

## Evaluation of F<sub>4</sub> Progenies of Brinjal (*Solanum melongena* L.) for Yield and Yield Attributes Under Konkan Agroclimatic Conditions

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**Abstract:** An experiment was carried out at the Educational Research Farm, Department of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (M.S.) to evaluate fifty brinjal genotypes. From the present study, it could be concluded that most of the yield and yield contributing characters fruit parameters were significantly varied. Progenies; 56, 57, 60, 62, 64, 72, 66, 72-1, 79, 88-2 and 100 had noticed more yield per plant than the general mean under Konkan agro climatic conditions. While, progenies 63, 77, 80, 81, 56-2, 99, 84, 83, 74, 80-2, 81-2, 87-2, 99-1 and 99-3 had desirable fruit characters with better market acceptability. Further, it was observed that all these progenies were found tolerant to bacterial wilt. Thus, on the basis of plant architecture, yield and yield contributing characters, fruit parameters, consumer preference and tolerance to bacterial wilt, 25 promising progenies were selected for further study in F<sub>5</sub> generation.

**Keywords:** Brinjal, yield, yield attributes and harvesting.

### INTRODUCTION

Brinjal (*Solanum melongena* L.) is one of the major and principle vegetable crops widely grown in India and other parts of world. Also in Maharashtra, it is one of the important vegetable crops under cultivation, which covers an area of 0.26 lakh ha with 0.58 Million tonnes annual production (Anonymous, 2013b). In Konkan, the area under brinjal cultivation is around 0.012 lakh ha with annual production of 0.02 MT during 2010-2011 (Anonymous, 2012).

Due to existence of wide genetic variation in the brinjal in the Konkan region, farmer has an opportunity to grow brinjal genotype as per the location specific consumer's preference. Some of the local types grown in Konkan region also show tolerance to bacterial wilt. Thus, by taking into consideration the variation in growth and fruit characters and tolerance to bacterial wilt, most of the local types have been selected from Konkan region and after screening to bacterial wilt tolerance,

growth and yield performance half diallel crosses were made at the Department of Horticulture during the year 2008-2009. The genotypes performing well can be released as a variety or it can be put to further use in the breeding programme as a breeding line by the breeder.

Thorough evaluation of the genotypes is needed to know the performance of the genotypes in terms of yield and other yield attributing characters. Based on this, promising genotypes can be identified. Keeping all these above mentioned points in view, an experiment was carried out to evaluate 50 brinjal genotypes of F<sub>4</sub> progenies were evaluated under Konkan agro climatic condition.

### MATERIALS AND METHODS

The field experiment was conducted at the Educational Research Farm, Department of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (M.S.) during the rabi season

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**Table 1**  
**Variation in quantitative fruit parameters in F<sub>4</sub> brinjal progenies**

Progenies	Fruit length (cm)	Fruit girth (cm)	Fruit weight (g)	Progenies	Fruit length (cm)	Fruit girth (cm)	Fruit weight (g)
56	13.35	17.15	126.5	84	8.27	19.75	119.5
57	15.75	28.1	250	83	13.25	17.35	79.5
60	16.5	20.85	152.5	82	8.5	15.85	70
61	12.1	12.15	59.5	70	11.25	13.1	61.5
62	14.95	17.05	99	71	9.95	18.6	105.5
63	14.7	16.05	70.5	72-1	8.95	13	72
64	16	14	72.5	74	14.85	19.8	121
68	10.4	13	55	79	8.35	21.05	152.5
69	10.95	13.05	68	80-2	7.2	18.85	89.5
72	15.2	20.3	111.5	81-2	13.45	22.5	192.5
76	7.35	15.33	54	86	9.8	14.7	72
77	6.84	22.05	118	87	11.85	13.3	73
80	15	16	94.5	87-2	6.65	15.75	64
81	11.1	19.2	207.5	88-2	14.9	13.5	106
66	9.2	16.25	80	89	15.35	16.4	111
65	9.35	13.65	47.5	90	9.42	15.3	72
59	12.15	17.9	95	92-2	11.55	12.1	71
56-2	14.85	15.8	76.5	93	9.1	16.9	70
99	12.5	17.75	80.5	94	9.6	16.55	83.5
95	9.2	17.15	65.5	100	7.95	17.25	82.5
94-2	6.25	13.15	65	99-1	11.15	15.65	60.5
94-1	10.4	21.45	138.5	99-2	9.45	14.6	62.5
92	10.6	17.15	85.5	99-3	7.45	15.4	61
91-2	10.5	17.35	101	Range	6.25-16.5	12.1-28.1	47.5-250
91	12.75	15.75	109.5	Mean	11.09	16.77	93.82
88	9.6	17	90	Result	Sig	Sig	Sig
85	8.95	16.6	65	S.Em+-	0.31	0.53	2.25
				CD@5%	0.87	1.50	6.41

