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EFFECT OF SEED RATE AND NITROGEN LEVELS ON HYBRID RICE (*Oryza Sativa*)

K. RAJENDRAN and R. VEERAPUTHIRAN

Department of Rice, Tamil Nadu Agricultural University, Coimbatore-641 003.

ABSTRACT

Field experiments were conducted during *Kuruvai* season (June to September) 1996 and 1997 on hybrid rice ADTRH1 to study the effect of four nitrogen levels (0, 75, 150 and 225 kg ha⁻¹) and three seed rates in nursery (10, 20 and 30 g m⁻²). The results revealed that there was significant increase in plant height, dry matter accumulation, productive tillers/m², panicle weight and grain yield with an increase in the level of nitrogen from 0 to 150 kg/ha further increase in N rate upto 225 kg ha⁻¹ did not show significant increase. Straw yield was found significant upto 225 kg N/ha. The seed rate 10 g/m² recorded the highest grain yield, followed by 20 and 30 g/m². The growth and yield attributes except plant height were significantly higher with 10 g/m² of seed rate than the other rates.

KEY WORDS: Seed rate, Nitrogen levels, Hybrid rice, Grain yield.

Plant growth and development are influenced substantially by nitrogen application in rice. The direct bearing of N on source parameters influences the sink size of rice, thereby increasing grain yield of rice. Seed rate manipulation in nursery increases seedling vigour which helps to increase resultant energy of rice by means of grain yield (Singh *et al.*, 1987). On introduction of hybrid rice in India, it is necessary to study the influence of N on growth and yield of the crop.

MATERIALS AND METHODS

A field experiment was taken up during *kuruvai* season (June to September) of 1996 and 1997 at Wetland Farm, TNAU, Coimbatore. The experiment was laid out in split plot design with three replications. Four nitrogen levels (0, 75, 150 and 225 kg/ha) were kept in main plots and three seed rates in nursery (10, 20 and 30 g/m²) were allotted in subplots. The soil was clay loam with 7.8 pH, 0.23 percent organic carbon and 0.43 dsm⁻¹ electrical conductivity and 125.3, 10.5 and 465.2 kg ha⁻¹ of available N, P and K respectively. Hybrid rice ADTRH1 was transplanted on 15 and 17 June during 1996 and 1997 respectively at a spacing of

20x15/cm with one seedling/hill. Basal dose of 50kg P₂O₅ and 50 kg K₂O was broadcasted uniformly and ZnSo₄ 25 Kg/ha was applied after transplanting. Nitrogen was applied in three equal splits viz., 7 days after transplanting (DAT), active tillering and panicle initiation stage. The observation on plant height, number of productive tillers/m² and dry matter accumulation was recorded at harvest.

RESULTS AND DISCUSSION

There was significant increase in plant height, number of productive tillers/m² and dry matter accumulation with each successive increase in N from 0 to 225 kg/ha (Table 1). Addition in N dose from 150 to 225 kg/ha could not bring significant improvement in the above parameters. However, the maximum values of yield attributes were recorded in the highest N level. Plant height was relatively lesser, whereas productive tillers/m² and dry matter accumulation were higher in 1996 than in 1997. This might be due 41.5 percent more bright sunshine hours in 1996 than in 1997 during July-August. Murty *et al.* (1975) and Venkateswaralu *et al.* (1977) reported beneficial effect of bright

Table 1. Effect of N levels and seed rate in nursery on hybrid rice

Treatment	Plant height (cm)		Productive tillers /m ²		Drymatter production (kg/m ²)		Panicle weight (g)		Grain yield (t/ha)		Straw yield (t/ha)		B-C ratio
	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	
Nitrogen levels (Kg/ha)													
0	80.1	77.3	176	170	0.71	0.63	2.46	2.36	4.40	4.02	6.88	6.65	1.81
75	93.2	90.9	217	212	1.93	1.14	2.59	2.49	5.28	4.84	8.45	8.22	1.96
150	94.1	91.1	265	259	1.47	1.35	3.08	2.92	8.32	7.30	11.29	11.49	2.19
225	96.9	93.0	257	252	1.64	1.51	2.46	2.54	7.38	6.35	13.10	13.00	2.07
SEd.	3.98	3.49	6.36	6.56	0.103	0.115	0.063	0.119	0.028	0.281	0.419	0.54	
CD (P=0.05)	7.97	7.00	12.71	13.1	0.201	0.23	0.124	0.236	0.055	0.560	0.836	1.07	
Seed rate in nursery (g/m²)													
10	90.2	87.9	237.7	232	1.29	1.19	2.71	2.36	7.07	5.91	9.51	9.53	2.12
20	93.6	88.4	227.0	220	1.26	1.14	2.64	2.60	6.52	5.61	9.95	9.82	2.03
30	88.8	89.3	22.0*	217	1.27	1.16	2.61	2.56	6.05	5.38	10.28	10.24	1.97
SEd	3.88	2.91	4.06	3.81	0.029	0.03	0.047	0.106	0.025	0.203	0.198	0.404	
CD (P=0.05)	7.51	5.80	8.12	7.61	0.057	0.06	0.092	0.210	0.048	0.404	0.398	0.807	

sunshine on growth and development of rice. Growth attributes except plant height were significantly superior with crops planted using seedling obtained from nursery sown with 10 g/m² seed rate to that of 30 g/m².

Panicle weight and grain yield increased significantly with increase in N level upto 150 kg ha⁻¹. Further increase in N from 150 to 225 kg/ha could not show significant increase in these parameters. Grain yield increased by 20, 89 and 68 and 20, 82 and 58 per cent over the control under 75, 150 and 225 kg N during 1996 and 1997 respectively. Such beneficial effects of N has also been reported by Budhar (1996).

The lowest seed rate (10 g/m²) produced significantly higher panicle weight than the highest seed rate (30 g/m²) in nursery. There was 17 and 8 per cent and 10 and 4 per cent increase in grain yield with seedlings obtained from seed rate of 10 and 20 g/m² compared with 30 g/m² in 1996 and 1997 respectively. Similar effect of seed rate on grain yield was recorded by Vijayalakshmi *et al.* (1992) and Singh *et al.* (1987). Straw yield also increased significantly upto the highest N level (Table 1). Highest straw yield was registered in the highest seed rate (30 g/m²) followed by 20 and 10 g/m². Straw yield obtained from 30 g/m² seed

rate was significantly higher than that obtained under 10g/m² in 1996 and 1997 and on par with 20 g/m². The highest B.C ratio was obtained at 150 kg ha⁻¹ N application and seed rate of 10g/m².

It can be concluded from the study that significant response of N in hybrid rice was upto 150 kg N and optimum seed rate in nursery was 10g/m².

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