Oryza Vol. 43. No.3, 2006 (249-250)

Effect of nitrogen on yield and yield attributes of rice hybrids under irrigated conditions

H.P. Tripathi* and L.M. Jaishwal

Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad, C.R.S. Masodha, Faizabad- 224 133, Uttar Pradesh, India

ABSTRACT

Rice hybrids Pro-agro 6201, DRRH 1, VRH 4, PAC-831, NDRH 2 along with a local check Sarjoo-52 were tested with 5 nitrogen doses viz. 0, 50, 100, 150 and 200 kg N ha^{-1}. Among the hybrids Pro-agro 6201 produced significantly highest grain yield of 5.30 and 5.48 t ha^{1} during 1996 and 1997, respectively. There was significant increase in grain yield and yield attributing characters with every increase in the dose of nitrogen up to 150 kg N ha^{-1}. On the average of two years, application of 150 kg N ha^{-1} recorded highest grain yield of 5.22 t ha^{-1} which showed an increase of 1.25, 0.84, 0.34 and 0.14 t ha^{-1} over 0, 50, 100 and 200 kg N ha^{-1} respectively.

Key words: *Hybrid rice, nitrogen fertilizers, grain yield*

For exploiting the full heterotic potential of hybrids, development of matching agronomic production technology including nitrogen response is essential. Inadequate N application adversely affects the grain production while excess nitrogen may lead to relatively higher crop growth, creating favourable condition for pests and diseases (Ohm *et al.* 1996). Significant increase in grain yield of hybrid rice have been reported up to 120 kg N ha^{-1} by Singh*et al.* (2001), up to 150 kg N ha^{-1} by Pandey *et al.* (1997) and up to 200 kg N ha^{-1} by Subbaiah *el al.*(2001). Thus, the present investigation was undertaken to study the effect of doses of nitrogen on yield and yield attributes of rice hybrids.

The field experiment was conducted at Narendra Deva University of Agriculture and Technology, Crop Research Station, Masodha, Faizabad during wet seasons of 1996 and 1997. The experiment was laid out in split plot design keeping three hybrids viz. Pro-agro 6201, DRRH 1and VRH 4 during 1996 and four hybrids viz. Pro-agro 6201, DRRH 1, PAC 831 and NDRH 2 during 1997 along with Sarjoo-52 as check in main plot and five nitrogen levels viz 0, 50, 100, 150 and 200 kg N ha^{-1} in sub plots. The soil of the experimental field was sandy loam in texture having pH 7.0, EC 0.40 mmhos cm^{-2}, low in nitrogen (240 kg N ha^{-1}) and medium in phosphorus (22.0 kg P_2O_5 ha^{-1}) and potash (292 kg K_2O ha^{-1}). Transplanting was done in 3rd week of July using two seedlings hill^{-1} at a spacing of 20 cm x 15 cm. An uniform dose of 60 kg ha^{-1} each of P_2O_5 and K_2O along with 25 kg Zinc sulphate and half dose of nitrogen (as per treatment) was applied as basal before transplanting. The remaining half dose of nitrogen was top-dressed in two equal splits *i.e.* at maximum tillering and panicle initiation stages.

Nitrogen application increased the grain yield significantly at each increased levels up to 150 kg N ha^{-1} during 1996 and up to 100 kg N ha^{1}during 1997 (Table 1). Application of 150 kg N ha^{-1} recorded highest grain yield of 5.52 and 4.92 t ha^{-1} which registered an increase of 2.43 and 1.53 t ha^{-1} during 1996 and 1.07 and 0.45 t ha^{-1} during 1997 over those of 0 and 50 kg N ha^{-1} respectively. The results are in conformity with those of Mahajan and Tripathi (1992) and Dehal and Misra (1994).

