

**Object :-** To determine the optimum time of application for N fertilizers for Cotton crop.

**1. BASAL CONDITIONS :**

(i) (a) No. (b) and (c) N.A. (ii) Class II. (iii) 23.5.65, (iv) (a) Bukhering and planting. (b) Drilling. (c) 19.8 Kg/ha. (d) 76 cm. between lines. (e) N.A. (v) N.A. (vi) C Indore-1. (vii) Irrigated. (viii) 4 hoeings. (ix) N.A. (x) Five pickings from 23.9.65 to 29.12.65.

**2. TREATMENTS :**

All combinations of (1) and (2) + a Control (2 plots).

(1) 2 levels of N : N<sub>1</sub>=61.8 and N<sub>2</sub>=123.6 Kg/ha.

(2) 5 times of application of N<sub>1</sub> : T<sub>1</sub>=Full at sowing, T<sub>2</sub>=Full at square formation, T<sub>3</sub>= $\frac{1}{2}$  at sowing +  $\frac{1}{2}$  at square formation, T<sub>4</sub>= $\frac{1}{3}$  at sowing +  $\frac{2}{3}$  at square formation and T<sub>5</sub>= $\frac{2}{3}$  at sowing +  $\frac{1}{3}$  at square formation.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) and (b) 6.1 m. x 4.6 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Dusting of BHC and Endrin spraying against ball worms. (iii) Stand, height, no. of branches and yield of *Kapas*. (iv) 1965 only. (b) No. (c) Nil. (v) No. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 851 Kg/ha. (ii) 140.6 Kg/ha. (iii) Main effect of N and 'control vs. others' are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

Control=489 Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	Mean
N <sub>1</sub>	801	719	818	788	783	782
N <sub>2</sub>	1194	1033	1110	1071	916	1065
Mean	997	876	964	930	850	923

C.D. for N marginal means=90.4 Kg/ha.

C.D. for 'Control vs. others'=111.0 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- Rj. 63(12), 64(84), 65(43).****Site :- Govt. Agri. Res. Farm, Sriganaganagar. Type :- 'M'.**Object :—To study the effect of various levels of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O on the yield of Cotton.**1. BASAL CONDITIONS :**

(i) (a) N.A. for 63(12); Nil for others. (b) Sugarcane for 63(12); Wheat for 64(84); Fallow for 65(43). (c) 112.1 Kg/ha. of N as A/S +112.1 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super for 62(12); Nil for others. (ii) Sandy loam. (iii) 20.4.1963; 25.5.1964; 26.5.1965. (iv) (a) N.A. for 63(12); 4 cultivation with tractor for 64(84); Ploughing and planking for 65(43). (b) N.A. for 63(12); Line sowing; Drilling. (c) 13 Kg/ha. (d) N.A. for 63(12); 81 cm. × 30 cm. for others. (e) N.A. (v) N.A. for 63(12), 65(43); Nil for 64(84). (vi) 320—F. (American). (vii) Irrigated. (viii) 3 weedings for 63(12); 1 thinning for 64(84). (ix) 2 hoeings and weedings for 65(43) N.A.; 22 cm. N.A. (x) 28.11.63, 18.1.1964; 18.17.64, 16.11.65, 31.12.1965.

**2. TREATMENTS :**

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

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=44.8 and N<sub>2</sub>=89.7 Kg/ha.(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.(3) 3 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>0</sub>=0, K<sub>1</sub>=33.6 and K<sub>2</sub>=67.2 Kg/ha.**3. DESIGN :**

(i) 3<sup>3</sup> Fact. confd. (ii) (a) 9 plots, block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) 9.2 m. × 5.5 m. (b) 9.2 m. × 3.7 m. for 63(12), 64(84); 7.4 m. × 3.7 m. for 65(43). (v) 91 cm. on either side along breadth for 63(12), 64(84); 91 cm. × 91 cm. for 65(43). (vi) Yes.

**4. GENERAL :**

(i) Normal for 63(12), 64(84); Poor for 65(43). (ii) N.A. for 63(12), 65(43); Spraying of Endrin (20% EC) at 1.2 litres/ha. for control of jassids in 64(84). (iii) Yield of *Kapas*. (iv) (a) 1963 to 1965. (b) —. (c) Results of combined analysis given under 5. (v) and (vi) Nil. (vii) Error variances are heterogeneous and treatments × years interaction is present.

**5. RESULTS :**

(i) 1161 Kg/ha. (ii) 473.1 Kg/ha. [based on 28 d.f. made up of interactions of N, P, K, N × P, N × K with years]. (iii) Main effect of N alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	1004	917	1006	857	1009	1061	976
N <sub>1</sub>	1039	1211	1174	1143	1138	1143	1141
N <sub>2</sub>	1390	1397	1313	1323	1422	1355	1367
Mean	1144	1175	1164	1108	1190	1186	1161
K <sub>0</sub>	1151	1123	1048				
K <sub>1</sub>	1209	1194	1166				
K <sub>2</sub>	1072	1208	1279				

C.D. for N marginal means=186.5 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- Rj. 60(40), 61(40), 62(107).****Site :- Govt. Agri. Res. Farm, Sriganaganagar.****Type :- 'M'.**

Object :—To study the effect of N, P and K alone and in combination on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) N.A. for 64(40), 61(40); Nil for 62(107). (b) Sugarcane (Ratoon) for 60(40); Cotton for 61(40); Wheat for 62(107). (c) 168.1 Kg/ha. of N+112.1 Kg/ha. of  $P_2O_5$  for 60(40), 61(40); N.A. for 62(107). (ii) Sandy loam. (iii) 2.6.60; 27.5.61 ; 20.5.62, (iv) (a) 3 to 5 ploughings. (b) N.A. (c) 13 Kg/ha. (d) 91 cm.  $\times$  30 cm, (e) N.A. (v) N.A. (vi) 320—F (American). (vii) Irrigated. (viii) 2 weedings and hoeings. (ix) N.A. (x) 3 pickings on 7.11.60, 9.12.60, 18.1.61 for 60(40); 15.11.61, 9.12.61 and 30.12.61 for 61(40); 21.12.62 and 16.1.63 for 62(107).

**2. TREATMENTS :**

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

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=44.8$  Kg/ha.(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=67.2$  Kg/ha.(3) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=67.2$  Kg/ha.**3. DESIGN :**(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 12.2 m.  $\times$  4.3 m. (b) 12.2 m.  $\times$  2.6 m. (v) 85 cm, on either side along breadth. (vi) Yes.**4. GENERAL :**(i) Normal. (ii) N.A. for 60(40); Nil for others. (iii) Yield of *Kapas*. (iv) (a) 1960 to 1962. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous, Treatments  $\times$  years interaction is absent.**5. RESULTS :**(i) 1553 Kg/ha. (ii) 251.3 Kg/ha. [based on 75 d.f. made up of interaction of various components of treatments with years and pooled error]. (iii) Main effect of N alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	$P_0$	$P_1$	$K_0$	$K_1$	Mean
$N_0$	1355	1359	1316	1408	1362
$N_1$	1732	1709	1753	1737	1745
Mean	1573	1534	1534	1572	1553
$K_0$	1558	1511			
$K_1$	1589	1557			

C.D. for N marginal means=102.3 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- Rj. 60(39), 61(39).****Site :- Govt. Agri. Res. Farm, Sriganaganagar.****Type :- 'M'.**

Object :—To study the effects of different manures on the yield of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Sugarcane for 60(39); Cotton for 61(39). (c) 168.1 Kg/ha. of N as A/S+112.1 Kg/ha. of  $P_2O_5$  as Super. (ii) Sandy loam. (iii) 5.6.60; 30.5.61. (iv) (a) 3 to 4 ploughings. (b) N.A. (c) 13 Kg/ha. (d) 91 cm.  $\times$  30 cm. (e) N.A. (v) N.A. (vi) 320 F (American). (vii) Irrigated. (viii) 2 weedings and hoeings. (ix) N.A. (x) 3 pickings on 7.11.60, 10.12.60 and 19.1.61 for 60(39); 3 pickings on 14.11.61, 8.12.61 and 31.12.61 for 61(39).

## 2. TREATMENTS :

9 manurial treatments :  $M_0$ =Control,  $M_1$ =67.2 Kg/ha. of N as Mustard cake,  $M_2$ =67.2 Kg/ha. of N as Taramira,  $M_3$ =67.2 Kg/ha. of N as A/S,  $M_4$ =67.2 Kg/ha. of  $P_2O_5$  as Super,  $M_5$ =89.7 Kg/ha. of  $K_2O$  as Mur. Pot.,  $M_6$ =67.2 Kg/ha. of N as Mustard cake+67.2 Kg/ha. of  $P_2O_5$  as Super+89.7 Kg/ha. of  $K_2O$  as Mur. Pot.,  $M_7=M_2+M_4+M_5$  and  $M_8=M_3+M_4+M_5$ .

## 3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 9.2 m.  $\times$  3.7 m. (v) 91 cm. on either side along breadth. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) N.A. for 60(39): Nil for 61(39). (iii) Yield of *Kapas*. (iv) (a) 1960 to 1961. (b) N.A. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 1011 Kg/ha. (ii) 412.6 Kg/ha. [based on 8 d.f. made up of Treatments  $\times$  years interaction]. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$	$M_8$
Av. yield	1041	1162	1228	996	906	922	902	949	990

**Crop :- Cotton (*Kharif*).**

**Ref :- Rj. 60, 61, 62, 63, 64(M.A.E).**

**Site :- M.A.E. Centre, Sriganganagar.**

**Type :-**

Object :—Type II : To study the effects of different levels of N, P, K and F.Y.M. on the yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A.. 20.5.61, N.A., 19.5.63 and 12.6.64. (iv) (a) 2 ploughings and 3 harrowings and disking followed by planking. (b) N.A. (c) 11.2 Kg/ha. (d) 76 cm. between rows. (e) N.A. (v) Nil. (vi) F. 320 for 61 and 63, Local for 64, N.A. for others. (vii) Irrigated. (viii) 3 weedings and hoeing. (ix) 3 cm. for 61 and N.A. for others. (x) N.A., 9.11.61 to 29.12.61, N.A., 28.11.63 and 12.9.64.

## 2. TREATMENTS :

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

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

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

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

(4) 2 levels of F.Y.M. :  $F_0=0$  and  $F_1=5600$  Kg/ha.

N and K broadcasted and P drilled at sowing.

## 3. DESIGN :

(i)  $3^3 \times 2$  Fact. confd. (ii) (a) 9 plots/block and 6 blocks/replication. (b) N.A. (iii) 1. (iv) (a) and (b) 8.8 m.  $\times$  3.6 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Attack of white ants. (iii) Yield of *Kapas*. (iv) (a) 1960-64. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) Error variances are heterogeneous and interaction of Treatments  $\times$  years is present, excepting (F  $\times$  K  $\times$  years) interaction.

## 5. RESULTS :

(i) 1274 Kg/ha. (ii) 379.9 Kg/ha. [76 d.f. made up of interaction of treatments components, F, N, P, K ; F  $\times$  N, F  $\times$  P, N  $\times$  P, N  $\times$  K, P  $\times$  K, with years]. (iii) Main effects of F, N, P, K are highly significant. Interactions N  $\times$  P, N  $\times$  K are significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	930	1195	1372	1069	1179	1329	1138	1197	1242	1166
F <sub>1</sub>	1129	1423	1594	1291	1411	1444	1330	1371	1446	1382
Mean	1029	1309	1483	1180	1295	1386	1234	1284	1344	1274
K <sub>0</sub>	964	1250	1488	1122	1257	1323				
K <sub>1</sub>	1010	1315	1527	1182	1275	1396				
K <sub>2</sub>	1114	1362	1555	1239	1353	1440				
P <sub>0</sub>	924	1163	1455							
P <sub>1</sub>	1036	1307	1542							
P <sub>2</sub>	1128	1458	1573							

C.D. for F marginal means

=112.9 Kg/ha.

C.D. for N, P or K marginal means

=92.2 Kg/ha.

C.D. for means in the body of N×P or N×K table=195.7 Kg/ha.

60(MAE)

	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	600	624	654	26
F <sub>1</sub>	777	800	778	785
Mean	689	712	716	706

S.E. of body of table=52.9 Kg/ha.

61(MAE)

	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	1430	1549	1356	1445
F <sub>1</sub>	1700	1673	1722	1698
Mean	1565	1611	1539	1572

S.E. of body of table=84.8 Kg/ha.

62(MAE)

	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	1443	1462	1549	1485
F <sub>1</sub>	1517	1698	1841	1685
Mean	1480	1580	1695	1585

S.E. of body of table=60.4 Kg/ha.

63(MAE)

	K <sub>1</sub>	K <sub>2</sub>	Mean	
F <sub>0</sub>	521	566	619	569
F <sub>1</sub>	674	716	811	734
Mean	598	641	715	651

S.E. of body of table=25.4 Kg/ha.



64(MAE)

	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	1695	1786	2032	1838
F <sub>1</sub>	1982	1971	2083	2012
Mean	1838	1878	2058	1925

S.E. of body of table=75.6 Kg/ha.

**Crop :- Cotton.****Ref :- Rj. 62 to 64(M.A.E).****Site :- M.A.E. Centre, Sriganagar.****Type :- 'M'.**

Object :- Type (v) (a) :- To study the effect of different methods of application of N on the yield of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Sandy loam (iii) 22.5.62; 7.7.63; 21.4.64. (iv) and (v) Nil. (vi) F-320. (vii) Irrigated. (viii) and (ix) Nil. (x) N.A.; 16.12.63; 6.1.65; N.A.

**2. TREATMENTS :**

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

(1) 2 levels of N as A/S : N<sub>1</sub>=60 and N<sub>2</sub>=120 Kg/ha.(2) 5 methods of application of N : M<sub>1</sub>=Broadcast at sowing. M<sub>2</sub>=Placement of fertiliser one week before sowing about 12.5 cm. deep by plough sole method, M<sub>3</sub>=Placement of fertiliser in the same line as seed by seed cum fertiliser drill, M<sub>4</sub>=Placement of fertiliser about 4 cm. below the seed by seed cum fertiliser drill and M<sub>5</sub>=Band placement of fertilisers about 5 cm. below and away from the seed.**3. DESIGN :**

(i) R.B.D. (ii) (a) 11. (b) N.A. (iii) 4. (iv) (a) and (b) N.A. (v) Yes.

**4. GENERAL :**(i) Good. (ii) Nil. (iii) Yield of *Kapas*. (iv) (a) 1962-65 [1965 N.A.]. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Pooled results are given for 62-65.**5. RESULTS :**(i) 1491 Kg/ha. (ii) 108.0 Kg/ha. (iii) Main effects of M and N are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

Control=976 Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	1503	1552	1694	1476	1488

C.D. for M marginal means=108.0 Kg/ha.

Treatment	N <sub>1</sub>	N <sub>2</sub>
Av. yield	1458	1628

C.D. for N means=68.0 Kg/ha.

Crop :- Cotton

Ref :- Rj. 62, 63, 64, 65 (S.F.T.) for Pali  
and 63, 64, 65 (S.F.T.) for Sriganaganagar.

Site :- Pali and Sriganaganagar

Type :- 'M'.

Object :—To study the response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with other nutrients (Type : A<sub>1</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Grey brown ; Desert soil. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

O =Control (no manure)

N<sub>1</sub> =56 Kg/ha of NN<sub>2</sub> =112 Kg/ha of NP<sub>1</sub> =33.6 Kg/ha of P<sub>2</sub>O<sub>5</sub>N<sub>1</sub>P<sub>1</sub> =56 Kg/ha of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>1</sub> =112 Kg/ha of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub> =112 Kg/ha of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub>K<sub>1</sub> =112 Kg/ha of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha of K<sub>2</sub>ON applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50 - 100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A<sub>1</sub>, 11 of type A<sub>2</sub>, 11 of type A<sub>3</sub> and 3 are of type C. The eleven experiments under type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are distributed as 3 on a *khari* cereal, 3 on a *rabi* cereal, 3 on a cash crop and 2 on oilseed. All the three type—C experiments are conducted on a legume crop. For the purpose of conducting the A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are laid out. For conducting the three type—C trials three villages are randomly selected in each block.

## 4. GENERAL :

(i) and (iii) N.A. (iv) (a) Nil, (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

Pali

62 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	178	197	61	100	220	198	404	61.6

Control yield=589 Kg/ha. ; No. of trials=5.

63 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	85	164	92	-27	121	191	295	56.0

Control yield=450 Kg/ha. ; No. of trials=3.

64 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	104	225	20	187	245	311	270	47.5

Control yield=548 Kg/ha. ; No. of trials=5.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	357	443	00	236	346	480	510	82.4

Control yield=646 Kg/ha. ; No. of trials=3.

## Sriganganagar

## 63(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	212	453	40	321	514	647	659	39.6

Control yield=1032 Kg/ha. ; No. of trials=11.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	213	375	64	288	394	529	617	47.5

Control yield=540 Kg/ha. ; No. of trials=10.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	156	453	28	107	336	448	461	165.5

Control yield =690 Kg/ha. ; No. of trials=7.

**Crop :-Cotton.****Ref :- Rj. 62, 63, 65(S.F. T.)****Site :- (District) Banswara.****Type :- 'M'.**

**Object :-**To study the response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with other nutrients (Type : A<sub>1</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Red and Yellow. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

O =Control (no manure).

N<sub>1</sub> =33.6 Kg/ha. of N.N<sub>2</sub> =67.2 Kg/ha. of N.P<sub>1</sub> =22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>1</sub> =33.6 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>1</sub> =67.2 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub> =67.2 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=67.2 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page 293.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 [1964—N.A.]. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	44	77	300	108	120	140	116	139.6

Control yield=262 Kg/ha. ; No. of trials=5.

## 63(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	166	140	43	166	164	221	221	29.5

Control yield=276 Kg/ha. ; No. of trials=5.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	205	175	45	265	240	380	380	39.5

Control yield=90 Kg/ha. ; No. of trials=2.

**Crop :- Cotton.**

**Ref :- Rj. 62, 63, 64, 65(S.F.T.) for Pali, 63, 64, 65(S.F.T.) for Sriganagar and 65(S.F.T.) for Banswara.**

**Site :- District : Pali, Sriganagar and Banswara.**

**Type :- 'M'.**

**Object :-** To study response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Grey brown ; Desert soil ; Red and yellow. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurials treatments :

O=Control (no manure).

N<sub>1</sub>=56 Kg/ha. of N.P<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.P<sub>2</sub>=67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>1</sub>=56 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>2</sub>=56 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>=112 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>K<sub>2</sub>=112 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) 293.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Pali, 1963 to 1966 for Sriganagar and 1965 only for Banswara.

(b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Pali

## 62(S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Cotton in Kg/ha.	110	86	154	204	233	221	419	48.7

Control yield=603 Kg/ha. ; No. of trials=6.

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Cotton in Kg/ha.	65	19	46	55	99	212	255	68.9

Control yield=469 Kg/ha. ; No. of trials=3.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Cotton in Kg/ha.	116	-26	40	82	124	225	304	55.6

Control yield=673 Kg/ha. ; No. of trials=5.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Cotton in Kg/ha.	220	-90	-150	30	20	240	400	120.9

Control yield=560 Kg/ha. ; No. of trials=2.

## Sriganganagar

## 63(S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Cotton in Kg/ha.	275	46	125	322	407	604	608	56.2

Control yield=1028 Kg/ha. ; No. of trials=9.

## 64(S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Cotton in Kg/ha.	172	8	62	220	300	451	519	32.3

Control yield=643 Kg/ha. ; No. of trials=9.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Cotton in Kg/ha.	178	-12	102	277	336	625	589	73.2

Control yield=725 Kg/ha.; No. of trials=7.

## Banswara

## 65(S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Cotton in Kg/ha.	180	45	85	215	275	405	360	45.4

Control yield=85 Kg/ha. ; No. trials=2.

**Crop :- Cotton.****Ref :- Rj. 62, 63(S.F.T).****Site :- (District) Banswara.****Type :- 'M'.**

**Object :—**To study the response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients (Type A<sub>2</sub>).

**1. BASAL CONDITIONS :**

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

**2. TREATMENTS :**

8 manurial treatments :

O = Control (no manure)

N<sub>1</sub> = 33.6 Kg/ha. of NP<sub>1</sub> = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>P<sub>2</sub> = 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>1</sub>P<sub>1</sub> = 33.6 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>1</sub>P<sub>2</sub> = 33.6 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub> = 67.2 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub>K<sub>2</sub> = 67.2 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+44.8 Kg/ha. of K<sub>2</sub>ON applied as A/S; P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.**3. DESIGN :**Same as in Type A<sub>1</sub> (Irrigated) on page no. 293.**4. GENERAL :**

(i) to (iii) N.A. (iv) (a) 1962 to 1966 [1964 and 1965—N.A.]. (b) and (c) N.A. (v) to (vii) N.A.

**5. RESULTS :****62(S.F.T.)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of cotton in Kg/ha.	105	58	444	132	164	149	157	205.2

Control yield=270 Kg/ha. ; No. of trials=4.

**63(S.F.T.)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of cotton in Kg/ha.	128	91	61	190	219	237	232	28.4

Control yield=217 Kg/ha. ; No. of trials=4.

**Crop :- Cotton.****Ref :- Rj. 62, 63, 64, 65(S.F.T.) for Pali ;  
63, 64, 65(S.F.T.) for Sriganganagar  
and 65(S.F.T.) for Banswara.****Site :- (District) : Pali, Sriganganagar  
and Banswara.****Type :- 'M'.**

**Object :—**To study response curves of important cereal, cash and oilseed crops to potash applied singly and in combination with other nutrients. (Type : A<sub>3</sub>).

**1. BASAL CONDITIONS :**

(i) N.A. (ii) Grey brown ; Desert soil ; Red and yellow. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O=Control (no manure).

 $N_1=56.0$  Kg/ha. of N. $K_1=33.6$  Kg/ha. of  $K_2O$ . $K_2=67.2$  Kg/ha. of  $K_2O$ . $N_1K_1=56.0$  Kg/ha. of N+ $33.6$  Kg/ha. of  $K_2O$ . $N_1K_2=56.0$  Kg/ha. of N+ $67.2$  Kg/ha. of  $K_2O$ . $N_2K_2=112.0$  Kg/ha. of N+ $67.2$  Kg/ha. of  $K_2O$ . $N_1P_1K_1=56.0$  Kg/ha. of N+ $33.6$  Kg/ha. of  $P_2O_5$ + $33.6$  Kg/ha. of  $K_2O$ .N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. Pot.

## 3. DESIGN :

Same as in type  $A_1$  (Irrigated) on page 294.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Pali and Sriganganagar and 1965 only for Banswara. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Pali

## 62(S.F.T.)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cotton in Kg/ha.	184	81	153	110	174	332	339	46.5

Control yield=482 Kg/ha. ; No. of trials=5.

## 63 (S.F.T.)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cotton in Kg/ha.	63	39	88	149	153	196	322	51.2

Control yield=375 Kg/ha. ; No. of trials=3.

## 64(S.F.T.)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cotton in Kg/ha.	163	27	54	27	64	186	207	78.3

Control yield=548 Kg/ha. ; No. of trials=4.

## 65(S.F.T.)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cotton in Kg/ha.	305	15	5	255	248	445	245	62.1

Control yield=430 Kg/ha. ; No. of trials=2.

## Sriganganagar

## 63(S.F.T.)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cotton in Kg/ha.	242	-18	34	291	319	578	518	86.8

Control yield=780 Kg/ha. ; No. of trials=8.

## 64(S.F.T.)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of cotton in Kg/ha.	151	-10	4	159	176	358	281	60.1

Control yield=615 Kg/ha. ; No. of trials=6.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	247	-36	-16	404	281	512	321	125.4

Control yield=600 Kg/ha. ; No. of trials=4.

## Banswara

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	125	10	30	195	195	315	295	44.5

Control yield=65 Kg/ha. ; No. of trials=2.

**Crop :- Cotton.****Ref :- Rj. 62(S.F,T) for Pali and 63(S.F.T.) for Banswara.****Site :- (District) : Pali and Banswara.****Type :- 'M'.**

Object :—To study response curves of important cereal, cash and oil seed crops to Potash applied singly and in combination with other nutrients. (Type : A<sub>3</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Grey brown ; Red and yellow. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments :

O=Control (no manure).

N<sub>1</sub>=33.6 Kg/ha. of N.K<sub>1</sub>=22.4 Kg/ha. of K<sub>2</sub>O.K<sub>2</sub>=44.8 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N + 22.4 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>2</sub>=33.6 Kg/ha. of N+44.8 Kg/ha. of K<sub>2</sub>O.N<sub>2</sub>K<sub>2</sub>=67.2 Kg/ha. of N+44.8 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page 293.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 only for Pali and 1963 to 1966 for Banswara [1964 and 1965 N.A.]. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

Pali

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	91	-110	-112	67	92	-6	-4	111.9

Control yield=416 Kg/ha. ; No. of trials=6.

## Banswara

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of cotton in Kg/ha.	170	84	101	121	108	217	187	31.7

Control yield=207 Kg/ha. ; No. of trials=4.



**Crop :- Cotton.****Ref :- Rj. 60(SFT).****Site :- As per treatments.****Type :- 'M'.**

Object :—To study the response of Cotton to levels of N, P and K applied individually and in combinations.  
(Type : A).

**1. BASAL CONDITIONS :**

(i) N.A. (ii) As per results (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

8 manurial treatments

0=Control (no manure).

N=44.8 Kg/ha. of N

P=22.4 Kg/ha. of  $P_2O_5$ K=22.4 Kg/ha. of  $K_2O$ NP=44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ NK=44.8 Kg/ha. of N+22.4 Kg/ha. of  $K_2O$ PK=22.4 Kg/ha. of  $P_2O_5$ +22.4 Kg/ha. of  $K_2O$ NPK=44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +22.4 Kg/ha. of  $K_2O$ N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. of Pot.**3. DESIGN :**

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on *kharif* cereal, 8 on a *rabi* cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

**4. GENERAL :**

N.A.

**5. RESULTS :**

District	Soil Class	No. of trials	Control yield in Kg/ha.	Av. response in Kg/ha.								
				N	P	K	S.E.	NP	NK	PK	NPK	S.E.
Banswara	Red & black	7	390	60	20	30	12.0	-20	20	-20	20	4.0
Pali		4	1040	140	30	40	30.0	40	-20	20	50	12.0
Sriganganagar		4	580	180	110	20	75.0	230	-200	-10	90	38.0

**Crop :- Cotton.****Ref :- Rj. 60(S.F.T.)****Site :- (District) Banswara, Pali and Sriganganagar.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) N.A. (ii) Red and black for Banswara and Desert for others. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

O=Control (no manure).

 $n_1$ =44.8 Kg/ha. of N as A/S $n_2$ =89.6 Kg/ha of N as A/S $n_1'$ =44.8 Kg/ha. of N as Urea $n_2'$ =89.6 Kg/ha. of N as Urea $n_1''$ =44.8 Kg/ha. of N as C/A/N. $n_2''$ =89.6 Kg/ha. of N as C/A/N.

## 3. DESIGN :

Same as in type A<sub>1</sub> on page no. 300.

## 4. GENERAL :

N.A.

## 5. RESULTS :

District	No. of trials	Av. yield of Cotton in Kg/ha.								G.M.	S.E./mean
		O	n <sub>1</sub>	n <sub>2</sub>	n <sub>1</sub> '	n <sub>2</sub> '	n <sub>1</sub> ''	n <sub>2</sub> ''			
Banswara	6	460	490	590	480	570	450	540	511	21.2	
Pali	3	760	830	1020	840	830	880	930	870	33.2	
Sriganganagar	4	1000	1070	1420	1100	1410	1010	1240	1179	113.1	

**Crop :- Cotton (Kharif).**

**Ref :- Rj. 63(26), 64(18).**

**Site :- Govt. Agri. Farm, Ummadganj.**

**Type :- 'MV'.**

Object :—To find out a suitable dose of application of fertilizers for different varieties of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. for 63 (26); Wheat for 64 (18). (c) N.A. for 63 (26); 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64 (18). (ii) N.A. (iii) 7.6.63; 1.6.64. (iv) (a) N.A. for 63 (26); 1 ploughing, 2 plankings, 1 discing and 1 harrowing for 64 (18). (b) Dibbling for 63 (26); Drilling for 64 (18). (c) 18 to 20 Kg/ha. (d) 76 cm. between rows. (e) 3 for 63 (26); N.A. for other. (v) N.A. for 63 (26); Nil for 64 (18). (vi) As per treatments. (vii) Irrigated. (viii) 3 hoeings for 63 (26); 1 weeding and 3 hoeing for 64 (18). (ix) N.A. for 63 (26); 72 cm. for others. (x) 10.11.63, 31.12.63, 2.2.64; 10.12.64.

## 2. TREATMENTS :

## Main-plot treatments :

6 varieties : V<sub>1</sub>=M 49—435, V<sub>2</sub>=M—48—446, V<sub>3</sub>=M 51—902, V<sub>4</sub>=C Indore—1, V<sub>5</sub>=R—5 and V<sub>6</sub>=Biddhawar—1.

## Sub-plot treatments :

3 levels of fertilizers : F<sub>1</sub>=33.6 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot., F<sub>2</sub>=2 F<sub>1</sub> and F<sub>3</sub>=3 F<sub>1</sub>.

N was applied in two equal doses. P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O were applied at sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 4.6 m. × 4.6 m. (b) 3.8 m. × 3.8 m. (v) 38 cm. × 38 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) N.A. for 63 (26); Nil for 64 (18). (iii) Yield of *Kapas*. (iv) (a) 1963 to 1964. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) No. (vii) Both the error variances are homogeneous Main-plot Treatments × years interaction is absent while sub-plot Treatments × years interaction is absent.

## 5. RESULTS :

(i) 1164 Kg/ha. (ii) (a) 489.2 Kg/ha. (based on 35 d. f. made up of Treatments × years interaction and pooled error). (b) 540.2 Kg/ha. (based on 12 d. f. made up of various components of interaction of Treatments × years). (iii) Main effect of V is highly significant and that of F is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>	Mean
F <sub>1</sub>	934	1155	1058	1124	766	810	984
F <sub>2</sub>	941	1246	1266	1476	778	1143	1142
F <sub>3</sub>	1212	1652	1618	1575	990	1154	1367
Mean	1049	1351	1314	1392	845	1036	1164

C.D. for V marginal means=286.6 Kg/ha.

C.D. for F marginal means=240.3 Kg/ha.

