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Research Notes

Correlation and regression analysis in scented rice

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The knowledge of genetic variation is important for selection in crop improvement programme. The genetic gain expected from selection depends on the amount of variability available in the quantitative traits in the germplasms of a crop. A successful selection programme depends upon the information on genetic variability and association of yield components with grain yield. Grain yield is interrelated with many of the component characters which are themselves associated with one another. Correlation studies provide better understanding of yield components which helps the plant breeder during selection (Robinson *et al.*, 1951). Considering the above mentioned aspects, the present investigation was undertaken to gather information on genetic variability and to determine inter relationships among yield and yield contributing characters in scented rice.

Seeds of twenty true breeding genotypes of scented rice comprising seven mutant lines of each of two local aromatic cultivars-Gobindabhog and Tulaipanja and their parents, two local cultivars-Kanakchur and Dudhsar of South 24 Parganas districts of West Bengal and two basmati varieties-Basmati 370 and Pusa Basmati 1 were sown during *kharif* season at Agricultural Farm, Visva-Bharati (23°39' N, 87°42' E and 58.9 m above msl). Single seedling hill^{-1} was transplanted in a randomized block design with three replications spaced 15cm between plants and 20cm between rows. Each plot consisted of 4 rows with 15 plants in each row. Observations were recorded on five randomly selected plants from each plot in each replication for twelve quantitative characters. Estimates of phenotypic and gcnotypic coefficients of variation (Burton, 1952), heritability in broad sense (Lush, 1940), genetic advance

Table 1. Mean, range, phenotypic and genotypic coefficients of variation, heritability and genetic advance for twelve quantitative characters in rice

Characters	Mean	Range		Coefficients of variation(%)		Heritability in broad sense (%)	Genetic advance as % of mean
		Min.	Max.	Phenotypic	Genotypic		
Plant height (cm)	130.50	100.87	165.07	16.34	16.11	97.1	32.70
Flag leaf length (cm)	27.80	21.80	42.83	19.51	15.79	65.5	28.33
Days to flowering	125.78	99.67	139.67	8.43	8.36	98.2	17.08
Panicle exsertion (cm)	6.81	-3.17	19.77	95.74	93.61	98.2	315.12
Panicle number / plant	12.51	8.27	17.93	23.26	20.04	74.2	35.57
Panicle length (cm)	25.95	19.07	32.30	13.40	11.90	79.0	21.81
Panicle weight (gm)	1.81	1.01	3.78	37.37	35.76	91.6	70.56
Grain length (mm)	7.27	5.43	11.17	22.61	22.45	98.6	45.94
Grain length/breadth ratio	3.19	2.22	5.11	25.50	25.18	97.5	51.10
Test weight (gm)	6.94	4.93	12.75	32.12	32.02	99.4	66.82
Harvest index (%)	28.06	22.16	39.95	20.03	16.19	65.3	26.94
Grain yield/plant (gm)	43.34	9.93	23.42	25.05	21.05	70.6	36.43

(Allard, 1940), correlation coefficient (Robinson *et al.*, 1951) and regression analysis (Draper and Smith, 1981) were done following standard statistical methods.

Information on variability in a population owing to genetic and nongenetic causes is a prerequisite for initiating a plant improvement programme. The present investigation revealed that a considerable range of variability existed for all the twelve characters studied (Table 1). High estimates of phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV) were recorded for panicle exsertion. panicle number, panicle weight, grain length, grain length/breadth ratio, test weight and grain yield per plant. Similar results had been recorded by Buu and Tuan (1991) and Tara Satyavathi *et al.*, (2001). Plant height, flag leaf length, panicle length and harvest index displayed moderate values of PCV and GCV.

The difference between the values of PCV and GCV for plant height, days to flower, panicle length, panicle weight, grain length, grain length/ breadth ratio and test weight were very low indicating that these traits were less sensitive to environmental changes and consequently, the estimates of

Table 2. Genotypic (G) and phenotypic (P) correlation coefllcients among twelve quantitative characters in rice

