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Nitrogen Application to CO 36 Rice

By

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ABSTRACT

An experiment was laid out for two seasons at Paddy Breedlng Station, Tamil Nadu Agricultural University, Coimbatore to study the time of N application on CO 36 rice. The study revealed that N applied in two equal splits at tillering and at panicle initiation ranked first and was having the highest efficient use of N of 16.5 kg grain per kg N per ha.

INTRODUCTION

Studies have been undertaken on times of application of nitrogen on IR 8 rice at Paddy Breeding Station, Coimbatore under All India Co-ordinated Rice Improvement Project. The results (Kalyanikutty *et al.*, 1969) indicated that for IR 8 two thirds of total nitrogen applied as basal and one third at panicle initiation proved to be the best. Have Ten (1971), and Pande and Adak (1971) have recommended split doses of N. The findings of Food and Agricultural Organisation in a six year study in 120 countries – South East Asia (Anonymous, 1971) revealed that N application in single dose applied two weeks prior to primordial stage is said to be efficiently utilised by the rice plant.

MATERIALS AND METHODS

The experiment was laid out at the Paddy Breeding Station of Tamil Nadu Agricultural University with the variety CO 36. The soil was sandy clay loam with pH 7.5, low available N (184 kg/ha), medium available phosphorus (12 kg/ha) and high available potash status (397 kg/ha). The experiment was conducted for two years in *kharif* 1971 and 1972, in a randomised block design replicated four times with a variety CO 36 having a duration of 120 days. There were twelve treatments consisting of two rates of N, *viz.* 0, 100 kg N/ha and in the rest of the treatments timings of application were fitted with one, two, three or four splits as in the Table 1. A common dose of 60 kg P_{205} and 50kg K_{20}/ha was applied before planting. Ammonium sulphate and urea were the sources of N in *Kharif* 1971 and *kharif* 1972 respectively. At the time of application of N, the field was drained and fertilizers were applied and reflooded after a day. The important biometric observations of total panicles

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per square meter, spikelets per earhead, 1000 grain weight, grain / straw ratio and grain yield were recorded.

RESULTS AND DISCUSSION

The grain yield data for the two *kharif* seasons 1971 and 1972 together with yield components are presented in Table 1.

Kharif **1971** — The grain yield data showed highly significant results due to rates of N and time of application of N. Among the doses of N application N was inferior to 100 kg N/ha mainly due to reduction in grain weight. Among treatments different times of N application T_2 – N applied as entire basal ranked first and was on par with T_{10} treatment in which N was applied in four equal splits in basal, tillering, panicle initiation and booting stages of the crop. T_{11} treatment having half of the total N applied at tillering and the rest applied at panicle initiation was on par with four equal splits of N (T_{10}).

Kharif **1972** — Similar to *kharif* 1971 among doses N at 100kg/ha was superior to N. Among the treatments 100 kg N/ha, 75 per cent applied as basal and 25 per cent at tillering ranked first and it was on par with treatments of two equal splits (half at tillering and half at panicle initiation) or four equal splits or all basal.

In the combined analysis for the two seasons, the grain yield data indicated that yield obtained in *kharif*. 1971 was superior to *kharif*, 1972. This was mainly due to use of different sources of nitrogen namely ammonium sulphate in *kharif*, 1971 and urea in kharif 1972, as it is evident from the comparison of grain yield of NO. and 100 kg N/ha all basal in both the seasons. Similar findings have also been reported by the earlier workers when comparing the efficiency of nitrogenous fertilizers (Ghosh *et al.*, 1960). The grain yield on pooled analysis indicated that among the treatments, treatment having 100 kg N applied 50 per cent at tillering and 50 per cent panicle initiation ranked first and it was on par with the treatments of four equal splits or all basal or three fourths basal and the remaining one fourth applied at tillering or panicle initiation or at booting. This was in agreement with the findings of earlier workers (Kalyanikutti *et al.*, 1969, Have Ten 1971, Pande and Adak, 1971 and All India Co - ordinated Rice Improvement Project Centre at Hyderabad (Anon. 1971). Grain yield in rice is mainly due to interaction of the yield components *viz.*, productive tillers per unit area, grain number per ear and grain weight. As seen in Table 1 all these characters are increased in treatment in which total N is applied half at tillering and half at panicle initiation. Taking into consideration of efficient use of N, the above treatment has also ranked first recording 16 . 50 kg grain per kg N per hectare. This was closely followed by treatments of N applied in four splits, complete basal and three fourths as basal plus one fourth at tillering. In case of grain / straw ratio there was no spectacular difference between the treatments.

TABLE 1. Influence of time of application of nitrogen on CO 36 rice on grain and yield components

Treatment particulars	Grain yield kg/ha				Yield components (Average for two seasons)			
	Kharif '71	*Kharif* '72	Mean	Grain Straw ratio	Mean number productive tillers (per clump 2 seasons)	Mean No. of Spikelets for two seasons	Mean 1000 grain weight (in grams)	Grain response per kg N per ha (Average for two seasons)
0 kg N/ha	3795	3851	3823	1.04	7.38	82	18.82	0
100 kg N/ha (All basal)	5732	5080	5406	1.04	7.38	82	19.29	15.83
100 kg N/ha (75%basal+25% tillering)	5072	5700	5386	1.08	7.65	82	19.25	15.63
100 kg N/ha (75% basal+25% panicle initiation)	5107	5168	5138	1.16	7.80	82	19.35	13.15
100 kg N/ha (75% basal+25% at booting)	4857	5379	5118	0.97	7.90	88	18.96	12.95
100 kg N/ha (50% basal+25% tillering+25% panicle initiation)	4643	5036	4840	1.10	8.30	87	19.04	10.17
100 kg N/ha (50% basal+25% panicle initiation +25% booting)	5107	4704	4905	0.98	7.95	88	18.72	10.82
100 kg N/ha (50% basal+25% tillering+25% booting)	5018	4837	4928	1.02	7.28	85	19.00	11.05
100 kg N/ha (25% basal+50% tillering+25% panicle initiation)	5197	4726	4962	1.00	7.80	83	19.24	11.39
100 kg N/ha (25% basal+25% tillering+25% panicle initiation+25% booting)	5625	5235	5430	0.99	7.85	86	19.21	16.07
100 kg N/ha (50% tillering+50% panicle initiation)	5628	5678	5473	0.97	8.25	89	19.30	16.50
100 kg N/ha (50% tillering+25% panicle initiation+25% booting)	4949	4937	4943	1.02	7.45	86	18.87	11.10
S. E.	173.5	274	165					
C. D. (P=0.05)	407.1	789	468					

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