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Effect of nitrogen on scented short grain rice in irrigated system of east plan zone of Uttar Pradesh

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Abstract
A field experiment was laid out at Crop Research Station, Masodha (ANDUAT), Ayodhya, U.P. to evaluate the effect of different nitrogen (N) level on agronomic traits of newly developed aromatic (Scented) short grain rices. The experiment was comprised of seven rice genotypes viz., IET 22648, IET 22649,IET 23194,IET 23203, Badshabhog, Kala namak and KN 3 and three levels of nitrogen viz., 30, 60 and 90 kg/ha. The graded level of nitrogen increase grain yield significantly up to 60 kg N/ha. Among the genotypes maximum grain yield was recorded for IET 22648 followed by IET 23194 and IET 23203.

Keywords: scented, indigenous, nitrogen use efficiency

Introduction
Rice (*Oryza sativa* L.) is the staple food of more than half of the world population and also the major source of nutrition for rice eating population. India is one of the largest rice growing countries of the world. In India it was cultivated in approximately 44.80 million hectare area with the production of 104 million ton. Uttar Pradesh province is the 2nd largest rice producing state of the country after West Bengal In Uttar Pradesh rice was cultivated in about 6.2 million hectare area with the production of 150.74 lac metric ton. The average productivity of the state is 2.85 t/ha. Eastern part of the Uttar Pradesh is rich in genetic diversity due to variable edaphic and climatic factors. This part of the state is also the natural gene bank of traditional aromatic short grain rices. Due to adoption of high yielding varieties and hybrids this genetic wealth is gradually declining. These aromatic short grain rices posses good cooking quality and having export potential. Yield potential of short grain aromatic rices is very low due to its tall stature under higher fertilizer dose. Nitrogen is the one of the major nutrient which limits the crop growth of rice plant and grain yield. Traditional aromatic rice does not respond at higher level of nitrogen. Split application of fertilizer especially nitrogen can increase nitrogen use efficiency resulting in high productivity. Adaptation of newly developed rice varieties having high N use efficiency is one of the prominent strategies to increase production of aromatic short grain rices. Optimization of nitrogen use not only enhance the grain yield through better nutrient use efficiency but also reduces the cost of cultivation. In view of these facts present study was carried out to find out response of varied level of N affecting the yield and attributing traits of scented short grain genotypes.

Materials and Methods

The field experiment was carried out at Crop Research Station, Masodha (ANDUAT), Ayodhya, U.P. during the kharif 2017 to assess genotypic response to varied level of Nitrogen and to identify optimum dose. Composite soil samples were taken for the nutrient analysis at 0 to 20 cm soil depth from randomly selected sites of experimental field before transplanting. Soil of the experimental field is sandy loam with pH 7.2, organic carbon 0.40%, Nitrogen 200 kg/ha, P_2O_5 24 kg/ha and K_2O 234 kg/ha. Crop nursery was grown in raised beds and thirty days old seedlings were transplanted in the first week of July.

The experiment was laid out in a split plot design with three replications. The main plots (N treatment) were separated by creating buffers of 50 cm each. The plot size of the experimental plots was 5 X 4 m^2 and spacing was 20×10 cm (row × hill). The treatments included three variable N rates of 30, 60 and 90 kg /ha in the main plots and seven genotypes viz. IET 22648, IET 22649,IET 23194,IET 23203,Badshabhog, Kala namak and KN 3 in subplots. N was applied as per treatments through urea in three splits. Half dose of urea was applied as basal while remaining half dose of Urea was applied in two equal splits at maximum tillering and panicle initiation stage of crop growth. The recommended dose of fertilizer (RDF) for the ecology is 60:30:30:10 N P K $ZnSO_4$ kg/ha. To control weeds, Rift @ 1.25 litre/ha was applied just after transplanting. Crop was harvested at physiological maturity and grain yield was calculated at 14% grain moisture. Randomly 10 hills were selected from each plot to measure the agronomic parameters panicle no. /m^2 and panicle weight (g).

Results and Discussion

The data presented in table-1 clearly revealed that the level of nitrogen increase grain yield significantly up to 60 kg N/ha 4.24 t/ha. The N response at 60 and 90 kg was 34.62 and 20.86 kg grain/kg N. Among the tested genotypes IET 22648 recorded maximum grain yield (4.79 t/ha^{-1}) followed by IET 23194 and IET 23203 (4.69 and 4.49) followed by IET 22649 (3.32 t/ha). These genotypes were found significantly superior over standard check Badshahbhog. Maximum panicle number per metre square and panicle weight (g) was recorded with genotype IET 23194 (313 and 2.91 g/panicle).

Table 1: Grain yield and ancillary characters of selected scented rice under transplanted condition at different levels of N fertilizer doses.

Treatments	Grain Yield(t/ha)	Panicle No/m^2	Panicle weight (g)	N response kg grain/kg N (base level 30 kg N/ha)
N_1-30 kg N/ha	3.21	263	3.42	
N_2-60 kg N/ha	4.24	282	2.70	34.62
N_3-90 kg N/ha	4.46	369	2.74	20.86
CD (0.05)	0.07	1.83	NS	
C.V. (%)	4.29	1.09	83.86	
IET 22648	4.79	304	2.74	34.83
IET 22649	3.32	311	2.80	23.17
IET23194	4.69	313	2.91	24.17
IET 23203	4.49	312	2.57	40.83
Badshabhog	3.02	293	2.81	23.17
Kala namak	2.70	288	2.45	18.92
KN 3	2.78	311	2.39	14.83
CD (0.05)	0.18	14.26	NS	
C.V. (%)	6.19	4.91	80.97	
Expt. Mean	3.97	305	2.95	

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