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Evaluation of Rice Hybrids (*Oryza sativa* L.) For Yield and its component characters

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Abstract

Analysis of variance among 25 rice hybrids was expressed significant differences for thirteen yield contributing traits viz., Days to 50% flowering, Plant height (cm), Flag leaf length (cm), Flag leaf width (cm), Number of tillers per hill, Number of panicles per hill, Panicle length (cm), Number of spikelet per panicle, Days to maturity, Biological yield per hill (g), Harvest index (%), Test weight (g), Grain yield per hill (g). This indicated the presence of substantial amount of genetic variability in the study material and there is ample scope for selection. The results showed that PCV (Phenotypic Coefficient of Variation) in general was higher than GCV (Genotypic Coefficient of Variation) for various characters. Highest PCV (Phenotypic Coefficient of Variation) and GCV (Genotypic Coefficient of Variation) were observed for number of spikelet per panicle and grain yield per hill. High estimate of heritability were observed for biological yield per hill. High genetic advance were observed for number of spikelet per panicle and biological yield per hill. High heritability was coupled with genetic advance for the traits like number of spikelet per panicle .These traits must be emphasize on during selection process in breeding programme.

Key words - Hybrid rice, Variability, Heritability and Genetic advance.

Introduction

Rice (*Oryza sativa* L.) belongs to family gramineae. Morphologically, rice is an annual grass and one of the most important crops. Globally it is grown extensively in tropical and sub-tropical regions of the world. More than half of the people on the globe depend on rice as their basic diet and generally extensively consumed in the producing countries. The average food grain production of rice in 2013 was 104.40 Million tonnes.**(Pocket Book on Agricultural Statistics 2013)** the significance of this commodity in our economy is evident from the above facts. Therefore, it is imperative to focus on the efforts needed to further improvements of its competitiveness in the international market. To meet out the ever growing domestic needs of food and enhance exports, to achieve sustainability and stabilize the rice production the need of research in varietal improvement, evaluation, modification of plant architecture and develop encourage to hybrid rice technology along with productivity.

Materials and Methods

The experiment consisted of 24 high yielding rice Hybrid collected from UPCAR, Lucknow, and one local check taken from SHAITS Allahabad during kharif 2011 represented at field experimentation centre of the Department of Genetics and Plant Breeding, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad. Trials was laid out of Randomized Block Design with three replications, spacing of 20 x 10 cm. All the recommended cultural practices were followed to raise a healthy crop. The data were analyzed by using ANOVA (Panse and Sukhatme, 1967) and the genetic parameters such as PCV and GCV were calculated by the formula given by Burton (1952), heritability broad sense (h2) by Burton and De Vane (1953), and genetic advance in percent of mean (genetic gain) were work out as suggested by Johnson et.al. (1955).

Results and discussion

Analysis of variance revealed highly significant differences among the genotypes for all the

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characters, indicating presence of high variability among the hybrid rice genotypes. Thus, there is ample scope for selection of different quantitative characters for improvement of rice. The maximum genotypic and phenotypic variation were obtained for number of spikelet per panicle, grain yield per hill, biological yield per hill, number of panicles per hill whereas, the moderate variation was observed for flag leaf length and flag leaf width .This indicated that low influence of environment Low level of genotypic variance for days to maturity, Flag leaf width and days to 50 percent flowering is indicative of stable nature of these characters. Similar findings were reported by **Ganesan *et al.* (1994) and Rao *et al.* (1996).** The Genotypic Coefficient of Variation provides a measure to compare genetic variability present in various quantitative characters. The highest value of Genotypic Coefficient of Variation was recorded for number of spikelet per panicle, grain yield per hill and low estimate for days to maturity. The higher value clearly indicated high degree of genotypic variability in these quantitative characters in rice hybrid. Similar findings were reported by **Nayak *et al.* (2002) and Vivek *et al.* (2004)**.

Heritability is a measure of extent of phenotypic variation caused by the action of genes. In the present study, high heritability was observed for traits *viz*., biological yield per hill, test weight. Whereas, panicle length was lowest heritability. High heritability of the above characters indicated that low influence of environment. High genetic advance only occurs due to additive gene action **(Panse, 1957).** High heritability coupled with genetic advance would be more useful than heritability alone. Estimate of genetic advance for different characters, it was observed for number of spikelets per panicle, followed by biological yield per hill, plant height and grain yield per hill. When both heritability and genetic advance are considered, as reported earlier by **Rema Bai *et al* . (1992)** for plant height, flag leaf area, panicle length and grain yield per hill.

Table.1 Genetic parameters for thirteen quantitative traits of 25 rice hybrids.

S. No.	Characters	$\sigma^2 g$	$\sigma^2 p$	G CV	P CV	h^2 (bs) %	GA	GA as % of mean
1.	Days to 50% flowering	9.25	11.31	3.25	3.59	81.78	5.66	6.05
2.	Plant height	69.55	108.83	7.87	9.85	64.20	13.73	12.96
3.	Flag leaf length	16.28	24.52	10.96	13.45	66.39	6.77	18.39
4.	Flag leaf width	0.02	0.03	10.23	11.27	66.66	0.29	19.12
5.	No. of tillers per hill	2.48	4.50	9.68	13.03	55.11	2.41	14.82
6.	No. of panicles per hill	2.32	5.30	11.14	16.83	43.77	2.08	15.19
7.	Panicle length	1.70	4.61	4.77	7.86	36.87	1.63	5.97
8.	No. of spikelet's per panicle	1494.50	1906.92	14.79	16.70	78.37	70.50	26.97
9.	Days to maturity	9.47	11.35	2.57	2.62	83.42	5.79	4.84
10.	Biological yield per hill	104.16	113.18	11.36	11.85	92.03	20.17	22.46
11.	Harvest index	148.86	22.09	9.88	12.05	67.27	6.51	16.70
12.	Test weight	3.01	3.51	7.66	8.28	85.75	3.31	14.61
13.	Grain yield per hill	19.34	25.03	12.53	14.26	77.30	7.96	22.69

The phenotypic coefficient of variation was higher than the genotypic coefficient of variation for all the charactersunder studied. The maximum genotypic coefficient of variation was found in number of spikelets per panicle and maximum phenotypic coefficient of variation found in number of panicles per hill. The heritability estimated in narrow sense was high for almost all the traits. Maximum heritability was observed in biological yield followed by test weight. Number of spikelet per panicle showed maximum genetic advance followed by biological yield. High heritability was coupled with genetic advance for the traits like number of spikelet per panicle .These traits must be emphasize on during selection process in breeding programme.

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