

Genetic variability Studies for Yield and Yield Attributing Traits in F₂ Generation of Brinjal

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ABSTRACT: The mean, range, phenotypic coefficient of variation (PCV), Genotypic coefficient of variation (GCV), heritability, genetic advance and genetic advance as per cent of mean were worked for the selection superior crosses in the F₂ generation. The PCV and GCV were high for the characters like Number of flowers per inflorescence, Number of fruits per cluster and Fruit length to fruit girth ratio. The heritability (broad sense) was found high for the characters studied *i.e.*, Number of flowers per inflorescence (88.50%), Number of fruits per cluster (99.87%), days to first harvesting (99.72%), fruit girth (96.79), fruit weight (99.87%), Fruit length to fruit girth ratio (98.84%), number of seeds for fruit (99.87%) and test weight of seeds (99.81%). The genetic advance was high for fruit weight (37.12%), Fruit length to fruit girth ratio (164.72%) and the GAM were high for the characters like Number of flowers per inflorescence, Number of fruits per cluster, days to first harvesting, fruit weight and fruit length to fruit girth ratio.

Keywords: Brinjal, PCV, GCV, heritability, genetic advance and GAM.

INTRODUCTION

Brinjal (*Solanum melongena* L.) is native of India and belonging to family Solanaceae, is one of the most popularly grown in India and other parts of the world. *Solanum* is a very large genus and among the 22 Indian species of brinjal all are diploid with somatic chromosome number $2n = 2x = 24$. It is highly productive and usually referred as the poor man's crop. Basically, it is self pollinated crop but cross pollination also reported as high as 29 per cent due to heterostyly condition and hence it is called as often-cross pollinated or facultative-cross pollinated crop. Greater the variability in a population, more will be chance for effective selection for desirable types (Vavilov, 1951). Evaluation of the brinjal genotypes is necessary to know the performance in terms of yield and for the future selection of genotypes. The genotypes selected are released as a variety or further it can be used in breeding programme.

MATERIAL AND METHODS

The present investigation was carried in COH, Venkataramannagudem, Dr. Y.S.R. Horticultural

University, West Godavari (A.P) during *kharif* 2019-20. The experiment consists of seven F₂ brinjal progenies *viz.*, Babajipet-1 × EC-169084, Tuni local × EC-169089, EC-169084 × Bhagyamati, EC-169089 × Pennada, Babajipet-1 × Babajipet-2, EC 169084 × Pennada and Babajipet-2 × EC-169084. The present investigation was carried out with the objective of selecting superior genotypes for economically important traits and to assess the effectiveness of selection by estimating per cent genetic gain and to study the effect of selection on other genetic parameters. Parameters of variability and Heritability can be calculated using formulae specified by Burton and Devane (1953) and Allard (1960). The genetic advance was calculated by formulae given by Allard (1960) and the GAM calculated using the formulae given by Johnson *et al.* (1955).

RESULTS AND DISCUSSION

Among various variability parameters, high PCV and GCV were observed in traits Number of flowers per inflorescence, Number of fruits per cluster and Fruit length to fruit girth ratio indicating that more variations

and resulted good scope for crop improvement by selection. Similar results were observed Divya Arti and Sharma (2018) for Number of flowers per inflorescence, Number of fruits per cluster and Fruit length to fruit girth ratio in brinjal. Moderate PCV and GCV were found in traits Number of primary branches, Fruit girth(cm) and fruit weight. These finding are similar to Balas *et al.* (2019) for Number of primary

branches, fruit girth in brinjal. Whereas, low PCV and GCV were recorded in plant height, days to first harvesting, number of seeds per fruit and test weight of seed. These results were in conformity with Balas *et al.* (2019) for days to first harvesting, number of seeds for fruit in brinjal, Priyanka *et al.* (2018) for test weight of seed in brinjal.

Sr. No.	Character	Mean	Range	PCV	GCV	Heritability (%)	GA at 5%	GAM at 5%
			Min-Max					
1.	Number of primary branches	9.09	7.86-10.13	12.49	8.73	48.9	1.14	12.59
2.	Number of flowers/inflorescence	5.88	3.70-8.72	30.3	28.51	88.5	3.35	55.26
3.	Number of fruits per cluster	2.48	1.50-3.50	26.48	26.41	99.87	1.35	54.38
4.	Days to first harvesting	53	47.80-61.00	7.84	7.83	99.72	8.54	16.11
5.	Fruit girth(cm)	18.34	15.40-21.80	11.73	11.72	96.79	4.42	24.12
6.	Fruit weight(g)	97.97	68.60-124.89	18.41	18.4	99.87	37.12	37.89
7.	Fruit length to fruit girth ratio	0.8	0.53-1.04	21.57	21.55	98.84	0.35	44.36
8.	Number of seeds per fruit	949.62	855.00-1072.90	8.43	8.42	99.87	164.72	17.34
9.	Test weight of seed (1000)	12.26	11.73-14.20	7.07	7.06	99.81	1.78	14.54

All the parameters exhibited high level of heritability (88.50% to 99.87%). High level of heritability for various traits indicates that vast proportion of phenotypic variance was aspect to genotypic variance and therefore, selection could be made in this traits on the measure of phenotypic expression. These results were in conformity with Jyothi *et al.* (2019) for plant height, days to first harvesting, number of seeds per fruit and test weight of seed in brinjal. Balas *et al.* (2018); Divya Arti and Sharma (2018) for number of fruits per cluster and Ramesh *et al.* (2013) for fruit length to fruit girth ratio.

The high heritability coupled with high GA was found for fruit weight and number of seeds per fruit indicating that these traits were controlled predominantly by additive gene effect. Therefore, phenotypic selection will be useful to improve these traits in future according to Prasad *et al.* (2004). High heritability along with greater GAM was found for Number of flowers per inflorescence, Number of fruits per cluster, fruit weight and fruit girth, indicates that these traits were also controlled by additive gene and selection might be useful for further improvement. These findings were in accordance with Divya Arti and Sharma (2018) for Number of flowers per inflorescence, Number of fruits per cluster, fruit weight in brinjal. The cross EC-169084 × Bhagyamati cross also recorded the highest Number of flowers per inflorescence, number of fruits per cluster, The cross Tuni local × EC-169089 recorded the highest average fruit weight and moderate value for number of fruits per cluster and days to first harvest in F₂ generation.

CONCLUSION

High level of PCV and GCV values were observed for number of fruits per cluster, fruit length to fruit girth ratio in F₂ generation indicates that high level variability present in progenies for these traits for further improvement. The minimum difference observed between PCV and GCV values indicates that, these traits were less influenced by environment and these characters might be improved by phenotypic selection in future generations. High heritability along

with GAM were noted in characters like number of fruits per cluster, number of flowers per inflorescence, average fruit weight, fruit girth, fruit length to girth ratio in F₂ generation indicates the additive gene action on these traits and selection might be done for enhancement of such traits through pure line method, mass selection, progeny selection, hybridization and selection followed by pedigree breeding.

Heritability was high in F₂ generation for most of the traits *viz.*, number of flowers per inflorescence, number of fruits per cluster, fruit girth, fruit length to girth ratio, average fruit weight, days to first harvesting, number of seeds per fruit, 1000 seed weight.

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Conflict of Interest. None.

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