**Crop - Cotton (Kharif).**

**Ref :- Rj. 63(25), 64(17).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'CV'.**

**Object :-**To find out a suitable date of sowing for different varieties of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) N.A. for 63 (25); Sugarcane for 64 (17). (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) N.A. for 63 (25); 2 ploughings and 1 harrowing for 64 (17). (b) Dibbling for 63 (25); Drilling for 64 (17). (c) 15 to 18 Kg/ha. (d) 61 cm. between rows for 63 (25) and 46 cm. between rows for other. (e) 3 for 63 (25); N.A. for 64 (17). (v) 33.6 Kg/ha. of N as A/S+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+44.8 Kg/ha. of K<sub>2</sub>O as Pot. Sul. (vi) As per treatments. (vii) Irrigated. (viii) 2 hoeings. (ix) N.A. for 63 (25); 72 cm. for 64 (17). (x) 4 pickings from 4.10.63 to 18.1.64; 15.9.64.

**2. TREATMENTS :**

**Main-plot treatments**

5 dates of sowing : D<sub>1</sub>=20th April. D<sub>2</sub>=5th May, D<sub>3</sub>=20th May, D<sub>4</sub>=4th June and D<sub>5</sub>=19th June.

**Sub-plot treatments**

3 varieties : V<sub>1</sub>=C—Indore 1, V<sub>2</sub>=M 51—902 and V<sub>3</sub>=M 49—435.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 5 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.1 m. × 4.6 m. (b) 5.3 m. × 3.8 m. (v) 38 cm. × 38 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Pink ball worm infected the crop, dusting of B.H.C. for 63 (25); Nil for 64 (17). (iii) Yield of *Kapas*. (iv) (a) 1963 to 1964. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Both the error variances are homogenous. Main-plot Treatments × years interaction is present while sub-plots Treatments × years interaction is absent.

**5. RESULTS :**

(i) 1054 Kg/ha. (ii) (a) 1145.6 Kg/ha. (based on 4 d. f. made up of Treatments × years interaction. (b) 310.6 Kg/ha. (based on 70 d. f. made up of interaction of various components of Treatments with years and pooled error.) (iii) Main effect of V alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	Mean
V <sub>1</sub>	1524	942	898	904	570	968
V <sub>2</sub>	1600	869	870	1027	609	1007
V <sub>3</sub>	2115	1344	905	950	628	1188
Mean	1766	1052	891	960	602	1054

C.D. for V marginal means=138.6 Kg/ha.

**Crop :- Tobacco (Kharif).****Ref :- Rj. 63(67).****Site :- Changperi.****Type :- 'D'.**

Object :- To study the control of orobanche by preemergence sprays of orag Herbicide No. 1.

**1. BASAL CONDITIONS :**

(i) (a) Maize-Tobacco. (b) Maize. (c) N.A. (ii) and (iii) N.A. (iv) K. 49. (v) (a) N.A. (b) Transplanting. (c) N.A. (d) 61 cm. × 61 cm. (e) N.A. (vi) 30.8.1963. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) 13.1.1964.

**2. TREATMENTS :**9 sprayings of herbicides :  $T_0$  = Control (no spray),  $T_1$  = One spray at 6.7 Kg/ha. after 4 weeks of transplanting ;  $T_2$  = One spray at 6.7 Kg/ha. after 6 weeks of transplanting,  $T_3$  = Two sprays at 3.4 Kg/ha. after 2 and 4 weeks of transplanting,  $T_4$  = Two sprays at 3.4 Kg/ha. after 2 and 6 weeks of transplanting,  $T_5$  = Two sprays at 3.4 Kg/ha. after 4 and 6 weeks of transplanting,  $T_6$  = Two sprays at 3.4 Kg/ha. after 4 and 8 weeks of transplanting,  $T_7$  = Three sprays at 2.2 Kg/ha. after 2, 4 and 6 weeks of transplanting and  $T_8$  = Three sprays at 2.2 Kg/ha. after 4, 6 and 8 weeks of transplanting.**3. DESIGN :**

(i) R.B.D. ; 9 plots/block and 4 replications. (ii) N.A. (iii) (a) 4.6 m. × 3.1 m. (b) 3.1 m. × 1.5 m. (iv) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Number of orobanche plants per tobacco plant. (iv) (a) 1963 only. (b) No. (c) Nil. (v) Nil. (vi) N.A. (vii) Nil.

**5. RESULTS :**

(i) 13. (ii) 1.5. (iii) Treatment differences are not significant. (iv) Av. no. of orobanche plants/tobacco plant.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$
Av. number	23	11	21	11	5	21	14	8	3

**Crop :- Groundnut (Kharif).****Ref :- Rj. 64(27).****Site :- Govt. Agri. Res. Farm, Sriganganagar.****Type :- 'M'.**

Object :- To study the effect of fertilizers on the yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 27.6.64. (iv) (a) 4 ploughings. (b) Behind the plough. (c) 74 Kg/ha. (d) Rows 30 cm. apart. (e) N.A. (v) Nil. (vi) P 6-1. (vii) Unirrigated. (viii) 2 hand hoeings. (ix) N.A. (x) 27.1 to 4.2.65.

**2. TREATMENTS :**

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

(1) 3 levels of N as : A/S  $N_0=0$ ,  $N_1=37$  and  $N_2=74$  Kg/ha.(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=37$  and  $P_2=74$  Kg/ha.(3) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=25$  Kg/ha.**3. DESIGN:**

(i) Fact. in R.B.D. (ii) (a) 18. (b) N.A. (iii) 4. (iv) (a) 5.5 m. × 3.7 m. (b) 4.9 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of pod. (iv) (a) 1964 only. (b) No. (c) N.A. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2679 Kg/ha. (ii) 530 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
K <sub>0</sub>	2231	2760	2746	2501	2531	2705	2579
K <sub>1</sub>	2296	2914	3129	2610	2827	2902	2780
Mean	2263	2837	2938	2556	2679	2803	2679
P <sub>0</sub>	2001	2802	2864				
P <sub>1</sub>	2174	2839	3023				
P <sub>2</sub>	2615	2869	2926				

C.D. for N marginal means=307.6 Kg/ha.

**Crop :- Groundnut (*Kharif*).**

**Ref :- Rj. 64(21).**

**Site :- Reg. Agri. Res. Stn., Sultanpur.**

**Type :- 'ICM'.**

**Object :-**To determine suitable date of sowing and optimum number of irrigations in relation to different fertility levels.

## 1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) As per treatments. (iv) (a) (b) N.A. (c) 62 Kg/ha. (d) 46 cm. × 30 cm. (e) N.A. (v) 22.4 Kg/ha. of N. (vi) R.S. 1. (vii) Irrigated. (viii) N.A. (ix) 72 cm. (x) 27.12.64.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 3 dates of sowing : D<sub>1</sub>=3.6.64, D<sub>2</sub>=24.6.64 and D<sub>3</sub>=15.7.64.

(2) 4 irrigational treatments : I<sub>1</sub>=Pre sowing irrigation only, I<sub>2</sub>=I<sub>1</sub>+irrigation after 30 days. I<sub>3</sub>=I<sub>1</sub>+irrigation at the time of flowering and I<sub>4</sub>=I<sub>1</sub>+irrigation after 30 days+irrigation at the time of flowering.

**Sub-plot treatments :**

3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=37.1 and P<sub>2</sub>=74.2 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 12 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 5.5 m. × 4.6 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of pod. (iv) (a) 1964 only. (b) No. (c) Nil. (v) to (vii) Nil,

## 5. RESULTS :

(i) 1499 Kg/ha. (ii) (a) 524.0 Kg/ha. (b) 230.5 Kg/ha. (iii) Main effects of I, D and P are highly significant and interaction D × P is significant. (iv) Av. yield of pod in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	Mean	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
D <sub>1</sub>	1602	1996	2139	2219	1988	1812	2043	2111
D <sub>2</sub>	1927	1725	2145	2288	2021	1805	2246	2012
D <sub>3</sub>	301	128	791	732	488	376	474	614
Mean	1277	1283	1692	1746	1499	1331	1588	1579
P <sub>0</sub>	1159	1173	1393	1599				
P <sub>1</sub>	1309	1382	1837	1824				
P <sub>2</sub>	1362	1293	1845	1817				

C.D. for D marginal means = 256.1 Kg/ha.

C.D. for I marginal means = 295.8 Kg/ha.

C.D. for P marginal means = 109.5 Kg/ha.

C.D. for P means at the same level of D = 189.7 Kg/ha.

C.D. for D means at the same level of P = 299.2 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref. :- Rj. 65(16).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'M'.**

Object :- To study the effect of P<sub>2</sub>O<sub>5</sub> to different stages of crop with the determination of suitable method of application.

1. BASAL CONDITIONS :

(i) (a) No. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 15.7.65. (iv) (a) 5 ploughings. (b) Behind the plough. (c) 33.6 Kg/ha. (d) 30 cm. × 15 cm. (e) N.A. (v) N.A. (vi) AK-12-24. (vii) Irrigated. (viii) 2 hand hoeings. (ix) N.A. (x) 11, 12.12.65.

2. TREATMENTS :

5 times and methods of application of P<sub>2</sub>O<sub>5</sub> : T<sub>1</sub> = Full P<sub>2</sub>O<sub>5</sub> as drill at sowing, T<sub>2</sub> = Full P<sub>2</sub>O<sub>5</sub> as drill after one month of sowing, T<sub>3</sub> =  $\frac{1}{2}$  P<sub>2</sub>O<sub>5</sub> as drill at sowing +  $\frac{1}{2}$  P<sub>2</sub>O<sub>5</sub> as drill after one month of sowing, T<sub>4</sub> =  $\frac{1}{2}$  P<sub>2</sub>O<sub>5</sub> as drill at sowing +  $\frac{1}{2}$  as foliar after a month of sowing and T<sub>5</sub> = Foliar alone (full P<sub>2</sub>O<sub>5</sub>).

Dose of P<sub>2</sub>O<sub>5</sub> applied not available.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iii) 6. (iv) (a) 5.5 m. × 3.7 m. (b) 4.9 m. × 3.1 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(iv) Normal. (ii) Incidence of grab weevil. BHC 16.8 Kg/ha., Endrin @ 0.02% foliar two ties @ 2.5 oz/45 gallons of water. (iii) Yield of pod. (iv) (a) 1965-only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 997 Kg/ha. (ii) 350.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	1004	1082	891	1093	914

**Crop :- Groundnut (Kharif).****Ref :- Rj. 61(90), 63(23).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'C'.**

Object :- To find out the effect of sowing methods, row spacing and seed rate on the yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Castor-Fallow-Groundnut for 61(90) ; Nil for 63(23). (b) Fallow fallow for 61(90) ; Wheat for other. (c) Nil. (ii) Clay loam. (iii) 28.7.1961 ; 17.7.1963. (iv) (a) One ploughing, one backhering and 2 discs for 61(90) ; 2 bakherings, 2 discs and pata for 63(23). (b) to (d) As per treatments. (e) N.A. (v) 33.6 Kg/ha. of N+67.2 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of  $K_2O$  for 61(90) ; N.A. for 63(23). (vi) R.S.B. 87. (vii) Un-irrigated. (viii) One earthing for 61(90) ; one weeding and one earthing for other. (ix) N.A. (x) 18.11.1961 ; 1 to 3.11.1963.

**2. TREATMENTS :****Main-plot treatments :**2 methods of sowing :  $M_1$ =Ridge sowing and  $M_2$ =Flat sowing.**Sub-plot treatments :**2 spacings between rows :  $S_1$ =30 and  $S_2$ =46 cm.**Sub-sub-plot treatments :**3 seed rates :  $R_1$ =44.8,  $R_2$ =89.7 and  $R_3$ =134.5 Kg/ha.**3. DESIGN:**

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 2 sub-plots/main-plot ; 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 4. (iv) (a) 6.1 m.  $\times$  4.6 m. (b) 5.5 m.  $\times$  4.0 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of pod. (iv) (a) 1961 to 1963 (1962 N.A.). (b) N.A. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) All the three error variances are homogeneous and interactions of main-plot treatments with year is present while those of sub-plot and sub-sub-plot treatments with years are absent.

**5. RESULTS :**

(i) 2345 Kg/ha. (ii) (a) 216.8 Kg/ha. [based on 1 d.f. made up of Treatments  $\times$  years interaction] (b) 522.2 Kg/ha. [based on 14 d.f. made up of various components of Treatments  $\times$  years interaction and pooled error]. (c) 460.8 Kg/ha. [based on 54 d.f. made up of various components of Treatments  $\times$  years interaction and pooled error]. (iii) Main effect of R alone is highly significant. (iv) Av. yield of pod in Kg/ha,

	$S_1$	$S_2$	$R_1$	$R_2$	$R_3$	Mean
$M_1$	2372	2424	1865	2570	2758	2998
$M_2$	2453	2132	1778	2545	2556	2293
Mean	2412	2378	1821	2558	2657	2345
$R_1$	1859	1784				
$R_2$	2687	2432				
$R_3$	2696	2618				

C.D. for R marginal means=231.2 Kg/ha.

**Crop :- Groundnut (Kharif).****Ref :- Rj. 63(33).****Site :- Govt. Agri. Res. Stn., Sriganganagar.****Type :- 'C'.**

Object :- To find out the suitable method and no. of earthings and spacings for Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N and  $P_2O_5$  each. (ii) N.A. (iii) 2.7.63. (iv) (a) 4 ploughings. (b) N.A. (c) 67 Kg/ha. (d) As per treatments. (e) N.A. (v) 16.8 Kg/ha. of N by broadcasting and 44.8 Kg/ha. of  $P_2O_5$  by drilling at the time of sowing. (vi) R.S.—1. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 5.1.64.

## 2. TREATMENTS :

## Main-plot treatments :

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

(1) No. of earthings:  $E_1=1$  and  $E_2=2$  earthings.

(2) 2 methods of earthings:  $M_1=$ By manual labour and  $M_2=$ By *deshi* plough.

## Sub-plot treatments :

3 spacings between rows:  $S_1=30$ ,  $S_2=46$  and  $S_3=61$  cm.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 5 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 4.6 m.  $\times$  3.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of pod. (iv) (a) 1963 only. (b) No. (c) N.A. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1500 Kg/ha. (ii) (a) 286.0 Kg/ha. (b) 341.0 Kg/ha. (iii) Main effect of E is highly significant. Main effect of M and S and interaction  $E \times M$  is significant. (iv) Av. yield of pod in Kg/ha.

$S_1M_0=1502$ ,  $S_2M_0=1577$  and  $S_3M_0=1570$  Kg/ha.

	$M_1$	$M_2$	$S_1$	$S_2$	$S_3$	Mean
$E_1$	1650	1614	1779	1645	1472	1632
$E_2$	1120	1567	1491	1385	1155	1343
Mean	1385	1590	1635	1515	1313	1488
$S_1$	1589	1681				
$S_2$	1389	1640				
$S_3$	1177	1450				

C.D. for E or M marginal means = 180.0 Kg/ha.

C.D. for S marginal means = 246.2 Kg/ha.

C.D. for means in the body of  $E \times M$  table = 254.6 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Rj. 60(77).**

**Site :- Govt. Agri. Farm, Borkhera.**

**Type :- 'CM'.**

Object :- To study the effect of N, P, K and spacing on the yield of Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Fallow. (c) 6 C.L. of F.Y.M. (ii) N.A. (iii) 9.7.60. (iv) (a) 2 ploughings. (b) N.A. (c) 67.2 Kg/ha. of shelled Groundnut. (d) As per treatments. (e) N.A. (v) N.A. (vi) Spreading local. (vii) Unirrigated. (viii) 1 weeding and two earthings. (ix) and (x) N.A.



## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1) and (2)

(1) 2 spacings between rows :  $S_1=30$  and  $S_2=46$  cm.(2) 2 spacings between plants :  $R_1=7.6$  and  $R_2=15.2$  cm.

## Sub-plot treatments:

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

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.(3) 3 levels of  $K_2O$  as Mur. of Pot. :  $K_0=0$ ,  $K_1=16.8$  and  $K_2=33.6$  Kg/ha.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 9 sub-plots/block ; 3 blocks/main-plot. 4 main-plots/replication. (b) N.A. (iii) 1. (iv) (a) 6.1 m.  $\times$  4.6 m. (b) 5.5 m.  $\times$  3.7 m. (v) 30 cm.  $\times$  45 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) No. (iii) Yield of pod. (iv) (a) 1960 only. (b) N.A. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2213 Kg/ha. (ii) (a) 837.2 Kg/ha. (b) 483.4 Kg/ha. (iii) Main effect of P alone is highly significant. (iv) Av. yield of pod in Kg/ha.

	$R_1$	$R_2$	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$S_1$	1795	2187	2034	1817	2122	1851	2064	2058	2014	1806	2153	1991
$S_2$	2289	2580	2118	2652	2533	2134	2433	2735	2339	2605	2358	2434
Mean	2042	2383	2076	2234	2328	1993	2249	2397	2176	2206	2256	2213
$K_0$	2000	2353	1960	2274	2294	1844	2242	2443				
$K_1$	2148	2263	2112	2246	2260	1966	2139	2513				
$K_2$	1977	2534	2156	2182	2429	2168	2365	2234				
$P_0$	1611	2374	1805	2048	2126							
$P_1$	2210	2287	2230	2182	2334							
$P_2$	2305	2488	2192	2475	2523							
$N_0$	1844	2308										
$N_1$	2010	2459										
$N_2$	2272	2383										

C.D. for P marginal means = 235.1 Kg/ha.

Crop :- Groundnut.

Ref :- Rj. 65(15).

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

Type :- 'ICM'.

Object :- Determination of optimum number and stages of irrigation, optimum dose of phosphorus together with suitable period of sowing for the crop.

## 1. BASAL CONDITIONS :

(i) (a) No. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 5 ploughings. (b) Behind the plough. (c) 74 Kg/ha. (d) 30 cm.  $\times$  15 cm. (e) —. (v) N.A. (vi) A.K.—12-24. (vii) Irrigated. (viii) 6 hand hoeings. (ix) N.A. (x) 9 to 15.12.65.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1) and (2)

(1) 3 dates of sowing :  $D_1=1.6.65$ ,  $D_2=28.6.65$  and  $D_3=19.7.65$ .(2) 4 irrigational treatments :  $I_0$ =Control (No irrigation),  $I_1$ =One irrigation after 30 days of sowing,  $I_2$ =One irrigation after 70 days of sowing and  $I_3$ =One irrigation after 30 days and second after 70 days of sowing.

## Sub-plot treatments :

3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=37.1$  and  $P_2=74.2$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 12 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m.  $\times$  4.6 m. (b) 4.9 m.  $\times$  4.0 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Incidence of gram weevil. BHC @ 37 Kg/ha. endrin 0.02%, folidol @ 2.5 oz/45 gallons (iii) Yield of pod. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1000 Kg/ha. (ii) (a) 574.2 Kg/ha. (b) 232.2 Kg/ha. (iii) Main effects of D and I are highly significant. (iv) Av. yield of groundnut in Kg/ha.

	$D_1$	$D_2$	$D_3$	$P_0$	$P_1$	$P_2$	Mean
$I_0$	692	915	960	750	910	908	856
$I_1$	752	542	861	699	703	753	718
$I_2$	926	1208	1208	1133	1084	1124	1114
$I_3$	748	1647	1542	1195	1344	1396	1312
Mean	780	1078	1143	944	1010	1045	1000
$P_0$	780	983	1071				
$P_1$	831	1075	1126				
$P_2$	728	1177	1231				

C.D. for D marginal means = 280.6 Kg/ha.

C.D. for I marginal means = 314.5 Kg/ha.

Crop :- Groundnut (*Kharif*).

Ref :- Rj. 64(19).

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

Type :- 'M'.

Object :- To find out the effect of Sulphur with different nitrogenous fertilizers on the yield of Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 22.4 Kg/ha. of N. (ii) Clay loam. (iii) 4.7.64. (iv) (a) 1 ploughing, 1 bakharing, 1 harrowing and planking. (b) Drilling. (c) 98.8 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) 1 hoeing, 2 earthing and weeding. (ix) 72 cm. (x) 20, 21.10.64.

## 2. TREATMENTS :

## Main-plot treatments :

7 sources of N at 22.4 Kg/ha. :  $S_0$ =Control,  $S_1$ =A/S,  $S_2$ =C/A/N,  $S_3$ =Urea,  $S_4$ =A/S/N,  $S_5$ =Oil cake and  $S_6$ =Compost.

## Sub-plot treatments :

4 doses of Sulphur :  $D_0=0$ ,  $D_1=11.2$ ,  $D_2=22.4$  and  $D_3=33.6$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 7 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m.  $\times$  4.6 m, (b) 5.0 m.  $\times$  4.1 m. (v) 23 cm.  $\times$  23 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of pod. (iv) (a) 1964 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1046 Kg/ha. (ii) (a) 487 Kg/ha. (b) 218 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	Mean
D <sub>0</sub>	1305	733	910	1031	1337	1216	1079	1087
D <sub>1</sub>	1031	854	862	689	1417	1232	1039	1032
D <sub>2</sub>	1442	741	1015	878	1289	1232	1200	1114
D <sub>3</sub>	830	910	846	781	1160	1240	878	949
Mean	1152	810	908	870	1301	1230	1049	1046

**Crop :- Groundnut (Kharif).**

**Ref :- Rj. 63(8), 65(41).**

**Site :- Janta College Farm, Dabok.**

**Type :- 'M'.**

Object :—To study the effect of N, P and K with and without Sulphur and Molybdenum on oil content and yield of Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Loam. (iii) N.A.; 20.7.1965. (iv) (a) 3 ploughings and 2 harrowings. (b) N.A. (c) 49.4 Kg/ha. (d) 46 cm.  $\times$  30 cm. (e) N.A. (v) 22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot. (vi) Local for 63(8); AK 12-24 for 65(41). (vii) Unirrigated. (viii) N.A. for 63(8); 1 hoeing for other. (ix) N.A. (x) N.A.; 28, 29.10.1965.

## 2. TREATMENTS :

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

(1) 3 levels of Molybdenum : M<sub>0</sub>=0, M<sub>1</sub>=1.1 and M<sub>2</sub>=2.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 3 levels of Sulphur : S<sub>0</sub>=0, S<sub>1</sub>=4.5 and S<sub>2</sub>=9.0 Kg/ha.

## 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.2 m.  $\times$  5.5 m. (b) 7.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 63(8); Good for other. (ii) N.A. for 63(8); Nil for other. (iii) Yield of pod. (iv) (a) 1963 to 1965 [1964 N.A.]. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Since the error variances are heterogeneous and the Treatments  $\times$  years interaction is absent, results of individual years are presented under 5. Results.

## 5. RESULTS :

63(8)

(i) 984 Kg/ha. (ii) 116.0 Kg/ha. (iii) Main effects of M and interaction M  $\times$  S  $\times$  P are highly significant. Interaction M  $\times$  S and M  $\times$  P are significant. (iv) Av. yield of pod in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>0</sub>	1002	912	914	918	997	913	943
M <sub>1</sub>	946	1191	1057	1105	1123	967	1065
M <sub>2</sub>	967	962	901	1145	772	913	943
Mean	972	1022	957	1056	964	931	—
S <sub>0</sub>	956	1180	1032				
S <sub>1</sub>	1009	976	907				
S <sub>2</sub>	950	909	933				

C.D. for M marginal means = 138.7 Kg/ha.  
 C.D. for means in the body of M × S or M × P table = 240.5 Kg/ha.

65(41)

(i) 1145 Kg/ha. (ii) 342.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>0</sub>	1000	1005	1308	975	1073	1264	1104
M <sub>1</sub>	1205	1260	1206	1305	1227	1140	1224
M <sub>2</sub>	1008	1224	1086	1055	1304	959	1106
Mean	1071	1163	1200	1112	1201	1121	1145
S <sub>0</sub>	1028	1122	1186				
S <sub>1</sub>	1171	1116	1317				
S <sub>2</sub>	1015	1250	1098				

**Crop :- Groundnut (Kharif).**

**Ref :- Rj. 61(41), 62(26).**

**Site :- Govt. Agri. Farm, Sawai Madhopur.**

**Type :- 'M'.**

**Object :-** To study the effect of phosphatic fertilizers on yield and quality of Groundnut in combination with N and Potash.

### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 2.7.1961; 1.8.1962. (iv) (a) 5 ploughings for 61(41); N.A. for other. (b) N.A. (c) 56 Kg/ha. (d) 46 cm. × 30 cm. (e) N.A. (v) N.A. (vi) Gangapur. (vii) Unirrigated for 61(41); N.A. for other. (viii) 2 weedings. (ix) N.A. (x) 28.12.1961; 8 to 10.11.1962.

### 2. TREATMENTS :

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

(1) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=22.4 Kg/ha.

(2) 4 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4, P<sub>2</sub>=44.8 and P<sub>3</sub>=67.2 Kg/ha.

(3) 2 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>0</sub>=0 and K<sub>1</sub>=22.4 Kg/ha.

### 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Medium growth for 61(41); Good for other. (ii) Nil. (iii) Yield of pod. (iv) (a) 1961 to 1962. (b) N.A. (c) Results of combined analysis are given under 5. Results. (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 1268 Kg/ha. (ii) 385.2 Kg/ha. [based on 72 d.f. made up interaction of various components of Treatments with years and pooled error]. (iii) Interaction  $K \times P$  alone is significant. (iv) Av. yield of pod in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	1280	1347	1201	1189	1258	1251	1254
N <sub>1</sub>	1132	1426	1147	1418	1326	1236	1281
Mean	1206	1386	1174	1304	1292	1243	1268
K <sub>0</sub>	1268	1264	1130	1504			
K <sub>1</sub>	1144	1508	1218	1103			

C.D. for means in the body of  $K \times P$  table = 313.9 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Rj. 64(12).**

**Site :- Govt. Agri. Farm, Banswara.**

**Type :- 'D'.**

Object :—To determine the relative efficacy of different seed dressing fungicides in relation to yield, disease intensity and germination of Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy. (iii) 20.7.64. (iv) (a) 2 ploughings. (b) Dibbling. (c) 32 seeds/plot. (d) 30 cm.  $\times$  23 cm. (e) 1. (v) 56.0 Kg/ha. of N by broadcast + 112.1 Kg/ha. of P<sub>2</sub>O<sub>5</sub> by drilling. (vi) R.S — 1. (vii) Unirrigated. (viii) 1 hand weeding. (ix) N.A. (x) 12.11.64.

## 2. TREATMENTS :

## Main-plot treatments :

3 fungus treatments of seeds : F<sub>1</sub> = Aspergillus, F<sub>2</sub> = Rhizopus and F<sub>3</sub> = Mixture of both.

## Sub-plot treatments :

16 seed treatments : T<sub>0</sub> = Control, T<sub>1</sub> = 3 gm. of Agrosan G.N., T<sub>2</sub> = 2 gm. of Ceresan, T<sub>3</sub> = 2 gm. of Phygon  $\times$  L, T<sub>4</sub> = 2 gm. of shell seed dresser, T<sub>5</sub> = 2 gm. of Mercurine DA, T<sub>6</sub> = 3 gm. of Thoram, T<sub>7</sub> = 2 gm. of Captan, T<sub>8</sub> = 2 gm. of Beej powder no. 4, T<sub>9</sub> = 2 gm. of Beej Powder no. 5, T<sub>10</sub> = 2 gm. of Beej Powder no. 6, T<sub>11</sub> = 2.5 gm. of Beej Powder no. 7, T<sub>12</sub> = 2.5 gm. of Beej Powder no. 8, T<sub>13</sub> = 2.5 gm. of Beej Powder no. 9, T<sub>14</sub> = 2 gm. of Tritisan and T<sub>15</sub> = Seed treated with fungus only.

Above chemicals were used for 1 Kg. of seed.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 16 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) and (b) 1.8 m.  $\times$  1.2 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) As per treatments. (iii) No. of plants germinated. (iv) (a) 1964 only. (b) No. (c) N.A. (v) and (vi) N.A. (vii) 89.7 Kg/ha. of Aldrin 2% dust mixed with the soil before harvesting.

## 5. RESULTS :

(i) 64.2 degrees. (ii) (a) 10.2 degrees. (b) 7.5 degrees. (iii) None of the effects is significant. (iv) Av. % of germination in degrees.

	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
F <sub>1</sub>	62.7	59.1	64.7	58.9	66.8	61.7	58.2	63.4
F <sub>2</sub>	38.4	60.8	65.2	56.7	63.8	57.0	66.3	67.4
F <sub>3</sub>	60.9	74.9	70.3	63.2	58.7	77.3	69.7	69.2
Mean	54.0	64.9	66.7	59.6	63.1	65.3	64.7	66.7

T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>	T <sub>13</sub>	T <sub>14</sub>	T <sub>15</sub>	Mean
57.8	66.3	63.9	69.5	61.7	62.1	52.9	58.8	61.8
69.1	62.7	71.4	61.4	66.9	67.6	60.8	58.8	62.1
66.6	66.9	68.3	63.6	67.8	72.1	63.6	66.0	67.4
64.5	65.3	67.9	64.8	65.5	67.3	59.1	61.2	63.8

**Crop :- Groundnut.**

**Ref :- Rj. 65(5).**

**Site :- Kalmi Bag Bhusawar, Bharatpur.**

**Type :- 'D'.**

**Object :-** To determine the relative efficacy of different fungicides in relation to yield and disease intensity and germination of Groundnut.

**1. BASAL CONDITIONS ;**

(i) (a) Nil. (b) *Sarson*. (c) N.A. (ii) N.A. (iii) 21.7.65. (iv) (a) Ploughing and cross ploughing three times. (b) Dibbling. (c) N.A. (d) 30 cm. x 30 cm. (e) 1. (v) 12 Kg/ha. of N+20 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+89.7 Kg/ha. of Eldrein dust. (vi) R.S.-1. (vii) Irrigated. (viii) 1 weeding. (ix) and (x) N.A.

**2. TREATMENTS :**

**Main-plot treatments :**

M<sub>1</sub>=Aspergillus, M<sub>2</sub>=Rhizopus and M<sub>3</sub>=Mixture of M<sub>1</sub> and M<sub>2</sub>.