There was significant increase in all yield contributing characters viz. plant height, panicles m^{-2}, panicle weight and test weight with increasing levels of nitrogen up to 150 kg N ha^{-1} (Table 1). Subbaiah *et al.* (2001). Pandey *et al.* (1997) and Singh *et al.* (2001) have also reported significant increase in grain yield,

Table 1. Effect of nitrogen and hybrids on grain yield and yield attributing characters

Treatments	Plant height (cm)		Panicles m^{-2}		Panicle length (cm)		Panicle weight (g)		Grain yield (t ha^{-2})	
	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997
Hybrids										
Pro-agro-6201	116	106	264	299	26.6	30.1	3.50	3.98	5.30	5.48
DRRH-1	107	98	246	282	24.7	29.9	2.92	3.26	4.05	4.59
VRH-4	104	-	248	-	25.5	-	3.33	-	4.41	-
PAC-831	-	96	-	299	-	29.2	-	3.72	-	4.42
NDRH-2	-	103	-	246	-	30.9	-	5.05	-	4.42
Sarjoo-52	98	99	238	231	22.0	28.2	3.12	3.69	4.79	3.97
SEm±	2.1	0.9	5	6	0.6	0.2	0.14	0.32	0.11	0.12
CD (P=0.05)	6.9	3.3	16	17	2.2	0.5	0.48	0.97	0.31	0.33
Nitrogen (kg ha^{-1})										
N 0	96	96	197	239	22.5	28.1	2.65	3.37	3.09	3.85
N 50	102	100	226	263	23.0	29.4	2.94	3.89	4.29	4.47
N 100	105	102	260	276	25.1	29.9	3.24	3.97	4.93	4.84
N 150	113	102	276	290	26.2	30.3	3.48	4.16	5.52	4.92
N 200	116	103	286	297	26.8	30.2	3.78	4.33	5.36	4.80
SEm±	0.7	0.4	5.0	5.2	0.8	0.1	0.10	0.08	0.10	0.12
CD (P=0.05)	2.1	1.2	15.2	17.0	2.3	0.3	0.29	0.26	0.30	0.38

panicles m^{-2}, panicle weight and test weight of rice varieties/ hybrids with increasing doses of nitrogen.

Hybrids shown significant variation in grain yield during both the years (Table 1). Pro-agro 6201 produced significantly highest grain yield of 5.30 and 5.48 t ha^{-1} in 1996 and 1997 respectively which showed an increase of 0.51 and 1.5 t ha^{-1} over check Sarjoo 52 and was significantly better than other hybrids. Higher values of panicles m^{-2} and panicle length recorded in Pro-agro 6201 were responsible for higher yield. During 1997, DRH 1, PAC 831 and NDRH 2 remained at par and produced significantly higher yield than Sarjoo 52. Bhist *et al.* (1997) and Subbaiah *et al.* (2001) also reported significantly higher yield of hybrids than high yielding inbred lines. However; the interaction effect of nitrogen and hybrids were not significant.

REFERENCE

Bisht PS Pandey PC Singh N P and Lal P 1997. Performance of hybrid rice in irrigated lowlands of Uttar Pradesh India. International Rice Research Notes 22 (2): 30-31

Dehal P and Misra G 1994. Interaction of spacing and nitrogen in rice. Oryza 31(2): 149-150

Mahajan KK and Tripathi BR 1992. Effect of increasing levels of different Urea based fertilizers on yield and nitrogen nutrition of rice in an alfisal Oryza 29(2): 101-106

Ohm H Katyal SK and Dhiman SD 1996. Response of rice hybrids PMS 2 A/IR 31802 to seeding vigour and nitrogen levels in Haryana India. International Rice Research Notes 21: 47-48

Pandey PC, Bisht PS and Lal P 1997. Increased yields of low land rice with late N application in the productive phase and at high N rates. International Rice Research Notes 22 (2): 38-39

Singh SK Verma SS and Singh RP 2001. Effect of integrated nutrient supply on growth yield nutrient uptake economics and soil fertility in irrigated rice. Oryza 38(1&2) : 56-60

Subbaiah SV Kumar RM Singh SP and Rama Prasad AS 2001. Influence of nitrogen levels as hybrid rice Oryza 38 (1&2) : 38-41