

## EVALUATION OF SELECTED F<sub>2</sub> AND PARENTAL LINES IN BRINJAL

**B**rinjal (*Solanum melongena*) is an important vegetable crop of India, with many medicinal values. For the rational improvement of yield and its components in brinjal, an understanding of the genetic parameters of yield characters is very essential.

The selfed seeds of F<sub>1</sub> plants of SM-6 x PPL, SMI-10 x PPL and PPC x PPL and the parents SM-6, SMI-10, PPC and PPL were sown. The seedlings were transplanted in pots (one seedling/pot) with sterilised potting mixture, to eliminate incidence of wilt disease. There were 48 pots arranged in four replications under each cross. The characters studied were days to first harvest, days to final harvest, plant height, fruits per plant, fruit weight per plant, fruit volume, fruit weight and weight/volume ratio. Mean and variance of each character were estimated. Correlation coefficients were worked out for pairs of characters under study and their significance tested.

In all the three crosses, there were significant differences between the parents with respect to days to first harvest. The F<sub>2</sub> means were more than the higher parental means, in all crosses (Table 1). There was high variability with two or three peaks in the F<sub>2</sub> distribution, in all the three crosses. Similar results were reported by Gotoh (1964) in brinjal which indicated four major genes contributing for duration to flowering. But Eldin *et al.* (1968), reported partial dominance of early flowering over late flowering.

The parents of all the three crosses differed significantly with respect to

days to final harvest. The F<sub>2</sub> means were beyond the upper limit of parental means in all the crosses (Table 1). However, the variance for this character was low in the F<sub>2</sub> population, suggesting limited segregation for this characters (Table 2).

In all the three crosses, the parents differed significantly with respect to plant height suggesting scope for variability in the F<sub>2</sub>. In the cross SM-6 x PPL, the F<sub>2</sub> mean was higher than the mean height of, the tall parent. But in the other two crosses F<sub>2</sub> means were close to the mid-parental mean (Table 1). This is in agreement with the findings of Vijayagopal and Sethumadhavan (1973).

Mean number of fruits per plant in parents of the crosses SM-6 x PPL and SMI-10 x PPL did not differ significantly (Table 1). So normally there is no scope for genetic variation in the F<sub>2</sub> generations of these two crosses. Apparently normal F<sub>2</sub> distribution for this character was obtained in two crosses. In the cross PPC x PPL on the other hand, the parents differed significantly with respect to the number of fruits per plant. Here the F<sub>2</sub> mean was almost the same as the mean of the lower parent (Table 1). But the F<sub>2</sub> distribution was mostly normal with slight skewness to the right (large number). In the cross SM-6 x PPL alone the parents differed significantly with respect to fruit weight per plant. In all the three F<sub>2</sub> populations the means were lower than the respective lower yielding parents (Table 1). None of the F<sub>2</sub> means was close to the means of the high yielding common male parent. In all the three crosses, the parents did not

Table 1. Means of characters studied in the varieties and F2 population

Varieties and F2 populations	Days to first harvest	Days to final harvest	Plant height (cm)	Fruits/plant	Fruit weight/plant (g)	Fruit volume (ml)	Fruit weight (g)	Weight/volume ratio
SM-6	55.2	73.0	74.0	7.2	401.0	110.0	58.0	0.52
SMI-10	61.5	74.0	95.0	6.3	494.0	130.0	85.0	0.55
PPC	54.5	81.0	95.0	20.1	662.0	97.0	46.0	0.47
PPL	42.3	64.7	57.0	10.1	738.0	137.0	80.8	0.58
SM-6 x PPL	66.5	109.0	76.0	5.5	350.0	75.0	70.0	0.93
SMI-10 x PPL	64.3	125.0	75.0	14.0	434.0	59.0	68.6	1.21
PPC x PPL	66.1	108.0	78.0	10.0	453.0	147.0	61.6	0.41
CD (0.05)	11.85	15.0	15.0	6.45	324.7	NS	29.0	0.090

NS : Not significant

Table 2. Means, variances and coefficients of variation in the F2 populations of the crosses