**Sub-plot treatments :**

S<sub>1</sub>=Beej powder no. 5, S<sub>2</sub>=B.P. no. 6, S<sub>3</sub>=B.P. no. 8, S<sub>4</sub>=B.P. no. 9, S<sub>5</sub>=Ceresan, S<sub>6</sub>=Mercurine, S<sub>7</sub>=Agrosan G.N., S<sub>8</sub>=Miram, S<sub>9</sub>=Fungus and S<sub>10</sub>=Control.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 10 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 2.7 m. x 1.8 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Yield of pod. (iv) (a) 1965 only. (b) N.A. (c) Nil. (v) Durgapura. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 4059 Kg/ha. (ii) (a) 1851 Kg/ha. (b) 1110 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of groundnut in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	S <sub>8</sub>	S <sub>9</sub>	S <sub>10</sub>	Mean
M <sub>1</sub>	4378	3613	4510	3339	4061	3812	4370	4336	4056	4286	4079
M <sub>2</sub>	4585	4311	4988	4136	4161	4360	3563	3563	3244	3483	4039
M <sub>3</sub>	4664	4061	3027	3842	3962	3817	4541	5083	3603	3982	4058
Mean	4542	3995	4175	3772	4061	3996	4158	4327	3644	3917	4059

**Crop :- Groundnut (Kharif).**

**Ref :- Rj. 64(9).**

**Site :- Govt. Agri. Farm, Bharatpur.**

**Type :- 'D'.**

**Object :-** To determine the relative efficacy of seed dressing fungicides in relation to yield and germination of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) N.A. (iii) 20.7.64. (iv) (a) 2 ploughings. (b) Dibbling. (c) 32 seeds/plot. (d) 30 cm. x 23 cm. (e) One. (v) Nil. (vi) R.S.—1. (vii) Unirrigated. (viii) One weeding. (ix) N.A. (x) 11.11.64.

**2. TREATMENTS :**

**Main-plot treatments :**

3 fungus treatments of seed :  $F_1$ =Aspergillus,  $F_2$ =Rhizopus sp. and  $F_3$ =Mixture of both.

**Sub-plot treatments :**

16 seed treatments :  $T_0$ =Control,  $T_1$ =3 gm. of Agrosan G.N.,  $T_2$ =2 gm. of Ceresan,  $T_3$ =2 gm. of Phygon x L,  $T_4$ =2 gm. of shell seed dresser,  $T_5$ =2 gm. of Merculine D.A.,  $T_6$ =2 gm. of Thiram,  $T_7$ =2 gm. of Captan,  $T_8$ =2 gm. of Beej powder no 4,  $T_9$ =2 gm. of Beej Powder no. 5,  $T_{10}$ =2 gm. of Beej Powder no. 6,  $T_{11}$ =2 gm. of Beej Powder no. 7,  $T_{12}$ =2.5 gm. of Beej Powder no. 8,  $T_{13}$ =2.5 gm. of Beej Powder no. 9,  $T_{14}$ =2 gm. of Tritisan and  $T_{15}$ =Fungi only.

Above fungicides were used for 1 Kg. of seed.

**3. DESIGN :**

(i) Split-plot with Lattice arrangements. (ii) (a) 16 plots/block, 3 blocks/replication. (b) N.A. (iii) 3. (iv) (a) and (b) 1.8 m. x 1.2 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) No. of plants germinated/plot, and Groundnut yield. (iv) (a) 1964 only. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) 89.7 Kg/ha. of Aldrin 2% dust broadcasted and mixed with soil in the field before sowing.

**5. RESULTS :**

**Groundnut yield :**

(i) 1347 Kg/ha. (ii) (a) 1233.0 Kg/ha. (b) 571.0 Kg/ha. (iii) Interaction  $F \times T$  alone is significant. (iv) Av. yield of pod in Kg/ha.

	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
$F_1$	1862	967	2232	912	1502	1121	2429	1792
$F_2$	650	1547	1307	653	709	1209	709	1476
$F_3$	1458	2829	2017	1963	1079	1401	972	1532
Mean	1323	1798	1852	1176	1097	1244	1370	1600

$T_8$	$T_9$	$T_{10}$	$T_{11}$	$T_{12}$	$T_{13}$	$T_{14}$	$T_{15}$	Mean
1308	1420	653	1289	1719	1162	972	1911	1453
631	990	1917	447	912	903	1159	1027	1015
1289	1032	1928	1719	1682	1510	1383	1326	1573
1076	1147	1499	1152	1438	1192	1171	1421	1347

C.D. for T means at the same level of  $F=927.7$  Kg/ha.

C.D. for F means at the same level of  $T=1124.6$  Kg/ha.

**Germination :**

(i) 64.1 degrees (ii) (a) 10.3 degrees (b) 7.2 degrees (iii) None of the effects is significant. (iv) Av. yield of seeds germinated (in degrees).

	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	
F <sub>1</sub>	69.1	59.1	63.8	58.9	66.8	61.7	58.2	62.4	
F <sub>2</sub>	59.4	60.8	65.2	56.7	62.8	54.5	64.7	67.4	
F <sub>3</sub>	60.0	74.9	70.3	63.2	58.7	77.3	69.7	74.2	
Mean	62.8	64.9	64.9	59.6	62.8	64.5	64.2	68.0	
	T <sub>8</sub>	V <sub>9</sub>	V <sub>10</sub>	V <sub>11</sub>	V <sub>12</sub>	V <sub>13</sub>	V <sub>14</sub>	V <sub>15</sub>	Mean
	57.8	65.3	62.9	69.5	61.7	61.1	52.9	58.8	61.9
	67.4	62.7	71.4	59.5	66.0	67.6	60.8	58.8	62.9
	62.9	66.9	67.3	63.6	67.8	72.1	63.6	66.0	67.4
	64.0	65.0	67.2	64.2	65.2	66.9	59.1	61.2	64.1

**Crop :- Groundnut (Kharif).**

**Ref :- Rj. 62(14).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

**Object :-** To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) and (b) N.A. (c) 48 seeds/plot. (d) 46 cm. x 23 cm. (e) N.A. (v) N.A. (vi) R.S. 1. (vii) to (x) N.A.

**2. TREATMENTS :**

**Main-plot treatments :**

3 fungus treatments of seed : F<sub>1</sub>=Aspergillus niger, F<sub>2</sub>=Rhizopus sp. and F<sub>3</sub>=Mixture of both.

**Sub-plot treatments :**

10 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=2.8 gm. of Agrosan-G.N, T<sub>2</sub>=1.9gm. of ceresan, T<sub>3</sub>=1.9 gm. of Lufasan, T<sub>4</sub>=1.9 gm. of Hervasan, T<sub>5</sub>=2.8 gm. of Thiram, T<sub>6</sub>=1.9 gm. of Phygon x L, T<sub>7</sub>=1.9 gm. of shell seed dresser, T<sub>8</sub>=1.9 gm. of Merculine and T<sub>9</sub>=1.9 gm. of P.C.N.B.

Fungicides were used for 1 Kg of seed.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 10 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 1.8 m. x 1.4 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of pod. (iv) (a) 1962 to 1964 (Modified in 1963 and 1964). (b) N.A. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 1388 Kg/ha. (ii) (a) 2850 Kg/ha. (b) 1104 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>	Mean
F <sub>1</sub>	623	2338	1567	143	1085	1670	640	1861	1364	1772	1306
F <sub>2</sub>	2031	2093	1042	1305	1959	1042	929	1495	1453	521	1387
F <sub>3</sub>	630	2121	1337	1481	2093	1132	1161	1799	1248	1713	1471
Mean	1095	2184	1315	976	1712	1281	910	1718	1355	1335	1388



**Crop :- Groundnut (*Kharif*).**

**Ref :- Rj. 63(68).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

**Object :-**To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Barley. (c) N.A. (ii) Sandy. (iii) 29.7.63. (iv) (a) 6 ploughings. (b) N.A. (c) 72 seeds/plot for replication I and for treatment A in replication II and 48 seeds/plot for others. (d) 46 cm. x 23 cm. (e) Two. (v) N.A. (vi) R.S. 1. (vii) to (ix) N.A. (x) 4.11.63.

**2. TREATMENTS :**

**Main-plot treatments :**

3 fungus treatments of seed ;  $F_1 = \text{Aspergillus sp.}$   $F_2 = \text{Rhizopns sp.}$  and  $F_3 = \text{Mixture of both.}$

**Sub-plot treatments :**

16 seed treatments :  $T_0 = \text{Control}$ ,  $T_1 = 3 \text{ gm. of Agrosan}$ ,  $T_2 = 2 \text{ gm. of ceresan}$ ,  $T_3 = 2 \text{ gm. of Harvasan}$ ,  $T_4 = 3 \text{ gm. of Thiram}$ ,  $T_5 = 2 \text{ gm. of PhygonXL}$ ,  $T_6 = 2 \text{ gm. of shell seed dresser}$ ,  $T_7 = 2 \text{ gm. of Mercuine}$ ,  $T_8 = 2 \text{ gm. of Captan}$ ,  $T_9 = 2 \text{ gm. of P.C.N.B.}$ ,  $T_{10} = \text{Ceresan and Captan in the ratio } 1 : 1$ ,  $T_{11} = \text{Ceresan and captan in the ratio } 2 : 1$ ,  $T_{12} = \text{Ceresan and Captan in the ratio } 5 : 1$ ,  $T_{13} = \text{Ceresan and Thiram in } 1 : 1 \text{ ratio}$ ,  $T_{14} = \text{Ceresan and Thiram in } 2 : 1 \text{ ratio}$  and  $T_{15} = \text{Ceresan and Thiram in } 5 : 1 \text{ ratio.}$

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 16 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) and (b) 1.8 m. x 1.4 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) No. of actual germinated plants/plot. (iv) (a) 1962-64 (In modified form in 1963 and 1964). (b) No. (c) N.A. (v) to (vii) Nil.

**5. RESULTS :**

(i) 33.7 degrees. (ii) (a) 20.8 degrees. (b) 9.4 degrees. (iii) Main effects of F and T are highly significant. (iv) Av.% of plants germinated in degrees.

	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
$F_1$	57.3	50.2	45.3	47.4	51.1	15.3	43.9	55.7
$F_2$	32.4	10.3	11.7	10.8	27.9	10.8	12.9	44.6
$F_3$	40.3	18.8	21.1	17.3	23.8	11.8	20.0	33.2
Mean	43.3	26.4	26.0	25.2	34.2	12.6	25.6	44.5

$T_8$	$T_9$	$T_{10}$	$T_{11}$	$T_{12}$	$T_{13}$	$T_{14}$	$T_{15}$	Mean
49.1	51.4	53.8	48.1	61.6	58.5	59.6	61.3	50.6
25.1	19.2	24.0	31.3	31.9	39.2	37.5	23.8	24.6
19.1	9.5	29.1	27.3	41.9	36.7	36.6	27.1	25.9
31.1	26.7	35.6	35.6	45.1	44.8	44.6	37.4	33.7

C.D. for F marginal means = 10.3 degrees.

C.D. for T marginal means = 8.8 degrees.

**Crop :- Groundnut (*Kharif*).**

**Ref :- Rj. 64(10).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

**Object :-** To determine the relative efficacy of seed dressing fungicides in relation to yield and germination of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Pea-Groundnut. (b) Pea. (c) N.A. (ii) Sandy. (iii) 11.7.64. (iv) (a) 2 ploughings. (b) Dibbling. (c) 32 seeds/plot. (d) 30 cm. × 23 cm. (e) 1. (iv) 247 Kg/ha. of  $P_2O_5$  by drilling + 123.5 Kg/ha. of N by broadcasting. (vi) R.S. 1. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 12.11.64.

**2. TREATMENTS :**

**Main-plot treatments**

3 fungus treatments of seed :  $F_1$  = Aspergillus,  $F_2$  = Rhizopus sp. and  $F_3$  = Mixture of both  $F_1 + F_2$ .

**Sub-plot treatments :**

16 seed treatments :  $T_0$  = Control,  $T_1$  = 3 gm. of Agrosan G.N.,  $T_2$  = 2 gm. of cerasan,  $T_3$  = 2 gm. of phygonXL,  $T_4$  = 2 gm. of shell seed dresser,  $T_5$  = 2 gm. of Merculine D.A.,  $T_6$  = 3 gm. of Thiram,  $T_7$  = 2 gm. of Captan,  $T_8$  = 2 gm. of Beej powder No. 4,  $T_9$  = 2 gm. of B.P. No. 5,  $T_{10}$  = 2 gm. of Beej Power No. 6,  $T_{11}$  = 2 gm. of Beej powder No. 7,  $T_{12}$  = 2.5 gm. of Beej Powder No : 8,  $T_{13}$  = 2.5 gm. of Beej Powder No : 4,  $T_{14}$  = 2 gm. of Thirisan and  $T_{15}$  = Fungil only.

Above fungicides were used for 1 Kg. of seed.

**3. DESIGN :**

(i) Split-plot with Lattice arrangements. (ii) (a) 16 plots/block, 3 blocks/replication. (b) N.A. (iii) 3. (iv) (a) and (b) 1.8 m. × 1.2 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) No. of plants germinated/plot and yield of pods. (iv) 1962-64 (Modified every year). (b) No. (c) Nil. (v) Jodhpur, Bharatpur and Udaipur. (vi) Nil. (vii) 89.7 Kg/ha. Aldrin 2% dust broadcasted and mixed with soil in the field before sowing.

**5. RESULTS :**

(i) 5622 Kg/ha. (ii) (a) 2920 Kg/ha. (b) 2255 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Groundnut in Kg/ha.

	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
$F_1$	4922	4049	6215	5230	4848	4652	7116	5554
$F_2$	4742	5980	6626	5674	6802	5222	7053	3267
$F_3$	4440	5104	5689	6633	4787	5170	6763	6355
Mean	4701	5044	6177	5846	5479	5015	6978	5059

$T_8$	$T_9$	$T_{10}$	$T_{11}$	$T_{12}$	$T_{13}$	$T_{14}$	$T_{15}$	Mean
6861	6441	5588	7052	5349	5946	6994	5262	5755
4048	7275	3427	6509	7988	4578	6512	4902	5663
4469	6710	4179	6044	6213	5941	4044	4549	5449
5126	6809	4388	6535	6517	5488	5850	4938	5622

**Crop :- Groundnut (Kharif).****Ref :- Rj. 65(4).****Site :- Govt. Agri. Faam, Durgapura.****Type :- 'D'.**

Object :—To determine the relative efficiency of seed dressing fungicides in rotation to yield and disease intensity and germination of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) N.A. (iii) 21.7.65. (iv) (a) Cross ploughing 4 times. (b) Dibbling. (c) N.A. (d) 30 cm. × 30 cm. (e) 1. (v) 5.6 Kg/ha. of N + 18 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) R.S.—1. (vii) Unirrigated. (viii) and (ix) N.A. (x) 20.11.65.

**2. TREATMENTS :****Main-plot treatments :**

M<sub>1</sub>=Aspergillus, M<sub>2</sub>=Rhizopus and M<sub>3</sub>=Mixture of M<sub>1</sub>+M<sub>2</sub>.

**Sub-plot plot treatments :**

S<sub>1</sub>=Beej powder No. 5 @ 2 gm/Kg., S<sub>2</sub>=Beej powder No. 6 @ 2 gm/Kg., S<sub>3</sub>=Beej powder No. 6 @ 2.5 gm/Kg., S<sub>4</sub>=Beej powder No. 9 @ 2.5 gm/Kg., S<sub>5</sub>=Ceresan @ 3 gm/Kg., S<sub>6</sub>=Merculine @ 3 gm/Kg., S<sub>7</sub>=Agrosangm @ 3 gm/Kg., S<sub>8</sub>=Thiram @ 3 gm/Kg., S<sub>9</sub>=Fungus only and S<sub>10</sub>=No treatment.

**8. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 10 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 2.7 m. × 1.8 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Yield of Groundnut. (iv) (a) 1965 only. (b) N.A. (c) Nil. (v) Bhusawar. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1072 Kg/ha. (ii) (a) 1114 Kg/ha. (b) 603 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	S <sub>8</sub>	S <sub>9</sub>	S <sub>10</sub>	Mean
M <sub>1</sub>	1162	848	733	1642	777	607	595	519	793	843	852
M <sub>2</sub>	837	621	1159	735	849	1077	1467	1302	551	1222	982
M <sub>3</sub>	1032	1167	1356	2326	1578	1374	1361	1185	1022	1426	1383
Mean	1010	879	1083	1568	1068	1019	1141	1002	789	1164	1072

**Crop :- Groundnut (Kharif).****Ref :- Rj. 60(17).****Site :- Govt. Agri. Farm, Durgapura.****Type :- 'D'.**

Object :—To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Fallow. (c) N.A. (ii) Sandy. (iii) to (v) N.A. (vi) Local. (vii) Unirrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

8 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=2.8 gm/Kg. of Agrosan G.N., T<sub>2</sub>=1.9 gm/Kg. of Ceresan, T<sub>3</sub>=1.9 gm/Kg. of Tillex, T<sub>4</sub>=1.9 gm/Kg. of Lunasan, T<sub>5</sub>=1.9 gm/Kg. of Hervasan, T<sub>6</sub>=2.8 gm/Kg. of Fernasan and T<sub>7</sub>=3.7 gm/Kg. of Sulphur.

## 3. DESIGN:

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 6. (iv) (a) and (b) 6'1 m. × 1'8 m. (v) Nil. (vi) Yes.

## 4. GENERAL:

(i) and (ii) N.A. (iii) Yield of pod. (iv) (a) 1960 to 1964 [Treatments modified every year]. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS:

(i) 1736 Kg/ha. (ii) 595.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	1970	1687	2118	1611	1437	1784	1932	1347

**Crop :- Groundnut (Kharif).**

**Ref :- Rj. 61(12).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

**Object :-**To determine the relative efficacy of seed dressing fungicides in relation to germination and yield of Groundnut.

## 1. BASAL CONDITIONS:

(i) (a) Cow pea-Barley. (b) Barley. (c) Nil. (ii) Sandy. (iii) 13.7.61. (iv) (a) 4 ploughings. (b) Dibbling. (c) N.A. (d) 46 cm. between lines. (e) N.A. (v) N.A. (vi) R.S.—1. (vii) Nil. (viii) and (ix) N.A. (x) 12 to 15.12.61.

## 2. TREATMENTS:

8 fungicidal treatments : F<sub>0</sub>=0, F<sub>1</sub>=2.8 gm. of Agrosan G.N., F<sub>2</sub>=1.9 gm. of Ceresan, F<sub>3</sub>=1.9 gm. of Tillex, F<sub>4</sub>=1.9 gm. of Lunasan, F<sub>5</sub>=1.9 gm. of Hervasan, F<sub>6</sub>=2.8 gm. of Thiram and F<sub>7</sub>=3.7 gm. of Sulphur.

## 3. DESIGN: and 4. GENERAL:

Same as in Expt. No. 60(17) on page 318.

## 5. RESULTS:

(i) 796 Kg/ha. (ii) 285.5 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of pods in Kg/ha.

Treatment	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>
Av. yield	474	788	1026	958	678	873	881	687

C.D.=334.9 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Rj. 62(15).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

**Object :-**To determine the relative efficacy of seed dressing fungicides in relation to yield and germination of Groundnut.

## 1. BASAL CONDITIONS:

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) and (b) N.A. (c) 240 seeds/plot. (d) 46 cm. × 30 cm. (v) N.A. (vi) R.S.—1. (vii) to (x) N.A.

## 2. TREATMENTS :

8 fungicidal treatments :  $F_0=0$ ,  $F_1=2.8$  gm. of Agrosan G.N.,  $F_2=1.9$  gm. of Ceresan,  $F_3=1.9$  gm. of Tillex,  $F_4=1.9$  gm. of Lunasan,  $F_5=1.9$  gm. of Hervasan,  $F_6=2.8$  gm. of Thiram and  $F_7=1.9$  gm. of Beej powder.

Fungicides were used for 1 Kg. of seed.

## 3. DESIGN : and 4. GENERAL :

Same as in Expt. No. 60(17) conducted at Durgapura on page 318.

## 5. RESULTS :

(i) 3675 Kg/ha. (ii) 976.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of pod in Kg/ha.

Treatment	$F_0$	$F_1$	$F_2$	$F_3$	$F_4$	$F_5$	$F_6$	$F_7$
Av. yield	2338	3331	3939	2990	3828	4814	3818	4341

C.D.=1145.1 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Rj. 61(4).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

Object :- To determine the relative efficacy of seed dressing fungicides in relation to yield and germination of Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Pea—Groundnut. (b) Pea. (c) N.A. (ii) Sandy. (iii) 10.7.64. (iv) (a) 2 ploughings. (b) Dibbling. (c) 61.8 Kg/ha. (d) 30 cm. x 30 cm. (e) 1. (v) 4.9 Kg/ha. of  $P_2O_5$  by drilling and 4.9 Kg/ha. of A S by broadcasting. (vi) R.T.—1. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 9.11.64.

## 2. TREATMENTS :

10 seed dressing treatments :  $T_0=0$ ,  $T_1=3$  gm., of Agrosan G.N.,  $T_2=3$  gm. of Ceresan,  $T_3=2$  gm. of Tillex,  $T_4=2$  gm. of Lumason,  $T_5=2$  gm. of Hervasan,  $T_6=3$  gm. of Thiram,  $T_7=2$  gm. Phygon X.L.,  $T_8=2$  gm. of Shell seed drsaser and  $T_9=2$  gm. of Merculine.

Above fungicides were used for 1 Kg/ha. of seed.

## 3. DESIGN :

(i) Incomplete L. Sq. (ii) (a) 3 plots/block ; 10 blocks/Sq. and 3 Sqs. (b) N.A. (iii) 9. (iv) (a) and (b) 1.3 m. x 1.4 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) N.A. (ii) B.H.C. powder broadcasted before sowing. [Incidence of diseases and pest as per results. (iii) No. of plants germinated/plot, and yield of pod. (iv) (a) 1950—54 [Modified every year]. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 75.8 degree. (ii) 7.8 degree. (iii) Treatment differences are significant. (iv) Av. % germination in degree.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Av. germination in degrees.	66	84	80	73	71	79	76	76	76	77

C.D. = 14.4 degree.

(i) 3451 Kg/ha. (ii) 914.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Av. yield.	3365	3987	3620	3556	2671	3919	3676	3018	3540	3161

**Crop :- Groundnut (Kharif).****Ref :- Rj. 62(16).****Site :- Bhinder Panchayat Samiti, Udaipur.****Type :- 'D'.**

Object :—To determine the relative efficacy of different seed dressing fungicides in relation to germination and yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Sandy loam. (iii) N.A. (iv) (a) and (b) N.A. (c) 81 seeds/plot. (d) and (e) N.A. (v) N.A. (vi) Local. (vii) to (x) N.A.

**2. TREATMENTS :****Main-plot treatments**

3 fungus treatments of seed :  $F_1$ =Aspergillus,  $F_2$ =Rhizopus sp. and  $F_3$ =Mixture of both.

**Sub-plot treatments :**

4 seed treatments :  $T_0$ =Untreated Seed,  $T_1$ =seed treated with Thiram,  $T_2$ =Seed treated with Mercu-line and  $T_3$ =Seed treated with Beej powder.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/block, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 1.8 m.  $\times$  1.4 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of pod. (iv) (a) 1962 only. (b) and (c) N.A. (v) to (vii) Nil.

**5. RESULTS :**

(i) 1144 Kg/ha. (ii) (a) 396.7 Kg/ha. (b) 83.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	$T_0$	$T_1$	$T_2$	$T_3$	Mean
$F_1$	1187	961	1074	1187	1102
$F_2$	1130	1130	1243	1187	1172
$F_3$	1130	1300	1130	1074	1158
Mean	1149	1130	1149	1149	1144

**Crop :- Groundnut (Kharif).****Ref :- Rj. 64(7).****Site :- Govt. Agri. Farm, Udaipur.****Type :- 'DC'.**

Object :—To determine the relative efficacy of seed dressing fungicides in relation to yield and germination of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) 13.7.64. (iv) (a) 4 ploughings. (b) Dibbling. (c) 32 seeds/plot. (d) 30 cm.  $\times$  23 cm. (e) 1. (v) 49.4 Kg/ha. of  $P_2O_5$  by drilling. + 3.7 C.L./ha. of F.Y.M. by broadcasting. (vi) Irrigated. (vii) 3 weedings. (ix) N.A. (x) 14 to 16.11.64.

**2. TREATMENTS :****Main-plot treatments :**

3 fungus treatments of seed :  $F_1$ =Aspergillus,  $F_2$ =Rhizopus sp. and  $F_3$ =Mixture of both  $F_1$ + $F_2$ .

**Sub-plot treatments :**

16 seed treatments :  $T_0$ =Control,  $T_1$ =3 gm. of Agrosan G.N.,  $T_2$ =2 gm. of Ceresan,  $T_3$ =2 gm. of Phygon XL,  $T_4$ =2 gm. of Shell seed dresser,  $T_5$ =2 gm. of Mercu-line DA,  $T_6$ =2 gm. of Thiram,  $T_7$ =2 gm. of Captan,  $T_8$ =2 gm. of Beej powder No. 4,  $T_9$ =2 gm. of Beej powder No. 5,  $T_{10}$ =2 gm. of B.P. No. 6,  $T_{11}$ =2 gm. of B.P. No. 7,  $T_{12}$ =2.5 gm. of B.P. No. 8,  $T_{13}$ =2.5 gm. of B.P. No. 9,  $T_{14}$ =2 gm. of Tritisan and  $T_{15}$ =Fungii only.

Above fungicides were used for 1 Kg. of seed.

## 3. DESIGN :

(i) Split-plot with Lattice arrangements. (ii) (a) 16 plots/block, 3 blocks/replication. (b) N.A. (iii) 3. (iv) (a) and (b) 1.8 m. × 1.2 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Germination %, Groundnut yield ; Total no. of plants/plot at the time of harvest. (iv) (a) 1964 only. (b) No. (c) N.A. (v) Durgapura, Jodhpur and Bharatpur. (vi) N.A. (vii) Aldrin 2% dust broadcasted and mixed with soil before sowing 80 lb/ac.

## 5. RESULTS :

(i) 1702 Kg/ha. (ii) (a) 2597 Kg/ha. (b) 827 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
F <sub>1</sub>	2437	1375	1674	1719	1644	927	3588	1794
F <sub>2</sub>	1839	1525	1405	1226	1510	1570	897	1525
F <sub>3</sub>	1749	2811	2063	1644	1241	2811	2691	1764
Mean	2008	1904	1714	1530	1465	1769	2392	1694

T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>	T <sub>13</sub>	T <sub>14</sub>	T <sub>15</sub>	Mean
1794	2063	1973	2153	1525	2317	2287	1674	1934
1196	1375	1211	1615	867	1390	777	897	1302
2168	1435	2242	792	1943	1615	1824	1121	1870
1719	1624	1809	1520	1445	1774	1629	1231	1702

(i) 50.1 degrees. (ii) (a) 11.6 degrees. (b) 7.5 degrees. (iii) Main effect of T alone is significant. (iv) Av. % of seed germinated (in degrees).

	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
F <sub>1</sub>	46.2	56.3	39.6	48.1	57.6	43.6	55.4	46.2
F <sub>2</sub>	52.4	50.6	53.8	42.2	47.4	46.2	37.0	48.6
F <sub>3</sub>	48.0	52.4	56.2	43.1	49.2	52.4	55.0	47.4
Mean	48.9	53.1	49.9	44.5	51.4	47.4	49.1	47.4

T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>	T <sub>13</sub>	T <sub>14</sub>	T <sub>15</sub>	Mean
58.3	58.9	52.8	47.6	54.4	55.4	49.9	44.0	50.9
52.4	53.1	50.0	50.0	44.4	52.6	43.1	46.8	48.2
56.0	53.1	51.7	45.7	56.2	60.0	46.2	47.4	51.2
55.6	55.0	51.5	47.7	51.7	56.0	46.4	46.1	50.1

C.D. for T marginal means = 5.2 degrees.

**Crop :- Mustard (Rabi).**

**Ref :- Rj. 62(48).**

**Site :- Govt. Seed. Multiplication Farm, Ora, Sirohi.**

**Type :- 'M'.**

**Object :-** To study the effect of N and P on the growth and yield of Mustard.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Heavy soils. (iii) N.A. (iv) (a) and (b) N.A. (c) 2 Kg/ha. (d) 61 cm. between rows. (e) N.A. (v) N.A. (vi) Local. (vii) Irrigated. (viii) 1 weeding. (ix) and (x) N.A.

## 2. TREATMENTS :

All combinations of (1) and (2)

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

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

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 5.5 m.  $\times$  3.7 m. (b) 4.9 m.  $\times$  3.1 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) and (ii) N.A. (iii) Yield of seed. (iv) (a) 1952 only. (b) and (c) N.A. (v) to (vii) Nil.

## 5. RESULTS :

(i) 16.8 Kg/ha. (ii) 44.4 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of seed in Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	Mean
$P_0$	116	161	141	199	154
$P_1$	105	161	185	185	159
$P_2$	144	195	218	204	190
Mean	122	172	181	196	168

C.D. for N marginal means = 26.1 Kg/ha.

**Crop :- Mustard (Rabi).**

**Ref :- Rj. 61(82).**

**Site :- Govt. Agri. Farm, Sewar.**

**Type :- 'M'.**

Object :—To study the effect of N, P and K on the yield of Mustard.

## 1. BASAL CONDITIONS :

(i) (a) Fallow-Mustard. (b) Fallow. (c) N.A. (ii) N.A. (iii) 13.11.61. (iv) (a) 2 ploughings. (b) N.A. (c) 3 Kg/ha. (d) 45 cm. between rows. (e) N.A. (v) N.A. (vi) Local. (vii) Unirrigated. (viii) and (ix) N.A. (x) 17.4.62.

## 2. TREATMENTS :

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

(1) 3 levels of N :  $N_0=0$ ,  $N_1=40.1$  and  $N_2=80.2$  Kg/ha.

(2) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=98.5$  and  $P_2=200.5$  Kg/ha.

(3) 3 levels of  $K_2O$  :  $K_0=0$ ,  $K_1=32.8$  and  $K_2=65.6$  Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 2. (iv) (a) 9.0 m.  $\times$  6.1 m. (b) 8.1 m.  $\times$  4.9 m. (v) 45 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

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

## 5. RESULTS :

(i) 729 Kg/ha. (ii) 339.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.



	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	699	920	759	639	819	920	793
N <sub>1</sub>	750	740	579	799	620	650	690
N <sub>2</sub>	771	492	856	750	752	617	706
Mean	740	717	731	729	730	729	729
K <sub>0</sub>	769	780	638				
K <sub>1</sub>	661	750	780				
K <sub>2</sub>	790	622	776				

**Crop :- Mustard (Rabi).**

**Ref :- Rj. 64(58), 65(31).**

**Site :- Govt. Agri. Res. Stn., Sriganaganagar.**

**Type :- 'M'.**

**Object :-** To find out the fertilizers requirement of Mustard under water scarcity conditions.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 6.10.1964 ; 26.10.1965. (iv) (a) Ploughings with tractor and *desi* plough. (b) Behind the plough. (c) 2.5 to 5 Kg/ha. (d) 46 cm. between rows for 64(58) ; 46 cm. × 23 cm. for other. (e) Nil. (v) Nil for 64(58) ; N.A. for other. (vi) L—18. (vii) Irrigated. (viii) 2 hoeings by hand hoe. (ix) 1 cm. for 64(58) ; N.A. for other. (x) 20.3.1965 ; 27.3.1966.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 4 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=18.5, N<sub>2</sub>=37.1 and N<sub>3</sub>=55.6 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=18.5 and P<sub>2</sub>=37.1 Kg/ha.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 5.5 m. × 3.7 m. (b) 4.6 m. × 2.7 m. (v) 46 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of seed. (iv) (a) 1964—1965. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Since the error variances are heterogeneous and Treatments × years interaction is absent, results of individual years are presented under 5. Results.

