



Research Article

Phenotypic stability for fruit yield and its components in rainy season brinjal (*Solanum melongena* L.) of Chhattisgarh plains

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Abstract:

Seven open pollinated genotypes of long brinjal were evaluated in three environments under rainy season and irrigated situations for Chhattisgarh plains. Data analyzed for stability parameters and highly significant mean squares were observed for genotypes, genotype x environment interaction and environment (linear). IBW1-2007-1 was the most stable genotype under irrigated condition of Chhattisgarh plains for *kharif* planting situations as it had high mean, regression coefficient not deviated from unity and non significant deviation from regression. Whereas, a local genotypes was suitable for fruit yield under low yielding environment.

Key words:- G x E Interaction, egg plant, fruit yield, stability

Introduction

Any genotype possessing considerably high yield potential coupled with stable performance in different environments has great value in plant breeding programme. Open pollinated long brinjal (*Solanum melongena* L.) is very important solanaceous vegetable for tribal and urban areas which is mostly grown under irrigated conditions in Chhattisgarh state. In general, genotype of this crop experience high fluctuations of climate in Chhattisgarh, for example, heavy monsoon rainfall to intermittent drought resulting in low yield. In this context an attempt was made to identify promising genotype with stable performance for fruit yield and its components under irrigated conditions for Chhattisgarh plains.

Material and Methods

Seven promising open pollinated long brinjal genotypes were grown in randomly block design with three replications during *kharif* of 2007-08, 2008-09 and 2009-10 under irrigated conditions. Each plot consists of 5 rows of 5.0 m length spaced 60 cm apart. Fertilizer dosage with i.e. recommended dose of brinjal for trials 120: 80: 60 N₂O: P₂O₅: K₂O per hectare was applied and normal package of practices were followed. Data were recorded on four yield attributes. They were plant height(cm), days to first flowering, fruit weight(gm) and fruit yield per

plant.(because these four traits are much more important & decide market.) For computation of stability parameters pooled analysis over environments was carried out following the regression approach of Eberhart and Russell (1966).

Results and Discussion

Pooled analysis of variance indicated significant differences among genotypes for all the characters under stability revealing the presence of sufficient variability in the genetic material. Significant mean squares due to environment + genotype x environment interaction showed differential response of genotypes with respect to environments. Both linear and non linear components of G x E interaction were significant for plant height, fruit weight and Days to first flowering indicating that the genotypes responded linearly to the environmental changes in respect of these traits. In case of fruit yield, linear component was significant, suggesting that its performance on the environments can be predicted more precisely. These results were in agreement with the previous observations in brinjal of Suneetha *et al.* (2006), Kumar *et al.* (2008) and Vaddoaria *et al.* (2009a).

Estimates of mean performance (\bar{x}), regression coefficient (b_i) and deviation from regression (S^2_{di}) of seven genotypes for fruit yield, plant height, days to first flowering and fruit weight are presented in

Table 2. Simultaneously consideration of three parameters revealed that genotype IBWL-2007-1 had mean performance with unit regression and least deviation from regression for all the characters. Similar results were observed in genotype Punjab Sadabahar for fruit yield, fruit weight and days to first flowering whereas local genotype for fruit yield and fruit weight only.

Stable genotype is very much important for sustainable vegetable production hence, it is desirable to identify genotype suitable for different environmental conditions. Therefore, in the present investigation a classification was tried based on the concept of Eberhart and Russell (1966). The genotype with high mean performance and deviation from regression approaching zero ($S^2_{di} = 0$) are categorized under medium yielding ($b=1$) and low yielding ($b<1$) environments. The results indicated that amongst the genotypes IBWL- 2007-1 and Punjab Sadabahar found suitable for medium yielding environment. These genotypes were superior due to its suitability for all the traits studied. This findings are in accordance with the findings of Vadodariya (2009b).

On the other hand local genotype proved better in low yielding environment for fruit yield and fruit weight. Based on the present investigation, the genotype IBWL-2007-1 and Punjab Sadabahar were found suitable in respect to fruit yield in medium environment conditions and thus, they can be used in future breeding programme for further improvement and therefore, these genotypes are specially suitable for rainy (*kharij*) planting situation of Chhattisgarh plains under irrigated conditions.

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Table 1: Pooled analysis (mean squares) of variances for grain yield and its components in rainy (Kharif) planting long brinjal (*Solanum melongena* L.)

Sources	D.F.	Fruit yield (q/ha)	Plant height (cm)	Days to 1 st flowering	Fruit weight (g)
Genotypes	6	60.6**	593**	6132**	439**
Years	3	143.9**	2319**	2109**	1143**
Genotypes x Years	18	3201**	768**	393**	383**
Year (linear)	1	213.1**	3216.3**	2196**	1104**
Genotypes x Year (linear)	6	32.2	523	421	323
Pooled deviation	7	15.1	91	63	54
Pooled error	41	9.3	16.3	11.3	18.3

* Significant at P = 0.05 level ** Significant at P = 0.01 level

Table 2 : Stability parameters of fruit yield and its components in long brinjal open pollinated genotypes.

Genotype	Fruit yield (Q/ ha)			Plant height (cm)			Days to 1 st flowering			Fruit weight (g)		
	Mean	bi	S ² di	Mean	bi	S ² di	Mean	bi	S ² di	Mean	bi	S ² di
PB- 71	252	1.57	-57.3*	72	1.27	49.2	69	1.77	72.3*	65	1.81	113.6**
IBWL-2007-1	280	1.02	7.7	76	0.90	9.3	66	0.93	9.9	60	0.97	11.4
Megha Brinjal-2	256	1.67	59.3*	1	1.41	55.4	75	1.31	54.1*	58	1.93	87.3**
BCB-11	240	0.67	43.0*	65	1.59	63.3**	69	0.88	49.1*	56	1.91	89.3**
KSS-331 ©	254	1.69	58.4*	69	1.63	69.8**	68	1.79	81.4**	59	1.51	70.7
Punjab Sadabahar ©	270	1.09	9.2	81	0.89	11.1	67	1.21	10.3	81	0.91	12.3
Local (c)	263	1.10	11.0	63	0.93	15.3	72	1.19	11.3	70	1.2	14.4
Mean	259.3	-	-	72.4	-	-	69.7	-	-	64.1	-	-
SEm	18.5	-	-	11.5	-	-	5.2	-	-	16.3	-	-
Se (b)	-	-	-	-	-	-	-	-	-	-	-	-
CD (0.05%)	16.16	0.52	-	8.7	-	-	5.4	-	-	11.5	-	-
CV (%)	7.07	-	-	9.3	0.63	-	10.3	-	-	11.5	-	-

* Significant at P = 0.05 level ** Significant at P = 0.01 level