Characters	Means			Variances			Coefficient of variation (%)		
	1	2	3	1	2	3	1	2	3
Days to first harvest	60.7	39.6	60.5	234.2	150.0	<b>154.3</b>	25.0	21.0	24.0
Days to final harvest	89.2	95.0	91.0	64.0	121.0	<b>55.7</b>	<b>9.0</b>	<b>6.2</b>	<b>9.0</b>
Plant height (cm)	78.8	81.0	84.0	262.0	216.0	156.0	20.5	15.4	17.0
Fruits per plant	<b>8.7</b>	13.6	14.0	19.2	96.0	59.7	50.4	57.0	71.0
Fruit weight plant (g)	<b>598</b>	<b>701</b>	<b>717</b>	133047	186224	194843	61.0	62.8	60.2
Fruit volume (ml)	111.5	97.5	104.6	1540	730.5	502.5	35.0	23.0	26.0
Fruit weight (g)	79.0	70.3	<b>71.5</b>	770	494.0	340.0	34.0	26.2	31.0
Weight volume ratio	0.71	0.72	0.69	0.003	7.7	0.005	<b>8.2</b>	10.0	12.8

1 SM-6 x PPL

2 SMI-10 x PPL

3 PPC x PPL

Table 3. Correlation matrix of F2 populations of SM-6 x PPL (1) SMI-10 x PPL (2) and PPC x PPL (3)

Characters		Days to first harvest	Days to final harvest	Plant height	Fruits/plant	Fruit weight/plant	Fruit volume	Fruit weight	Weight/volume ratio
<b>Days to first harvest</b>	(1)		0.20	-0.42**	-0.47**	-0.65**	-0.33*	-0.33*	0.11
	(2)		-0.12	-0.32	-0.38*	-0.38*	-0.33*	-0.30*	-0.26
	(3)		0.13	-0.09	-0.15	-0.37*	-0.26	-0.14	0.12
Days to final harvest	(1)			0.30	0.10	0.08	0.07	0.06	0.03
	(2)			0.42**	0.45**	0.30*	0.34*	0.28	0.09
	(3)			0.46**	0.47**	0.39**	0.17	0.19	-0.02
Plant height	(1)				0.41**	0.64**	0.34	0.20	0.09
	(2)				0.34*	0.29	0.34*	0.28	-0.0002
	(3)				0.30*	0.22	0.20	0.24	0.07
Fruits/plant	(1)					0.58**	0.44"	0.34*	0.02
	(2)					0.76**	0.24	0.28	0.32*
	(3)					0.75**	0.02	0.005	-0.03
Fruit weight/plant	(1)						0.31	0.32*	-0.23
	(2)						0.35*	0.35*	0.28
	(3)						0.22	0.19	0.02
Fruit volume	(1)							0.58**	0.07
	(2)							0.96"	0.49"
	(3)							0.92*	0.21
Fruit weight	(1)								0.20
	(2)								0.65"
	(3)								0.50

\* Significant at 5%

\*\* Significant at 1%

differ significantly with respect to fruit volume indicating that there was no scope for genetic variability in the  $F_2$  population for this character. Parents in SMI-10 x PPL did not differ significantly with respect to fruit weight. In the other two crosses (SM-6 x PPL and PPC x PPL) the  $F_2$  means were close to the midparental means. Mean weight/volume ratio of the parents did not differ significantly in any of the three crosses, suggesting very little scope for genetic variability in the  $F_2$  populations. This was reflected in the coefficient of variation which was very low in the three  $F_2$  populations (Table 2). Correlation matrix of the  $F_2$  populations of the crosses SM-6 x PPL, SMI-10 x PPL and PPC x PPL is given in Table 3. Days to first harvest had significant negative correlation with yield in all the three  $F_2$  populations. It also had significant negative correlation with plant height, fruits per plant, fruit weight and fruit volume in two out of the three  $F_2$  populations. In the  $F_2$  population of SMI-10 x PPL and PPC x PPL, number

of days to final harvest had significant positive correlation with plant height, fruits per plant and fruit weight per plant. It had significant positive correlation with fruit volume in SMI-10 x PPL and fruit weight in PPC x PPL. Plant height had significant positive correlation with fruits per plant in all the three  $F_2$  populations. It had significant positive correlation with fruit weight per plant in the  $F_2$  population of SM-6 x PPL. Fruits per plant had highly significant positive correlation with fruit weight per plant in all the three  $F_2$  populations. Similar reports were made by Singh (1974), Hiremath and Rao (1975) and Sinha (1983).

Fruit weight per plant (yield) had significant positive correlation with fruit weight in two of the three  $F_2$  populations. It also had significant positive correlation with fruit volume in the  $F_2$  of SMI-10 x PPL. Between weight and fruit volume there was significant positive correlation in all the three  $F_2$  populations.

College of Agriculture  
Vellayni 695 522, Trivandrum

V.G. Jayalekshmi  
V.G. Nair

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