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Short communication

Genetic Parameters Studies on Exotic Rice Germplasm Lines in Coastal Region of Maharashtra

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Genetic variability is the prime requirement for breeding programme. An understanding of the nature and magnitude of genetic variation present in the germplasm lines and cultivated varieties is necessary before initiating a breeding programme aiming to develop high yielding varieties. The effectiveness of selection depends upon the extent of genetic variability for different characters. An attempt has been made to evaluate 53 exotic germplasm lines and one variety of rice from DBSKKV, Dapoli for twelve quantitative characters.

Fifty four genotypes of rice were grown in randomized block design with three replications during *Kharif* 2013 at Regional Agriculture Research Station, Karjat (Maharashtra) having medium black soil. Each genotype had 3 rows of 1.5 m length with spacing of 20 x 15 cm. One seedling was transplanted per hill. Fertilizer dose of 100 kg N + 50 kg P_2O_5 + 50 kg K_2O per hectare and other recommended package of practices were adopted to raise a healthy crop. Observations on five randomly selected plants were recorded for the characters *viz*. days to initiation of flowering, days to 50 % flowering, days to maturity, plant height (cm), total tillers per plant, productive tillers per plant, panicle length (cm), grains per panicle, spikelet fertility (%), 1000 grain weight (g), straw yield per plant (g) and grain yield per plant (g). Analysis of variance was done by the method as suggested by Panse and Sukhatme (1954). Genotypic and phenotypic coefficients of variation, heritability and genetic advance were studied as per the standard procedure (Burton and De Vane, 1953; Johnson *et al*., 1955).

Analysis of variance revealed significant differences among the 53 exotic germplasm lines and one variety for all the characters studied (Table 1) indicating presence of variability in the material. Estimates of genetic parameters like genotypic coefficient of variation (GCV), phenotypic coefficient of variation (PCV), heritability, genetic advance and genetic advance as per cent of mean are presented (Table 2). Maximum variation was observed for plant height (97 to 144 cm), productive tillers per plant (6.2 to 13.3), panicle length (19.6 to 28.7 cm), grains per panicle (112 to 237), 1000 grain weight (22.6 to 30.7 g) and grain yield per plant (12.4 to 39.2 g). The data suggested that a wide range of variation was

Table 1. *Analysis of variance for different characters in rice*

Characters	Mean sum of squares		
	Replication (2)	Genotypes (53)	Error (106)
Days to initiation of flowering	0.96	32.18**	2.72
Days to 50 % flowering	7.30	34.17**	2.96
Days to maturity	0.60	44.87**	4.93
Plant height (cm)	1.50	220.24**	1.25
Total tillers per plant	0.035	8.25**	1.10
Productive tillers per plant	0.33	8.09**	0.38
Panicle length (cm)	0.20	9.85**	0.83
Grains per panicle	32.64	3053.90**	235.82
Spikelet fertility %	10.31	65.98**	6.84
1000 grain weight (g)	2.21	8.98**	1.01
Straw yield per plant (g)	11.79	39.83**	3.47
Grain yield per plant (g)	0.37	118.52**	8.64

** Significant at 1%. Figures in parentheses are degrees of freedom.

Table 2. *Variability parameters for different characters in rice*

Characters	Range	Mean	GCV(%)	PCV(%)	h²b(%)	GA	GAM %
Days to initiation of flowering	89 to 104	94	3.33	3.76	78	5.71	6.07
Days to 50 % flowering	92 to 107	98	3.29	3.72	78	5.86	5.97
Days to maturity	115 to 132	123	2.96	3.46	73	6.42	5.21
Plant height (cm)	97 to 144	118	7.23	7.29	98	17.45	14.77
Total tillers per plant	9.3 to 16.6	12.8	12.04	14.56	68	2.63	20.51
Productive tillers per plant	6.2 to 13.3	9.6	16.57	17.76	87	3.08	31.83
Panicle length (cm)	19.6 to 28.7	25.8	6.71	7.58	78	3.16	12.23
Grains per panicle	112 to 237	171	17.83	19.94	80	56.45	32.83
Spikelet fertility (%)	77.3 to 95.6	88.1	5.04	5.85	74	7.88	8.94
1000 grain weight (g)	22.6 to 30.7	26.7	6.09	7.16	72	2.85	10.66
Straw yield per plant (g)	12.2 to 35.4	18.6	18.66	21.17	78	6.32	33.89
Grain yield per plant (g)	12.4 to 39.2	22.2	27.15	30.19	81	11.21	50.31

present in the genotypes for these characters. Similar results were also reported in rice by Singh *et al*. (2013), Tuwar *et al*. (2013), Bhadru *et al*. (2012) and Karim *et al*. (2007).

In general, the phenotypic variances were higher than the genotypic variances. High PCV for the characters *viz*. total tillers per plant, productive tillers per plant, grains per panicle and grain yield per plant (g) indicated that these characters were influenced by environmental factors. High GCV was observed in total tillers per plant, productive tillers per plant, grains per panicle, 1000 grain weight and grain yield per plant (g). These results are in agreement with the findings of Tuwar *et al*. (2013), Bhadru *et al*. (2012), Yadav *et al*. (2011) and Shukla *et al*. (2005).

Highest heritability was observed in days to initiation of flowering, days to 50 % flowering followed by grains per panicle, plant height (cm), 1000 grain weight (g), days to maturity and grain yield per plant (g). The high genetic advance was observed for grains per panicle, plant hight (cm), days to maturity and days to 50% flowering. High estimates of heritability along with high genetic advance as per cent of mean were observed for grains per panicle, grain yield per plant (g), productive tillers per plant, total tillers per plant and 1000 grain weight (g). Similar results were also reported by Tuwar *et al*. (2013) and Bhadru *et al*. (2012). It appeared that the above mentioned characters might exhibit predominance of additive gene effects; hence selection for these characters would be effective for the genetic improvement of yield. High heritability was accompanied with low genetic advance for the characters like days to initiation of flowering, days to 50% flowering and days to maturity which was apparently due to low PCV. High heritability and low genetic advance for such character indicated that dominance and epistatic effects were of considerable value in the inheritance of these characters.

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