Cont. table 1

2012-13. The soil of experimental plot was lateritic and acidic in reaction with pH ranging from 5.6 to 6.5. The selection of the site was considered on the basis of suitability of land for the cultivation of brinjal. The investigation consisted of 50F<sub>4</sub> progenies of brinjal and studied in Randomized Block Design with two replications. To record the biometric observations, sampling technique was used. The observations were recorded on ten randomly selected plants per genotype per replication for characters *viz.*, shape of fruit, size of fruit, colour of fruit, presence of thorns on fruit calyx, length of fruit (cm), girth of fruit (cm), fruit weight (g), days to

first harvest, days to last harvest, harvesting span (days), No. of harvest, number of fruits/plant, yield/plant (kg) and yield/ha (tonnes).

The fifty promising progenies selected based on the characters like plant height, branching habit, earliness, harvesting span, fruit shape size and colour, yield and their tolerance to incidence of bacterial wilt during F<sub>3</sub> generation were self to get seed material for raising F<sub>4</sub> generation. The spacing adopted was 60 cm in between two rows and 60 cm in between two plants within a row. The pits were made in these beds at a distance of 60 cm apart. The recommended dose of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O was applied

**Table 2**  
**Mean performance of yield and yield attributing characters of F<sub>4</sub> progenies of brinjal**

<i>Progenies</i>	<i>Days to first harvest</i>	<i>Days to last harvest</i>	<i>Harvesting span (Days)</i>	<i>No. of harvest</i>	<i>No. of fruits per plant</i>	<i>Yield per plant (Kg)</i>	<i>Yield per ha (tonnes)</i>
56	64	118	54	9	23.5	1.61	44.73
57	64	120.5	56.5	9.5	9	1.45	40.22
60	64	118	54	9	20	1.72	47.77
61	59	118	59	10	26.5	2.19	60.70
62	53	118	65	10	27.5	1.73	48.13
63	64	118	54	9	18.5	1.15	32.05
64	59	124	65	10	24	1.61	44.73
68	61.5	118	56.5	9.5	17.5	1.45	40.21
69	64	118	54	8	15	1.02	28.33
72	58.5	123.5	65	11	15.5	1.68	46.67
76	61.5	118	56.5	9.5	16	1.69	46.79
77	61.5	118	56.5	9.5	11	0.99	27.17
80	64	118	54	9	13.5	1.36	37.72
81	61.5	118	56.5	9.5	9	1.35	37.37
66	64	118	54	9	18	1.50	41.64
65	64	118	54	9	26.5	1.53	42.37
59	64	118	54	9	18.5	1.67	46.37
56-2	56	115	59	9	18.5	1.16	32.14
99	59	118	59	10	17	1.30	36.13
95	61.5	118	56.5	9.5	22.5	1.58	43.79
94-2	64	118	54	9	21	1.52	42.17
94-1	64	118	54	9	22.5	1.73	48.01
92	64	118	54	9	16.5	1.37	38.06
91-2	64	118	54	9	16	1.29	35.92
91	64	118	54	9	15.5	1.29	35.88
88	59	115.5	56.5	9.5	12	1.15	32.05
85	59	118	59	10	20.5	1.63	45.22
84	64	118	54	9	11	1.00	27.85
83	64	115	51	8.5	19	1.36	37.83
82	58.5	118	59.5	10	15.5	1.06	29.53
70	56.5	118.5	62	9.5	24	1.71	47.56
71	61.5	118	56.5	9	19	2.19	60.72
72-1	56	118	62	10.5	22.5	1.56	43.42
74	58.5	118	59.5	10	13.5	1.32	36.67
79	64	118	54	9	17.5	1.61	44.67
80-2	61.5	109	47.5	9	13	1.10	30.43
81-2	70.5	118	47.5	8.5	7.5	1.32	36.59
86	56	118	62	10.5	17.5	1.40	38.80
87	59	118	59	10	21	1.64	45.57
87-2	70.5	118	47.5	8.5	16.5	0.96	26.70
88-2	53	118	65	10.5	23.5	1.55	42.99

