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RESPONSE OF RICE GENOTYPES TO NITROGEN MANAGEMENT

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Rice is one of the most important staple food crops of India. The productivity of upland rice is far below the national average. The reason for such low productivity is the nutrient mining and imbalanced use of fertilizers. Among the nutrients, nitrogen is one of the major nutrients which determine the growth and development of rice. It is an important constituent of many organic compounds and is known to improve the various morphological attributes in the rice because higher synthesis of protoplasmic proteins and nucleic acid (Tiwari *et al.*2015). The responses of nitrogen differed widely among cultivars because of wide variatious in sensitivity of nitrogen stress. The information regarding the differential behavior of rice cultivars to nitrogen application under identical soil and weather conditions was considered to be of inferred. However, no systematic information is available on the response of N to rice cultivars; hence the study was carried out.

The present investigation was conducted during Kharif season of 2011 at, KVK, Bhind (M.P.). The soil was silty clay loam with pH 7.5, organic carbon 4.8 g ha^{-1}, available $N.P_20_5$ and K_2O, 237, 16.4 and 351 kg ha^{-1}, respectively. The experiment was laid out in randomized block design replicated three times. The treatments comprised of three nitrogen levels 40, 80 and 120 kg ha^{-1}) five genotypes of rice IET 18732 IET 18736, Annada and local (JR-3-45) Each of nitrogen level was applied through urea in three splits i.e. 50% basal, 25% at tillering and remaining 25% at panicle initiation stages as second top dressing, respectively. A uniform dose of 50 kg $P_2 0_5$ ha^{-1} through single superphosphate (16% P_2O_5) and 30 kg K_2O ha^{-1} through muriate of potash was applied as basal in all the plots. During the experimental period the total amount of rains was received was 723.4 mm and the major portion of rains was received during the month August, Rice crop was sown on 1st July 2011 using seed rate of 60 kg ha^{-1} as drilling method at row spacing of 20 cm / plant. Hand weeding was done at 25 days after sowing of the crop. All the growth and yield attributing parameters were recorded as per standard methods. All the recommended agronomic practices were followed. The yields were recorded at harvest.

Table 1: Growth, yield attributes and yield of rice as affected by nitrogen Levels and veriety of rice

Treatment	Plant Height (cm)	Tillers / plant	Days to 50% Flowering	Panicle length (cm)	Filled grain / panicle	1000 grain weight (g)	Grain yield (q ha^{-1})	Straw yield (q ha^{-1})	Harvest Index (%)
Nitrogen (kg ha^{-1})									
40	65.55	3.36	68.5	18.45	121.8	17.56	18.43	29.04	39.5
80	71.66	6.84	78.2	19.53	152.3	17.97	20.86	30.17	36.4
120	79.89	6.89	75.7	20.05	173.0	18.50	21.98	32.38	35.3
C.D. (P=0.05)	6.7	0.37	4.68	1.16	11.7	0.65	2.68	6.89	2.66
Variety									
IET – 18732	80.71	3.46	67.2	17.17	146.4	18.94	26.38	41.10	46.0
IET – 18736	68.00	3.52	69.8	19.53	164.5	18.86	23.32	35.86	36.2
Annada	72.56	4.13	74.0	20.04	140.0	17.03	21.87	31.80	36.2
Narendra -97	70.18	4.29	80.9	19.33	157.8	17.41	14.50	23.89	36.4
Local (JR–45)	70.53	3.07	78.3	19.38	136.7	17.75	16.01	27.90	36.4
C.D.(P= 0.05)	8.39	0.64	3.78	1.13	NS	NS	2.57	5.63	2.73

Nitrogen levels had significant effect on growth and yield contributing characters of rice gynotypes (Table 1) and the highest plant height (79.89 cm), tillers per plant days to 50% flowering, panicle length (20.05 cm), filled grain/ panicle (173) and 1000 grains weight (18.5 g) were observed under 120 kg. N ha^{-1} followed by 80 and 40 kg N ha^{-1} Avasthe (2009) and Tiwari *et al.* (2015) also reported similar results. Improvement in availability of nitrogen might have helped in better nitrogen uptake

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by the crop which in turn resulted in assimilation of photosynthates towards sink as well as higher dry matter accumulation.

All the growth and yield attributes of rice were significantly influenced by genotypes except filled grains per panicle and 1000 grain weight (Table 1). The maximum plant height (80.71 cm) 1000 grain weights (18.95 g) were noted in rice IET 18732 as compared to other genotypes. The tillers per plant in different varieties also varied significantly among themselves. Amongst the varieties, Narendra 97 attained the higher number of tillers per plant (4.29 to 4.34) except Annada. The local variety recorded the lowest tillers counts. The varieties were found to differ significantly to attain 50% flowering. The panicle length was statistically identical (19.33 to 20.0 cm) in case of IET 18736, Annada, Narendra-97 and local variety, but significantly superior to IET 18732 (18.17cm) these result are in conformity with the findings of Tripathi *et al.* (2014).

The nitrogen application increased the grain as well as straw yield of rice with subsequent increasing in nitrogen levels from 40 to 120 kg N ha^{-1}. The maximum grain (21.98 q ha^{-1}) and straw (37.38 q ha^{-1}) were gained with 120 kg N ha^{-1} which was significantly higher to 40 kg ha^{-1}. Nitrogen application provided better conducive condition for batter growth and yield attributes through simply of more photosynthesis. Singh and Kumar (2014) also reported the positive response of nitrogen application on yield of rice.

Among the varieties, IET-18732 resulted significantly higher grain (26.38 q ha^{-1}) and straw yield (44.10 q ha^{-1}) followed by Annada (23.32 q ha^{-1} grain and 37.86 q ha^{-1} straw). Narendra-97 and local variety JR-3-45 proved to be lower yielder. The maximum harvest index was obtained with 40 kg N ha^{-1} (39.5%) and variety IET-14732 (46%). Application of 120 kg N ha^{-1} and rice variety IET-18732 recorded lowest harvest index. Tripathi *et al.* (2014) reported similar results.

It may be concluded that IET-18732 genotype fertilized with 120 kg N ha^{-1} can be grown sussesfully for higher yields in Bhind district of Madhya Pradesh.

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