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Studies on stability analysis in upland rice (*Oryza sativa*)

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ABSTRACT

A set of nine promising varieties of rice were evaluated for three consecutive years (2003-05) at Research Station Jagdalpur situated in Bastar plateau zone of Chhattisgarh state of India under Upland rice Shuttle Breeding network Project. The layout of the trial was in RBD with three replications. Variety 'Anjali' is found suitable for all environments due to low mean square deviation from regression function and regression value close to unity. Higher grain yield was recorded by Anjali (25.14q/ha) followed by Annada (24.73q/ha), Ashoka 200F (23.68q/ha), Ashoka 228 (22.24q/ha), Poornima (21.66q/ha) and Danteshwari (21.47q/ha). The varieties Danteshwari and Poornima can be grouped as highly responsive varieties and suitable for favorable environments, since their bi values (2.79, 2.71, respectively) exceeded unity.

Key words : Rice, Stability, Analysis and variance

INTRODUCTION

A Phenotype is the interplay of genotype and environment. A specific genotype does not exhibit the same phenotype under the changing environments and different genotypes respond differently to a specific environment. The existance of interaction between genotype and environment has been recognized by Fisher and Mackenzie (1923). In present investigation, the approach suggested by Eberhart and Russell (1966) has been employed to understand the differential G x E interactions of varieties to assess the stability of the performance of different genotypes.

MATERIALS AND METHODS

The material for the investigation comprised nine upland rice varieties. The experiment was conducted in the *kharif* season for three consecutive years *i.e.* 2003-05. Data was recorded in each plot for grain yield (kg/ha.). Data was subjected to stability analysis following Eberhart and Russell (1966).

RESULTS AND DISCUSSION

The pooled analysis for variance revealed that the mean square of the genotypes as well as the environments were significant for grain yield, when tested against both the pooled deviation and pooled error (Table 2), indicating genetic control of response to environments and independent nature of genetic system in controlling stability response. The significance of mean squares due to G x E for grain yield indicated that genotype interacted significantly with the environments. The linear response to environments also differed significantly, when tested against pooled deviation and pooled error revealing the importance of additive environmental variance. It also indicated that the simulated environments, selected for testing of genotype, varied in their effects on the

Table 1 : Parameters of stability for grain yield in rice

Sr. No.	Genotype	Mean yield (q/ha.)	bi	S^2di
1.	Ashoka 228	22.24	0.62	29.29**
2.	Ashoka 200 F	23.68	0.57	35.30**
3.	Vandana	20.16	0.74	38.45**
4.	Anjali	25.14	0.90	6.84
5.	Danteswari	21.47	2.79	134.34**
6.	Poornima	21.67	2.71	93.37**
7.	Narender -97	18.91	0.06	2.13
8.	Annada	24.73	0.29	0.63
9.	Heera	13.54	0.43	1.36
	Mean	21.28	1.01	0.46

* and ** indicates significance of values at P=0.05 and 0.01, respectively

Table 2 : Pooled analysis of variance for grain yield in rice

Sr. No.	Source	d.f.	S.S.	M.S.
1.	Total	26	931.70	-
2.	Genotype (G)	8	301.31	37.66*
3.	Environment (E) +(GXE)	18	630.39	35.02*
4.	Environment (Linear)	1	148.52	148.52**
5.	G x E (Linear)	8	140.15	17.51
6.	Pooled deviation	9	71.64	7.96**
7.	Pooled error	54	-	2.401

* and ** indicates significance of values at P=0.05 and 0.01, respectively

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