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Research Notes

Variability and Heritability in Segregating Generation of Eggplant *(Solanum melongena* L.)

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By resorting to hybridization, attempts are being made to widen the variability and to evolve high yielding genotypes. Inheritance of yield is governed by polygenes, which include heritable and non-heritable variations. Estimates of heritability along with genetic advance are helpful to breeder in exercising the selection effectively. The present study was undertaken to evaluate F_4 segregating population of the four interspecific crosses to assess the magnitude of variability and to understand heritable component of variation in eggplant.

The F_4 populations of four interspecific eggplant crosses *viz*., EP 45 x *Solamun viarum* (cross A), EP 65 x *S. viarum* (cross B), CO 2x *S.viarum* (cross C) and MDU 1 x *S. viarum* (cross D) were raised at college orchard, Tamil Nadu Agricultural University, Coimbatore in a randomized block design and replicated thrice. In each replication, there were 30 plants per cross raised at a spacing of 60 x 60 cm during March 2003. The observations on the characters namely, plant height, number of branches per plant, mean fruit weight, fruit length, fruit girth, number of fruits per plant, fruit borer infestation, shoot borer infestation, calyx length and marketable yield per plant were recorded on individual plant basis. Phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV) were calculated by following the method of Burton (1952). Heritability estimates as per the method of Lush (1940) and genetic advance as per the method of Johnson *et al.* (1955) were calculated.

The GCV and PCV, heritability and genetic advance as per cent of mean for various

Table 1. Genotypic parameters in interspecific crosses

Characters	F_4 EP 45 x *S. viarum*				F_4 EP 65 x *S. viarum*			
	GCV (%)	PCV (%)	Heritability (%)	GA as per cent of mean	GCV (%)	PCV (%)	Heritability (%)	GA as per cent of mean
Plant height	8.17	9.03	81.75	15.22	8.61	9.64	79.77	15.83
Branches plant^{-1}	7.96	9.29	73.44	14.05	15.24	15.97	91.14	29.98
Mean fruit weight	6.17	6.95	78.77	11.28	5.96	8.28	51.88	8.85
Fruit length	10.50	11.49	83.58	19.78	9.14	10.29	78.91	16.72
Fruit girth	8.71	9.62	82.10	16.26	6.64	7.78	72.94	11.69
Calyx length	7.99	10.71	55.63	12.27	5.76	7.75	55.34	8.83
Fruit number plant^{-1}	7.05	8.03	77.15	12.75	6.03	7.13	71.43	10.49
Fruit borer infestation	13.18	14.65	80.99	24.43	14.17	15.31	85.70	27.02
Shoot borer infestation	16.49	17.84	85.40	31.39	11.45	13.80	68.86	19.57
Marketable yield plant^{-1}	11.56	13.58	72.49	20.27	11.43	12.39	85.09	21.71

Table 1. Contd...

Characters	F_4 CO 2 x *S. viarum*				F_4 MDU 1 x *S. viarum*			
	GCV (%)	PCV (%)	Heritability (%)	GA as per cent of mean	GCV (%)	PCV (%)	Heritability (%)	GA as per cent of mean
Plant height	7.32	8.73	70.16	12.62	4.18	4.30	94.49	8.37
Branches plant^{-1}	7.09	7.89	80.78	13.13	11.93	12.84	86.30	22.84
Mean fruit weight	6.29	7.28	74.62	11.20	3.91	4.31	82.15	7.29
Fruit length	6.39	7.01	83.11	11.99	6.91	8.12	72.32	12.10
Fruit girth	6.09	6.81	79.97	11.21	8.35	9.64	75.15	14.92
Calyx length	8.97	10.17	77.74	16.28	10.92	11.72	86.88	20.97
Fruit number plant^{-1}	6.74	8.43	63.90	11.10	7.93	8.90	79.26	14.54
Fruit borer infestation	12.24	13.07	87.78	23.62	13.28	14.92	79.29	24.36
Shoot borer infestation	12.65	13.90	82.79	23.70	10.84	12.18	79.31	19.89
Marketable yield plant^{-1}	10.17	12.17	69.88	17.51	6.90	7.85	77.22	12.49

characters in the four interspecific crosses are presented in Table l. In the present study, for all the characters studied, GCV was lower than that of PCV indicating presence of environmental influence. The highest GCV estimates were recorded for shoot borer infestation (16.49 per cent) and fruit borer infestation (13.18 per cent) in cross A, number of branches per plant (15.24 per cent) and fruit borer infestation (14.17 per cent) in cross B, shoot borer infestation (12.65 percent), fruit borer infestation (12.24 per cent) and marketable yield per plant (10.17 per cent) in cross C and fruit borer infestation (13.18 per cent) in cross D.

In general, the GCV estimates were high for fruit borer infestation indicating less influence of environment on this character. The study further indicated that larger portion of phenotypic variability was compared of genetic factors. These observations are in agreement with the reports of Dhankhar and Sharma (1986) and Malik *et al.* (1986). This suggests the presence of sufficient genetic variability, which can be exploited by practising simple breeding method like pure line selection.

Heritability and genetic advance for various characters varied considerably (Table l). In the present study the estimates of heritability were found to be moderate to high for all the characters studied. High heritability with high genetic advance as per cent of mean was observed for fruit borer infestation, shoot borer infestation and marketable yield per plant in cross A, branches per plant, fruit borer infestation and marketable yield per plant in cross B, fruit borer and shoot borer infestation in cross C and branches per plant, calyx length and fruit borer infestation in cross D. High heritability with high genetic advance for yield per plant was reported by Vadivel and Babu (1993) and for fruit borer infestation was reported by Dhankhar *et al.* (1977). High heritability associated with high genetic gain indicated the predominant role of additive gene action in controlling the expression of these characters *viz*., fruit borer infestation, shoot borer infestation and marketable yield per plant in the present study. Therefore, selection based on phenotypic performance for these characters would be useful for achieving desired results.

High heritability with moderate genetic advance was observed for the characters *viz*., plant height, branches per plant, mean fruit weight, fruit length, fruit girth, number of fruits per plant in cross A, plant height, fruit length, fruit girth, number of fruits per plant and shoot borer infestation in cross B, plant height, number of branches per plant, mean fruit weight, fruit length, fruit girth, calyx length, number of fruits per plant and marketable yield per plant in cross C and fruit length, fruit girth, number of fruits per plant, shoot borer infestation and marketable yield per plant in cross D. High heritability with moderate genetic advance indicates either additive or non-additive gene action of the parents (Amirthanayagam, 2001). Mohanty (2002) reported that high heritability combined with moderate genetic advance for yield.

The present results revealed that high values of heritability with high to moderate genetic gain were manifested for different characters. This might be attributed to additive gene action conditioning their expression and phenotypic selection could be thought of. Thus explicability of yield and its important components such as branches per plant, number of fruits per plant and shoot and fruit borer infestation in brinjal could be achieved by simple methods like pure line or mass selection or bulk or single seed descent method.

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Research Notes

Variability and Heritability Analysis in Pearl millet *(Pennisetum glaucum* (L.)R. Br.)

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Pearl millet *(Pennisetum glaucum* (L.) R. Br.) is an major coarse cereal crop of India and Africa. Its importance as a source of food and feed would continue in marginal lands situated in low rainfall areas. The development of superior varieties / hybrids depends on the magnitude of genetic variability and heritability present in the source material. The extent of variability is measured by GCV and PCV which provides information about relative amount of variation in different characters. To have a better knowledge about the amount of genetic advance to be expected by phenotypic selection, genotypic coefficient