**5. RESULTS :**

**64(58)**

(i) 1216 Kg/ha. (ii) 419.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
P <sub>0</sub>	1156	877	917	1270	1055
P <sub>1</sub>	991	1156	1190	1439	1194
P <sub>2</sub>	1170	1900	1258	1272	1400
Mean	1106	1311	1122	1327	1216

**65(31)**

(i) 408 Kg/ha. (ii) 167.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
P <sub>0</sub>	396	417	331	514	414
P <sub>1</sub>	368	329	466	414	394
P <sub>2</sub>	329	346	419	570	416
Mean	364	364	405	499	408

**Crop :- Mustard (Rabi).**

**Ref :- Rj. 61(69).**

**Site :- Govt. Agri. Res. Farm, Sriganganagar.**

**Type :- 'M'.**

**Object :-** To study the effect of different types and levels of N at different levels of P and K on the yield of Mustard.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 31.10.61. (iv) (a) 4 ploughings. (b) Sown as drilled. (c) 2 Kg/ha. (d) Row to row 30 cm. (e) N.A. (v) N.A. (vi) L 18. (vii) 4 irrigated. (viii) 3 weedings and hoeings. (ix) N.A. (x) 29.3.62 to 9.4.62.

**2. TREATMENTS:**

**Main-plot treatments :**

5 nitrogenous treatments : N<sub>0</sub>=N<sub>0</sub> N<sub>1</sub>=33.6 Kg/ha. of N as A/S, N<sub>2</sub>=67.2 Kg/ha. of N as A/S, N<sub>3</sub>=33.6 Kg/ha. of N as Cal. Am. Sulph. and N<sub>4</sub>=67.2 Kg/ha. of N as Cal. A/S.

**Sub-plot treatments :**

All combination of (1) and (2)

(1) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(2) 2 levels of K<sub>2</sub>O : K<sub>0</sub>=0 and K<sub>1</sub>=33.6 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 5 main-plots/block ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of mustard. (iv) (a) 1961-contd. (b) and (c) N.A. (v) to (vii) N.A.

**5. RESULTS :**

(i) 1260 Kg/ha. (ii) (a) 206.0 Kg/ha. (b) 145.4 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of mustard in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
K <sub>0</sub>	1105	1270	1286	1284	1426	1281	1295	1247	1274
K <sub>1</sub>	1129	1199	1276	1283	1341	1238	1249	1249	1245
Mean	1117	1234	1281	1284	1383	1259	1272	1248	1260
P <sub>0</sub>	1163	1219	1249	1293	1375				
P <sub>1</sub>	1060	1277	1404	1300	1320				
P <sub>2</sub>	1129	1208	1191	1258	1456				

C.D. for N marginal means = 129.7 Kg/ha.

**Crop :- Mustard (Rabi).****Ref :- Rj. 62(108), 63(19).****Site :- Govt. Agri. Res. Farm, Sriganganagar.****Type :- 'M'.**

Object :—To study the effect of different types and levels of N with different levels of P and K on the yield of Mustard.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow for 63(19); Cotton for 62(108). (c) Nil. (ii) Sandy loam. (iii) 17.10.62; 2-11.63. (iv) (a) 4 ploughings. (b) Drilling for 62(108); N.A. for 63(19). (c) 2 Kg/ha. (d) 23 cm. between rows for 62(108); 30 cm. × 23 cm. for 63(19). (e) N.A. (v) N.A. for 62(108); Nil for 63(19). (vi) L-18. (vii) Irrigated. (viii) One weeding. (ix) N.A. (x) 22, 23:3.1963; 5.4.1964.

**2. TREATMENTS :****Main-plot treatments :**

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

(1) 2 levels of N :  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.

(2) 2 sources of N :  $S_1=A/S$  and  $S_2=C/A/N$ .

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

(2) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=33.6$  Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 5 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.4 m. × 5.5 m. (b) 6.2 m. × 4.3 m. (v) 61 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal for 62(108); poor for 63(19). (ii) Nil for 62(108); Attack of jassids controlled by spraying Akodin for 63(19). (iii) Yield of mustard. (iv) (a) 1961 to 1963 (treatments modified in 62). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5 results.

**5. RESULTS :****62(108)**

(i) 1414 Kg/ha. (ii) (a) 407.4 Kg/ha. (b) 178.8 Kg/ha. (iii) 'Control vs. others' is highly significant and main effect of P is significant. (iv) Av. yield of seed in Kg/ha.

without Nitrogen

	$P_0$	$P_1$	$P_2$	Mean
$K_0$	934	924	908	922
$K_1$	948	977	1050	992
Mean	941	950	979	957

with Nitrogen

	$S_1$	$S_2$	$K_0$	$K_1$	$P_0$	$P_1$	$P_2$	Mean
$N_1$	1429	1470	1494	1405	1392	1448	1508	1449
$N_2$	1568	1648	1621	1595	1527	1593	1704	1608
Mean	1498	1559	1557	1500	1459	1521	1606	1529
$P_0$	1453	1466	1486	1433				
$P_1$	1468	1573	1516	1525				
$P_2$	1574	1638	1670	1542				
$K_0$	1519	1596						
$K_1$	1478	1522						

C.D. for P marginal means = 89.2 Kg/ha.  
 C.D. for 'control mean vs. others' = 202.6 Kg/ha.

63(19)

(i) 477 Kg/ha. (ii) (a) 270 Kg/ha. (b) 113 Kg/ha. (iii) Main effect of P is highly significant and interaction  $S \times N \times P$  is significant. (iv) Av. yield of seed in Kg/ha.

Control (No. N) mean=N.A.

	S <sub>1</sub>	S <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>1</sub>	471	436	465	442	418	467	476	454
N <sub>2</sub>	477	524	521	480	419	532	552	500
Mean	474	480	494	461	418	500	514	477
P <sub>0</sub>	426	410	406	408				
P <sub>1</sub>	485	514	510	462				
P <sub>2</sub>	511	516	474	495				
K <sub>0</sub>	494	493						
K <sub>1</sub>	455	467						

C.D. for P marginal means=56.3 Kg/ha.

**Crop :- Mustard (Rabi).****Ref :- Rj. 62(43), 63(66).****Site :- Govt. Agri. Res. Farm, Sriganaganagar.****Type :- 'M'.**

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

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Wheat for 62(43); N.A. for 63(66). (c) Nil for 62(43); N.A. for 63(66). (ii) Sandy loam. (iii) 3.10.1962; N.A. (iv) (a) 3 ploughings for 62(43); N.A. for 63(66). (b) N.A. (c) 3 Kg/ha. for 62(43); N.A. for 63(66). (d) 46 cm. between rows. (e) N.A. (v) N.A. for 62(43); Nil for 63(66). (vi) R.L. 13 for 62(43); R.L. 18 for 63(66). (vii) Irrigated. (viii) 2 weedings for 62(43); N.A. for 63(66). (ix) N.A. (x) 3.4.1963; 24.3.1964.

**2. TREATMENTS :****Main-plot treatments :**

4 methods of application of manures : M<sub>1</sub>=Whole fertilizers by broadcast at sowing, M<sub>2</sub>=Whole fertilizers by drilling at sowing, M<sub>3</sub>= $\frac{1}{2}$  N+full dose of P<sub>2</sub>O<sub>5</sub> by broadcasting+ $\frac{1}{2}$  N as top dressing and M<sub>4</sub>= $\frac{1}{2}$  N+full dose of P<sub>2</sub>O<sub>5</sub> as drilling+ $\frac{1}{2}$  N as top dressing.

**Sub-plot treatments :**

All combinations of (1) and (2)

- (1) 3 levels of N: N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.  
 (2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

**3. DESIGN:**

(i) Split-plot. (ii) (a) 4 main-plots/replication; 9 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m. x 4.6 m. for 62(43); 5.5 m. x 3.7 m. for 63(66). (b) 4.6 m. x 3.7 m. for 62(43); 4.6 m. x 2.7 m. for 63(66). (v) 46 cm. x 46 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 62(43); Good for 63(66). (ii) N.A. for 62(43); Nil for 63(66). (iii) Yield of seed. (iv) (a) 1962-1964 [treatments modified in 64]. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the main-plot error variances are heterogeneous and main-plot Treatments $\times$ years interaction is absent. Results of individual years are presented under 5. Results.

## 5. RESULTS :

## 62(43)

(i) 1581 Kg/ha. (ii) (a) 777.4 Kg/ha. (b) 275.1 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of seed in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	1475	1266	1488	1435	1265	1450	1532	1416
P <sub>1</sub>	1776	1525	1468	1683	1355	1713	1772	1613
P <sub>2</sub>	1773	1712	1595	1784	1528	1817	1802	1716
Mean	1675	1501	1517	1634	1383	1660	1702	1582
N <sub>0</sub>	1389	1372	1326	1445				
N <sub>1</sub>	1747	1652	1534	1707				
N <sub>2</sub>	1889	1478	1691	1750				

C.D. for N or P marginal means=129.5 Kg/ha.

## 63(66)

(i) 1078 Kg/ha. (ii) (a) 279.0 Kg/ha. (b) 236.0 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of seed in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	831	798	884	1131	684	1011	1038	911
P <sub>1</sub>	1077	1292	1044	1267	990	1138	1337	1155
P <sub>2</sub>	1113	1150	1078	1331	921	1159	1424	1168
Mean	987	1080	1002	1243	865	1103	1267	1078
N <sub>0</sub>	887	814	732	1028				
N <sub>1</sub>	1006	1178	1045	1182				
N <sub>2</sub>	1068	1250	1229	1519				

C.D. for N or P marginal means=111.1 Kg/ha.

**Crop :- Mustard (Rabi).**

**Site :- Govt. Agri. Res. Farm, Sriganagar.**

**Ref :- Rj. 64(47).**

**Type :- 'MP'.**

**Object :-**To study the effect of different methods of application of N and P at various levels on the yield of Mustard.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 3.11.64. (iv) (a) 3 ploughings. (b) Behind the plough. (c) 74 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) R.L. 18. (vii) Irrigated. (viii) 2 hand hoeings. (ix) N.A. (x) 9.4.65.

## 2. TREATMENTS :

**Main-plot treatments :**

4 methods of application :  $M_1$ =Whole fertilizers at sowing by broadcasting,  $M_2$ =Whole fertilizers at sowing by drilling,  $M_3$ = $\frac{1}{2}$  N+full dose of  $P_2O_5$  by broadcasting and  $\frac{1}{2}$  N as top dressing and  $M_4$ = $\frac{1}{2}$  N+full dose of  $P_2O_5$  by drilling +  $\frac{1}{2}$  N as top dressing

**Sub-plot treatments :**

All combinations of (1) and (2)

- (1) 3 levels of N :  $N_0=0$ ,  $N_1=37.1$  and  $N_2=74.1$  Kg/ha.  
 (2) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=37.1$  and  $P_2=74.1$  Kg/ha.

## 3. DESIGN : and 4. GENERAL :

Same as in Expt. No. 63(66) on page 327.

## 5. RESULTS :

(i) 1325 Kg/ha. (ii) (a) 138.6 Kg/ha. (b) 221.4 Kg/ha. (iii) Main effect of N alone is highly significant. Main effects of M and P are significant. (iv) Av. yield of seed in Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	Mean	$P_0$	$P_1$	$P_2$
$N_0$	1082	1169	1044	1161	1114	1055	1070	1216
$N_1$	1267	1484	1340	1434	1381	1343	1400	1401
$N_2$	1509	1456	1376	1579	1480	1353	1545	1540
Mean	1286	1370	1253	1391	1325	1250	1338	1386
$P_0$	1216	1246	1215	1325				
$P_1$	1263	1483	1201	1407				
$P_2$	1378	1380	1344	1441				

C.D. for M marginal means = 92.2 Kg/ha.

C.D. for N or P marginal means = 104.5 Kg/ha.

**Crop :- Mustard (Rabi).**

**Ref :- Rj. 65(30).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'M'.**

**Object :-** To study the effect of different methods of application of N on the yield of Mustard.

## 1. BASAL CONDITIONS :

(i) (a) No. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 26.10.65. (iv) (a) Ploughing. (b) Behind the plough. (c) 2.5 Kg/ha. (d) 46 cm.  $\times$  23 cm. (e) N.A. (v) N.A. (vi) L. 18. (vii) Irrigated. (viii) 2 hand hoeings. (ix) N.A. (x) 27.3.66.

## 2. TREATMENTS :

**Main-plot treatments :**

3 methods of application :  $M_1$ =Full fertilizer as soil application at sowing,  $M_2$ = $\frac{1}{2}$  as soil and  $\frac{1}{2}$  as foliar application and  $M_3$ =Full as foliar application in 2 splits.

**Sub-plot treatments :**

All combinations of (1) and (2)

- (1) 3 levels of N :  $N_0=0$ ,  $N_1=18.5$  and  $N_2=37.1$  Kg/ha.  
 (2) 2 levels of phosphate :  $P_0=0$  and  $P_1=24.7$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 5.5 m.  $\times$  3.7 m. (b) 4.9 m.  $\times$  2.7 m. (v) 30 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of Mustard. (iv) (a) 1963 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 230 Kg/ha. (ii) (a) 110.3 Kg/ha. (b) 60.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Mustard in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
M <sub>1</sub>	185	213	283	233	221	227
M <sub>2</sub>	270	291	256	265	280	272
M <sub>3</sub>	169	173	228	190	191	190
Mean	208	226	256	229	231	230
P <sub>0</sub>	220	220	247			
P <sub>1</sub>	197	231	264			

**Crop :- Mustard.**

**Ref :- Rj. 62, 64(S.F.T.)**

**Site :- (District) : Sriganagar.**

**Type :- 'M'.**

**Object :-** To study the response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with other nutrients (Type : A<sub>1</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Desert soil. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

O=Control (no manure).

N<sub>1</sub>=33.6 Kg/ha. of N.

N<sub>2</sub>=67.2 Kg/ha. of N.

P<sub>1</sub>=16.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N<sub>1</sub>P<sub>1</sub>=33.6 Kg/ha. of N+16.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N<sub>2</sub>P<sub>1</sub>=67.2 Kg/ha. of N+16.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N<sub>1</sub>P<sub>2</sub>K<sub>1</sub>=57.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+16.8 Kg/ha. of K<sub>2</sub>O.

N applied as A/S ; P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

A selected district is divided into four agriculturally homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50-100 villages. In each block 36 experiments are conducted in a year of which 11 are of type A<sub>1</sub>, 11 of type A<sub>2</sub>, 11 of type A<sub>3</sub> and 3 are of type C. The eleven experiments under type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are distributed as 3 on a kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type-C experiments are conducted on a legume crop. For the purpose of conducting the A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> are laid out. For conducting the three type-C trials three villages are randomly selected in each block.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 62(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of mustard in Kg/ha.	272	262	110	275	304	430	408	80.7

Control yield=441 Kg/ha. ; No. of trials=8.

## 64(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of mustard in Kg/ha.	181	300	64	236	319	403	416	41.0

Control yield=572 Kg/ha. ; No. of trials=5.

**Crop :- Mustard.****Ref :- 62, 64(S.F.T.).****Site :- (District) : Sriganagar.****Type :- 'M'.**

Object :—To study the response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Desert soil. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments

O=Control (no manure)

N<sub>1</sub>=33.6 Kg/ha. of NP<sub>1</sub>=16.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>P<sub>2</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>1</sub>P<sub>1</sub>=33.6 Kg/ha. of N+16.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>1</sub>P<sub>2</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub>K<sub>2</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page No. 330.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS.

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of mustard in Kg/ha.	74	15	100	171	251	345	479	55.3

Control yield=559 Kg/ha. ; No. of trials=8.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of mustard in Kg/ha.	238	88	128	270	299	516	535	41.9

Control yield=737 Kg/ha. ; No. of trials=7.



**Crop :- Mustard.****Ref :- 62, 63, 64, 65(S.F.T.).****Site :- (District) : Sriganagar.****Type :- 'M'.**

Object :- To study response curves of important cereal, cash and oilseed crops to Potash applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

**1. BASAL CONDITIONS :**

(i) N.A. (ii) Desert soils. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

8 manurial treatments :

O=Control (no manure)

N<sub>1</sub>=33.6 Kg/ha. of NK<sub>1</sub>=16.8 Kg/ha. of K<sub>2</sub>OK<sub>2</sub>=33.6 Kg/ha. of K<sub>2</sub>ON<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+16.8 Kg/ha. of K<sub>2</sub>ON<sub>1</sub>K<sub>2</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>ON<sub>2</sub>K<sub>2</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>ON<sub>1</sub>P<sub>1</sub>K<sub>1</sub>=33.6 Kg/ha. of N+16.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+16.8 Kg/ha. of K<sub>2</sub>O.**3. DESIGN :**Same as in type A<sub>1</sub>(Irrigated) on page 330.**4. GENERAL :**

(i) to (iii) N.A. (iv) (a) 1952 to 1955. (b) and (c) N.A. (v) and (vi) N.A. (vii) Expt. rejected.

**5. RESULTS :****62 (S.F.T.)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Mustard in Kg/ha.	226	101	115	267	262	530	470	64.3

Control yield=433 Kg/ha ; No. of trials=7.

**63 (S.F.T.)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Mustard in Kg/ha.	105	19	25	79	104	221	139	18.8

Control yield=198 Kg/ha. ; No. of trials=4.

**64 (S.F.T.)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Mustard in Kg/ha.	229	50	51	266	285	445	385	36.8

Control yield=636 Kg/ha. ; No. of trials=6.

**Crop :- Mustard.****Ref :- Rj. 60(S.F.T.)****Site :- (District) Sriganagar.****Type :- 'M'.**

Object :- To study the responses of Mustard to levels of N, P and K applied individually and in combination. (Type A).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Desert soil. (iii) to (x) N.A.

## 2. TREATMENTS :

O =Control (no manure)

N =22.4 Kg/ha. of N as A/S

P =22.4 Kg/ha. of  $P_2O_5$  as Super.K =22.4 Kg/ha. of  $K_2O$  as Mur. Pot.NP =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super.NK =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of  $K_2O$  as Mur. Pot.NPK =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super+22.4 Kg/ha.  $K_2O$  as Mur. Pot.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oil seed 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 four zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

Effect	Response to				Interaction effect				S.E.
	N	P	K	S.E.	NP	NK	PK	NPK	
Av. response of Mustard Kg/ha.	150	120	40	10.0	10	20	20	-10	9.0

Control yield=640 Kg/ha., and No. of trials=5.

**Crop :- Mustard.****Site :- Sriganganagar.****Ref :- Rj. 60(S.F.T.)****Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) N A. (ii) Desert soil. (iii) to (x) N.A.

## 2. TREATMENTS :

O =Control (no manure)

 $n_1$  =22.4 Kg/ha. of N as A/S. $n_2$  =44.8 Kg/ha. of N as A/S. $n_1'$  =22.4 Kg/ha. of N as Urea. $n_2'$  =44.8 Kg/ha. of N as Urea. $n_1''$  =22.4 Kg/ha. of N as C/A/N. $n_2''$  =44.8 Kg/ha. of N as C/A/N.

## 3. DESIGN :

Same as in type A. on page 333.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

Treatment	O	n <sub>1</sub>	n <sub>2</sub>	n <sub>1</sub> '	n <sub>2</sub> '	n <sub>1</sub> ''	n <sub>2</sub> ''
Av. yield of Mustard in Kg./ha.	630	700	990	690	870	890	980

G.M.=807 Kg/ha. S.E./Mean=29.7 Kg/ha. and No. of trials=4.

**Crop :- Mustard.**

**Ref :- Rj. 65(36).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'MV'.**

Object :— To find out the requirement of N and P for different varieties of Mustard.

## 1. BASAL CONDITIONS :

(i) (a) No. (b) Fallow. (c) Nil. (ii) N.A. (iii) 18.10.65. (iv) (a) Bukhering. (b) Drilling. (c) N.A. (d) Between lines 30 cm. (e) N.A. (v) N.A. (vi) As per treatments. (vii) Irrigation. (viii) Nil. (ix) N.A. (x) 2.3.66.

## 2. TREATMENTS:

**Main-plot treatments :**

4 varieties : V<sub>1</sub>=R-53, V<sub>2</sub>=L-101, V<sub>3</sub>=T-11 and V<sub>4</sub>=R.L.-18.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 4 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=33.6, N<sub>2</sub>=57.2 and N<sub>3</sub>=100.9 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=57.2 Kg/ha.

## 3. DESIGN:

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 12 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 5.5 m. × 2.4 m. (b) 3.1 m. × 1.8 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) No. of branches/plant, and yield of mustard. (iv) (a) 1965 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1057 Kg/ha. (ii) (a) 588.2 Kg/ha. (b) 390.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

**Mustard seed :**

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
V <sub>1</sub>	1136	1196	1017	1032	1020	1267	998	1095
V <sub>2</sub>	972	822	1121	1196	1188	987	908	1028
V <sub>3</sub>	912	1046	1136	1211	975	1144	1132	1084
V <sub>4</sub>	972	1151	822	1136	1116	1003	852	1020
Mean	998	1054	1024	1151	1075	1123	972	1057
P <sub>0</sub>	998	1155	1065	1082				
P <sub>1</sub>	1076	1043	1065	1306				
P <sub>2</sub>	919	964	942	1065				

**Crop :- Mustard (Rabi).****Ref :- Rj. 62(52).****Site :- Govt. Seed Multiplication Farm, Ora, Sirohi.****Type :- 'C'.**

Object :- To study the effect of different seed rates and spacings on growth and yield of Mustard.

**1. BASAL CONDITIONS;**

(i) (a) to (c) N.A. (ii) Heavy soil. (iii) 4.11.62. (iv) (a) and (b) N.A. (c) and (d) As per treatments. (e) N.A. (v) 22.4 Kg/ha. of N by broadcasting and 22.4 Kg/ha. of P as drilling before sowing. (vi) Local. (vii) Irrigated. (viii) 1 weeding. (ix) N.A. (x) 28.3.63.

**2. TREATMENTS;****Main-plot treatments :**4 spacings between rows :  $S_1=30$ ,  $S_2=46$ ,  $S_3=61$  and  $S_4=91$  cm.**Sub-plot treatments :**4 seed rates :  $R_1=1.2$ ,  $R_2=2.5$ ,  $R_3=3.7$  and  $R_4=4.9$  Kg/ha.**3. DESIGN:**(i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 5.5 m.  $\times$  3.7 m. (b) 4.9 m.  $\times$  3.1 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of seed. (iv) to (vii) N.A.

**5. RESULTS:**

(i) 244 Kg/ha. (ii) (a) 132.9 Kg/ha. (b) 83.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha,

	$S_1$	$S_2$	$S_3$	$S_4$	Mean
$R_1$	245	272	202	134	213
$R_2$	299	477	148	192	279
$R_3$	309	252	124	185	217
$R_4$	217	424	128	303	268
Mean	267	356	150	203	244

**Crop :- Mustard (Rabi).****Ref :- Rj. 64(56).****Site :- Govt. Agri. Res. Farm, Sriganaganagar.****Type :- 'CM'.**

Object :- To study the effect of dates of sowing, N and P on the yield of Mustard.

**1. BASAL CONDITIONS;**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) One ploughing with tractor, 4 ploughings with desi plough. (b) Behind the plough. (c) N.A. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) L-18. (vii) Irrigated. (viii) 2 hoeings with hand hoe. (ix) 1 cm. (x) 17.3.65 to 22.4.65.

**2. TREATMENTS :****Main-plot treatments :**3 dates of sowing :  $D_1=5.10.64$ ,  $D_2=25.10.64$  and  $D_3=15.11.64$ .**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 3 levels of N :  $N_0=0$ ,  $N_1=24.7$  and  $N_2=49.4$  Kg/ha.(2) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=24.7$  and  $P_2=49.4$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m. × 3.7 m. (b) 4.6 m. × 2.7 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of seed. (iv) (a) 1963 to 65. (b) No. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1396 Kg/ha. (ii) (a) 584.7 Kg/ha. (b) 227.1 Kg/ha. (iii) Main effect of N is highly significant. Main effects of D and P and interactions D × P and D × N × P are significant. (iv) Av. yield of seed in Kg/ha

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
D <sub>1</sub>	1494	1581	1751	1707	1362	1757	1609
D <sub>2</sub>	1486	1617	1747	1488	1625	1737	1617
D <sub>3</sub>	779	992	1112	1005	939	939	961
Mean	1253	1397	1537	1400	1309	1478	1396
P <sub>0</sub>	1255	1392	1553				
P <sub>1</sub>	1231	1240	1455				
P <sub>2</sub>	1272	1558	1603				

C.D. for D marginal means = 441.7 Kg/ha.

C.D. for N or P marginal means = 124.4 Kg/ha.

C.D. for P means at the same level of D = 215.4 Kg/ha.

C.D. for D means at the same level of P = 471.7 Kg/ha.

**Crop :- Mustard (Rabi).**

**Ref :- Rj. 63(58).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'IM'.**

Object :- To study the effect of irrigation, fertilizers and method of application on the yield of Mustard.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Class I. (iii) 13.11.63. (iv) (a) 1 ploughing, 2 cross bulkerings and 1 p'anking. (b) Drilling behind the plough. (c) 7 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 44.8 Kg/ha. of K<sub>2</sub>O. (vi) R.L.-18. (vii) As per treatments. (viii) N.A. (ix) 140 cm. (x) 19.3.64.

## 2. TREATMENTS:

## Main-plot treatments :

4 irrigation schedules : I<sub>0</sub>=No irrigation, I<sub>1</sub>=1 irrigation after one month, I<sub>2</sub>=One irrigation after 2 months and I<sub>3</sub>=One irrigation after one month and the 2nd after 2 months.

## Sub-plot treatments :

All combinations of (1) and (2).

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=50.4 and N<sub>2</sub>=100.9 Kg/ha.

(2) 4 methods of application of N : M<sub>1</sub>=Full dose by broadcasting, M<sub>2</sub>=Full dose by drilling, M<sub>3</sub>=½ dose by drilling + ½ dose as top dressing after one month and M<sub>4</sub>=½ dose by broadcasting + ½ as top dressing after one month.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 12 sub-plots/main-plot. (b) 46.0 m. × 12.7 m. (iii) 4. (iv) (a) 3.1 m. × 2.4 m. (b) 2.4 m. × 1.8 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal: (ii) Incidence of Apring brassica. spraying of Nicotine sulphate fortnightly. (iii) Yield of grain. (iv) (a) 1963-contd. (b) No. (c) N.A. (v) to (vii) Nil.

## 5. RESULTS :

(i) 501 Kg/ha. (ii) (a) 54.9 Kg/ha. (b) 59.3 Kg/ha. (iii) Main effect of I, N and M are highly significant and interaction  $M \times N$  is significant. (iv) Av. yield of seed in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	Mean
N <sub>0</sub>	251	378	279	390	325	325	325	325	325
N <sub>1</sub>	322	432	614	789	470	577	582	527	539
N <sub>2</sub>	327	620	704	711	573	668	717	604	640
Mean	300	477	532	697	456	523	541	485	501
M <sub>1</sub>	190	324	377	500					
M <sub>2</sub>	246	369	462	582					
M <sub>3</sub>	235	367	520	610					
M <sub>4</sub>	193	342	398	576					

C.D. for I marginal means = 25.3 Kg/ha.  
 C.D. for N marginal means = 20.6 Kg/ha.  
 C.D. for M marginal means = 23.7 Kg/ha.  
 C.D. for means in the body of  $N \times M$  table = 41.0 Kg/ha.

**Crop :- Mustard (Rabi).**

**Ref :- Rj. 63(64).**

**Site :- Govt. Agri. Farm, Sriganganagar.**

**Type :- 'IM'.**

**Object :-** To find out the suitable dose of N and optimum number of irrigations at critical stages for mustard crop.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) N.A. (ii) Sandy loam. (iii) 15.10.63. (iv) (a) N.A. (b) Drilling. (c) 5 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) R.L. 18. (vii) As per treatments. (viii) 2 hoeings. (ix) N.A. (x) 27.3.64.

## 2. TREATMENTS :

**Main-plot treatments :**

7 irrigation schedules : I<sub>0</sub>=No irrigation, I<sub>1</sub>=1 irrigation after 1½ months, I<sub>2</sub>=2 irrigations, 1st after 1½ months and 2nd at flowering stage, I<sub>3</sub>=Irrigation at flowering stage, I<sub>4</sub>=3 irrigations, 1st after 1½ months, 2nd at flowering stage and 3rd at seed formation stage, I<sub>5</sub>=1 irrigation at seed formation stage and I<sub>6</sub>=2 irrigations, 1st after 1½ months and 2nd at seed formation stage.

**Sub-plot treatments :**

3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=24.7 and N<sub>2</sub>=49.4 Kg/ha.

## 3. DESIGN :

(s) Split-plot. (ii) (a) 7 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m. × 4.6 m. (b) 3.7 m. × 2.8 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of seed. (iv) (a) 1963 to 1965. (b) No. (c) N.A. (v) to (vii) Nil.

## 5. RESULTS :

- (i) 800 Kg/ha. (ii) (a) 218.0 Kg/ha. (b) 134.0 Kg/ha. (iii) Main effects of I and N are highly significant. (iv) Av. yield of seed in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	Mean
N <sub>0</sub>	384	522	678	548	870	442	689	590
N <sub>1</sub>	649	907	889	771	1035	807	909	852
N <sub>2</sub>	576	1086	1063	895	1229	834	1032	959
Mean	536	838	877	738	1045	694	877	301

C.D. for I marginal means=224.0 Kg/ha.

C.D. for N marginal means=84.6 Kg/ha.

**Crop :- Mustard (Rabi).**

**Ref :- Rj. 64(51), 65(29).**

**Site :- Govt. Agri. Res. Farm, Srigananagar.**

**Type :- 'IM'.**

**Object :-**To study the effect of irrigations and levels of N on the yield of Mustard.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 27.10.64 ; 27.10.65. (iv) (a) 1 to 2 ploughings. (b) Sown in lines for 64(51) ; Behind the plough for other. (c) 2 Kg/ha. (d) 46 cm. × 30 cm. between lines. (e) Nil. (v) 37 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) R.L. 18 for 64(51) ; Z-18 for 65(29). (vii) Irrigated. (viii) 2 hand hoeings. (ix) N.A. (x) 4.4.65 ; 24.3.66.

