

## GENETIC EVALUATION OF PRE-RELEASE CULTURES AND VARIETIES OF RICE FOR YIELD, SHEATH BLIGHT AND SHEATH ROT DISEASES

The total phenotypic variability in any crop may be due to the combined effect of heritable and non-heritable components. Information on the heritable components by estimating heritability and the expected genetic advance due to selection will give an idea about the component characters that can be used for selection programmes. A knowledge on the magnitude and sign of the genotypic correlation helps the breeder in judging how the improvement in one character will result simultaneous improvement or decline in the other character. The present study was undertaken to estimate the genetic parameters of grain yield and its components and the association of grain yield with sheath blight and sheath rot diseases in pre-release cultures and varieties of rice.

Fifteen entries (6 pre-release cultures and 9 released varieties) of rice were evaluated in a randomised complete block design with three replications during kharif season, at the College of Agriculture, Vellayani, Thiruvananthapuram. Observations on duration to 50% flowering (days), height of the plant (cm), number of productive tillers, 1000-grain weight (g), sheath blight and sheath rot disease scores (SES system, IRRI, 1976) were recorded from a random sample of 5 plant in each plot and the mean values recorded. Grain yield was estimated on plot basis. The data were subjected to statistical analysis. The genotypic and phenotypic coefficient of variation (gcv and pcv) were estimated as suggested by Burton (1959). Heritability in the broad sense

( $h^2$ ) and genetic advance (ga) were estimated as per Allard (1960). The genotypic and phenotypic correlations of grain yield and other characters were estimated as per Al Jibouri *et al.* (1958).

The analysis of variance revealed significant differences in respect of all the characters studied. The genotypic and phenotypic coefficients of variation, heritability in broad sense and genetic advance along with mean values of the character are presented in Table 1. The high genotypic coefficients of variation for sheath blight and sheath rot disease scores indicate high amount of genetic variability for the disease and the possibility of selecting disease resistant/tolerant varieties from the genotypes under study. The duration to 50% flowering and height of the plant recorded high heritability (96.22 and 94.08%) and genetic advance (23.75 and 34.09%). This is in agreement with the reports of Singh *et al.* (1986) and Chauhan *et al.* (1986). High heritability and genetic advance in the above characters indicate additive gene action (Panse, 1957) and reliability of these characters during selection programmes for increasing the yield. The characters like number of productive tillers, grain yield and 1000-grain weight recorded moderate to high heritability and low genetic advance in agreement to the results obtained by Sree Rangasamy and Murugesan (1973). The moderate to high heritability and low genetic advance may be due to dominance and epistatic effects (Paramasivam, 1986). Low heritability estimates recorded for sheath blight and sheath rot diseases

Table 1. Mean and genetic parameters of seven characters in pre-release cultures and varieties of rice

Sl. No.	Character	Mean	Variance		Coefficients of variation		Heritability in broad sense	Genetic advance as percentage of mean
			Phenotypic	Genotypic	Phenotypic	Genotypic		
1	Duration to 50% flowering (days)	99.00	143.51	138.09	12.06	11.83	96.22	23.75
2	Height of the plant (cm)	88.41	309.39	291.08	19.90	19.30	94.80	34.09
3	Number of productive tillers	8.43	4.55	2.28	25.33	17.91	50.02	2.20
4	1000-grain weight (g)	33.25	11.41	10.67	10.16	9.82	93.51	6.51
5	Sheath blight disease score	2.67	2.04	0.89	53.41	35.27	43.61	1.28
6	Sheath rot disease score	0.46	0.35	0.16	128.91	87.33	45.90	0.56
7	Grain yield (t/ha)	2.60	0.71	0.44	32.41	24.44	61.64	1.07

Table 2. Genotypic and phenotypic correlations of grain yield and its components and sheath blight and sheath rot disease scores in pre-release cultures and varieties of rice

Character	Sheath blight score	Sheath rot score	Duration to 50% flowering	Height of the plant	Number of productive tillers	1000-grain weight	Grain yield
Sheath blight score	-	0.026	-0.168	-0.271	-0.145	0.085	-0.263
Sheath rot score	0.059	-	-0.237	-0.301	-0.128	-0.054	-0.015
Duration to 50% flowering	-0.215	-0.365	-	0.129	0.669	-0.124	0.488
Height of the plant	-0.528	-0.527	0.121	-	0.192	0.014	-0.038
Number of productive tillers	-0.268	-0.324	0.436	0.252	-	-0.413	0.374
1000-grain weight	0.195	-0.093	-0.116	0.031	-0.564	-	-0.062
Grain yield	-0.346	-0.188	0.638	-0.045	0.749	-0.144	-

Phenotypic correlations are given in the upper diagonal

Genotypic correlations are given in the lower diagonal

indicate that the environment has an important role in the expression of the diseases.

The genotypic and phenotypic correlation between grain yield with six other characters and their *inter-se* associations are presented in Table 2. The grain yield showed positive genotypic correlations with duration up to 50% flowering (0.638) and number of productive tillers (0.749). This is in conformity with the results of Chauhan *et al.* (1986) and suggests that selection based on any one of the above components will result in a simultaneous increase in grain yield.

Sheath blight and sheath rot diseases recorded negative genotypic correlations with grain yield, indicating that increasing the disease incidence will result in a reduction in grain yield. The results of the study suggest that selection of dwarf types with medium duration and more number of productive tillers will result in higher grain yield.

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College of Agriculture  
Vellayani 695 522, Trivandrum, India

S.G.Sreekumar  
V.Gopinathan Nair  
R.Balakrishnan Asan  
P.Manikantan Nair

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