Indian J. Pl. Genet. Resources 8(2): 279-281, 1995; Special Issue (3)
Short Communication

RICE BEAN : GERMPLASM EVALUATION UNDER TEMPERATE CONDITIONS

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Key words : Ricebean, evaluation, stability analysis

Ricebean [*Vigna umbellata* (Thunb.) Ohwi & Ohashi] has considerable high potential for grain yield. The seed protein varies from 18 to 23 per cnet. Collection of germplasm can be of use to increase the available genetic variability which can be effectively used either by crossing with currently used germplasm or by selecting for local conditions. High genetic variation exists in Indian collections for pod and seed characters. Ricebean seeds possess remarkable storage quality without much being infested by bruchids.

Germplasm evaluation and stability analysis

The evaluation of 300 indigenous and exotic germplasm collections of ricebean for 14 economically important characters during 1985-92 led to identification of some promising accessions as mentioned below:

Bold and Heavy Seeds	:	IC-18453, IC-12436 (100 seed wt = 8.84 g)
Early maturity	:	IC-18454 (129 days)
Long pods	:	IC-12436 (10.50 cm)
High yielding & stable lines	:	R-49, RB 40

The crop is highly sensitive to environmental fluctuations. Hence, an experiment was also conducted to work out the extent of G × E interaction to isolate high yielding stable genotypes that may be used either as a variety or as a donor parent in a breeding programme. The 11 genotypes of rice bean viz RB-4, RB- 56, C × M_8 P_2, RB-40, RB-49, C × M_{12} P_3, RB-26, RB-39, RB-17, RB-53, RB-32 were grown under randomized block design with 3 replications during the rainy season of 1988-91. Data were recorded on 5 random plants

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Table 1. Estimates of mean and stability parameters in 11 genotypes of ricebean

Line	Clusters/plant			Pod length(cm)			Pods/plant			Yield/plant (g)		
	Mean	bi	S^2di	Mean	bi	S^2di	Mean	bi	S^2di	Mean	bi	S^2di
'RB 4'	12.10^{abc}	1.05†	–0.78	0.09	0.09†	–0.15	47.58cde	1.16†	71.82††	17.73bc	1.13†	–2.32
'RB 56'	12.54^{a}	1.00†	0.16	9.08^{bc}	1.10†	–0.20	52.28ab	1.14†	–19.55	19.33ab	1.39	–3.58
'C×$M_{12}P_3$	11.00^{cd}	0.90†	–0.48	9.01^{bcd}	1.02†	–0.22	46.03def	0.65	–6.05	16.70^{cd}	0.87†	5.70††
'RB 40'	12.68^{a}	0.89†	0.96	9.33^{ab}	1.10†	0.14	51.98ab	1/27	–9.70	20.40^{a}	1.12†	–3.69
'RB 49'	12.06^{abc}	1.03†	–3.27	9.60^{a}	0.94†	–0.029	48.18bcd	1.14†	14.16	19.89a	1.14†	–1.97
C×M_8P_2	12.65^{a}	1.27	1.72	9.06^{bc}	0.85†	1.49††	51.23abc	1.59	105.75††	20.68a	0.87†	6.04††
'RB 26'	12.13^{ab}	1.01†	0.65	8.82^{cd}	1.11†	–0.02	50.28abcd	1.01†	–7.89	10.29ab	0.48	–2.94
'RB 39'	12.76^{a}	1.19†	1.40	9.09^{bc}	1.07†	–0.05	52.63a	1.09†	53.92	17.61c	1.10†	14.94††
'RB 17'	11.39^{bcd}	0.50	0.80	8.57^{d}	0.89†	–0.26	42.40f	0.37	24.48	15.67^{d}	0.88†	–3.65
'RB 53'	12.20^{ab}	1.26	1.56	8.94^{bcd}	0.63	0.69††	48.25bcd	1.07†	34.81	18.20	1.09†	8.92††
'RB 32'	10.58^{d}	0.91†	0.62	9.20^{abc}	1.39	–0.15	43.25^{ef}	0.51	–14.60	16.85	0.91†	–2.14
Mean	12.02		9.20		48.55		18.40					
r(x, bi)	0.54		0.24		0.63		0.21					
r(x, S^2di)	0.21		–0.05		0.17		–0.10					
r(b, S^2di)	0.16		–0.46		0.50		–0.12					

Figures for mean followed by same letter are not significantly different from each other, according to Duncan's Multiple Range Test at P = 0.05
r, Correlation coefficient; bi, regression coefficient, S^2 deviation from regression

for clusters per plant, pods per plant, pod length, yield per plant at maturity. Average data of 5 plants was utilized for statistical analysis. The stability parameters were worked out. Environment (year) were analysis of variance revealed that significant differences existed among genotypes under each environment for clusters per plant, pods per plant, pod length, and yield per plant. The pooled analysis of variance also revealed significant differences among genotypes and environments indicating the presence of genetic variability among the genotypes. Highly significant mean squares due ot environment + (G × E) interactions suggested that the genotypes interacted considerably with environmental conditions. A major portion of these interactions could be attributed to the linear component, indicating that the prediction of seed yield was possible in the environments. Though the pooled deviations were not significant for all the characters, the genotypes C × M_8P_2 showed significant deviation from regression for all the characters except for clusters/plant. It indicates that both (linear) and non-predictable (non-linear) components contributed significantly to the differences in stability among genotypes. Considering all the characters simultaneously, the genotypes RB-49 and RB-40 appeared promising and could either be used as a variety perse or as a donor in hybridization programme for breeding high yielding stable varieites. The co-relation coefficients (r) among 3 parameters (mean, b_i and Sd_i) indicated no significant association among these parameters (Table 1) indicating the involvement of different genetic system in the control of these 4 parameters. Hence, all the 3 parameters may be taken into account while breeding for stable varieties of ricebean. The simple use of mean values as suggested in other crops (Sanghi and Kandalkar, 1983) may not be useful in ricebean.

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