## 2. TREATMENTS :

**Main-plot treatments :**

8 irrigation schedule : I<sub>0</sub>=No irrigation, I<sub>1</sub>=1 irrigation after 45 days of sowing, I<sub>2</sub>=1 irrigation at 45 days and the 2nd at flowering stage, I<sub>3</sub>=1 irrigation at flowering stage, I<sub>4</sub>=1 irrigation at 45 days, 2nd at flowering stage and 3rd at seed formation, I<sub>5</sub>=1 irrigation at seed formation, I<sub>6</sub>=1 irrigation after 45 days and 2nd at seed formation and I<sub>7</sub>=1 irrigation at flowering stage +2nd at seed formation.

**Sub-plot treatments :**

3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=24.7 and N<sub>2</sub>=49.4 Kg/ha.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 8 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m. × 3.7 m. for 64(51) ; 5.5 m. × 5.5 m. for 65(29). (b) 4.6 m. × 2.7 m. for 64(51) ; 4.6 m. × 4.6 m. for 65(29). (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) N.A. for 64(51) ; Nil for 65(29). (iii) Yield of seed. (iv) (a) 1964—1965. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

## 5. RESULTS :

## 64(51)

- (i) 1079 Kg/ha. (ii) (a) 281.0 Kg/ha. (b) 234.0 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of seed in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	I <sub>7</sub>	I <sub>8</sub>	Mean
N <sub>0</sub>	1039	1034	781	675	866	1079	672	792	867
N <sub>1</sub>	1087	1193	832	1456	1092	1148	1124	1225	1145
N <sub>2</sub>	1512	1475	1347	1108	1066	1281	1055	957	1225
Mean	1213	1234	987	1080	1008	1169	950	991	1079

C.D. for N marginal means=137.8 Kg/ha.

65(29)

- (i) 1060 Kg/ha. (ii) (a) 219.2 Kg/ha, (b) 148.2 Kg/ha. (iii) Main effects of I and N are highly significant.  
(iv) Av. yield of seed in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	I <sub>7</sub>	I <sub>8</sub>	Mean
N <sub>0</sub>	1015	1082	891	1241	934	1089	753	727	966
N <sub>1</sub>	1183	1257	988	1457	813	1037	954	842	1066
N <sub>2</sub>	1206	1229	1181	1631	935	1237	964	790	1147
Mean	1135	1189	1020	1443	894	1121	890	786	1060

C.D. for I marginal means=221.6 Kg/ha.

C.D. for N marginal means=87.2 Kg/ha.

**Crop :- Mustard (Rabi).**

**Ref :- Rj. 64(41).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'D'.**

Object :—To work out a schedule for the control of Mustard pests.

#### 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Fallow, (c) Nil. (ii) Clay loam. (iii) 26.11.64. (iv) (a) N.A. (b) Drilling. (c) 6.7 Kg/ha. (d) 46 cm. × 15 cm. (e) —. (v) 33.6 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> were applied by drilling on 26.11.64. (vi) R.L. 17. (vii) Irrigated. (viii) 1 kudali, (ix) Nil, (x) 31.3.65.

#### 2. TREATMENTS :

6 fungicidal treatment : T<sub>0</sub>=Control, T<sub>1</sub>=2 sprays : Spray of D.D.T.+B.H.C. 0.25% 7 days after germination, pre bloom spray of Parathion 0.05%, T<sub>2</sub>=3 sprays : Spray of DDT+BHC 0.25% 7 days after germination pre bloom spray of parathion 0.05%, Post bloom spray of parathion (2—3 weeks after pre bloom parathion 0.05%.) T<sub>3</sub>=4 sprays : Spray of DDT+BHC 0.25% 7 days after germination spray of DDT+BHC 0.25% 15 days after 1st spray, spray of parathion 0.05% 21 days after 2nd spray, spray of parathion 0.05% 15 days after 3rd spray, T<sub>4</sub>=5 sprays : Starting from 7 days up to 5th spray fortnightly intervals (3 sprays of DDT+BHC 0.25% and last 2 sprays with parathion 0.05% and T<sub>5</sub>=6 sprays : starting from 2 days after germination till 6th spray at fortnightly intervals (3 sprays with DDT+BHC and the last 3 sprays with parathion).

#### 3. DESIGN :

- (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) and (b) 10.1 m. × 5.0 m. (v) Nil. (vi) Yes.

#### 4. GENERAL :

- (i) Good except in control plots. (ii) Attack of mustard pests. Control measure taken as per treatments. (iii) Yield of grain. (iv) (a) 1964—66. (b) No. (c) N.A. (v) to (vii) Nil.



## 5. RESULTS :

(i) 389 Kg/ha. (ii) 118.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of seed in Kg/ha.

Treatments	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	Mean
Av. yield.	313	324	494	366	393	445	389

**Crop :- Til (*Kharif*).**

**Ref :- Rj. 63(39).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'CV'.**

**Object :-** To study the effect of different seed rates, spacing and varieties on the yield of Til.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (i) Sandy loam. (iii) 10.8.63. (iv) (a) 1 discing and 2 cultivation. (b) Line sowing behind the plough. (c) and (d) As per treatments, (e) N.A. (v) N.A. (vi) As per treatments. (vii) Unirrigated. (viii) 1 hand weeding. (ix) N.A. (x) 24.10.63.

## 2. TREATMENTS :

**Main-plot treatments :**

4 row spacings : S<sub>1</sub>=23 cm., S<sub>2</sub>=30 cm., S<sub>3</sub>=38 cm. and S<sub>4</sub>=46 cm.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 4 seed rates : R<sub>1</sub>=2, R<sub>2</sub>=4, R<sub>3</sub>=7 and R<sub>4</sub>=9 Kg/ha.

(2) 2 varieties : V<sub>1</sub>=No. 50 and V<sub>2</sub>=N.P. 6.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots replication ; 8 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 5.5 m, × 3.7 m. (b) 4.6 m. × 3.1 m. (v) 46 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. (ii) Nil. (iii) Yield of til. (iv) 1963—contd. (b) No. (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

(i) 378 Kg/ha. (ii) (a) 115.0 Kg/ha. (b) 77.6 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of *til* in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	V <sub>1</sub>	V <sub>2</sub>	
S <sub>1</sub>	359	425	397	369	368	407	388
S <sub>2</sub>	467	368	418	320	382	405	393
S <sub>3</sub>	325	396	434	342	340	409	374
S <sub>4</sub>	378	404	360	283	302	411	356
Mean	382	398	402	328	348	408	378
V <sub>1</sub>	356	368	342	325			
V <sub>2</sub>	409	429	462	331			

C.D. for V marginal means=32.3 Kg/ha.

**Crop :- Til (Kharif).****Ref :- Rj. 64(6).****Site :- Govt. Agri. Farm, Banswara.****Type :- 'D'.**

Object :—To study the relative efficacy of different fungicides in the control of Til Blight.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 33.6 Kg/ha. of N+16.8 Kg/ha. of  $P_2O_5$  as Super. (ii) Black cotton soil. (iii) 31.7.64. (iv) (a) 3 discings, 3 plankings and 4 bukerings. (b) Line sowing behind the plough. (c) N.A. (d) 30 cm.×15 cm. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) 3 weedings and thinning. (ix) N.A. (x) 6.11.64.

**2. TREATMENTS :**

10 fungicidal treatments :  $T_0$ =Control,  $T_1$ =Blitane 0.2%,  $T_2$ =Bordeaux mixture 1.0%,  $T_3$ =Dithane Z-780 2%,  $T_4$ =Blitox 0.25%,  $T_5$ =Crag 0.3%,  $T_6$ =Ferbam 0.2%,  $T_7$ =Colloidal copper 0.2%,  $T_8$ =Tamraghar 0.25% and  $T_9$ =Fytolan 0.25%.

First spray is given to 3 weeks old plants, and subsequent sprays at an interval of 20 days till the maturity of the crop.

**3. DESIGN :**

(i) Incomplete L. Sq. (ii) (a) 3 plots/block ; 10 blocks/sq. ; and 3 sqs. (b) 30.2 m.×12.2 m. (iii) 9. (iv) (a) and (b) 3.7 m.×2.7 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) N.A. (ii) Incidence of seasm blight ; control measures as per treatments. (iii) Yield of til and no. of diseased plants/plot. (iv) (a) 1964 only. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

**5. RESULTS :**

(i) 71.7 Kg/ha. (ii) 25.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of seasmum in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Av. yield	76.9	74.2	72.6	61.5	69.7	82.0	49.8	85.0	74.4	70.5

**Crop :- Castor (Kharif).****Ref :- Rj. 64(23).****Site :- Govt. Agri. Res. Farm, Sriganganagar.****Type :- 'CM'.**

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

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Barley. (c) N.A. (ii) Sandy loam. (iii) 21.7.64. (iv) (a) Field preparation with desi plough. (b) N.A. (c) N.A. (d) As per treatments. (e) N.A. (v) Nil. (vi) HC 6. (vii) Irrigated. (viii) Weeding by hand hoe. (ix) N.A. (x) 2.3.65.

**2. TREATMENTS :****Main plot treatments :**

3 spacings :  $S_1$ =91 cm.×30 cm.,  $S_2$ =91 cm.×61 cm. and  $S_3$ =91 cm.×91 cm.

**Sub-plot treatments :**

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

(1) 3 levels of N :  $N_0$ =0,  $N_1$ =18.5 and  $N_2$ =37.1 Kg/ha.

(2) 2 levels of  $P_2O_5$  :  $P_0$ =0 and  $P_1$ =37.1 Kg/ha.

(3) 2 levels of  $K_2O$  :  $K_0$ =0 and  $K_1$ =37.1 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 12 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 7.3 m.×5.5 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) N.A. (iii) Yield of castor. (iv) (a) 1963 only. (b) No. (c) N.A. (v) and (vi) N.A. (vii) Nil.

## 5. RESULTS :

(i) 117.5 Kg/ha, (ii) 94.8 Kg/ha. (b) 51.7 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of castor in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
K <sub>0</sub>	110	103	105	96	121	130	120	112	116
K <sub>1</sub>	136	117	105	98	130	130	112	127	119
Mean	138	110	105	97	125	130	116	119	117
P <sub>0</sub>	148	97	102	90	131	126			
P <sub>1</sub>	128	122	108	104	119	135			
N <sub>0</sub>	113	88	90						
N <sub>1</sub>	146	133	97						
N <sub>2</sub>	155	109	127						

C.D. for N marginal mean = 24.4 Kg/ha.

**Crop :- Castor (Kharif).**

**Ref :- Rj. 62(78).**

**Site :- Govt. Agri. College Farm, Jobner.**

**Type :- 'D'.**

Object :- To find out the foxily of different insecticides on castor hairy caterpillar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) N.A. (iv) (a) Nil. (b) Dibbling. (c) 24 seeds/plot. (d) 91 cm. x 91 cm. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) Nil. (ix) and (x) N.A.

## 2. TREATMENTS :

8 insecticidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=D.D.T.W./P. 0.25%, T<sub>2</sub>=Endrin E.C. 0.02%, T<sub>3</sub>=Diazinon E.C. 0.02%, T<sub>4</sub>=Parathion E.C. 0.03%, T<sub>5</sub>=Sevin W.P. 0.1%, T<sub>6</sub>=Gusathion W.P. 0.1% and T<sub>7</sub>=Malathion E.C. 0.1%.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) and (b) 6.1 m. x 2.4 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Attack of hairy caterpillar on castor ; control measures as per treatments. (iii) Population of evprochis before spraying and 3 days after spraying. (iv) (a) 1962 only. (b) No. (c) N.A. (v) (a) Massuria. (b) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 61.16 degrees. (ii) 4.28 degrees. (iii) Treatment differences are highly significant. (iv) Av. % of mortality in degrees.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. % of mortality in degrees	12.92	59.18	61.63	64.14	83.17	74.67	69.08	64.47

C.D. = 7.49 degrees

**Crop :- Linseed (Rabi).****Ref :- Rj. 60(42), 61(51).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'M'.**

**Object :-** To study the effect of different levels of P along with different levels and sources of N on the yield of Linseed.

**1. BASAL CONDITIONS :**

- (i) (a) Nil. (b) Nil for 60(42); Groundnut for 61(51). (c) Nil. (ii) Clay loam. (iii) 13.10.60; 26.10.61.  
 (iv) (a) One ploughing for 60(42); N.A. for other. (b) N.A. (c) 23 Kg/ha. (d) 30 cm. × 23 cm. (e) N.A.  
 (v) N.A. (vi) Local. (vii) Unirrigated. (viii) Weeding and hoeing for 60(42); N.A. for other. (ix) N.A.  
 (x) N.A.; 14 and 23.3.62.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)+3 extra treatments.

(1) 3 sources of N :  $S_1=A/S$ ,  $S_2=A/S/N$  and  $S_3=Urea$ .

(2) 2 levels of N :  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.

(3) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=16.8$  and  $P_2=33.6$  Kg/ha.

Extra treatments are :  $E_0=0$ ,  $E_1=16.8$  and  $E_2=33.6$  Kg/ha. of  $P_2O_5$  as Super.

**3. DESIGN :**

- (i) Fact. in R.B.D. (ii) (a) 21. (b) N.A. (iii) 3. (iv) (a) 9.2 m. × 5.5 m. (b) 7.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

- (i) N.A. (ii) N.A. for 60(42); Nil for other. (iii) Yield of seed. (iv) (a) 1960-1961. (b) N.A. (c) Results of combined analysis given under 5. Results (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

**5. RESULTS :**

- (i) 456 Kg/ha. (ii) 129.6 Kg/ha. [based on 100 d.f. made up of Treatments × years interaction and pool error]. (iii) Main effect of N alone is significant. (iv) Av. yield of seed in Kg/ha.

$$E_0=355, E_1=386 \text{ and } E_2=464 \text{ Kg/ha.}$$

	$S_1$	$S_2$	$S_3$	$P_0$	$P_1$	$P_2$	Mcan
$N_1$	400	484	430	409	438	466	438
$N_2$	481	479	516	486	525	465	492
Mean	440	481	473	447	481	466	465
$P_0$	452	432	459				
$P_1$	433	544	467				
$P_2$	436	468	493				

C.D. for N marginal means = 49.5 Kg/ha.

**Crop :- Linseed (Rabi).****Ref :- Rj. 61(102), 62(62).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) (a) N.A. (b) Fallow. (c) No. (ii) Clay loam. (iii) 22.10.61; 15.10.1962. (iv) (a) 1 ploughing and 2 discings. (b) Drilling. (c) 17 to 25 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) N.A. (vi) R.R. 45. (vii) Unirrigated. (viii) and (ix) N.A. (x) N.A. for 61(102); 21.3.1963.

## 2. TREATMENTS :

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

(1) 3 levels of N :  $N_0=0$ ,  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.

(2) 3 levels of P :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

(3) 3 levels of K :  $K_0=0$ ,  $K_1=33.6$  and  $K_2=67.2$  Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 4. (iv) (a) 6.1 m.  $\times$  3.1 m. for 61(102); N.A. for 62(62). (b) 5.5 m.  $\times$  2.4 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 61(102); Good for 62(62). (ii) Nil. (iii) Yield of seed. (iv) (a) 1961 to 1962. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) Since the error variances are heterogeneous and Treatments  $\times$  years interaction is absent, results of individual years are presented under 5. Results.

## 5. RESULTS :

## 61(102)

(i) 607 Kg/ha. (ii) 153.4 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of seed in Kg/ha.

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$N_0$	389	564	601	467	527	560	518
$N_1$	492	841	816	676	763	711	716
$N_2$	495	629	639	567	608	588	588
Mcan	459	678	685	570	633	620	607
$K_0$	392	655	664				
$K_1$	501	692	704				
$K_2$	483	688	688				

C.D. for N or P marginal means = 71.7 Kg/ha.

## 62(62)

(i) 690 Kg/ha. (ii) 246.7 Kg/ha. (iii) Main effects of N and P are highly significant. Interaction  $N \times P \times K$  is significant. (iv) Av. yield of seed in Kg/ha.

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$N_0$	429	649	692	600	587	593	590
$N_1$	644	910	869	748	816	860	808
$N_2$	584	725	707	739	672	605	672
Mean	552	761	756	696	692	683	690
$K_0$	480	763	843				
$K_1$	517	824	735				
$K_2$	661	697	688				

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

**Crop :- Linseed (Rabi).****Ref :- Rj. 62(89).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'M'.**

Object :—To study the effect of different trace elements under different fertility levels on the yield of Linseed.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) (a) Clay loam. (b) N.A. (iii) 5.11.62. (iv) (a) 1 bakhering with Bakhar, 2 plankings with *pata* and 1 harrowing with disc harrow. (b) Drilling. (c) 27.7 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) Nil. (vi) R.R. 45. (vii) Irrigated. (viii) Nil. (ix) Negligible. (x) 3.3.63.

**2. TREATMENTS :****Main-plot treatments :**2 methods of application :  $A_1$ =Basal at sowing and  $A_2$ =Sprays after 2 months.**Sub-plot treatments :**4 fertility levels :  $F_0$ =Control,  $F_1$ =22.4 Kg/ha. of N+22.4 Kg/ha. of P+22.4 Kg/ha. of K,  $F_2$ =Twice  $F_1$  and  $F_3$ =3 times  $F_1$ .**Sub-sub-plot treatments :**9 trace elements treatments :  $T_0$ =Control,  $T_1$ =Cu,  $T_2$ =Fe,  $T_3$ =Zn,  $T_4$ =Mg,  $T_5$ =BO,  $T_6$ =DO,  $T_7$ =Mn and  $T_8$ =Sulphur.

All trace elements were applied at 11.2 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 9 main-plots/replication; 4 sub-plots/main-plot, 9 sub-sub-plots/sub-plot. (b) N.A. (iii) 2. (iv) (a) 3.1 m. × 2.4 m. (b) 2.4 m. × 1.8 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of seed. (iv) (a) 1962—N.A. (b) No. (c) N.A. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 823 Kg/ha. (ii) (a) 199.4 Kg/ha. (b) 148.7 Kg/ha. (c) 192.8 Kg/ha. (iii) Main effect of F alone is significant. (iv) Av. yield of seed in Kg/ha.

	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$F_0$	$F_1$	$F_2$	$F_3$	Mean
$A_1$	645	863	912	886	816	748	926	890	835	712	856	865	890	836
$A_2$	699	786	914	826	910	903	755	790	702	753	882	767	835	809
Mean	672	824	913	856	863	826	840	840	768	732	869	826	862	823
$P_0$	575	790	816	729	785	754	715	729	701					
$P_1$	589	827	970	936	998	855	846	897	903					
$P_2$	838	748	914	760	765	785	897	933	796					
$P_3$	687	933	953	998	903	908	905	802	678					

C.D. for F marginal means=85.6 Kg/ha.

**Crop :- Linseed (Rabi):****Ref :- Rj. 63(44).****Site :- Govt. Agri. Res. Farm, Sultanpur.****Type :- 'M'.**

Object :—To find out a suitable method of application and manurial requirement for Linseed.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Class II. (iii) 23.10.63. (iv) (a) 1 ploughing and 1 bakhtring. (b) Drilling. (c) 27.7 Kg/ha. (d) Between lines 30 cm. (e) N.A. (v) N.A. (vi) R.R. 45. (vii) Unirrigated. (viii) 1 weeding and hoeing. (ix) N.A. (x) 30.3.64.

## 2. TREATMENTS :

## Main-plot treatments :

3 manurial treatments :  $M_1 = 16.8$  Kg/ha. of N +  $16.8$  Kg/ha. of P,  $M_2 =$  Twice  $M_1$  and  $M_3 = 3$  times  $M_1$ .

## Sub-plot treatments :

10 methods of application :  $T_1 =$  Full dose at sowing by broadcasting.  $T_2 =$  Full dose at sowing by drilling,  $T_3 = \frac{1}{2}$  at sowing by broadcasting +  $\frac{1}{2}$  as top dressing,  $T_4 = \frac{1}{2}$  at sowing by drilling +  $\frac{1}{2}$  as top dressing,  $T_5 = \frac{3}{4}$  at sowing by broadcasting +  $\frac{1}{2}$  as top dressing,  $T_6 = \frac{3}{4}$  at sowing by drilling +  $\frac{1}{2}$  as top dressing,  $T_7 = \frac{1}{2}$  at sowing by broadcasting +  $\frac{3}{4}$  as top dressing,  $T_8 = \frac{1}{2}$  at sowing by drilling +  $\frac{3}{4}$  as top dressing,  $T_9 = \frac{1}{3}$  at sowing by broadcasting +  $\frac{1}{2}$  after a month of sowing +  $\frac{1}{2}$  as top dressing at flowering stage and  $T_{10} = \frac{1}{2}$  at sowing by drilling +  $\frac{1}{2}$  after a month +  $\frac{1}{2}$  as top dressing at flowering stage.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 10 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 3.7 m.  $\times$  3.1 m. (b) 3.1 m.  $\times$  2.4 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of seed. (iv) (r) 1963—N.A. (b) No. (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

(i) 758 Kg/ha. (ii) (a) 48.6 Kg/ha. (b) 46.6 Kg/ha. (iii) Main effect of M is highly significant and main effect of T and interaction  $T \times M$  are significant. (iv) Av. yield of seed in Kg/ha.

	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$	$T_{10}$	Mean
$M_1$	491	605	572	703	609	651	658	725	674	769	646
$M_2$	700	743	760	774	758	800	821	868	928	1009	816
$M_3$	656	757	733	854	693	794	863	912	896	959	812
Mean	616	702	688	777	687	748	781	835	833	912	758

C.D. for M marginal means = 26.7 Kg/ha.

C.D. for T marginal means = 37.9 Kg/ha.

C.D. for T means at the same level of M = 65.8 Kg/ha.

C.D. for M means at the same level of T = 67.4 Kg/ha.

**Crop :- Linseed (Rabi).**

**Ref :- Rj. 63(55).**

**Site :- Mech. Farm, Ummadgunj.**

**Type :- 'M'.**

**Object :-** To study the effect of different trace elements under different fertility levels on the yield of Linseed.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Class II. (iii) 20.10.63. (iv) (a) 2 cross discings and 1 planking. (b) Drilling. (c) 23 Kg/ha. (d) Between lines 30 cm. (e) N.A. (v) N.A. (vi) R.R.—45. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 8.4.64.

## 2. TREATMENTS :

## Main-plot treatments :

2 times of application :  $A_1$ =At sowing and  $A_2$ =Spraying after 2 months.

## Sub-plot treatments :

4 manurial treatments :  $M_0$ =Control,  $M_1$ =22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +22.4 Kg/ha. of  $K_2O$   
 $M_2$ =44.8 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$ +44.8 Kg/ha. of  $K_2O$  and  $M_3$ =67.2  
 Kg/ha. of N+67.2Kg/ha. of  $P_2O_5$ +67.2 Kg/ha. of  $K_2O$ .

## Sub-sub-plot treatments :

9 trace elements :  $T_0$ =Control,  $T_1$ =Cu,  $T_2$ =Fe,  $T_3$ =Zn,  $T_4$ =Mg,  $T_5$ =Bo,  $T_6$ =Io,  $T_7$ =Mn and  $T_8$ =  
 Sulphur.

All trace elements were applied at 11.2 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication, 4 sub-plots/main-plot, 9 sub-sub-plots/sub-plots. (b) N.A.  
 (iii) 2. (iv) (a) 3.1 m.  $\times$  2.4 m. (b) 2.4 m.  $\times$  1.8 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of seed. (iv) (a) 1962—contd. (b) No. (c) N.A. (v) (a) Borkhera. (b)  
 N.A. (vi) Nil. (vii) N.A.

## 5. RESULTS :

(i) 729 Kg/ha. (ii) (a) 50 Kg/ha. (b) 108.9 Kg/ha. (c) 58.5 Kg/ha. (iii) Main effects of A, M and T are  
 highly significant. Interactions  $A \times M$ ,  $M \times T$  and  $A \times M \times T$  are significant. (iv) Av. yield of seed in Kg/ha.

	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$M_0$	$M_1$	$M_2$	$M_3$	Mean
$A_1$	594	1034	767	765	650	883	619	750	636	501	865	901	710	744
$A_2$	547	940	708	771	600	894	597	722	646	551	766	795	742	714
Mean	570	987	738	768	625	888	608	736	641	526	816	848	726	729
$M_0$	448	768	535	527	443	614	404	502	493					
$M_1$	936	1057	818	869	723	959	762	827	729					
$M_2$	701	1127	844	846	762	1012	706	875	760					
$M_3$	533	998	751	830	572	970	561	740	583					

C.D. for A marginal means = 10.2 Kg/ha.

C.D. for M marginal means = 62.9 Kg/ha.

C.D. for T marginal means = 41.4 Kg/ha.

C.D. for M means at the same level of A=88.8 Kg/ha.

C.D. for A means at the same level of M=77.1 Kg/ha.

C.D. for M means at the same level of T=99.6 Kg/ha.

C.D. for T means at the same level of M=82.5 Kg/ha.

Crop :- Linseed.

Ref :- Rj. 63(S.F.T.)

Site :- (District). Kota.

Type :- 'M'.

Object :—To study the response curves of important cereal, cash and oilseed crops to nitrogen applied  
 singly and in combination with other nutrients (Type :  $A_2$ ).

## 1. BASAL CONDITIONS :

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



## 2. TREATMENTS :

8 manurial treatments

O = Control (no manure)

 $N_1$  = 33.6 Kg/ha. of N $N_2$  = 67.2 Kg/ha. of N $P_1$  = 16.8 Kg/ha. of  $P_2O_5$  $N_1P_1$  = 33.6 Kg/ha. of N + 16.8 Kg/ha. of  $P_2O_5$  $N_2P_1$  = 67.2 Kg/ha. of N + 16.8 Kg/ha. of  $P_2O_5$  $N_2P_2$  = 67.2 Kg/ha. of N + 33.6 Kg/ha. of  $P_2O_5$  $N_2P_2K_1$  = 67.2 Kg/ha. of N + 33.6 Kg/ha. of  $P_2O_5$  + 16.8 Kg/ha. of  $K_2O$ N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. Pot.

## 3. DESIGN :

A selected district is divided into four agriculturally-homogeneous zones based on climate, soil, cropping pattern etc. In each zone one block is selected at random. A block normally consists of a group of 50—100 villages. In each block 36 experiments are conducted in a year of which 11 are of type  $A_1$ , 11 of type  $A_2$ , 11 of type  $A_3$  and 3 are of type C. The eleven experiments under type  $A_1$ ,  $A_2$  and  $A_3$  are distributed as 3 on a kharif cereal, 3 on a rabi cereal, 3 on a cash crop and 2 on oil seed. All the three type—C experiments are conducted on a legume crop. For the purpose of conducting the  $A_1$ ,  $A_2$  and  $A_3$  experiments 11 villages are randomly selected in each block and in each village 3 experiments one each of type  $A_1$ ,  $A_2$  and  $A_3$  are laid out. For conducting the three type—C trials three villages are randomly selected in each block.

## 4. GENERAL :

(i) to (iii), N.A. (iv) (a) 1962 to 1966 [1964 and 1965 N.A.] (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

63 (S.F.T.)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of linseed in Kg/ha.	97	231	37	146	251	329	376	40.1

Control yield=303 Kg/ha. ; No. of trials=7.

**Crop :- Linseed.****Ref :- Rj. 62, 64, 65(S.F.T.)****Site :- (District) : Kota.****Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

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

## 2. TREATMENTS:

8 manurial treatments :

O = Control (no manure).

 $N_1$  = 22.4 Kg/ha. of N $N_2$  = 44.8 Kg/ha. of N $P_1$  = 11.2 Kg/ha. of  $P_2O_5$  $N_1P_1$  = 22.4 Kg/ha. of N + 11.2 Kg/ha. of  $P_2O_5$  $N_2P_1$  = 44.8 Kg/ha. of N + 11.2 Kg/ha. of  $P_2O_5$  $N_2P_2$  = 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  $N_2P_2K_1$  = 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  + 11.2 Kg/ha.  $K_2O$ .N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. of Pot.

## 3. DESIGN :

Same as in type  $A_1$  (Irrigated) on page 347.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 [1963—N.A.]. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of linseed in Kg/ha.	-137	-95	-160	-45	-21	65	34	148.4

Control yield=470 Kg/ha. ; No. of trials=7.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of linseed in Kg/ha.	92	171	83	145	199	325	657	216.7

Control yield=248 Kg/ha. ; No. of trials=7.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of linseed in Kg/ha.	78	88	61	97	176	182	246	9.4

Control yield=218 Kg/ha. ; No. of trials=6.

**Crop :- Linseed.****Ref :- Rj. 63,65(S.F.T.)****Site :- (District) Kota.****Type :- 'M'.**Object :-To study the response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

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

## 2. TREATMENTS :

8 manurial treatments

O=Control (no manure).

N<sub>1</sub>=33.6 Kg/ha. of N.P<sub>1</sub>=16.8Kg/ha. of P<sub>2</sub>O<sub>5</sub>.P<sub>2</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>1</sub>=33.6 Kg/ha. of N+16.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>2</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>K<sub>2</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. of Pot.

## 3. DESIGN :

Same as in type A<sub>2</sub> (Irrigated) on page 347.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 [1964—N.A.] (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 63(S.F.T.)

Treatments	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Linseed in Kg/ha.	120	20	71	165	117	225	347	44.9

Control yield=360 Kg/ha. ; No. of trials=6.

## 65 (S.F.T.)

Treatments	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Linseed in Kg/ha.	55	92	85	85	170	157	282	16.6

Control yield=300 Kg/ha. ; No. of trials=3.

**Crop :- Linseed.****Ref :- Rj. 62 64, 65(S.F.T.)****Site :- (District) : Kota.****Type :- 'M'.**

Object :—To study response curver of important cereal, cash and oilseed crops to phosphorus singly and in combination with other nutrients. (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

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

## 2. TREATMENTS:

8 manurial treatments :

O =Control (no manure).

N<sub>1</sub> 22.4 Kg/ha. of N.P<sub>1</sub> =11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.P<sub>2</sub> =22.4 Kg/hk. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>1</sub> =22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>2</sub> =22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub> =44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>K<sub>2</sub> =44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of K<sub>2</sub>O.N applied as A/S. P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O s Mur. Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page 347.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1965 [1963 N.A.]. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 62 (S F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of linseed in Kg/ha.	147	49	67	136	238	253	327	49.0

Control yield=239 Kg/ha. ; No. of trials=6.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of liuseed in Kg/ha.	69	48	41	107	131	138	165	56.0

Control yield=263 Kg/ha. ; No. of trials=7.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of linseed in Kg/ha.	72	40	57	110	162	158	185	20.9

Control yield=160 Kg/ha. ; No. of trials=3.

