GAU Res. J. 1992 17 (2) :137-139

Integrated Nutrient Management in Irrigated Rice (*Oryza sativa* L.) Variety GR-11

M. R. Patel, N. P. Chauhan, J. K. Patel and I. D. Patel

Main Rice Research Station,
Gujarat Agricultural University, Nawagam-387 540

On account of continuing world energy crisis, increasing prices of chemical fertilizers, use of organic manures as a renewable source of plant nutrient, is assuming importance. In this effort, a proper blend of organic manures with inorganic fertilizers is most important, not only for increasing grain yield but also for sustaining soil health. An experiment was conducted to study the effect of green manure, farm yard manure and azolla (biofertilizer) in combination with inorganic fertilizers on grain yield of rice, at the Main Rice Research Station, Nawagam during kharif 1989. The experiment was laid out in a randomized block design with four replications. Soil was sandy loam with pH 8.2, 0.068% total N and 23.8 kg available P_2O_5/ha.

Fresh azolla (12.5 ton/ha) was incorporated into soil in no standing water 5 days after transplanting. *Sesbania aculeata* (Dhaincha) was grown in situ, coarsely chopped and incorporated before transplanting. Farm yard manure was incorporated before transplanting. Phosphorus was applied at 50 kg/ha as basal. The data on grain and straw yields, ancillary characters and NPK uptake were worked out for all the treatments.

Data given in table 1 revealed that urea super granules (USG) recorded significantly higher grain yield than all treatments, except ammonium sulphate. Similar results were obtained by Shrivastav *et al.* (1987), Singh and Mishra (1987) and Patel *et al.* (1990). USG was at par with ammonium sulphate. Prilled urea (PU) in 2/3 + 1/3 split (Tr. 3) and combination of PU + green manuring/azolla (Tr. 5/4) produced comparable fields. The similar results were obtained by Mamaril *et al.* (1986) and Anonymous (1975). The comparable trend was observed in straw yields also.

Except PU split (Tr. 3) and PU + FYM (Tr. 6) all other treatment combinations produced comparable panicle number per unit area, although these were significantly superior over the control.

Urea super granules produced maximum panicle weight followed by PU split. Similar results were obtained by Shrivastav *et al.* (1987).

The application of ammonium sulphate showed highest N uptake followed by urea super granule and were significantly better than

TABLE 1

Effect of N sources on rice grain and straw yield, ancillary characters and nutrient uptake.

Sr. No.	Treatment	Grain yield kg/ha	Straw yield kg/ha	Panicles/ m^2	Weight of panicle(gm)	Uptake kg/ha		
						N	P	K
	Sources and methods of application							
1.	0 kg N/ha (control)	3002	2525	194	1.99	41.46	16.30	62.47
	100 kg N/ha							
2.	Urea super granules point placed at 10-12 cm soil depth	6299	6124	290	3.42	94.52	32.06	147.96
3.	Prilled urea 2/3 N basal + 1/3N 5-7 days before panicle Initiation (DBPI)	5189	4693	257	2.94	74.07	26.83	116.39
4.	Azolla (3/6 N)+ PU (1/6 N basal -+2/6 N 5-7 DBPI)	4998	4377	302	2.59	69.97	26.92	100.99
5.	Green manuring (3/6 N)+ PU (1/6 N basal + 2/6 N 5-7 DBPI)	4971	4398	286	2.56	69.80	29.02	120.35
6.	FYM 3/6 N + PU (1/6 N basal + 2/6 N 5-7 DBPI)	4515	4061	244	2.56	60.42	22.35	100.29
7.	Prilled Urea 1/4 N basal + 1/2N at maxi.tillering + 1/4 N at PI	5074	4609	314	2.60	79.19	27.80	121.98
8.	Ammonium sulphate 1/4 N basal + 1/2 N at max. tillering + 1/4 N at PI	6088	5892	295	2.91	105.76	31.24	155.88
	S. Em. ±	128.45	146.8	15.43	0.22	2.86	1.46	4.34
	C. D. at 5%	377.86	431.82	45.30	0.65	8.40	4.29	12.77
	C.V%	5.13	6.4	11.32	16.37	7.68	11.00	7.50

rest of treatments in total N uptake. Similar results were obtained by Dubey and Bisen (1989) and Ramiah *et al.* (1986). The uptake of P_2O_5 was miximum under USG followed by ammonium sulphate and were significantly higher than PU in 2 splits alone or in combination with azolla or FYM. Similarly, both USG and ammonium sulphate treatments resulted into significantly higher K_2O uptake than rest of the treatments.

(Received on 3rd May, 1990)

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