		Flag leaf length	Days to flowering	Panicle exsertion	Panicle number/ plant	Panicle length	Panicle weight	Grain length	Grain L/B ratio	Test weight	Harvest index	Grain yield/ plant
Plant Height	G	0.760**	-0.307*	0.534**	-0.609**	0.550**	0.647**	-0.084	-0.188	0.141	-0.242	0.318*
	P	0.610**	-0.294*	0.514**	-0.507**	0.493**	0.616**	-0.085	-0.186	0.139	-0.185	0.282*
Flag leaf length	G		-0.185	0.113	0.834**	0.594**	0.855**	0.094	0.015	0.209	-0.050	0.820**
	P		-0.140	0.134	0.405**	0.493**	0.697**	0.085	0.029	0.180	-0.057	0.589**
Days to flowering	G			-0.200	0.259*	-0.750**	-0.113	-0.780**	-0.739**	-0.766"	-0.585**	0.255*
	P			-0.205	0.199	-0.656**	-0.106	-0.767**	-0.720**	-0.755**	-0.460**	-0.208
Panicle exsertion	G				0.119	0.223	-0.056	-0.074	-0.069	-0.079	-0.035	-0.117
	P				0.110	-0.202	-0.034	-0.067	-0.064	-0.077	0.009	-0.077
Panicle number/plant	G					-0.536**	-0.911**	0.123	0.229	-0.098	-0.192	-0.542**
	P					-0.438**	-0.743**	0.106	0.199	-0.081	-0.033	-0.209
Panicle length	G						0.483**	0.456**	0.406**	0.500**	0.501 **	0.268*
	P						0.398**	0.397**	0.349**	0.450**	0.268*	0.164
Panicle weight	G							-0.113	-0.226	0.102	0.004	0.765**
	P							-0.099	-0.208	0.104	0.051	0.667**
Grain Length	G								0.973**	0.892**	0.549**	-0.161
	P								0.965**	0.887**	0.452**	-0.129
Grain I./B ratio	G									0.762**	0.591**	-0.205
	P									0.753**	0.470**	-0.162
Test weight	G										0.358**	-0.103
	P										0.298*	-0.083
Harvest index	G											0.030
	P											0.202

*, ** ; Significant at P=0.05 and 0.01, respectively.

heritability for these traits were high. Rest of the traits showed slightly greater differences in the values of PCV and GCV indicating greater role of environment for the expression of these characters.

Johnson *et al.* (1955) had suggested that heritability estimate along with genetic advance would be more useful in predicting the resultant effect of selecting the best individuals. In the present experiment, panicle exsertion, panicle weight, grain length, grain length/breadth ratio and test weight had high genetic advance accompanied by high heritability. According to Panse(1957), this association would indicate that additive gene effects were probably more important for the expression of these characters. Phenotypic selection would, therefore, be more effective in improving these traits. Manna and Sasmal (2000) had also reported high heritability and genetic advance for grain length and grain weight. Panicle number and grain yield had high heritability and high to moderate values of genetic gain along with high PCV and GCV. Therefore, there is a scope of improvement of these traits through selection.

Knowledge on significant correlation of characters can be used as a tool for indirect selection. The results on genotypic and phenotypic correlations (Table 2) indicated that grain yield per plant had positive and significant correlations with plant height, flag leaf length and panicle weight at both genotypic and phenotypic levels, while days to flower and panicle length had positive and significant correlation at genotypic level only. These results are in conformity with Thakur *et al.*, (2000) for panicle weight and Nayak *et al.*, (2001) for plant height and panicle length. Panicle number per plant showed significant and negative correlation with grain yield at both genotypic and phenotypic levels. Similar result was reported by Gravois and McNew (1993). This trait had significant and negative correlations with most of the characters. Significant and negative correlations with grain yield at both genotypic and phenotypic levels were shown by days to flower with plant height, grain characteristics and harvest index which might arise primarily from developmentally induced relationships (Adams. 1967). In general, tall plants with higher panicle weight were related to high grain yield in this population.

Stepwise regression analysis following stepdown procedure gave the equation : Y (expected yield) = -7.96 + 0.168 (days to flower) +5.135 (Panicle weight) +0.257 (panicle length) + 0.669 (panicle number) + 0.208 (harvest index) with R^2 = 0.7902**. This indicated that days to flower, panicle weight, panicle length, panicle number and harvest index jointly accounted for 79% variation in grain yield in this population.

From the above results on different genetic parameters used in this investigation, it appears that selection of medium plant height, moderate number of panicles, higher panicle weight and long panicle would be more effective for improving grain yield in this population of scented rice.

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Research Notes

Performance of ICGV 92093 Groundnut culture for *rabi*-summer season in Tamil Nadu.

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In Tamil Nadu groundnut is having an area of 9.58 lakh hectares with the production of 14.41 lakh tonnes and the productivity of 1504 kg/ha. All India area coverage under groundnut is 228.49 lakh hectares with a production of 207.34 lakh tonnes and the productivity of 907 kg/ha. In our state, nearly 15-22% of the area under groundnut is irrigated