**Crop :- Linseed.**

**Ref :- Rj. 63, 65(S.F.T.).**

**Site :- (District) : Kota.**

**Type :- 'M'.**

Object :- To study response curves of important cereal, cash and oilseed crops to potash applied singly and in combination with other nutrients (Type : A<sub>3</sub>).

## 1. BASAL CONDITIONS :

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

## 2. TREATMENTS :

8 manurial treatment :

O = Control (no maure) :

N<sub>1</sub> = 33.6 Kg/ha. of N.

K<sub>1</sub> = 16.8 Kg/ha. of K<sub>2</sub>O.

K<sub>2</sub> = 33.6 Kg/ha. of K<sub>2</sub>O.

N<sub>1</sub>K<sub>1</sub> = 33.6 Kg/ha. of N+16.8 Kg/ha. of K<sub>2</sub>O.

N<sub>1</sub>K<sub>2</sub> = 33.6 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>O.

N<sub>2</sub>K<sub>1</sub> = 67.2 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>O.

N<sub>1</sub>P<sub>1</sub>K<sub>1</sub> = 33.6 Kg/ha. of N+16.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+16.8 Kg/ha. of K<sub>2</sub>O.

N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page 347.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 (1963 N.A.). (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	104	39	78	135	169	253	220	27.1

Control yield=290 Kg/ha. ; No. of trials=7.

## 65 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	45	35	20	115	157	155	200	38.9

Control yield=360 Kg/ha.; No. of trials=3.

**Crop :- Linseed.**

**Ref :- Rj. 62, 64(S.F.T.).**

**Site :- (District) Kota.**

**Type :- 'M'.**

Object :- To study response curves of important cereal, cash and oilseed crops to potash applied singly and in combination with other nutrients. (Type : A<sub>3</sub>).

## 1. BASAL CONDITIONS :

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

## 2. TREATMENTS :

8 manurial treatments :

O = Control (no manure).

N<sub>1</sub> = 22.4 Kg/ha. of N.K<sub>1</sub> = 11.2 Kg/ha. of K<sub>2</sub>O.K<sub>2</sub> = 22.4 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>1</sub> = 22.4 Kg/ha. of N + 11.2 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>2</sub> = 22.4 Kg/ha. of N + 22.4 Kg/ha. of K<sub>2</sub>O.N<sub>2</sub>K<sub>2</sub> = 44.8 Kg/ha. of N + 22.4 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>P<sub>1</sub>K<sub>1</sub> = 22.4 Kg/ha. of N + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 11.2 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> (Irrigated) on page 347.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1965 (1963 N.A.). (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of oilseed in Kg/ha.	88	254	105	141	193	184	277	258.6

Control yield=249 Kg/ha. ; No. of trials=5.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of oilseed in Kg/ha.	66	62	64	98	118	191	182	38.5

Control yield=247 Kg/ha. ; No. of trials=7.

**Crop :- Linseed.****Site :- (District) : Kota.****Ref :- Rj. 60(S.F.T.).****Type :- 'M'.**

Object :—To study the response of Linseed to levels of N, P and K applied individually and in combinations. (Type : A).

## 1. BASAL CONDITIONS :

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

## 2. TREATMENTS :

O = Control (no manure)

N = 22.4 Kg/ha. of N as A/S

P = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as SuperK = 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.NP = 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as SuperNK = 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.PK = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super + 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.NPK = 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super + 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year 8 on kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a legume crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of Type C. Residual effects of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

Effects	N	P	K	S.E.	NP	NK	PK	NPK	S.E.
Av. response of Linseed in Kg/ha.	60	60	30	14.0	0	-10	10	10	15.0

Control yield = 290 Kg/ha. ; No. of trials = 4.

**Crop :- Linseed.**

**Ref :- Rj. 60(S.F.T.).**

**Site :- (District) : Kota.**

**Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

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

## 2. TREATMENTS :

O = Control (no manure).

$n_1$  = 22.4 Kg/ha. of N as A/S.

$n_2$  = 44.8 Kg/ha. of N as A/S.

$n_1'$  = 22.4 Kg/ha. of N as Urea.

$n_2'$  = 44.8 Kg/ha. of N as Urea.

$n_1''$  = 22.4 Kg/ha. of N as C/A/N.

$n_2''$  = 44.8 Kg/ha. of N as C/A/N.

## 3. DESIGN :

Same as in type A.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

Treatment	O	$n_1$	$n_2$	$n_1'$	$n_2'$	$n_1''$	$n_2''$	S.E./mean
Av. yield of Linseed in Kg/ha.	350	400	490	410	490	460	520	20.5

G.M. = 446 Kg/ha. ; No. of trials = 5.

**Crop :- Linseed (Rabi).****Ref :- Rj. 62(55).****Site :- Govt. Agri. Res. Farm, Borkher.****Type :- 'C'.**

Object :- To find out a suitable spacing and seed rate for Linseed.

**1. BASAL CONDITIONS :**

(i) (a) Gram-Jowar-Linseed-Fallow. (b) Jowar. (c) Nil. (ii) Clay loam. (iii) 21.10.62. (iv) (a) One ploughing and two bakherings. (b) N.A. (c) and (d) As per treatments. (e) N.A. (v) N.A. (vi) R.R.-45. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 17.3.63.

**2. TREATMENTS :****Main-plot treatments :**2 spacings between rows :  $S_1=30$  cm. and  $S_2=46$  cm.**Sub-plot treatments :**6 seed rates :  $R_1=15$ ,  $R_2=25$ ,  $R_3=35$ ,  $R_4=45$ ,  $R_5=54$  and  $R_6=64$  Kg/ha.**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 3.7 m.  $\times$  2.4 m. (b) 3.1 m.  $\times$  1.8 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of seed. (iv) to (vii) N.A.

**5. RESULTS :**

(i) 946 Kg/ha. (ii) (a) 243.1 Kg/ha. (b) 290.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed in Kg/ha.

	$R_1$	$R_2$	$R_3$	$R_4$	$R_5$	$R_6$	Mean
$S_1$	762	1009	1197	1078	993	962	1000
$S_2$	628	785	964	1031	975	973	893
Mean	695	897	1080	1054	984	967	946

**Crop :- Linseed (Rabi).****Ref :- Rj. 63(42), 65(35).****Site :- Govt. Agri. Res. Farm, Sultanpur.****Type :- 'C'.**

Object :- To find out a suitable seed rate and spacing for Linseed.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) N.A. (iii) 20.10.1963 ; 19.10.1965. (iv) (a) One ploughing and 2 bakherings for 63 (42), Bakhering for 65 (35). (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 22.4 Kg/ha. of N broadcast. (vi) R.R. 45 for 63 (42) ; Local als for 65 (35). (vii) Unirrigated for 63 (42) ; Irrigated for 65 (35). (viii) One hoeing for 63 (42) ; Nil for 65 (35). (ix) N.A. (x) 21.3.64, 27.4.66.

**2. TREATMENTS :****Main-plot treatments :**2 spacings between rows :  $S_1=30$  and  $S_2=46$  cm.**Sub-plot treatments :**6 seed rates :  $R_1=14.8$ ,  $R_2=24.7$ ,  $R_3=34.6$ ,  $R_4=44.5$ ,  $R_5=54.4$  and  $R_6=64.2$  Kg/ha.**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 3.7 m.  $\times$  2.4 m. (b) 3.1 m.  $\times$  1.8 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Height of plants and yield of linseed. (iv) (a) 1963-1965 (1964 N.A.). (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Both the error variances are homogeneous, and main-plot Treatments  $\times$  years interactions is absent while sub-plot Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 797 Kg/ha. (ii) (a) 349.8 Kg/ha. (based on 7 d.f. made up of Treatments  $\times$  years interaction and pooled error). (b) 368.8 Kg/ha. (based on 10 d.f. made up of various components of treatments with years). (iii) None of the effects is significant. (iv) Av. yield of linseed in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	Mean
S <sub>1</sub>	596	930	1000	967	792	771	843
S <sub>2</sub>	651	782	796	932	722	628	752
Mean	624	856	898	950	757	699	797

**Crop :- Linseed (Rabi).**

**Ref :- Rj. 62(90), 63(52), 64(65).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'IMV'.**

**Object :-** To find out the suitable variety under different irrigation and fertility levels for Linseed.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Clay loam. (iii) 18.10.62; 18.10.63; 25.11.64. (iv) (a) 1 bakharing, discing and planking for 62 (90); 2 bakharing and ploughings for 63 (52); 1 ploughings, cross tilling and planking for 64 (65). (b) Drilling (c) 28 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil for 62 (90); 64 (65); N.A. for 63 (52). (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) Nil for 62 (90), 64 (65); N.A. for 63 (52). (x) 25.3.63; 21.3.64; 22.4.65.

## 2. TREATMENTS :

**Main-plot treatments :**

4 irrigational treatments : I<sub>0</sub>=No irrigation, I<sub>1</sub>=1 irrigation after a month, I<sub>2</sub>=1 irrigation after 2 months and I<sub>3</sub>=One irrigation after a month+1 irrigation after 2 months.

**Sub-plot treatments :**

4 varieties : V<sub>1</sub>=R.R. 45, V<sub>2</sub>=S-36, V<sub>3</sub>=R.R. 9 and V<sub>4</sub>=Malvi-1.

**Sub-sub-plot treatments :**

3 manurial treatments : M<sub>1</sub>=16.8 Kg/ha. of N+16.8 Kg/ha. of P, M<sub>2</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P+16.8 Kg/ha. of K<sub>2</sub>O and M<sub>3</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P+33.6 Kg/ha. of K<sub>2</sub>O.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication; 4 sub-plots/main-plot, 3 sub-sub-plots/sub-plot. (b) N.A. for 62 (90), 63 (52); 14.1 m.  $\times$  8.5 m. for 64 (65); 2 for 62 (90); 3 for others. (iv) (a) 3.1 m.  $\times$  2.4 m. (b) 2.4 m.  $\times$  1.8 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of seed. (iv) (a) 1962 to 1964. (b) No. (v) N.A. (vi) Nil (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5 results.

## 5. RESULTS :

## 62(90)

(i) 727 Kg/ha. (ii) (a) 14.5 Kg/ha. (b) 77.6 Kg/ha. (c) 60.0 Kg/ha. (iii) Main effects of I, V, M are highly significant. and interaction I  $\times$  M is significant. (iv) Av. yield of seed in Kg/ha.



	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	Mean
M <sub>1</sub>	484	615	600	646	471	425	698	751	586
M <sub>2</sub>	593	789	789	800	593	621	797	910	730
M <sub>3</sub>	685	954	908	912	757	748	917	1038	865
Mean	587	769	766	786	607	598	804	900	727
V <sub>1</sub>	478	673	656	620					
V <sub>2</sub>	480	607	622	682					
V <sub>3</sub>	628	854	828	906					
V <sub>4</sub>	762	944	957	936					

C.D. for I marginal means = 13.4 Kg/ha.

C.D. for V marginal means = 48.8 Kg/ha.

C.D. for M marginal means = 30.6 Kg/ha.

C.D. for two M means at the same level of I = 61.1 Kg/ha.

C.D. for two I means at the same level of M = 51.4 Kg/ha.

## 63 (52)

(i) 972 Kg/ha. (ii) (a) 70.9 Kg/ha. (b) 74.4 Kg/ha. (c) 100.2 Kg/ha. (iii) Main effects of I, V, M and interaction I × V are highly significant. Interactions I × M, V × M are significant. (iv) Av. yield of seed in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	Mean
M <sub>1</sub>	632	814	787	770	732	674	790	806	751
M <sub>2</sub>	830	1061	1133	990	933	851	1029	1202	1004
M <sub>3</sub>	1013	1152	1230	1253	1095	1033	1160	1360	1162
Mean	825	1009	1050	1004	920	853	993	1123	972
V <sub>1</sub>	776	992	1040	873					
V <sub>2</sub>	691	840	916	964					
V <sub>3</sub>	941	1049	995	985					
V <sub>4</sub>	891	1156	1248	1195					

C.D. for I marginal means = 40.9 Kg/ha.

C.D. for M marginal means = 40.8 Kg/ha.

C.D. for V marginal means = 36.1 Kg/ha.

C.D. for two V means at the same level of I = 72.4 Kg/ha.

C.D. for two I means at the same level of V = 78.5 Kg/ha.

C.D. for two M means at the same level of I = 81.8 Kg/ha.

C.D. for two I means at the same level of M = 65.8 Kg/ha.

C.D. for two M means at the same level of V = 81.8 Kg/ha.

C.D. for two V means at the same level of M = 58.5 Kg/ha.

## 64 (65)

(i) 656 Kg/ha. (ii) (a) 89.7 Kg/ha. (b) 109.9 Kg/ha. (c) 95.1 Kg/ha. (iii) Main effect of I, V, M are highly significant. (iv) Av. yield of seed in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	Mean
M <sub>1</sub>	377	536	488	564	468	420	532	547	491
M <sub>2</sub>	524	698	660	788	598	588	747	736	667
M <sub>3</sub>	696	789	836	921	730	734	875	904	811
Mean	532	674	661	758	599	581	718	729	656
V <sub>1</sub>	435	664	668	628					
V <sub>2</sub>	440	632	604	647					
V <sub>3</sub>	625	713	680	853					
V <sub>4</sub>	630	689	693	903					

C.D. for I marginal means=51.6 Kg/ha.

C.D. for M marginal means=38.8 Kg/ha.

C.D. for V marginal means=53.5 Kg/ha.

**Crop :- Rai (Rabi).**

**Ref :- Rj. 63(45), 64(64).**

**Site :- Govt. Agri. Res. Farm, Sultanpur.**

**Type :- 'MV'.**

Object :— To study the effect of different levels of N and P on different varieties of Rai.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) N.A. (iii) 22.10.63 ; 21.10.64. (iv) (a) 1 ploughing and 3 bakherings for 63 (45) ; 3 bakherings for others. (b) Drilling. (c) 7 Kg/ha. (d) 30 cm. between lines. (e) N.A. (v) N.A. for 63 (45) ; Nil for other. (vi) As per treatments. (vii) Irrigated. (viii) 1 weeding and hoeing for 63 (45) ; N.A. for others. (ix) N.A. for 63 (45) ; Nil for other. (x) 5.3.64 ; 10.4.65.

#### 2. TREATMENTS :

**Main-plot treatments :**

4 varieties : V<sub>1</sub>=R-53, V<sub>2</sub>=L-101, V<sub>3</sub>=T-11 and V<sub>4</sub>=R.L. 18.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 4 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 12 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 3.7 m. × 2.4 m. (b) 3.1 m. × 1.8 m. (v) 30 cm. × 30 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal. (ii) Incidence of aphids, Controlled by spraying Nicotine Sulphate. (iii) Yield of grain. (iv) (a) 1963-1964. (b) No. (v) N.A. (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5 results.

#### 5. RESULTS :

63(45)

(i) 726 Kg/ha. (ii) (a) 62.1 Kg/ha. (b) 69.4 Kg/ha. (iii) Main effects of N, P and interaction N × V are significant. (iv) Av. yield of grain in Kg/ha.

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>1</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Til in Kg/ha.	-43	112	-4	68	155	191	162	23.9

Control yield = 147 Kg/ha. ; No. of trials=5.

**Crop :-Til.**

**Ref :- Rj. 62, 63, 64, 65(S.F.T.) for Pali**

**Site :- (District) Pali and Banswara.**

**and Rj; 62, 63, (S.F.T.) for Banswara**

**Type :- 'M'.**

Object :— To study the response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Grey brown, Red and yellow ; (iii) to (vi) N.A. (vii) unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

8 manurial treatments :

O=Control (no manure).

N<sub>1</sub>=22.4 Kg/ha. of N.

P<sub>1</sub>=11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

P<sub>2</sub>=22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N<sub>1</sub>P<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of N.

N<sub>1</sub>P<sub>2</sub>=22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N<sub>2</sub>P<sub>2</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of K<sub>2</sub>O.

N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

Same as in Type A<sub>1</sub> (unirrigated) on page no.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Pali and 1962 to 1966 [1964 and 1965 N.A.] for Banswara. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

**Pali**

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Til in Kg/ha.	69	65	368	110	168	152	222	136.8

Control yield=330 Kg/ha. ; No. of trials=6.

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Til in Kg/ha.	46	56	77	106	137	181	214	33.9

Control yield=471 Kg/ha. ; No. of trials=6.

## 64 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Til in Kg/ha.	34	11	54	94	110	161	192	27.2

Control yield= 243 Kg/ha ; No. of trials=6.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Til in Kg/ha.	55	17	47	71	83	130	150	12.5

Control yield=198 Kg/ha. ; No. of trials=8.

## Banswara

## 62(S.F.T.)

Treatment :	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Til in Kg/ha.	37	56	-2	66	123	168	175	31.3

Control yield=135 Kg/ha. ; No. of trials=3.

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Til in Kg/ha.	79	51	64	93	98	200	222	38.5

Control yield=101 Kg/ha. ; No. of trials=4.

Crop :- Til.

Ref :- Rj. 62, 63, 64, 65(S.F.T.) for Pali and  
62, 63(S.F.T.) for Banswara.Site :- (District) : Pali and  
Banswara.

Type :- 'M'.

Object :—To study response curves of important cereal, Cash and oilseed crops to potash, applied singly and in combination with other nutrients (Type : A<sub>3</sub>).

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Grey brown ; Red and yellow. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS:

O =Control (no manure).

N<sub>1</sub> =22.4 Kg/ha. of N.K<sub>1</sub> =11.2 Kg/ha. of K<sub>2</sub>O.K<sub>2</sub> =22.4 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>1</sub> =22.4 Kg/ha. of N+11.2 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>2</sub> =22.4 Kg/ha. of N+22.4 Kg/ha. of K<sub>2</sub>O.N<sub>2</sub>K<sub>2</sub> =44.8Kg/ha. of N+22.4 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+11.2 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub>(unirrigated) on page 268.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966.[1964 and 1965 N.A. for Banswara] (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Pali

## 62(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Til in Kg/ha.	66	10	48	106	149	145	205	64.2

Control yield=368 Kg/ha. ; No. of trials=3.

## 63(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Til in Kg/ha.	50	49	70	92	115	140	177	20.4

Control yield=395 Kg/ha. ; No. of trials=7.

## 64(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Til in Kg/ha.	46	6	46	51	85	138	142	26.3

Control yield=408 Kg/ha. ; No. of trials=8.

## 65(S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Til in Kg/ha.	33	31	52	63	65	97	92	9.4

Control yield=192 Kg/ha. ; No. of trials=8.

## Banswara

## 62 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Til in Kg ha.	49	-4	-2	76	84	123	157	30.8

Control yield=118 Kg/ha. ; No. of trials=3.

## 63 (S.F.T.)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Til in Kg/ha.	77	-9	13	56	69	156	135	13.8

Control yield=118 Kg/ha. ; No. of trials=5.

**Crop :- Til.****Ref :- Rj. 60(SFT).****Site :- (District) : Banswara and Pali.****Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Red and black ; Desert soil. (iii) to (x) N.A.

## 2. TREATMENTS :

O =Control (no manure).

N =22.4 Kg/ha. of N as A/S.

P =22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.K =22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.NP =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.NK =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.PK =22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.NPK =22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on kharif cereal, 8 on a rabi cereal, 8 on cash crop, 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on Type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

District	No. of trials	Response to				S.E.	Interaction				S.E.
		Control yield	N	P	K		NP	NK	PK	NPK	
Banswara	2	400	100	90	10	57.0	-20	10	-20	120	59.0
Pali	4	490	20	20	50	15.0	-20	0	-10	0	26.0

**Crop :- Til.**

**Ref :- Rj. 61(SFT).**

**Site :- (District) : Pali.**

**Type :- 'M'.**

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

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Desert soil. (iii) to (x) N.A.

## 2. TREATMENTS :

O = Control (no manure).

N<sub>1</sub> = 22.4 Kg/ha. of N as A/S.

N<sub>2</sub> = 44.8 Kg/ha. of N as A/S.

N<sub>1</sub>' = 22.4 Kg/ha. of N as Urea.

N<sub>2</sub>' = 44.8 Kg/ha. of N as Urea.

N<sub>1</sub>'' = 22.4 Kg/ha. of N as C/A/N.

N<sub>2</sub>'' = 44.8 Kg/ha. of N as C/A/N.

## 3. DESIGN :

Same as in type A above on page 362.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

Treatment	O	N <sub>1</sub>	N <sub>2</sub>	N <sub>1</sub> '	N <sub>2</sub> '	N <sub>1</sub> ''	N <sub>2</sub> ''	S.E.
Av. yield of Til in Kg/ha.	550	600	690	660	700	670	730	13.4

G.M. = 657 Kg/ha.; No of trials = 7.

**Crop :- Chillies.****Ref :- Rj. 65(20).****Site :- Govt. Agri. Farm, Rampura.****Type :- 'M'.**

Object :—To study the effect of N, P and K applied singly and in combinations on the yield of Chillies.

**1. BASAL CONDITIONS :**

(i) (a) No. (b) and (c) Nil. (ii) Sandy loam. (iii) 30.7.65. (iv) (a) 2 discings. (b) Transplanting. (c) N.A. (d) 46 cm. × 30 cm. (e) 1. (v) N.A. (vi) Local. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 29.11.65 and 11.1.66.

**2. TREATMENTS :**

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

(1) 3 levels of N:  $N_0=0$ ,  $N_1=49.4$  and  $N_2=98.8$  Kg/ha.(2) 3 levels of  $P_2O_5$ :  $P_0=0$ ,  $P_1=37.1$  and  $P_2=74.1$  Kg/ha.(3) 3 levels of  $K_2O$ :  $K_0=0$ ,  $K_1=37.1$  and  $K_2=74.1$  Kg/ha.**3. DESIGN :**

(i)  $3^3$  confd. [NP<sup>2</sup>K<sup>2</sup> and NP<sup>2</sup>K confd]. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) and (b) 2.5 m. × 1.8 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Good (ii) Nil. (iii) Yield of chillies. (iv) (a) 1955 only. (b) and (c) —. (v) to (vii) Nil.

**5. RESULTS :**

(i) 126.3 Q/ha. (ii) 36.2 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of chillies in Q/ha.

	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$N_0$	91.9	107.4	90.1	95.0	101.7	92.8	96.5
$N_1$	114.9	138.7	128.7	136.9	119.0	126.3	127.4
$N_2$	153.3	153.4	158.1	139.7	164.0	161.1	154.9
Mean	120.0	133.2	125.6	123.9	128.2	126.7	126.3
$K_0$	110.0	133.9	127.8				
$K_1$	134.5	135.3	114.8				
$K_2$	115.7	130.2	134.2				

C.D. for N marginal means = 25.0 Q/ha.

**Crop :- Chillies.****Ref :- Rj. 65(6).****Site :- Govt. Agri. Farm, Rampura.****Type :- 'D'.**

Object :—To test the relative efficacy of different fungicides on controlling of die back and fruit rot of chillies.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of  $P_2O_5$  and A/S. (ii) Sandy loam. (iii) 31.7.65. (iv) (a) Ploughing and harrowing by tractor. (b) Transplanting. (c) —. (d) 30 cm. × 30 cm. (e) N.A. (v) 44.8 Kg/ha. of  $P_2O_5$  + 67.2 Kg/ha. of N. (vi) Local. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 29.11.65, 22.12.65, 17.1.66 and 2.2.66.

**2. TREATMENTS :**

12 fungicides:  $T_0$ =Control,  $T_1$ =Fytolan 0.3%,  $T_2$ =Bordeaux mixture 4:4:50,  $T_3$ =Cupramar 0.3%,  $T_4$ =Tamraghol 0.3%,  $T_5$ =Colloidal copper 0.3%,  $T_6$ =Ferbam 0.2%,  $T_7$ =Hexathane  $T_8$ =Cuman 0.1%,  $T_9$ =Blitox 50 0.3%,  $T_{10}$ =Blitane 0.3% and  $T_{11}$ =Dithane Z-78 0.3%.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 6. (iv) (a) 3.7 m. × 2.8 m. (b) 2.7 m. × 1.8 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) N.A. (iii) Yield of green pickings. (iv) (a) 1965 contd. (b) No. (c) Nil. (v) (a) No. (b) Nil. (vi) and (vii) Nil.

## 5. RESULTS :

- (i) 324.6 Q/ha. (ii) 56.3 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of chillies in Q/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	319.8	321.0	295.3	333.6	347.5	391.1

Treatment	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>
Av. yield	318.7	325.6	332.0	324.2	325.6	332.4

**Crop :- Corriender (Rabi).**

**Ref :- Rj. 60(76).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'CM'.**

Object :—To study the effect of different dates of sowing and levels of N and P on the yield of Corriender.

## 1. BASAL CONDITIONS :

- (i) (a) No. (b) Fallow. (c) No. (ii) Clay loam. (iii) As per treatments. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) Row to row 30 cm. (e) N.A. (v) N.A. (vi) Local. (vii) and (viii) No. (ix) and (x) N.A.

## 2. TREATMENTS :

**Main-plot treatments :**

3 dates of sowing : D<sub>1</sub>=13.10.60, D<sub>2</sub>=23.10.60 and D<sub>3</sub>=3.11.60.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=16.8 and N<sub>2</sub>=33.6 Kg/ha.

(2) 3 levels of P : P<sub>0</sub>=0, P<sub>1</sub>=16.8 and P<sub>2</sub>=33.6 Kg/ha.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 3 main-plots/block ; 9 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 5.8 m. × 2.7 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

- (i) and (ii) N.A. (iii) Yield of grain. (iv) (a) 1960 only. (b) and (c)  $\frac{1}{2}$  N.A. (v) and (vi) N.A. (vii) Light frost.

## 5. RESULTS :

- (i) 111.6 Kg/ha. (ii) (a) 175.0 Kg/ha. (b) 226.6 Kg/ha. (iii) Main effects of D, N and P are highly significant. (iv) Av. yield of corriender in Kg/ha.



	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	Mean
N <sub>0</sub>	873	850	1073	677	1036	1083	932
N <sub>1</sub>	971	1049	1348	821	1269	1277	1123
N <sub>2</sub>	1151	1314	1416	967	1508	1406	1294
Mean	998	1068	1279	822	1271	1255	1116
D <sub>1</sub>	768	787	910				
D <sub>2</sub>	1128	1175	1510				
D <sub>3</sub>	1099	1251	1416				

C.D. for D marginal means = 100.8 Kg/ha.

C.D. for N or P marginal means = 106.6 Kg/ha.

**Crop :- Corriender (Rabi).**

**Ref :- Rj. 61(103).**

**Site :- Govt. Agri. Res. Farm, Borkhera**

**Type :- 'M'.**

Object :—To study the effect of different dates of sowing and levels of N, P and K on the yield of Corriender.

**1. BASAL CONDITIONS :**

(i) (a) No. (b) Fallow. (c) N.A. (ii) N.A. (iii) As per treatments. (iv) (a) 1 ploughing, 2 bhukerings and 1 pata. (b) N.A. (c) 25 Kg/ha. (d) Row to row 30 cm. (e) N.A. (v) N.A. (vi) Local. (vii) to (x) N.A.

**2. TREATMENTS :**

**Main-plot treatments :**

3 dates of sowing : D<sub>1</sub>=23.10.61, D<sub>2</sub>=3.11.61 and D<sub>3</sub>=13.11.61.

**Sub-plot treatments :**

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

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of P : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 3 levels of K : K<sub>0</sub>=0, K<sub>1</sub>=33.6 and K<sub>2</sub>=67.2 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/block ; 27 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 3.1 m. x 2.4 m. (b) 2.4 m. x 1.8 m. (v) 30 cm. x 30 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of Corriender. (iv) (a) 1951—1952 (dates changed in 62). (b) and (c) N.A. (v) and (vi) N.A. (vii) Frost-appeared in December.

**5. RESULTS :**

(i) 756 Kg/ha. (ii) (a) 46.6 Kg/ha. (b) 99.6 Kg/ha. (iii) Main effects of D, N, P and interaction N x P, D x N, D x P are highly significant. Interaction P x K is significant. (iv) Av. yield of corriender in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
D <sub>1</sub>	642	1550	804	670	925	906	785	846	870	834
D <sub>2</sub>	729	1088	852	662	995	1012	897	897	875	890
D <sub>3</sub>	432	646	553	424	600	607	537	546	548	544
Mean	601	930	736	585	840	842	740	763	764	756
K <sub>0</sub>	590	882	746	600	824	795				
K <sub>1</sub>	616	944	730	549	847	893				
K <sub>2</sub>	597	963	733	607	848	837				
P <sub>0</sub>	423	666	667							
P <sub>1</sub>	684	1033	801							
P <sub>2</sub>	696	1089	740							

C.D. for D marginal means	=38.6 Kg/ha.
C.D. for N or P marginal means	=38.2 Kg/ha.
C.D. for N or P means at the same level of D	=66.2 Kg/ha.
C.D. for D means at the same level of N or P	=63.3 Kg/ha.
C.D. for means in the body of N×P or P×K table	=66.2 Kg/ha.

**Crop :- Corriender (Rabi).**

**Ref :- Rj. 62(66).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'CM'.**

**Object :-** To find out the optimum date of sowing with fertilizer requirement.

**1. BASAL CONDITIONS :**

(i) (a) N.A. (b) Fallow. (c) Nil. (ii) N.A. (iii) As per treatments. (iv) (a) and (b) N.A. (c) 7 Kg/ha. (d) Rows 30 cm. apart. (e) N.A. (v) N.A. (vi) Local. (vii) Unirrigated. (viii) 1 weeding. (ix) N.A. (x) 15.2.63, 9.3.63 and 13.3.63.

**2. TREATMENTS :**

**Main-plot treatments :**

4 dates of sowing : D<sub>1</sub>=13.10.62, D<sub>2</sub>=23.10.62, D<sub>3</sub>=2.11.62 and D<sub>4</sub>=12.11.62.

**Sub-plot treatments : and 3. DESIGN :**

Same as in Expt. No. 61(103) on page 366.

**4. GENERAL :**

(i) Frost, in the month of Dec., affected the quality of early dates. (ii) N.A. (iii) Yield of Corriender. (iv) (a) 1961-62 [Treatments changed in 62]. (b) and (c) N.A. (v) to (vii) N.A.

