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Application of Nitrogen on Wheat**

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Studies on the Effect of Soil and Foliar Application of Nitrogen on Wheat*

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SUMMARY

Lermo Rojo gives significantly higher yields of both grain and straw than Sonora-64. Grain and straw yield differences due to soil or foliar application of nitrogen were not significant. However foliar application showed a trend towards increasing the yield and also improving quantitative characters. Significant interaction between varieties and methods of application was observed only for straw yield and 1000 grain weight.

INTRODUCTION

The absorption of nutrients and their utilisation mainly depend on mode of application and right type fertilizer. Nitrogen spray to crop plants can act as useful means of stimulating plant growth even in very dry seasons when nitrogen added to the soil is not likely to be properly utilised. Experiments to investigate the efficacy of foliar application on wheat have been carried out by several workers (1&3). For studying this aspect further, an experiment was carried out at the Agriculture College Farm, Rajendranagar, during the rabi season of 1966-67. The studies were aimed at finding out the efficacy of foliar application of nitrogen on two Mex can dwarf wheat varieties viz., Sonora-64 and Lermo Rojo.

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MATERIALS AND METHODS

The field selected for the experiment was a sandy clay loam of medium fertility with a pH of 8.1. The experiment was laid out on a simple randomised block design having three replications with twelve treatments. The ultimate plot size was 12 square metres. The details of the treatments are given below.

TREATMENTS

1. Varieties - 2
V₁ = Sonora 64.
V₂ = Lermo Rojo.
2. Methods of applications = 6
M₁ = Control.
M₂ = Complete N as soil application (Top dressing).
M₃ = 3/4th N as soil application + 1/4th N as foliar spray (once).
M₄ = 1/2 N as soil application + 1/2 N as foliar spray (twice).
M₅ = 1/4 N as soil application + 3/4 N as foliar spray (Thrice).
M₆ = Complete N as foliar spray (four times).

An initial basal dressing of N, P₂O₅ and K₂O each at 67.2 Kgs/Hac. in the forms of Urea, superphosphate, and sulphate of potash was applied uniformly to all the plots including control. Sowing using a seed rate of 100 kgs per hac was done on first December 1966. The crop was top dressed with nitrogen at 67.2 kgs per hac either through soil or foliar application as required under the particular treatment. Top dressing of N through soil was done on 30th day after seeding. In foliar sprays, 4% concentration of solution was used. First spray was given to the seedling when they were 35 days old. Subsequent sprays were given at 10 days intervals. The crop altogether received 3 weedings, 3 hoeings and 10 irrigations at suitable intervals based on the requirements of the crop. Harvesting was completed on 5th March 1967.

RESULTS AND DISCUSSION

The results are presented in table 1.

Grain yield differences were highly significant due to both varieties and methods of application of nitrogen. Lermo Rajo gave significantly increased yields of both grain and straw over Sonora-64. On an average, the increase was of the order of 420 kgs of grain per hectare or 17.6% and 1178 kgs of straw or 21.4%. Increased yield in Lerma Rojo was mainly due to the production of more number of effective tillers which alleraged at 10.0 tillers per

TABLE-I

Yield and other quantitative characters of wheat varieties as influenced by soil and foliar application of nitrogen.

S.I. Treatment No.	Height of the plant (cms)	productive tillers per plant	length of the ear head (cms)	number of grains per ear head	weight of 1000 grain	proteien content of grain (percent)	grain yield kgs per hac.	straw yield kgs per hac.
Sonora-64								
M ₁	76.45	5.6	9.11	43.9	33.4	11.0	3999.9	4259.2
M ₂	87.30	7.8	10.61	59.4	42.3	13.88	5222.2	5629.5
M ₃	87.04	7.9	10.71	61.8	43.1	13.89	5222.1	5703.8
M ₄	87.21	8.0	10.90	62.7	44.0	14.19	5407.3	5740.6
M ₅	87.31	7.9	11.54	64.7	45.0	14.78	5666.6	5814.7
M ₆	87.51	8.1	12.33	65.8	46.1	15.12	5777.7	5814.7
Lermo Rojo								
M ₁	90.70	7.6	8.36	40.3	31.6	10.01	4703.7	5111.3
M ₂	98.62	10.8	9.47	54.2	40.93	14.06	6111.1	6888.8
M ₃	98.65	10.8	9.63	54.7	42.23	14.26	6296.2	6925.8
M ₄	98.75	10.9	9.65	55.7	43.20	14.73	6333.3	6999.9
M ₅	98.75	11.0	10.06	56.8	43.53	14.88	6592.5	7037.0
M ₆	98.90	10.9	10.90	58.5	44.10	15.21	6777.7	7074.1
'F' test								
Varieties (V)	Sig	Sig	Sig	Sig	Sig	Not Sig	Sig	Sig
Methods of application (M)	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig
Interaction	Not Sig	Not Sig	Not Sig	Not Sig	Sig	Not Sig	Not Sig	Sig
C.D. at 5%	1.41	0.226	2.185	0.977	0.269	--	424.4	253.3
Methods of application	2.259	0.680	1.42	1.74	0.477	0.995	748.7	460.8
Interaction	--	--	--	--	0.477	--	--	460.8

plant, as against 7.6 tillers only in Sonora-64. Sonora-64 however, was significantly superior to Lerma Rojo in possessing more number of grains per earhead. No significant differences were observed between the varieties in respect of length of earhead and protein content.

Among the methods of application, M_6 (complete N as foliar spray) gave the highest yield of 6278 kg., gain per hectare. However the differences between M_6 , M_5 , M_4 , M_3 , and M_2 were not significant. The lowest yield of 5667 kg. was obtained in control M_1 . A trend towards increase in straw yield, plant height, productive tillers, length of earhead, number of grains per earhead, 100 grain weight and protein content was observed in M_6 . The results thus indicate that foliar application as a general practice for wheat may be advantageous. Similar results were reported by Sadaphal and Das (3) and Finney *et al* (1).

Except for straw yield and 1000 grain weight there was no marked interaction between varieties and methods of application for any of the characters studied.

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