*Cont. table 2*

Progenies	Days to first harvest	Days to last harvest	Harvesting span (Days)	No. of harvest	No. of fruits per plant	Yield per plant (Kg)	Yield per ha (tonnes)
89	64	118	54	9	12.5	1.0	27.94
90	61.5	118	56.5	9.5	18.5	1.15	31.96
92-2	56	118	62	10.5	26	1.53	42.57
93	64	122	58	8	16.5	0.93	25.90
94	64	118	54	9	22.5	1.62	45.07
100	64	118	54	9	25.5	1.71	47.38
99-1	64	118	54	9	23	1.12	30.98
99-2	59	118	59	10	18	0.91	25.17
99-3	61.5	118	56.5	9.5	22	1.09	30.14
Range	53-70.5	109-124	47.5-65	8-11	7.5-27.5	0.91-2.19	25.17-60.72
Mean	61.55	118.02	56.47	9.37	18.34	1.41	39.18
Result	Sig	NS	NS	NS	Sig	Sig	Sig
S.Em+-	1.75	1.24	2.49	0.34	2.26	0.07	1.95
CD@5%	4.98	-	-	-	6.42	0.20	5.55

as spot application in the form of urea, single super phosphate and muriate of potash respectively. The transplanting was done when seedlings were of 45 days old. All other recommended practices and plant protection measures were adopted to raise the healthy crop. The statistical analysis of the data was done by using the standard methods as described by Panse and Sukhatme (1988). The standard error (S.E.) of means was worked out and critical differences (CD) at 5% level work out whenever the results were significant.

## RESULTS AND DISCUSSION

While evaluating fruit characters and yield contributing characters of  $F_4$  progenies of 50 brinjal progenies; it was observed that number of fruits per plant, yield per plant, yield per hectare, fruit length, fruit girth and fruit weight were significantly varied. The data regarding above characters are presented in Table 1, 2 and 3.

It was observed that all the fruit parameters significantly varied among all progenies. The results obtained of these parameters are presented in the Table 1. Significantly the highest length of fruit was observed in the progeny 60 and was significantly superior over all except the progenies 57 and 64. Significantly the lowest fruit length was observed in progeny 94-2. Significantly the highest fruit girth was observed in the progeny 57 and was

significantly superior over all the progenies. The lowest fruit girth was observed in progeny 92-2. Significantly the highest fruit weight was observed in the progeny 57 and was significantly superior over all the progenies under study. The lowest fruit weight was observed in progeny 65.

It was observed that all these 50 progenies of  $F_4$  progenies of brinjal under study were significantly varied for days to first harvest, number of fruits per plant, yield of fruits per plant (kg), yield of fruits per hectare (tones) only while days to last harvest, harvesting span and number of harvests were non-significantly varied. The details results obtained are given in the Table 2.