**5. RESULTS :**

(i) 822 Kg/ha. (ii) (a) 53.8 Kg/ha. (b) 1110.0 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of Corriender in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	569	759	785	384	470	665	740	621	631	621	624
N <sub>1</sub>	832	1038	1195	675	646	1069	1089	891	944	971	935
N <sub>2</sub>	859	992	1101	675	700	1047	972	872	901	940	907
Mean	753	930	1027	578	605	927	934	797	825	844	822
K <sub>0</sub>	737	863	1026	561	601	884	907				
K <sub>1</sub>	761	961	1010	568	612	921	941				
K <sub>2</sub>	762	964	1046	605	604	974	954				
P <sub>0</sub>	591	688	753	390							
P <sub>1</sub>	801	1041	1186	678							
P <sub>2</sub>	869	1059	1142	667							

C.D. for D marginal means=44.5 Kg/ha.

**Crop :- Corriender (Rabi).**

**Ref :- Rj. 63(48).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'ICM'.**

**Object :** To find out the suitable schedule of irrigation, fertilizer and seed rate for Corriender crop.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) Nil. (ii) Clay loam. (iii) 14.11.63. (iv) (a) 1 ploughing, 1 planking, 1 backhoeing and 1 harrowing. (b) Behind the plough in rows. (c) As per treatments. (d) Between lines 30 cm (e) N.A. (v) N.A. (vi) Local. (vii) Irrigated. (viii) 1 hoeing. (ix) 19 cm. (x) 12.3.64.

#### 2. TREATMENTS :

##### Main-plot treatments :

4 times irrigation : I<sub>0</sub>=No irrigation, I<sub>1</sub>=1 irrigation after one month, I<sub>2</sub>=1 irrigation at flowering, I<sub>3</sub>= one irrigation after one month and one irrigation at flowering.

##### Sub-plot treatments :

5 seed rates : R<sub>1</sub>=7, R<sub>2</sub>=10, R<sub>3</sub>=12, R<sub>4</sub>=15 and R<sub>5</sub>=17 Kg/ha.

##### Sub-sub-plot treatments :

3 levels of fertilizers : M<sub>0</sub>=Control, M<sub>1</sub>=33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+16.8 Kg/ha. of K<sub>2</sub>O as Pot. Chloride and M<sub>2</sub>=67.2 Kg/ha. of N as A/S+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+33.6 Kg/ha. of K<sub>2</sub>O as Pot. Chloride.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots replication; 5 sub-plots/main-plot, 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 2. (iv) (a) 3.1 m. × 3.1 m. (b) 2.4 m. × 2.4 m. (v) 30 cm. × 30 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of Corriender. (iv) (a) 1962—contd. (b) No. (c) N.A. (v) N.A. (vi) Frost. (vii) N.A.

#### 5. RESULTS :

(i) 903 Kg/ha. (ii) (a) 386.0 Kg/ha. (b) 198.0 Kg/ha. (c) 217.0 Kg/ha. (iii) Main effects of I and M are significant and interaction I × M is highly significant. (iv) Av. yield of Corriender in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
I <sub>0</sub>	662	875	589	594	583	753	592	636	660
I <sub>1</sub>	774	830	774	785	875	713	807	901	807
I <sub>2</sub>	818	807	835	919	987	693	908	1019	873
I <sub>3</sub>	1222	1200	1312	1345	1278	807	1399	1608	1271
Mean	869	928	878	911	931	742	926	1041	903
M <sub>0</sub>	732	925	656	648	748				
M <sub>1</sub>	858	849	925	1009	992				
M <sub>2</sub>	1018	1009	1051	1076	1051				

C.D. for I marginal means = 317.2 Kg/ha.  
 C.D. for M marginal means = 98.0 Kg/ha.  
 C.D. for M means at the same level of I = 196.0 Kg/ha.  
 C.D. for I means at the same level of M = 347.8 Kg/ha.

**Crop :- Cumin (Rabi).**

**Ref :- Rj. 64(45).**

**Site :- Govt. Agri. Farm, Tonk.**

**Type :- 'M'.**

**Object :-** To study the effect of different methods of application of N, P and K on the yield of Cumin.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize. (c) 44.8 Kg/ha. of N + 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) N.A. (iii) 24.11.64. (iv) (a) 2 ploughings. (b) Drilling. (c) 12 Kg/ha. (d) Between lines 30 cm. (e) N.A. (v) Nil. (vi) S. 404. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 11.3.65.

#### 2. TREATMENTS :

##### Main-plot treatments :

4 methods of application : M<sub>1</sub> = All based by broadcasting, M<sub>2</sub> = All based by drilling, M<sub>3</sub> =  $\frac{1}{2}$  by broadcasting +  $\frac{1}{2}$  as top dressing and M<sub>4</sub> =  $\frac{1}{2}$  by drilling +  $\frac{1}{2}$  as top dressing.

##### Sub-plot treatments :

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

(1) 3 levels of N : N<sub>0</sub> = 0, N<sub>1</sub> = 50.4 and N<sub>2</sub> = 100.9 Kg/ha.

(2) 3 levels of P : P<sub>0</sub> = 0, P<sub>1</sub> = 50.4 and P<sub>2</sub> = 100.9 Kg/ha.

(3) 3 levels of K : K<sub>0</sub> = 0, K<sub>1</sub> = 50.4 and K<sub>2</sub> = 100.9 Kg/ha.

#### 3. DESIGN :

(i) Split-plot confd., N<sup>2</sup> PK is confd. (ii) (a) 3 blocks/replication, 4 main-plots/block; 9 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 3.1 m. × 2.4 m. (b) 2.4 m. × 1.8 m. (v) 30 cm. × 30 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal. (ii) Incidence of powdery mildew ; Sulphur dusting on 27.1.65. (iii) Height, stand, No. of umbles, No. of branches and yield of Cumin. (iv) (a) 1963—contd. (b) No. (c) N.A. (v) and (vi) N.A. (vii) Nil.

#### 5. RESULTS :

(i) 668 Kg/ha. (ii) (a) 382 Kg/ha. (b) 199 Kg/ha. (iii) Main effect of P alone is highly significant. (iv) Av. yield of Cumin in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	577	582	602	716	512	695	651	631	601	626	619
N <sub>1</sub>	676	602	728	818	619	714	785	708	645	766	796
N <sub>2</sub>	504	665	785	762	584	776	677	700	627	711	679
Mean	586	616	705	765	572	728	704	680	624	701	668
K <sub>0</sub>	573	647	677	821	590	734	714				
K <sub>1</sub>	538	551	664	743	504	696	672				
K <sub>2</sub>	646	651	774	732	621	754	728				
P <sub>0</sub>	435	522	632	698							
P <sub>1</sub>	674	701	731	807							
P <sub>2</sub>	647	628	752	791							

C.D. for P marginal means = 93.2 Kg/ha.

**Crop :- Cumin (Rabi).**

**Ref :- Rj. 61(83).**

**Site :- Govt. Agri. Farm, Bassi.**

**Type :- 'C'.**

Object :- To study the effect of different seed rates and sprayings on the yield of Cumin.

**1. BASAL CONDITIONS :**

(i) (a) No. (b) N.A. (c) Nil. (ii) N.A. (iii) 20.12.61. (iv) (a) 6 ploughings. (b) to (d) As per treatments. (e) N.A. (v) Basal dose of 44.8 Kg/ha. of N as A/S. Basal dose of 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot. (vi) K-1. (vii) Irrigated. (viii) 2 weedings. (ix) N.A. (x) 10.4.62.

**2. TREATMENTS :**

**Main-plot treatments :**

4 methods of sowing : M<sub>1</sub>=Broadcast, M<sub>2</sub>=15 cm. spacing between rows, M<sub>3</sub>=30 cm. spacings between rows and M<sub>4</sub>=46 cm. spacing between rows.

**Sub-plot treatments :**

4 seed rates : R<sub>1</sub>=11, R<sub>2</sub>=17, R<sub>3</sub>=22 and R<sub>4</sub>=28 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/block; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 3.1 m. × 1.8 m. (b) 2.4 m. × 1.4 m. (v) 30 cm. × 23 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of Cumin. (iv) to (vii) N.A.

**5. RESULTS :**

(i) 216.0 Kg/ha. (ii) (a) 132.6 Kg/ha. (b) 96.2 Kg/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of Cumin in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	Mean
M <sub>1</sub>	73	126	208	143	138
M <sub>2</sub>	234	290	213	266	251
M <sub>3</sub>	331	347	363	238	320
M <sub>4</sub>	113	194	141	180	157
Mean	188	239	231	207	216

C.D. for M marginal means = 106.1 Kg/ha.

**Crop :- Cumin (Rabi).**

**Ref :- Rj. 61(94), 62(87), 63(57).**

**Site :- Govt. Agri. Farm, Tonk.**

**Type :- 'C'.**

**Object :-** To study the optimum date of sowing with different seed rates and method of sowing.

#### 1. BASAL CONDITIONS :

(i) (a) N.A. for 61(94) ; Cumin-Fallow for 62(87), N.A. for 63(57). (b) N.A. for 61(94) and 63(57) ; Fallow for 62(87). (c) N.A. (ii) N.A. for 61(94) and 63(57) ; Sandy loam for 62(87). (iii) As per treatments. (iv) (a) 2—4 ploughings and 2 bukherings. (b) to (d) As per treatments. (e) N.A. (v) 504 Kg/ha. each of N, P and K for 61(94) and 63(57) ; N.A. for 62(87). (vi) Local for 61(94) and 62(87) ; S-404 for 63(57). (vii) Irrigated. (viii) 1-2 weedings ; 1 hoeing for 63(57). (ix) N.A. (x) N.A. for 61(94) and 63(57) ; 2, 3, 15.3.63 for 62(87).

#### 2. TREATMENTS :

##### Main-plot treatments :

4 dates of sowing D<sub>1</sub>=30th Oct. ; D<sub>2</sub>=9th Nov. ; D<sub>3</sub>=19th Nov. and D<sub>4</sub>=29th Nov.

##### Sub-plot treatments :

4 methods of sowing : M<sub>1</sub>=Broadcasting, M<sub>2</sub>=15 cm. spacing between rows ; M<sub>3</sub>=30 cm. spacing between rows and M<sub>4</sub>=46 cm. drilling.

##### Sub-sub-plot treatments :

4 seed rates : R<sub>1</sub>=11, R<sub>2</sub>=17, R<sub>3</sub>=22 and R<sub>4</sub>=28 Kg/ha.

#### 3. DESIGN :

(i) Split plot. (ii) (a) 4 main-plots/replication, 4 sub-plots/main-plot, 4 sub-plots/sub-sub-plot. (b) N.A. for 61(94) and 62(87) ; 30.5 m. × 19.1 m. for 63(57). (iii) 2. (iv) (a) 3.7 m. × 2.4 m. for 61(94), 3.1 m. × 2.4 m. for 62(87) and 3.1 m. × 1.8 m. for 63(57). (b) 3.1 m. × 1.8 m. for 61(94) ; 2.4 m. × 1.8 m. for 62(87) and 2.4 m. × 1.2 m. for 63(57). (v) 30 cm. × 30 cm. (vi) Yes.

#### 4. GENERAL :

(i) N.A. for 61(94) ; Normal for 62(87) ; Good for 63(57). (ii) Attack of powdery Mildew ; Sulphur dusting. (iii) Yield of cumin. (iv) (a) 1961-63 (b) No. (c) Nil. (v) and (vi) N.A. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

#### 5. RESULTS :

##### 61(94)

(i) 604 Kg/ha. (ii) (a) 91.2 Kg/ha. (b) 114.2 Kg/ha. (c) 97.6 Kg/ha. (iii) Main effects of D, M, R and interaction D × M × R are highly significant, Interaction M × R is significant. (iv) Av. yield of cumin in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	Mean
D <sub>1</sub>	567	420	650	628	421	555	560	729	566
D <sub>2</sub>	420	768	504	639	504	549	650	628	583
D <sub>3</sub>	594	841	790	734	667	813	740	740	740
D <sub>4</sub>	510	430	605	572	499	431	611	577	529
Mean	523	615	637	643	523	587	640	668	604
R <sub>1</sub>	466	504	566	555					
R <sub>2</sub>	549	587	628	583					
R <sub>3</sub>	482	672	740	667					
R <sub>4</sub>	594	695	616	768					

C.D. for D marginal means = 72.5 Kg/ha.

C.D. for M marginal means = 62.3 Kg/ha.

C.D. for R marginal means = 49.1 Kg/ha.

C.D. for R means at the same level of M = 98.2 Kg/ha.

C.D. for M means at the same level of R = 105.3 Kg/ha.

#### 62 (87)

(i) 558 Kg/ha. (ii) (a) 18.3 Kg/ha. (b) 60.3 Kg/ha. (c) 55.2 Kg/ha. (iii) Main effects of D, M, R are highly significant. Interaction M × R is significant. (iv) Av. yield of cumin in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	Mean
D <sub>1</sub>	510	569	589	558	370	538	619	698	556
D <sub>2</sub>	488	622	597	552	415	516	619	709	565
D <sub>3</sub>	622	799	715	656	476	673	765	877	698
D <sub>4</sub>	359	479	394	413	234	370	507	534	411
Mean	495	617	574	545	374	524	628	704	558
R <sub>1</sub>	362	385	380	369					
R <sub>2</sub>	448	579	562	507					
R <sub>3</sub>	545	706	638	622					
R <sub>4</sub>	624	799	715	681					

C.D. for D marginal means = 14.6 Kg/ha.

C.D. for M marginal means = 32.9 Kg/ha.

C.D. for R marginal means = 27.8 Kg/ha.

C.D. for R means at the same level of M = 55.6 Kg/ha.

C.D. for M means at the same level of R = 58.1 Kg/ha.

#### 63 (57)

(i) 1032 Kg/ha. (ii) (a) 150 Kg/ha. (b) 126 Kg/ha. (c) 1691 Kg/ha. (iii) Main effects of D and M are highly significant and interaction D × M is significant. (iv) Av. yield of cumin in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	Mean
D <sub>1</sub>	845	944	1158	882	569	883	1147	1232	958
D <sub>2</sub>	984	1091	1274	1129	720	1124	1272	1362	1120
D <sub>3</sub>	1032	1316	1221	1185	783	1188	1360	1423	1188
D <sub>4</sub>	737	910	1120	689	524	765	991	1176	864
Mean	900	1065	1194	971	649	990	1192	1298	1032
R <sub>1</sub>	582	698	803	514					
R <sub>2</sub>	805	1013	1198	943					
R <sub>3</sub>	1047	1215	1360	1148					
R <sub>4</sub>	1165	1335	1413	1280					

C.D. for D marginal means =119.3 Kg/ha.  
 C.D. for M marginal means =68.6 Kg/ha.  
 C.D. for M means at the same level of D =126.8 Kg/ha.  
 C.D. for D means at the same level of M =165.5 Kg/ha.

**Crop :- Guar (Rabi).**

**Ref :- Rj. 64(79).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar.**

**Type :- 'M'.**

**Object :-** To study the effect of different levels of green matters added to soil as green manures and levels of N and P on the yield of Guar.

### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 8.11.64. (iv) (a) 3 cultivations and 2 discings with tractor 1 ploughing and a planking with bullock. (b) Line sowing. (c) 212 Kg/ha. (d) Between lines 23 cm. (e) N.A. (v) Nil. (vi) C-591. (vii) Irrigated. (viii) 2 hoeings and weeding. (ix) 1 cm. (x) 24, 25.4.65.

### 2. TREATMENTS :

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

(1) 4 levels of green matters : G<sub>0</sub>=0, G<sub>1</sub>=224, G<sub>2</sub>=448 and G<sub>3</sub>=672 Kg/ha.

(2) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=33.6 Kg/ha.

(3) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

Green matters were applied on 12.8.64, P<sub>2</sub>O<sub>5</sub> by drilling on 8.11.64 and N broadcast  $\frac{1}{2}$  at the time of sowing and  $\frac{1}{2}$  at the time of 1<sup>st</sup> irrigation.

### 3. DESIGN :

(i) 4×3×2 confd. (ii) (a) 12 plots/block ; 2 blocks/replication. (b) N.A. (iii) 3. (iv) (a) 9.2 m.×5.5 m. (b) 7.4 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

### 4. GENERAL :

(i) Normal. (ii) B.H.C. at 44.8 Kg/ha. applied at the time of sowing. (iii) Yield of guar. (iv) (a) 1964—N.A. (b) No. (c) Nil. (v) to (vii) Nil.

### 5. RESULTS :

(i) 1691 Kg/ha. (ii) 177.4 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of guar in Kg/ha.



	G <sub>0</sub>	G <sub>1</sub>	G <sub>2</sub>	G <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	1451	1638	1628	1514	1578	1590	1504	1558
N <sub>1</sub>	1831	1888	1839	1743	1854	1808	1814	1825
Mean	1641	1763	1734	1628	1716	1699	1659	1691
P <sub>0</sub>	1649	1822	1779	1615				
P <sub>1</sub>	1711	1692	1748	1646				
P <sub>2</sub>	1563	1775	1674	1621				

C.D. for N marginal means=84.3 Kg/ha.

**Crop :- Guar (Kharif).**

**Ref :- Rj. 64(5).**

**Site :- Govt. Agri. Farm, Durgapura.**

**Type :- 'D'.**

Object :-To test the relative efficacy of different fungicides in controlling the blight disease of Guar.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Pea. (c) N.A. (ii) Sandy. (iii) 10.7.64. (iv) (a) 2 ploughings. (b) Behind the plough. (c) 25 Kg/ha. (d) Between lines 30 cm. (e) N.A. (v) 5 Kg/ha. of P<sub>2</sub>O<sub>5</sub> drilled and 5 Kg/ha. of A/S broadcast. (vi) Local. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 18.11.64.

2. TREATMENTS :

10 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Shell copper 0.3%, T<sub>2</sub>=Crag 658 0.2%, T<sub>3</sub>=Bordeaux mixture 4 : 4 : 50, T<sub>4</sub>=Dithane 278, 0.3%, T<sub>5</sub>=Cupramar 0.3%, T<sub>6</sub>=Tamarghal 0.3%, T<sub>7</sub>=Ultra sulphur 0.2%, T<sub>8</sub>=Blitox 0.2% and T<sub>9</sub>=Ferbam 0.2%.

3. DESIGN :

(i) Incomplete L. Sq. (ii) (a) 3 plots/block ; 10 blocks/sq., 3 sqs. (b) N.A. (iii) 9. (iv) (a) 2.7 m. × 1.8 m. (b) 1.8 m. × 1.2 m. (v) 46 cm. × 30 cm. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) Incidence of blight disease ; control measures as per treatments. (iii) Disease intensity on leaf and stem of *Guar* and grain yield. (iv) (a) 1964 only. (b) No. (c) N.A. (v) N.A. (vi) Nil. (vii) B H.C. powder broadcast before sowing on 10.7.64.

5. RESULTS :

(i) 2134 Kg/ha. (ii) 364 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	L <sub>3</sub>	T <sub>9</sub>
Av. yield	2310	1987	2310	1866	1978	2108	2440	2108	1996	2234

**Crop :- Guar (Kharif).**

**Ref :- Rj. 64(1).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

Object :-To test the relative efficacy of different fungicides in controlling powdery mildew of Guar.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy. (iii) 30.7.64. (iv) (a) 2 ploughings. (b) Behind the plough. (c) 25 Kg/ha. (d) Between lines 46 cm. and between plants as usual. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) One weeding with *khurpi*. (ix) N.A. (x) 10.11.64.

## 2. TREATMENTS :

9 fungicidal treatments :  $T_0$ =Control,  $T_1$ =Spersul 0.5% at 674 litres/ha.,  $T_2$ =Elosal 0.5% at 674 litres/ha.,  $T_3$ =Ghandhakghal 0.5% at 674 litres/ha.,  $T_4$ =Karathane W.D. 0.2% at 674 litres/ha.,  $T_5$ =Wettable sulphur W.P. 0.5% at 674 litres/ha.,  $T_6$ =Ultra sulphur 0.3% at 674 litres/ha.,  $T_7$ =Sulphur dust at 11.2 Kg/ha. mixed with ash at 5.6 Kg/ha. and  $T_8$ =Sulphur dust at 16.8 Kg/ha.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 5. (iv) and (b) 2.7 m.  $\times$  1.8 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) Nil because powder mildew not appeared. (iii) Yield of guar. (iv) (a) 1964 only. (b) No. (c) N.A. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

- (i) 544 Kg/ha. (ii) 148.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$
Av. yield	556	423	584	588	596	508	492	590	558

**Crop :- Guar (Kharif).**

**Ref :- Rj. 64(2).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'D'.**

Object :— To test the relative efficacy of different fungicides in controlling the blight disease of Guar.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Fallow. (c) Nil. (ii) Sandy. (iii) 30.7.64 and resowing on 22.8.64. (iv) (a) One ploughing. (b) Behind the plough. (c) 25 Kg/ha. (d) Between lines 30 cm. and between plants N.A. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 11.11.64.

## 2. TREATMENTS :

10 fungicidal treatments :  $T_0$ =Control,  $T_1$ =Shell copper 0.3%,  $T_2$ =Crag 658 0.2%  $T_3$ =Bordeaux mixture 4 : 4 : 50,  $T_4$ =Dithane Z-78 0.3%,  $T_5$ =Kirti copper 0.3%,  $T_6$ =Tamraghal 0.3%,  $T_7$ =Ultra sulphur 0.2%,  $T_8$ =Colloidal sulphur 0.2% and  $T_9$ =Ferbam 0.2%.

## 3. DESIGN :

- (i) Incomplete L. Sq. (ii) (a) 3 plots/block ; 10 blocks/sq. and 3 Sqs. (b) 30.2 m.  $\times$  6.7 m. (iii) 9. (iv) (a) 2.7 m.  $\times$  1.8 m. (b) 1.8 m.  $\times$  1.2 m. (v) 46 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

- (i) Poor. (ii) Blight disease did not appear. (iii) Grain yield. (iv) (a) 1964 only. (b) No. (c) N.A. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

- (i) 1472 Kg/ha. (ii) 882.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of guar in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Av. yield	1839	2090	1117	1260	1435	1372	1023	1610	1296	1673

**Crop :- Jowar (Fodder).****Ref :- Rj. 65(13).****Site :- Govt. Agri. Res. Farm, Ganganagar.****Type :- 'CM'.**

Object :— To study the effect of different levels of N and seed rates on the yield of Jowar.

**1. BASAL CONDITIONS:**

(i) (a) No. (b) Fallow. (c) Nil. (ii) Sandy loam. (iii) 8.5.65. (iv) (a) Ploughing and harrowing. (b) Behind the plough. (c) As per treatments. (d) 23 cm. × 23 cm. (e) N.A. (v) 49.4 Kg/ha. of  $P_2O_5$  (vi) Local. (vii) Irrigated. (viii) 4 weedings. (ix) N.A. (x) 2, 3 and 4.11.65.

**2. TREATMENTS :****Main-plot treatments :**

8 seed rates :  $R_1$ =Jowar at 37.1 Kg/ha.,  $R_2$ =Jowar at 49.4 Kg/ha.,  $R_3$ =Guar at 37.1 Kg/ha.  $R_4$ =Guar at 49.4 Kg/ha.  $R_5$ =Jowar+Guar at 37.1 Kg/ha. (1 : 1),  $R_6$ =Jowar+Guar at 37.1 Kg/ha. (2 : 1),  $R_7$ =Jowar+Guar at 49.4 Kg/ha. (1 : 1),  $R_8$ =Jowar+Guar at 49.4 (2 : 1).

**Sub-plot treatments :**

3 levels of N :  $N_0$ =0,  $N_1$ =37.1 and  $N_2$ =74.1 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 8 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.1 m. × 4.6 m. (b) 5.6 m. × 4.1 m. (v) 23 cm. × 23 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Endris 0.1% was sprayed against Borers in Jowar on 16.6.65. (iii) Yield of Jowar fodder. (iv) (a) 1965 only. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 228.7 Q/ha. (ii) (a) 44.1 Q/ha. (b) 28.9 Q/ha. (iii) Main effects of N, R and interaction  $N \times R$  are highly significant. (iv) Av. yield of fodder in Q/ha.

	$R_1$	$R_2$	$R_3$	$R_4$	$R_5$	$R_6$	$R_7$	$R_8$	Mean
$N_0$	187.0	185.3	160.6	143.3	225.7	238.7	262.9	209.0	201.6
$N_1$	266.1	259.7	113.1	140.6	258.6	313.0	255.9	277.5	235.6
$N_2$	284.5	295.8	139.5	114.8	272.8	297.4	303.9	283.9	249.1
Mean	245.9	246.9	137.7	132.9	252.4	283.0	274.2	256.8	228.7

C.D. for R marginal means = 37.4 Q/ha.  
 C.D. for N marginal means = 15.4 Q/ha.  
 C.D. for N means at the same level of R = 43.7 Q/ha.  
 C.D. for R means at the same level of N = 49.8 Q/ha.

**Crop :- Fodder crops (Rabi).****Ref :- Rj. 62(91), 63(53), 64(46).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'M'.**

Object :— To find out the suitable forage crops with optimum fertilizers requirements.

**1. BASAL CONDITIONS:**

(i) (a) Fallow-Wheat-Paddy-Forage for 62 (91); Nil for others. (b) Paddy for 62 (91); Jowar chari for 63 (53); Fallow for 64 (46). (c) Nil. (ii) N.A. (iii) 31.10.62; 31.10.63; 20.11.64. (iv) (a) 1 ploughing, 2 bakhering and 1 pata (b) Broadcasting. (c) 25 Kg/ha. (d) and (e) N.A. (v) Nil for 62 (91); 64 (46); N.A. for 63 (53). (vi) Local for 62 (91); N.A. for others. (vii) Irrigated. (viii) Nil. (ix) Nil for 62 (91); 64 (46); N.A. for 63 (53). (x) 9 cuttings from 15.12.62 to 18.4.63 for 62 (91); 3 cuttings from 14.1.64 to 5.3.64 for 63 (53); 5 cuttings from 21.1.65 to 18.5.65 for 64 (46).

## 2. TREATMENTS :

## Main-plot treatments :

2 forage crops :  $C_1$ =Berseem and  $C_2$ =Senji.

## Sub-plot treatments :

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

(1) 2 levels of N :  $N_0=0$  and  $N_1=44.8$  Kg/ha.(2) 4 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=44.8$ ,  $P_2=89.7$  and  $P_3=134.5$  Kg/ha.(3) 2 levels of  $K_2O$  :  $K_0=0$  and  $K_1=44.8$  Kg/ha.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 2 main-plots/replication ; 2 blocks/main-plot and 8 sub-plots/block. (b) 48.8 m.  $\times$  36.6 m. for 62 (91) ; N.A. for others. (iii) 2. (iv) (a) 6.1 m.  $\times$  4.6 m. for 62 (91) ; N.A. for others. (b) 6.1 m.  $\times$  4.6 m. (v) Nil for 62 (91) ; N.A. for others. (vi) Yes.

## 4. GENERAL :

(i) Normal for 62 (91), 63 (53) ; Good for 64 (46). (ii) Nil. (iii) Yield of fodder. (iv) (a) 1962 to 1964. (b) No. (c) Nil (v) and (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

## 5. RESULTS :

## 62(91)

(i) 350.8 Q/ha. (ii) (a) 23.8 Q/ha. (b) 63.1 Q/ha. (iii) Main effect of C, P, N and interaction  $C \times P$ ,  $C \times N$  are highly significant and interaction  $C \times P \times N$  is significant. (iv) Av. yield of fodder in Q/ha.

	$P_0$	$P_1$	$P_2$	$P_3$	$N_0$	$N_1$	$K_0$	$K_1$	Mean
$C_1$	251.6	465.2	533.8	526.9	341.2	547.5	441.8	446.9	444.4
$C_2$	204.6	251.3	280.0	293.1	236.9	277.6	250.0	263.5	257.2
Mean	228.1	358.2	406.9	410.0	289.0	412.6	346.4	355.2	350.8
$K_0$	223.2	349.8	405.2	407.0	N.A.				
$K_1$	232.8	366.6	408.6	412.7					
$N_0$	210.6	292.5	310.9	342.3					
$N_1$	245.6	423.9	502.9	477.8					

C.D. for C marginal means

=74.9 Q/ha.

C.D. for P marginal means

=46.2 Q/ha.

C.D. for N marginal means

=32.6 Q/ha.

C.D. for P means at the same level of C

=65.3 Q/ha.

C.D. for C means at the same level of P

=71.3 Q/ha.

C.D. for N means at the same level of C

=46.2 Q/ha.

C.D. for C means at the same level of N

=57.2 Q/ha.

## 63(53)

(i) 385.3 Q/ha. (ii) (a) 27.0 Q/ha. (b) 19.3 Q/ha. (iii) Main effects of C, P, N, K and interactions  $P \times N$ ,  $C \times P$ ,  $C \times N$  and  $C \times N \times P$  are highly significant. (iv) Av. yield of fodder in Q/ha.

	$P_0$	$P_1$	$P_2$	$P_3$	$N_0$	$N_1$	$K_0$	$K_1$	Mean
$C_1$	279.9	481.5	534.4	519.6	369.3	538.4	449.2	458.5	453.8
$C_2$	241.0	305.4	360.8	360.2	298.1	335.6	307.7	326.0	316.8
Mean	260.4	393.4	447.6	439.9	333.7	437.0	378.4	392.2	385.3
$K_0$	251.4	381.1	443.8	437.4	326.5	430.3			
$K_1$	269.6	405.8	451.8	442.4	340.9	443.7			
$N_0$	236.2	332.4	382.6	383.6					
$N_1$	248.8	454.5	512.6	496.2					

C.D. for C marginal means	=85.6 Q/ha.
C.D. for P marginal means	=14.1 Q/ha.
C.D. for N or K marginal means	=9.9 Q/ha.
C.D. for P means at the same level of C	=20.0 Q/ha.
C.D. for C means at the same level of P	=60.0 Q/ha.
C.D. for N means at the same level of C	=14.1 Q/ha.
C.D. for C means at the same level of N	=75.4 Q/ha.
C.D. for means in the body of P×N table	=20.0 Q/ha.

64(46)

(i) 428.7 Q/ha. (ii) (a) 9.5 Q/ha. (b) 19.1 K/ha. (iii) Main effects of N, P and interactions C×P, C×N, C×P×N are highly significant and main effect of K and interaction P×N are significant. (iv) Av. yield of fodder in Q/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
C <sub>1</sub>	388.5	533.8	605.2	661.1	500.7	568.4	528.8	540.3	540.8
C <sub>2</sub>	232.3	304.3	366.4	363.5	298.2	334.9	310.0	323.1	316.6
Mean	310.4	419.0	485.8	512.3	399.4	451.6	419.4	431.7	428.7
K <sub>0</sub>	299.5	414.8	484.2	479.4	396.7	442.0			
K <sub>1</sub>	321.4	423.3	487.2	495.1	402.1	461.3			
N <sub>0</sub>	297.0	392.3	451.1	457.7					
N <sub>1</sub>	323.8	445.8	520.6	516.8					

C.D. for N or K marginal means	=9.8 Q/ha.
C.D. for P marginal means	=13.9 Q/ha.
C.D. for P means at the same level of C	=19.6 Q/ha.
C.D. for C means at the same level of P	=24.7 Q/ha.
C.D. for N means at the same level of C	=13.9 Q/ha.
C.D. for C means at the same level of N	=22.2 Q/ha.
C.D. for means in the body of N×P table	=13.9 Q/ha.

