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Evaluation of Rice (*Oryza sativa* L.) Hybrids under Prayagraj conditions of U.P in *Kharif*-2018

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Abstract

A field experiment was conducted during *kharif* season of 2018 at the Crop Research Farm, Department of Agronomy, Naini Agricultural Institute, SHUATS, Prayagraj (U.P.) to evaluate rice (*Oryza sativa* L.) hybrids under different agro-climatic conditions of U.P. The experiment is comprised of Randomized Block Design and was conducted to find the performance of 13 hybrids. In the experiment it was revealed that variety KR-21 performed better than other varieties i.e. Plant height (66.82) Panicle length (29.62 cm), grain yield (7.85 t ha⁻¹), highest net return (₹1,14,290.1) and B:C ratio (2.49) were found to be significantly higher than other varieties respectively.

Keywords: Hybrid rice, varietal response, yield, *Oryza sativa* L.

Introduction

Rice (*Oryza sativa* L.) is consider a staple food for more than half of the global population. About 55 per cent of the rice area is irrigated that accounts 75 per cent of the rice production in the world. More than 90% of the world's rice is grown and consumed in Asia, where 60% of the calories are consumed by 3 billion Asians (Khush, 2005) [3] Globally it is cultivated in an area of 153.51 m ha with an annual production of about 650.19 million tones and an average productivity of 2.96 t ha (FAO, 2013)

Rice being a crop having high water requirement there is a need to search for alternative methods to reduce water requirement of rice without reduction in yield. Establishment techniques, plant density, nutrient requirement and management, water management etc., need to be standardized to achieve the reported yield potential of rice under different duration in various environments. Method of establishment is one of the cultural practices, which influences the rice crop through its effect on growth and development (Gopi *et al.*, 2006) [2]. There is an urgent need to adopt some innovative technologies to break the yield ceiling in rice. Among the available technological options to enhance rice production and productivity, hybrid rice is the most practically feasible and readily adoptable technology. Hybrid rice offers a wide opportunity to augment rice productivity in India. Hybrid rice gives about (15-20%) more yield than high yielding commercial varieties (Virmani, 1994) [6]

Materials and Methods

The experiment was carried out during *kharif* season of 2018 at Crop Research Farm, Department of Agronomy, Naini Agricultural Institute, SHUATS, Allahabad (U.P.) which is located at 25° 24' 42" N latitude, 81° 50' 56" E longitude and 98 m altitude above the mean sea level. This area is situated on the right side of the river Yamuna by the side of Allahabad Rewa Road about 5 km away from Allahabad city. The soil of the experiment at site was sandy loam with a pH (7.8), available N (142.5 kg ha⁻¹) P₂O₅ (11.2 kg ha⁻¹) and K₂O (232.5 kg ha⁻¹). The experiment was laid in Randomized block design with three replications the performance of twenty two varieties with check variety. The recommended dose was fertilizer 120:60:60 kg N, P₂O₅ and K₂O ha⁻¹ basal dose of fertilizer was applied just before last puddling on, half dose of nitrogen and full dose of phosphorus and potassium followed by two topdressings of 1/4th dose of nitrogen on 23 DAT & 50 DAT.

Number of tillers was counted from five random plants per hills of panicle, Panicle length (cm) was observed at the time of harvest randomly from five tagged hills and their averages were recorded.

The ten panicles were counted separately which were obtained randomly from five tagged hills and their averages of filled grain were recorded. One thousand grains were randomly counted from panicles obtained from each plot and weighed and recorded as test weight (g) at 14% moisture. Five plants were selected randomly from each plot to analyze the various yield observations such as number of tillers hill-1, number of grains spike-1. Moreover, grains from harvest area (1.0 m²) were dried in sun, cleaned and weighed separately from each plot for calculating the grain yield in tones ha-1. Straw from harvest area (1.0 m²) was dried in sun, bundled, tagged and weighed separately from each plot for calculating the straw yield in tones hectare-1. Economics was calculated on the basis of prevailing market prices. The data subjected to be statistical analysis.

Results and Discussions

Yields attributes and yield of rice

During the period of investigation the maximum number of tillers hill-1 (12.97) and panicle length plant-1 (29.62 cm) was recorded under variety KR-21 (T7). The significant differences in panicle length among the hybrid rice varieties

could be attributed to their genetic make-up. The result confirms the findings of Yadav *et al.* (2004) [7]. The significant and highest grain yield plant-1 (60.60 g) was found in treatment T7. Further, this could be due to the better growth attribute resulting to produce higher grain yield. Similar findings were reported by Ranjitha *et al.* (2013) [8]. The data showed the maximum test weight (32.66 g) was observed in variety KR-21 (T7). This could be due to the adoption of 20 x 15 cm spacing for rice transplanting resulted in heavier filled and healthy grain in variety (KR-21). Similar results have been also reported by Haque *et al.* (2015) [4]. The data revealed that the significant and highest grain yield (7.85 t ha-1) and straw yield (79.7 t ha-1) was found in treatment T7. In general biological yield per plant had highly significant positive correlation with plant height, days to maturity, filled grain per panicle and total number of grains per panicle. Grain yield per plant had highly significant positive correlation with plant height, panicle length, 1000 grain weight, harvest index, grain yield per plot, grain yield per square meter and with grain yield ha-1 and B:C ratio. These results confirm the findings of Tripathi (2013) [5].

Table 1: Effect of different hybrid varieties on yield attributes and yield of hybrid rice under agro-climatic condition of Prayagraj, U.P.

Treatments	No. of Tillers hill 1	Panicle length (cm)	Test weight (g)	Grain Yield (g) hills-1	Grain Yield (t) ha ⁻¹	B: C ratio
KR 15	10.07	27.78	30.11	49.34	5.90	1.56
KR 16	11.20	28.75	27.48	51.44	7.07	2.12
KR 17	9.23	28.74	24.56	45.04	7.07	2.13
KR 18	7.07	25.79	20.22	38.85	5.93	1.49
KR 19	9.43	29.25	28.62	44.90	7.24	2.19
KR 20	11.73	29.15	31.55	46.68	6.93	1.96
KR 21	12.97	29.62	32.66	60.60	7.85	2.49
KR 22	10.20	28.99	29.49	58.97	6.33	1.79
KR 23	8.80	27.00	27.92	56.48	6.50	1.82
KR 24	8.30	26.61	28.40	57.92	6.85	1.97
KR 25	10.87	28.31	27.91	55.08	6.38	1.80
KR 26	12.10	27.77	28.98	54.07	7.28	2.17
KR 27	11.93	28.61	24.04	58.16	7.03	2.07
F test	NS	S	S	S	S	
S.Ed(±)	2.48	0.97	1.74	0.49	0.28	
C.D. (5%)	-	2.00	3.58	1.00	0.57	

Conclusion

It may be concluded that variety KR-21 was found to be the best for obtaining higher yield attributes, yield (7.85 t ha-1), panicle length (29.62 cm), net return (1,14,290.1) and benefit cost ratio (2.49) in hybrid rice. Since the finding is based on the research done in one season further trials are needed to confirm the results.

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