Short Communications

Phenotypic stability for grain yield in promising lines of rice (*Oryza sativa*)

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In Tripura, rice (*Oryza sativa* L.) crop is grown during the *kharif* or wet season (June–December) and occupies largest area. Year-to-year fluctuations in yield were high even within a location. An attempt was made to study stability parameters of promising lines (fixed).

Ten newly developed rice lines ('TRC 53-1389', 'TRC 40-8832', 'TRC 216-14', 'TRC 53-34', 'CR 149-5010-228' ('IET 5882'), 'TRC 41-76', 'TRC 215-312A', 'TRC 41-2814E', 'TRC 51-171' and 'Pijum') were grown during the rainy seasons of 1986, 1987 and 1988. Experiment was conducted in randomized block design with 3 replications in each year. The plot size was 10 m^2 and fertilizer was applied @ 80 kg N, 40 kg P and 40 kg K/ha. The stability parameters were worked out for grain yield (Eberhart and Russell 1966).

Pooled analysis of variance for grain yield revealed significant differences among the lines and the environments, indicating enough variability among the fixed lines as well as environments (Table 1). The significant line × environment interaction indicates that the lines showed different reactions in different years. This confirms the findings of Sinha and Biswas (1984), Sinha and Biswas (1986) and Jaggi *et al.* (1988).

Both linear and non-linear components

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Table 1 Pooled analysis of variance for grain yield of promising lines of rice during 1986–1988

Source	df	MSS
Total	29	1.8211**
Lines (G)	9	3.5337**+
Environments (E)	2	2.5606**
G × E	18	0.8827**
Environment + (variety × environment)	20	1.0505**
Environment (linear)	1	5.1218**
Variety × environment (linear)	9	0.5884**
Pooled deviation	10	1.0593**
Pooled error	60	0.0931

*P = 0.05, **P = 0.01 (with pooled error), +P = 0.05 (with pooled deviation)

were important. Eberhart and Russell (1966) suggested that both linear and non-linear components of genotype × environment interactions should be used in judging the stability of different varieties. The value of 'b' (regression coefficient) was different for different genotypes, indicating their differential response to changing environments (Table 2). The coefficients of regression were either more or less than 1 in all the lines except 'Pijum'. 'CR 149-5010-228' ('IET 5882') showed good stability because it recorded high mean yield, least deviation from regression and average regression coefficient. Next in order was 'Pijum' a local variety. 'Pijum' is the most popular local variety for the rainy season in

Table 2 Stability parameters for yield in promising lines of rice

Promising line	Cross-combination	Mean yield of 3 years (tonnes/ha)	bi	Sd-²
'TRC 53-1389'	'BG 90-2' × 'PR 106-1'	5.96	2.4292	0.9743**
'TRC 40-8832'	'BG 90-2' × 'IR 4570-74'	5.71	2.0949	1.0066**
'TRC 216-14'	'IR 42' × 'IR 13168'	5.27	2.7612	0.0330
'TRC 53-34'	'BG 90-2' × 'PR 106'	4.76	0.2739	1.1662**
'CR 149-5010-228' ('IET 5882')	'CR 63-5218' × 'Pankaj'	4.25	0.7207	0
'TRC 41-76'	'BG 90-2' × 'IR 4570-124'	3.61	−0.3174	5.7717**
'TRC 215-312A'	'IR 42' × 'BKN 6809-74'	3.29	0.4551	0.9155**
'TRC 41-2814E'	'BG 90-2' × 'IR 4570-124'	3.28	0.2336	0
'TRC 51-171'	'BG 90-2' × 'IR 2123'	3.12	0.1331	0
'Pizum' (local)		3.36	1.2311	0
Mean		4.25	1.0015	
CD (P = 0.05)		1.16		

Tripura because of its high stability under low input management. 'TRC 53-1389', 'TRC 40-8832' and 'TRC 216-14' had high mean yield and non-significant deviation from regression but their regression coefficient were very high, suggesting their sensitivity to environmental changes, ie lines were sensitive to intermittent floods, drought or other environmental hazards. However they gave higher yield when the seasons were favourable.

'TRC 53-34' had high mean performance with low regression value but recorded significant deviation from regression, indicating that its performance cannot be predicted. 'TRC 215-312 A' recorded low 'b' value and non-significant deviation from regression coupled with low mean yield, suggesting its homeostatic nature. 'TRC 41-76', 'TRC 51-171' and 'TRC 41-2814E' were unstable because they showed low mean performance and significant deviation from regression.

Thus 'CR 149-5010-228' ('IET 5882') may be an alternate choice for 'Pizum' for wide cultivation in the state for the rainy season. 'TRC 216-14', 'TRC 40-8832' and 'TRC 53-1389' may be considered only for ideal environments.

REFERENCES

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