Significantly the progeny 62 took lowest days to first harvest; while progenies 81-2 and 87-2 noticed highest days to first harvest. Days to last harvest was non-significantly varied. The progeny 80-2 had noticed lowest days to last harvest, while progeny 64 had noticed highest days to last harvest. Similarly harvest span was also non-significantly varied and the progenies 62, 64, 72 and 88-2 showed harvesting span values more than mean. Non-significantly the higher number of harvest recorded in the progeny 72, while lower number of harvest recorded in the progenies 69 and 93. Significantly the highest number of fruits per plant was observed in the progeny 62 and was

**Table 3**  
**Variation in qualitative characters of F<sub>4</sub> brinjal progenies**

<i>Progenies</i>	<i>Fruit shape</i>	<i>Fruit size</i>	<i>Fruit colour</i>	<i>Thorns on fruit calyx</i>	<i>Thorns on leaves</i>	<i>Thorns on stem</i>
56	Slender	M	Whitish green	Present	Absent	Absent
57	Round	M-L	Light purple from calyx light green from bottom	Absent	Absent	Absent
60	Oblong	M	White fruit with light purple from calyx	Absent	Absent	Absent
61	Oblong	S	Light green from bottom and green from calyx	Absent	Absent	Absent
62	Oblong	M	Light purple fruit and light green from bottom	Absent	Absent	Absent
63	Oblong	S	Whitish green fruit with light purple strips	Present	Absent	Absent
64	Slender long	S	Purple fruit with green patches	Absent	Absent	Absent
68	Slender	S	Whitish fruit with purple patches from calyx	Absent	Absent	Absent
69	Slender long	S	Light green fruit with purple patches from calyx and white green strips from bottom	Absent	Absent	Absent
72	Round	M	Dark purple	Present	Absent	Absent
76	Round	S	Green fruit with whitish strips from bottom	Absent	Absent	Absent
77	Round	M	Purple fruit and light green from bottom	Absent	Absent	Absent
80	Oblong	S-M	Dark green fruit with light green strips from bottom	Absent	Absent	Absent
81	Round	M-L	Light green from bottom light purple strips from calyx	Present	Present	Present
66	Oblong	S	Purple fruit and whitish green from bottom	Absent	Absent	Absent
65	Slender oblong	S	Purple fruit and light green strips from bottom	Absent	Absent	Absent
59	Slender oblong	S-M	Light purple fruit and whitish green from bottom	Absent	Absent	Absent
56-2	Oblong	S	Light green fruit with light purple strips from calyx	Absent	Absent	Absent
99	Oblong	S	Dark purple fruit and light green strips from bottom	Absent	Absent	Absent
95	Oblong	S	Dark purple fruit with green tinch from bottom	Absent	Absent	Absent
94-2	Round	S	Green fruit with whitish strips from bottom	Absent	Absent	Absent
94-1	Oblong	M	Green fruit with whitish strips from bottom	Absent	Absent	Absent
92	Oblong	S	Light green fruit with whitish strips from bottom	Absent	Absent	Absent
91-2	Oblong	S-M	Light green from bottom purple strips from calyx	Absent	Absent	Absent
91	Slender oblong	S-M	Purple fruit with green from bottom	Absent	Absent	Absent
88	Oblong	S	Whitish green fruit with purple patches in middle	Absent	Absent	Absent
85	Oblong	S	Purple fruit with light green from bottom	Absent	Absent	Absent
84	Round	M	Whitish green and purple tinch at calyx	Present	Absent	Absent
83	Oblong	S	Purple fruit and light green from bottom	Present	Absent	Absent
82	Round	S	Purple fruit and light green dots on bottom	Absent	Absent	Absent
70	Oblong	S	Light purple fruit and whitish green from bottom	Absent	Absent	Absent
71	Oblong	S-M	Purple fruit with whitish strips from bottom	Absent	Absent	Absent
72-1	Oblong	S	Purple fruit with irregular green tinch	Absent	Absent	Absent
74	Oblong	M	White green	Absent	Absent	Absent
79	Oblong	M	Green fruit with light green strips	Absent	Absent	Absent
80-2	Round	M	Purple fruit with irregular green tinch	Absent	Absent	Absent
81-2	Round	M-L	Light green from bottom light purple strips from calyx	Present	Absent	Absent