**Crop :- Fodder crop (Kharif).**

**Ref :- Rj. 62(36), 63(32), 64(22).**

**Site :- Govt. Agri. Res. Farm, Sriganaganagar. Type :- 'CM'.**

Object :— To find out a suitable seed rate legume mixture for chari jowar at different fertility levels.

#### 1. BASAL CONDITIONS :

(i) (a) Wheat-Chari Jowar for 62 (36) ; Nil for others. (b) Wheat for 62 (36) ; Fallow for 63 (32) ; Nil for 64 (22) (c) N.A. (ii) N.A. for 62 (36) ; Sandy loam for others. (iii) 7.7.62 ; N.A. for 63 (32) ; 13.6.64. (iv) (a) 2 to 4 ploughings. (b) N.A. (c) As per treatments. (d) and (e) N.A. (v) N.A. for 63 (32) ; 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62 (36) and 64 (22). (vi) Local. (vii) Irrigated. (viii) N.A. for 62 (36), 63 (32) ; one hoeing for 64 (22). (ix) N.A. (x) 19.10.62 ; 10.10.63 ; 4.10.64.

#### 2. TREATMENTS :

##### Main-plot treatments :

7 seed rates of fodder crops : S<sub>1</sub>=44.8 Kg/ha. of Jowar alone, S<sub>2</sub>=44.8 Kg/ha. of Jowar and 44.8 Kg/ha. of Guar, S<sub>3</sub>=44.8 Kg/ha. of Jowar and 22.4 Kg/ha. of Guar, S<sub>4</sub>=67.2 Kg/ha. of Jowar alone, S<sub>5</sub>=67.2 Kg/ha. of Jowar and 67.2 Kg/ha. of Guar, S<sub>6</sub>=67.2 Kg/ha. of Jowar and 33.6 Kg/ha. of Guar and S<sub>7</sub>=44.8 Kg/ha. of Guar alone.

##### Sub-plot treatments :

3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 7 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 6.1 m. × 4.6 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 62 (36) ; Good for others. (ii) N.A. (iii) Yield of green fodder. (iv) (a) 1962 to 1964. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) Since the sub-plot error variances are heterogenous, results of individual years are presented under 5. Results.

## 5. RESULTS :

## 62(36)

(i) 201.8 Q/h. (ii) a) 31.9 Q/ha. (b) 20.6 Q/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of fodder in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	Mean
N <sub>0</sub>	120.5	240.3	210.6	125.8	243.3	199.3	263.9	200.5
N <sub>1</sub>	126.8	235.5	218.9	124.8	249.8	173.2	270.9	200.0
N <sub>2</sub>	144.8	236.7	210.4	141.6	230.7	191.6	278.7	204.9
Mean	130.6	237.5	213.3	130.7	241.3	188.0	271.2	201.8

C.D. for S marginal means

=27.3 Q/ha.

## 63(32)

(i) 333.8 Q/ha. (ii) (a) 66.8 Q/ha. (b) 33.5 Q/ha. (iii) Main effects of S and N are highly significant. (iv) Av. yield of fodder in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	Mean
N <sub>0</sub>	209.0	383.9	356.1	244.0	384.8	369.6	282.5	318.6
N <sub>1</sub>	233.2	382.1	374.0	247.6	408.1	381.2	285.2	330.2
N <sub>2</sub>	255.6	396.5	372.2	270.0	385.7	412.6	376.7	352.8
Mean	232.6	387.5	367.4	253.8	392.8	387.8	314.8	333.8

C.D. for S marginal means

=57.4 Q/ha.

C.D. for N marginal means

=17.8 Q/ha.

## 64(22)

(i) 385.5 Q/ha. (ii) (a) 54.1 Q/ha. (b) 47.2 Q/ha. (iii) Main effects of S and N are highly significant. (iv) Av. yield of fodder in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	Mean
N <sub>0</sub>	386.6	351.6	384.8	396.5	402.7	360.6	223.4	358.0
N <sub>1</sub>	409.0	445.8	409.9	369.6	412.6	408.1	258.3	387.6
N <sub>2</sub>	389.3	401.0	444.9	454.8	459.3	456.6	270.0	410.8
Mean	395.0	399.5	413.2	407.0	424.9	408.4	250.6	385.5

C.D. for S marginal means

=46.4 Q/ha.

C.D. for N marginal means

=25.2 Q/ha.

**Crop :- Opium (Rabi).****Ref :- Rj. 61(98), 62(64).****Site :- Govt. Agri. Res. Farm, Borkhera.****Type :- 'C'.**

Object :- To find out optimum date of sowing with plant and row spacing.

## 1. BASAL CONDITIONS :

(i) (a) Wheat—Fallow—Opium for 61(98) ; Opium—Fallow—Opium for 62(64). (b) Fallow. (c) N.A. (ii) Clay loam. (iii) As per treatments. (iv) (a) N.A. for 61(98) ; 1 disc, 2 ploughings and two bakherings for 62(64). (b) N.A. (c) 1 to 2 Kg/ha. (d) As per treatments. (e) N.A. (v) N.A. (vi) N.A. for 61(98) ; Local for 62(64). (vii) Irrigated. (viii) 3 weedings for 61(98) ; 2 weedings and 2 heerings for other. (ix) N.A. (x) N.A ; 14.2.63 to 23.3.1963.

## 2. TREATMENTS :

## Main-plot treatments :

5 dates of sowing :  $D_1=6$ th November,  $D_2=16$ th November,  $D_3=26$ th November,  $D_4=6$ th December and  $D_5=16$ th December.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 spacings between rows :  $R_1=15$  cm.,  $R_2=30$  cm. and  $R_3=61$  cm.

(2) 3 spacings between plants :  $P_1=8$  cm.,  $P_2=15$  cm. and  $P_3=23$  cm.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 5 main-plots, replications ; 9 sub-plots/main-plot. (b) N.A. (iii) 3 for 61(98) 5 ; 2 for 62(64). (iv) (a) and (b) 2.4 m.  $\times$  1.8 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Effect of frost at early stages of growth and later growth suffered due to low temperature for 61(98) ; High temperature affected adversely the final extraction for 62(64). (ii) N.A. for 61(98) ; Blight incidence was controlled by spraying bordeaux mixture for 62(64). (iii) Yield of opium. (iv) (a) 1961—1962. (b) N.A. (c) Nil (v) and (vi) N.A. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

## 5. RESULTS :

## 61(98)

(i) 17 Kg/ha. (ii) (a) 2.7 Kg/ha. (b) 1.8 Kg/ha. (iii) Main effects of D, R, P and interactions  $D \times R$  and  $R \times P$  are highly significant. Interaction  $D \times P$  is significant. (iv) Av. yield of opium in Kg/ha.

	$D_1$	$D_2$	$D_3$	$D_4$	$D_5$	$P_1$	$P_2$	$P_3$	Mean
$R_1$	27	27	20	9	6	18	19	17	18
$R_2$	32	31	20	10	6	22	24	14	23
$R_3$	21	20	15	6	3	16	14	9	13
Mean	27	26	18	8	5	19	19	13	17
$P_1$	30	28	20	9	6				
$P_2$	29	28	21	10	6				
$P_3$	21	23	13	7	3				

C.D. for D marginal means = 1.7 Kg/ha.

C.D. for R or P marginal means = 0.8 Kg/ha.

C.D. for R or P means at the same level of D = 1.7 Kg/ha.

C.D. for D means at the same level of R or P = 2.2 Kg/ha.

C.D. for means in the body of  $R \times P$  table = 1.3 Kg/ha.

## 62(64)

(i) 24 Kg/ha. (ii) (a) 2.9 Kg/ha. (b) 2.7 Kg/ha. (iii) All main effects and their interactions are highly significant. (iv) Av. yield of opium in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
R <sub>1</sub>	29	27	19	11	10	17	19	21	19
R <sub>2</sub>	46	42	27	14	12	20	32	32	28
R <sub>3</sub>	42	38	24	12	11	21	28	27	25
Mean	39	36	23	12	11	19	26	27	24
P <sub>1</sub>	30	27	19	11	10				
P <sub>2</sub>	43	38	25	13	12				
P <sub>3</sub>	44	42	26	12	10				

C.D. for D marginal means = 2.7 Kg/ha.

C.D. for P or R marginal means = 1.4 Kg/ha.

C.D. for P or R means at the same level of D = 3.2 Kg/ha.

C.D. for D means at the same level of R or P = 3.7 Kg/ha.

C.D. for means in the body of P × R table = 2.5 Kg/ha.

**Crop :- Opium (Rabi).**

**Ref :- Rj. 61(99), 62(61).**

**Site :- Govt. Agri. Res. Farm, Borkhera.**

**Type :- 'M'.**

**Object :-** To study the effect of different levels of P and K along with different times of application of N on the yield of Opium

#### 1. BASAL CONDITIONS:

(i) (a) Fallow—Wheat—Opium for 61(99) ; Opium—Fallow—Opium for other. (b) Wheat for 61(99) ; Fallow for 62(61). (c) 628 Kg/ha. of F.Y.M. for 61(99) ; N.A. for other. (ii) Clay loam. (iii) 19.11.1961 ; 7.11.1962. (iv) (a) 3 ploughings and 2 bakherings for 61(99) ; N.A. for 62(61). (b) N.A. (c) 2 Kg/ha. (d) 30 cm. × 15 cm. (e) N.A. (v) N.A. (vi) Local. (vii) Irrigated. (viii) 3 weedings for 61(99) ; 2 weedings and thinning for other. (ix) N.A. (x) N.A. ; 24.2.63 to 26.3.63.

#### 2. TREATMENTS :

##### Main-plot treatments :

6 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=22.4, N<sub>2</sub>=44.8, N<sub>3</sub>=67.2, N<sub>4</sub>=89.7 and N<sub>5</sub>=112.1 Kg/ha.

##### Sub-plot treatments :

3 split application of N : T<sub>1</sub>=2, T<sub>2</sub>=3 and T<sub>3</sub>=4 split application.

##### Sub-sub-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of P : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of K : K<sub>0</sub>=0, K<sub>1</sub>=33.6 and K<sub>2</sub>=67.2 Kg/ha.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication ; 3 sub-plots/main-plot ; 9 sub-sub-plots/sub-plot. (b) N.A. (iii) 2. (iv) 2.4 m. × 1.2 m. for 61(99) ; N.A. for other. (b) 2.4 m. × 1.2 m. (v) Nil for 61(99) ; N.A. for other. (vi) Yes.

#### 4. GENERAL :

(i) Late sowing and water scarcity for 61(99) ; N.A. for other. (ii) Nil for 61(99) ; Resowing was done due to attack [of blight for 62(61)]. (iii) Yield of opium. (iv) (a) 1961 to 1962. (b) N.A. (c) Nil. (v) and (vi) N.A. (vii) Since the sub-plot error variances are heterogeneous, results of individual years are presented under 5. Results.

#### 5. RESULTS :

##### 61(99)

(i) 10 Kg/ha. (ii) (a) 0.8 Kg/ha. (b) 1.1 Kg/ha. (c) 1.0 Kg/ha. (iii) Main effects of N, T, P, K and interactions P × K, T × P, T × K, N × K, N × P are highly significant. Interaction N × T is significant.



	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
T <sub>1</sub>	—	6	9	11	13	13	7	10	11	8	10	10	9
T <sub>2</sub>	—	7	9	12	15	14	7	11	13	9	11	11	10
T <sub>3</sub>	—	6	10	12	14	13	7	11	12	9	10	11	10
Mean	5	6	9	12	14	13	7	10	12	9	10	10	10
K <sub>0</sub>	4	5	7	10	11	12	6	8	10				
K <sub>1</sub>	5	7	10	12	15	14	7	11	13				
K <sub>2</sub>	5	7	11	12	15	15	8	12	13				
P <sub>0</sub>	4	5	6	8	10	10							
P <sub>1</sub>	5	7	11	13	15	16							
P <sub>2</sub>	5	8	11	13	17	17							

C.D. for N marginal means	=0.4 Kg/ha.
C.D. for T marginal means	=0.3 Kg/ha.
C.D. for P or K marginal means	=0.3 Kg/ha.
C.D. for the means in the body of P × K table	=0.4 Kg/ha.
C.D. for P or K means at the same level of N	=0.6 Kg/ha.
C.D. for N means at the same level of P or K	=0.7 Kg/ha.
C.D. for P or K means at the same level of T	=0.5 Kg/ha.
C.D. for T means at the same level of P or K	=0.7 Kg/ha.
C.D. for N means at the same level of T	=0.8 Kg/ha.
C.D. for T means at the same level of N	=0.8 Kg/ha.

62(61)

(i) 34 Kg/ha. (ii) (a) 2.2 Kg/ha. (b) 7.3 Kg/ha. (c) 3.7 Kg/ha. (iii) Main effects of N, T, P, K and interactions N × P, N × K and T × P, T × K are highly significant. Interaction P × K is significant. (iv) Av. yield of opium in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
T <sub>1</sub>	—	20	25	33	38	32	26	32	31	29	30	30	30
T <sub>2</sub>	—	22	28	39	43	41	28	37	39	33	34	36	34
T <sub>3</sub>	—	23	29	43	43	44	32	39	39	35	37	38	37
Mean	19	22	27	38	41	39	29	36	36	32	34	35	34
K <sub>0</sub>	18	21	27	37	39	39	26	32	32				
K <sub>1</sub>	19	22	27	38	42	39	25	34	35				
K <sub>2</sub>	20	22	29	40	43	39	28	35	34				
P <sub>0</sub>	16	20	25	33	33	32							
P <sub>1</sub>	20	23	29	41	45	42							
P <sub>2</sub>	21	23	29	41	46	42							

C.D. for N marginal means	=1.1 Kg/ha.
C.D. for T marginal means	=2.7 Kg/ha.
C.D. for P or K marginal means	=1.0 Kg/ha.
C.D. for means in the body of P × K table	=1.7 Kg/ha.
C.D. for P or K means at the same level of T	=1.7 Kg/ha.
C.D. for T means at the same level of P or K	=3.6 Kg/ha.
C.D. for P or K means at the same level of N	=2.4 Kg/ha.
C.D. for N means at the same level of P or K	=2.3 Kg/ha.

**Crop :- Opium (Rabi).****Ref :- Rj. 63(89).****Site :- Govt. Agri. Farm, Chittorgarh.****Type :- 'D'.**

Object : - To find out the optimum dose of chemical for the control of powdery mildew in Opium.

**1. BASAL CONDITIONS .**

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) 12.11.63. (iv) (a) 2 ploughings and 4 plankings by bullocks, 2 discings by tractor disc harrow. (b) Local method. (c) 3 Kg/ha. (d) and (e) N.A. (v) 3 C.L./ha. of F.Y.M. by spreading and 185 Kg/ha. of N as A/S/N in three instalments by broadcasting. (vi) Local. (vii) Irrigated. (viii) 3 hand weedings. (ix) N.A. (x) Last week of April, 64.

**2. TREATMENTS :**

6 concentrations of spersul sprays :  $T_0$ =Control,  $T_1$ =0.1%,  $T_2$ =0.2%,  $T_3$ =0.3%,  $T_4$ =0.4% and  $T_5$ =0.5%.

Sprays done fortnightly starting from 1.2.64.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) 11.0 m.  $\times$  5.5 m. (iii) 5. (iv) (a) 3.7 m.  $\times$  2.7 m. (b) 2.7 m.  $\times$  1.8 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Incidence of powdery mildew ; Control measures as per treatments. (iii) Percentage of disease index. (iv) 1963 only. (b) No. (c) N.A. (v) to (vii) Nil.

**5. RESULTS :**

(i) 40.4 degrees. (ii) 2.4 degrees. (iii) Treatment differences are highly significant. (iv) Av. disease index.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Mean degrees	45.7	41.3	40.1	37.0	39.3	39.2

C.D.=3.2 degrees.

**Crop :- Opium (Rabi).****Ref :- Rj. 63(90).****Site :- Govt. Agri. Farm, Chittorgarh.****Type :- 'D'.**

Object :—To find out optimum period of spraying for the control of powdery mildew disease in Opium.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) 12.11.63. (iv) (a) 2 ploughings and plankings by bullocks and 2 discings by tractor disc harrow. (b) Local method. (c) 3 Kg/ha. (d) and (e) N.A. (v) 3 C.L./ha. of F.Y.M. by spreading and 185 Kg/ha. of N as A/S/N in three instalments by broadcasting. (vi) Local. (vii) Irrigated. (viii) 3 hand weedings. (ix) N.A. (x) Last week of April, 64.

**2. TREATMENTS :**

16 applications of 5% spersul :  $T_0$ =Control,  $T_1$ =3 fortnightly sprays starting from 22.2.64,  $T_2$ =3 fortnightly sprays starting from 29.2.64,  $T_3$ =3 fortnightly sprays starting from 7.3.64,  $T_4$ =3 fortnightly sprays starting from 14.3.64,  $T_5$ =2 fortnightly sprays starting from 22.2.64,  $T_6$ =2 fortnightly sprays starting from 29.2.64,  $T_7$ =2 fortnightly sprays starting from 7.3.64,  $T_8$ =2 fortnightly sprays starting from 14.3.64,  $T_9$ =1 application on 22.2.64,  $T_{10}$ =1 application on 29.2.64,  $T_{11}$ =1 one application on 7.3.64,  $T_{12}$ =1 application on 14.3.64,  $T_{13}$ =1 application on 22.3.64,  $T_{14}$ =1 application on 29.3.64 and  $T_{15}$ =1 application on 5.4.64.

**3. DESIGN :**

(i) B.I.B.D. (ii) (a) 4 plots/block ; 10 blocks. (b) 14.6 m.  $\times$  2.7 m. (iii) 5. (iv) (a) 3.7 m.  $\times$  2.7 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Incidence of powdery mildew ; Control measures as per treatments. (iii) Percentage of disease index. (iv) (a) 1963 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 41.2 degrees. (ii) 2.2 degrees. (ii) Treatment differences are highly significant. (iv) Av. disease index in degrees.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. disease index	53.9	41.5	40.7	39.8	39.7	38.7	39.4	41.4
Treatment	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>	T <sub>13</sub>	T <sub>14</sub>	T <sub>15</sub>
Av. disease index	40.2	39.6	40.1	40.1	40.1	41.1	41.3	41.8

C.D.=2.9 degrees.

**Crop :- Opium (Rabi).**

**Ref :- Rj. 63(92),**

**Site :- Govt. Agri. Farm, Chittorgarh.**

**Type :- 'D'.**

Object :- To test the efficacy of different chemicals for the control of powdery mildew in Opium.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Clay loam. (iii) 12.11.63. (iv) (a) 2 ploughings and 4 plankings by bullocks and 2 discings by tractor disc harrow. (b) Local method. (c) 3 Kg/ha. (d) and (e) N.A. (v) 3 C.L.ha. of F.Y.M. by spreading and 185 Kg/ha. of N as A/S/N in 3 instalments by broadcasting. (vi) Local. (vii) Irrigated. (viii) 3 hand weedings. (ix) N.A. (x) Last week of April, 64.

## 2. TREATMENTS :

8 chemical treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Spersul 0.5%, T<sub>2</sub>=Gandhak ghol 0.5%, T<sub>3</sub>=Thiovit 0.5%, T<sub>4</sub>=Elosul 0.5%, T<sub>5</sub>=W.P. Sulphur 0.5%, T<sub>6</sub>=Karathane W.D. 0.2% and T<sub>7</sub>=Sulphur dust at 22.4 Kg/ha.

## 2. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) 14.6 m. × 5.5 m. (iii) 5. (iv) (a) 3.7 m. × 2.7 m. (b) 2.7 m. × 1.8 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Incidence of powdery mildew; control measures as per treatments. (iii) Percentage of disease index. (iv) (a) 1963 only. (b) No. (c) N.A. (v) to (vii) Nil.

## 5. RESULTS :

(i) 39.7 degrees. (ii) 2.0 degrees. (iii) Treatment differences are highly significant. (iv) Av. disease index in degrees.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. disease index	50.9	38.0	39.1	38.5	35.1	40.8	37.0	38.5

C.D.=2.5 degrees.

**Crop :- Bajra + Pulses (Kharif).****Ref :- Rj. 60(69), 61(72).****Site :- Govt. Agri. Farm, Bassi.****Type :- 'X'.**

Object :- To find out the economics of mixed cropping of Bajra with Pulses.

**1. BASAL CONDITIONS :**

(i) (a) Fallow-Bajra. (b) Fallow. (c) Nil. (ii) N.A. (iii) 12.7.1960 ; 14.7.1961. (iv) (a) 2 ploughings. (b) and (c) N.A. (d) 30 cm. between rows for Bajra and 61 cm. between rows for pulses. (e) N.A. (v) N.A. (vi) N.A. (vi) Bajra : R.S.J. ; Pulses : Local. (vii) Unirrigated. (viii) One weeding. (ix) N.A. (x) September, 1960 ; 24.10.1961.

**2. TREATMENTS :**

12 mixed cropping treatments :  $T_1$ =Bajra alone,  $T_2$ =Moong alone,  $T_3$ =Guar alone,  $T_4$ =Bajra and Moong mixed in the ratio of 1 : 1,  $T_5$ =Bajra and Guar in 1 : 1 ratio,  $T_6$ =Bajra and Moong in alternate rows,  $T_7$ =Bajra and Guar in alternate rows,  $T_8$ =4 rows of Bajra after every four rows of Moong,  $T_9$ =4 rows of Bajra after every four rows of Guar,  $T_{10}$ =Bajra, Moong and Guar in 1 : 1 : 1 ratio,  $T_{11}$ =Bajra, Moong and Guar in alternate rows and  $T_{12}$ =4 rows of Bajra, Moong and Guar respectively.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 8.5 m.  $\times$  5.8 m. (b) 7.9 m.  $\times$  5.2 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Grain yield. (iv) (a) 1960 to 1961. (b) N.A. (c) Results of combined analysis are given under 5. (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is present.

**5. RESULTS :**

(i) 292.8 Rs/ha. (ii) 112.7 Rs/ha. [based on 11 d.f. made up of Treatments  $\times$  years interaction]. (iii) Treatment differences are significant. (iv) Av. money value in Rs/ha.

Treatment	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. money value	316.6	97.5	260.1	315.8	381.3	293.7
	$T_7$	$T_8$	$T_9$	$T_{10}$	$T_{11}$	$T_{12}$
	357.6	260.0	353.8	335.7	310.5	231.3

C.D.=123.9 Rs/ha.

**Crop :- Bajra and Pulses (Kharif).****Ref :- Rj. 60(70), 61(71).****Site :- Govt. Agri. Farm, Durgapura.****Type :- 'X'.**

Object :- To find out the economics of pure and mixed sowing of Bajra and Pulses.

**1. BASAL CONDITIONS :**

(i) (a) Bajra-Fallow. (b) Fallow. (c) Nil. (ii) N.A. (iii) July 1960; July 1961. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) 30 cm. between rows for Bajra and 61 cm. between rows for Pulses (e) N.A. (v) N.A. (vi) R.S.K. for 60(70); Bajra-R.S.J. and Pulses : Local for 61(71). (vii) Nil. (viii) 1 weeding. (ix) N.A. (x) Sept. 1960; Sept. 1961.

**2. TREATMENTS :**

12 mixed cropping treatments :  $T_1$ =Bajra alone,  $T_2$ =Moong alone,  $T_3$ =Cowpea,  $T_4$ =Bajra and Moong mixed in 1 : 1 ratio,  $T_5$ =Bajra and Cowpea mixed in 1 : 1 ratio,  $T_6$ =Bajra and Moong in alternate rows,  $T_7$ =Bajra and Cowpea in alternate rows,  $T_8$ =4 rows of Bajra and Moong respectively,  $T_9$ =4 rows of Bajra and Cowpeas respectively,  $T_{10}$ =Bajra, Moong and Cowpeas mixed,  $T_{11}$ =Bajra, Moong and Cowpeas in alternate rows and  $T_{12}$ =4 rows of Bajra, Moong and Cowpeas respectively.

## 3. DESIGN and 4. GENERAL :

Same as in expt. Nos. 60(69), 61(72) conducted at Bassi on page 385.

## 5. RESULTS :

(i) 168.2 Rs./ha. (ii) 107.1 Rs/ha. [based on 11 d.f. made up of Treatments×years interaction]. (iii) Treatment differences are not significant. (iv) Av. value of produce in Rs/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. value of produce	228.5	68.2	78.3	196.8	250.6	167.3
	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>
	156.5	153.5	183.7	217.9	194.5	123.1

**Crop :- Bajra and Pulses (Kharif).**

**Ref :- Rj. 61(73).**

**Site :- Govt. Agri. Farm, Mandore.**

**Type :- 'X'.**

Object :-To study the economics of sowing Bajra and Pulses as pure and mixed crop.

## 1. BASAL CONDITIONS :

(i) (a) Bajra-Fallow. (b) Fallow. (c) Nil. (ii) N.A. (iii) 26.7.61. (iv) (a) 3 ploughings. (b) and (c) N.A. (d) Bajra 30 cm. between rows. Pulses 61 cm. between rows. (v) N.A. (vi) Bajra—R.S.K. (vii) Nil. (viii) 1 weeding. (ix) N.A. (x) 1.11.61.

## 2. TREATMENTS :

12 mixed cropping treatments : T<sub>1</sub>=Bajra alone, T<sub>2</sub>=Moong alone, T<sub>3</sub>=Moth alone, T<sub>4</sub>=Bajra and Moong mixed in 1 : 1 ratio, T<sub>5</sub>=Bajra and Moth mixed in 1 : 1 ratio, T<sub>6</sub>=Bajra and Moong in alternate rows, T<sub>7</sub>=Bajra and Moth in alternate rows, T<sub>8</sub>=4 rows of Bajra and Moong respectively, T<sub>9</sub>=4 rows of Bajra and Moth respectively, T<sub>10</sub>=Bajra, Moong and Moth mixed in 1 : 1 : 1 ratio, T<sub>11</sub>=Bajra, Moong and Moth in alternate rows and T<sub>12</sub>=4 rows of Bajra, Moong and Moth respectively.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 8.5 m.×5.8 m. (b) 7.9 m.×5.2 m. (v) 30 cm.×30 cm. (vi) Yes.

## 4. GENERAL

(i) and (ii) N.A. (iii) Grain seed. (iv) (a) 1961 only. (b) and (c) N.A. (v) to (vii) Nil.

## 5. RESULTS :

(i) 608.7 Rs/ha. (ii) 101.4 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. money value in Rs/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. money value	678.9	173.5	93.8	853.0	749.5	641.1
	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>
	689.2	787.3	670.4	766.6	537.0	664.3

C.D.=146.0 Rs/ha.

**Crop :- Wheat Gram (Rabi).****Ref :- Rj. 60(81).****Site :- Soil Cons. Res. Demons. and Trg. Centre, Kota.****Type :- 'X'.**

Object :—To find out the economics of growing of legumes and cereal mixture under dry farming.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat+Gram. (c) Nil. (ii) Clay loam. (iii) 13.10.1960. (iv) (a) One ploughing and 4 bukherings. (b) Sowing behind the plough. (c) 67 Kg/ha. (d) 23 cm. × 30 cm. (e) N.A. (v) Nil. (vi) Malvi (Wheat). (vii) Unirrigated. (viii) Two weedings and two hoeings. (ix) and (x) N.A.

**2. TREATMENTS :**3 mixed cropping treatments:  $T_1$ =Wheat alone,  $T_2$ =Gram alone and  $T_3$ =Wheat and Gram mixed in 1 : 1 ratio.**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) N.A. (b) 1/148 ha. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1958 to 1962. (b) Yes. (c) N.A. (v) to (vii) Nil.

**5. RESULTS :**

(i) 530 Rs/ha. (ii) 190.38 Rs/ha. (iii) Treatment differences are significant. (iv) Av. money value in Rs/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. money value	457	499	634

C.D.=204.2 Rs/ha.

**Crop :- Wheat + Gram (Rabi).****Ref :- Rj. 61(120).****Site :- Soil Cons. Res. Demons. & Trg. Centre, Kota.****Type :- 'X'.**

Object :—To study the yield of Wheat in pure and mixed conditions and in presence of legume in mixture.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) As per treatments. (c) Nil. (ii) Clay loam. (iii) 7.11.61. (iv) (a) Ploughing and bukhering. (b) Behind the plough. (c) 7 Kg/ha. (d) 23 cm. (e) N.A. (v) Ni. (vi) Wheat-Malvi, Gram-Local. (vii) Unirrigated. (viii) 2 weedings. (ix) 4 cm. (x) N.A.

**2. TREATMENTS :**3 mixed crop treatments:  $T_1$ =Pure Wheat,  $T_2$ =Pure Gram, and  $T_3$ =Mixture of Wheat and Gram in 1 : 1 ratio.  
(Alternate row of Wheat and Gram).**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) N.A. (b) 10.1 m. × 6.7 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1958 to 1962. (b) Yes. (c) N.A. (v) to (vii) Nil.

**5. RESULTS :**

(i) 348.0 Rs/ha. (ii) 140.8 Rs/ha. (iii) Treatment differences are significant. (iv) Av. money value in Rs/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. money value	572	197	277

C.D.=151.0 Rs/ha.

**Crop :- Cotton and Moth (Kharif).**

**Ref :- Rj. 60(12).**

**Site :- Govt. Agri. Farm, Sriganaganagar.**

**Type :- 'X'.**

**Object :-**To study the beneficial effect of mixed cropping cotton with Moth in the control of root rat of Cotton.

**1. BASAL CONDITIONS:**

(i) (a) N.A. (b) Cotton. (c) N.A. (ii) Sandy loam. (iii) 14.6.60. (iv) (a) 4 ploughings. (b) to (e) N.A. (v) to (x) N.A.

**2. TREATMENTS :**

2 mixed cropping treatments :  $T_1$ =Cotton mixed with Moth and  $T_2$ =Pure Cotton.

**3. DESIGN:**

(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 12. (iv) (a) and (b) 5.5 m.  $\times$  3.7 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) and (ii) N.A. (iii) Yield of cotton. (iv) (a) to (c) N.A. (v) and (vi) Nil. (vii) Results of cotton crop only available.

**5. RESULTS:**

(i) 1255 Kg/ha. (ii) 266.0 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of cotton in Kg/ha.

Treatment	$T_1$	$T_2$
Av. yield	1214	1296





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