

## Response of boro rice cultivars to fertility levels in Eastern Uttar Pradesh

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### ABSTRACT

The performance of boro rice cultivars (Gautam, Prabhat, Rasi and Krishna Hansa) at five levels of fertility (control; 40: 20: 20; 80: 40: 40; 120: 60: 60 and 160: 80: 80 kg N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O ha<sup>-1</sup>). Gautam recorded the maximum panicles (406.6 m<sup>-2</sup>), grains panicle<sup>-1</sup> (87.2), 1000 grain weight (22.2 g) and gave the highest grain yield (4.81 t ha<sup>-1</sup>) were studied for 3 years. Grain and straw yields increased by increasing level of fertility upto 160, 80, 80 kg N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O ha<sup>-1</sup>.

**Key words:** Boro rice, cultivars, fertility levels, yield

Boro rice cultivation is a good option for improving production and resource use efficiency in water logged flood prone and fragile environments. Yield potential of improved boro rice cultivars is high and economic returns to farmers are good making it an attractive component in the farming system. Efforts are therefore, underway to augment its yield and a number of improved varieties have been developed. Hence, a study was carried out to find out the response of boro rice cultivars to varying fertility levels.

The field experiments were conducted consecutively for 3 years during the boro seasons of 2001-02, 2002-03 and 2003-04 in a lowland vertisol at

Agricultural Research Farm, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi. The soil was silty clay loam, having pH 7.4, organic carbon 0.46 % and available N, P and K. 154.7, 17.9 and 271.6 kg ha<sup>-1</sup>, respectively. The treatment included four rice cultivars Gautam, Prabhat, Rasi, Krishna Hansa and five fertility levels viz., 0:0:0 (control) 40: 20: 20; 80: 40: 40; 120: 60: 60 and 160: 80: 80 kg N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O ha<sup>-1</sup>. The experiment was conducted in a split plot design with rice cultivars in main plots and fertility levels in subplots replicated 3 times. Half N and full P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O were applied at transplanting and remaining half of the N dose was applied in 2 splits as topdressing at

**Table 1. Effect of cultivar and fertility levels on crop growth, yield attributes and yield of boro rice (pool data of 3 years)**

Treatment	Plant height at harvest	Tillers hill <sup>-1</sup> at 45 DAT	Tillers m <sup>-2</sup> at 45 DAT	Effective tillers hill <sup>-1</sup>	Panicles (No. m <sup>-2</sup> )	Panicle length (cm)	Grains Panicle <sup>-1</sup>	Spiklet fertility (%)	Grain wt. panicle <sup>-1</sup> (g)	Test weight (g)	Grain yield (t ha <sup>-1</sup> )	Straw yield (t ha <sup>-1</sup> )	Harvest index
<b>Cultivars</b>													
Gautam	82.4	15.1	455.7	12.4	406.6	22.7	87.2	76.4	1.83	22.2	4.81	5.13	48.1
Prabhat	81.0	13.7	444.4	11.6	393.0	21.6	77.4	75.3	1.62	21.5	4.50	5.42	45.3
Rasi	82.4	14.1	455.7	12.2	393.9	22.5	85.6	74.8	1.75	21.7	4.60	5.63	46.5
Krishna Hansa	81.0	14.4	455.0	12.3	396.7	21.7	84.4	72.1	1.72	21.5	4.60	4.87	45.8
CD (P= 0.05)	NS	NS	10.1	0.50	21.8	NS	8.54	3.61	NS	0.50	0.30	1.11	1.13
<b>Fertility levels (N: P<sub>2</sub>O<sub>5</sub>: K<sub>2</sub>O kg ha<sup>-1</sup>)</b>													
Control	78.7	11.7	411.5	10.6	354.2	21.5	75.5	74.4	1.57	21.1	4.00	4.29	46.9
40:20:20	80.6	13.8	447.5	11.5	379.6	22.0	81.8	75.8	1.67	21.4	4.20	4.51	45.4
80:40:40	82.4	14.5	450.0	12.1	402.7	22.2	84.2	74.4	1.72	21.6	4.60	5.35	46.5
120:60:60	83.1	15.7	465.1	12.9	416.3	22.5	87.0	74.2	1.75	21.7	4.90	5.58	46.7
160:80:80	84.4	16.0	495.3	13.3	433.7	22.7	89.5	74.4	1.97	22.2	5.20	5.98	46.5
CD (P= 0.05)	1.27	0.50	12.5	0.60	15.8	0.80	2.3	1.50	0.18	0.25	0.22	0.27	0.10

maximum tillering and panicle initiation stage.

Gautam produced tallest plants with highest tiller numbers, effective tillers, panicle numbers and length, spikelet fertility, grains panicle<sup>-1</sup> and test weight resulting in maximum grain yield (4.81 t ha<sup>-1</sup>) followed by Rasi and Krishna Hansa, however, the differences in grain yields among Gautam, Rasi and Krishna Hansa were not significant (Table 1). Cultivar Gautam had significantly higher grain yield as compared to Prabhat. No significant difference in grain yield among Prabhat, Rasi and Krishna Hansa was observed.

Increasing rate of fertility increased growth, yield attributes and grain yield significantly. The grain yield increase was 30, 22.5, 15 and 5 % with 160: 80: 80; 120: 60: 60; 80: 40: 40; 40: 20: 20 over control,

respectively. The increase in growth and yield attributes with higher fertility levels caused higher grain yield (Pandey and Agarwal, 1993; Desmukh *et al.*, 1988).

The results indicated that Gautam was the suitable variety and 160: 80: 80 kg N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O t ha<sup>-1</sup> was the appropriate fertility level for boro rice in lowland conditions of Eastern Uttar Pradesh.

## REFERENCE

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