*Cont. table 3*

Progenies	Fruit shape	Fruit size	Fruit colour	Thorns on fruit calyx	Thorns on leaves	Thorns on stem
86	Oblong	S	Light green	Absent	Absent	Absent
87	Slender long	S	Dark purple fruit from calyx and green from bottom	Absent	Absent	Absent
87-2	Oblong	S	Light green fruit with purple strips	Absent	Absent	Absent
88-2	Slender	S-M	Light green fruit with thin purple strips	Absent	Absent	Absent
89	Slender	S-M	Light green fruit with whitish from bottom	Absent	Absent	Absent
90	Oblong	S	Light green fruit with purple strips from calyx	Absent	Absent	Absent
92-2	Oblong	S	Purple fruit with green from bottom	Absent	Absent	Absent
93	Oblong	S	Green and purple fruit with whitish green strips on bottom	Absent	Absent	Absent
94	Oblong	S	Light green fruit with whitish green strips from bottom	Absent	Absent	Absent
100	Oblong	S-M	Whitish green	Absent	Absent	Absent
99-1	Oblong	S	Light purple fruit and light green from bottom	Absent	Absent	Absent
99-2	Oblong	S	Whitish green fruit with light purple patches from calyx	Absent	Absent	Absent
99-3	Round	S	Light green fruit with purple patches from calyx and white green strips from bottom	Absent	Absent	Absent

Note : S - Small, M - Medium, L - Large, S - M = Small to Medium, M - L = Medium to Large

significantly superior over all except 56, 61, 64, 65, 95, 94-1, 70, 72-1, 88-2, 92-2, 94, 100, 99-1 and 99-3 progenies. The lowest number of fruits per plant was observed in 81-2 progeny. Significantly the highest yield per plant was observed in the progeny 71 and 61, and was significantly superior over all progenies. The lowest yield per plant was observed in 99-2 progeny. Significantly the highest yield per hectare was observed in the progeny 71 and 61, and was significantly superior over all progenies. The lowest yield per hectare was observed in 99-2 progeny.

All these F<sub>4</sub> brinjal progenies also showed notable variation in shape. The data presented in Table 3 revealed that brinjal progenies under study showed variation in shape of fruit namely round, slender, slender long, slender oblong and oblong shapes. The progeny 56, 68, 88-2, 89 had slender fruits, while progenies 65, 59, 91 had slender oblong fruits. Slender long fruits were observed in the progenies 64, 69 and 61. The round shape fruits were observed in the progenies 57, 72, 76, 77, 81, 94-2, 84, 82, 80-2, 81-2 and 99-3. Further the progeny 60, 61, 62, 63, 80, 66, 56-2, 99, 95, 94-1, 92, 91-2, 88, 85, 83, 70, 71, 72-1, 74, 79, 86, 87-2, 90, 92-2, 93, 94, 100, 99-1 and 99-2 had the oblong shaped fruits. Similarly variation in fruit colour among the different brinjal

progenies under study was also observed. These fruit colours were green, light green, whitish green, purple, dark purple with whitish stripes, whitish green stripes, purplish strips, and purple patches. In present investigation, only one progeny *i.e.* 81 had having thorns on leaves and stem. Further the progenies 56, 81-2, 83, 84, 72 and 63 had thorns on fruits calyx.

## CONCLUSION

From the present findings, it could be concluded that most of the yield and yield contributing characters fruit parameters were significantly varied. Progenies; 56, 57, 60, 62, 64, 72, 66, 72-1, 79, 88-2 and 100 had noticed more yield per plant than the general mean under Konkan agro climatic conditions. While, progenies 63, 77, 80, 81, 56-2, 99, 84, 83, 74, 80-2, 81-2, 87-2, 99-1 and 99-3 had desirable fruit characters with better market acceptability. Further, it was observed that all these progenies were found tolerant to bacterial wilt. Thus, on the basis of plant architecture, yield and yield contributing characters, fruit parameters, consumer preference and tolerance to bacterial wilt, 25 promising progenies were selected for further study in F<sub>5</sub> generation. These progenies were 56, 57, 60, 62, 64, 72, 66, 72-1, 79, 88-2, 100, 63, 77, 80, 81, 56-2, 99, 84, 83, 74, 80-2, 81-2, 87-2, 99-1 and 99-3.

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