



Evaluation of Green Fruited Brinjal Genotypes for Growth, Yield and Quality Characters

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An experiment was carried out at Department of vegetable crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore to evaluate 30 green fruited brinjal genotypes. The study revealed that highly significant differences were observed for all the traits. Among the 30 genotypes, ABSR-2 recorded the maximum number of fruits and fruit yield per plant whereas, EC 316201 was found to be best for number of branches, number of fruits, fruit yield per plant next to ABSR-2. The genotype Devachinnampatti local was found to be good for the earliest flowering and yield per plant and protein content. The three genotypes viz., ABSR-2, EC 316201, Devachinnampatti local were superior for yield and yield contributing characters. These three genotypes can be used as parents in hybridization programmes.

Key words: Evaluation, Green fruited genotypes, Yield, Quality

Brinjal (*Solanum melongena* L.) is widely cultivated as one of the most important vegetables in both subtropical and tropical regions of India. It is a popular vegetable in India, China, Turkey, Japan, Syria, Egypt, Indonesia, Philippines, Thailand, France, Italy and USA. It is an important source of fibre (1.3 g/100g), protein (1.4 g/100g), vitamin-A (124 I.U) and potassium (200 mg/100g) and it is recommended even for patients with diabetes, asthma, cholera and bronchitis. Brinjal is grown almost in all the districts of Tamil Nadu and extensively in Dindigul, Theni and Madurai districts. In these districts consumers prefer only green coloured fruits than other coloured fruits. To meet the consumers preference of these districts, it is necessary to develop green fruited variety or hybrids. As a first step of the breeding programme, collection and evaluation of genotype is important to know the yield potential and quality characters of the selected genotypes. The selected genotypes can be released as a variety otherwise used for further breeding programmes.

Materials and Methods

The present investigation on evaluation of green fruited brinjal genotypes for growth, yield and quality was carried out in the Department of vegetable crops, Faculty of Horticulture, Tamil Nadu Agricultural University, Coimbatore during 2015 which is situated at 11° N latitude and 77° E longitude and at an elevation of 426.6 m above MSL. The experimental materials for the present study consisted of 30 genotypes. Out of 30 genotypes, twelve (IC 261786, IC 354546, IC 111033, IC 090907, EC 316201, EC 315014, IC 249344, IC 354721, IC 383345, IC 454561, IC 310889 and IC 111013) from NBPGR, New Delhi, one (ABSR -2) from IIVR, Varanasi, fifteen local types (Notchidaipatti, Namakkal, Karur, Patteswaram,

Mathukadipattu, Sathirampatti, Kumbakonam, Kurumbapatti, Devachinnampatti, Swamimalai, Ottanchathiram, Andipatti, Thiruchy, Mettupalayam and Musuri) and two (Arka Kusumakar and Arka Shirish) from IIHR, Bangalore were collected and evaluated in a randomized block design with two replications. Forty five days old seedlings were transplanted on the ridges adopting a spacing of 60 x 60 cm. Twenty five plants were maintained for each hybrid in each replication. Cultural practices were followed as per the package of practices recommended for Tamil Nadu. The data were analyzed by the methods outlined by Panse and Sukhatme (1967).

Results and Discussion

Analysis of variance was carried out for twelve characters for all the thirty genotypes. The analysis of variance showed significant difference among the genotypes for both growth and yield characters (Table 1). Similar observations were reported by Ramesh Babu and Patil (2005) and Ramesh Kumar et al. (2012) in brinjal. The genotypic variance for all the characters was highly significant indicating wide variability for all the characters studied.

Among the thirty green fruited genotypes, significantly the highest plant height was recorded in Arka Shirish (125.95 cm) followed by Arka Kusumakar (121.65 cm) and EC 316201 (121.05 cm) and the lowest plant height was recorded in IC 249344 (54.40 cm). EC 316201 recorded significantly higher number of branches (11.65) per plant followed by the genotype Musuri local (10.40). The minimum number of branches was recorded by IC 354546 (4.50). Variation in plant height may be due to genetic makeup of the plants (Dalal *et al.*, 2000) (Table 2).

Significant variation was observed for days to first flowering, 50 % flowering and first harvest.

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Devachinnampatti local recorded the earliest flowering with less number of days for first flowering (40.30) and 50 % flowering (50.95) compare to other genotypes. The late flowering was recorded by IC 354721 (52.15 days for first flowering and 63.95 days for 50 % flowering). The minimum number of days (60.75) was taken for first harvest by Andipatti local and longest period for the first harvest was recorded by Patteswaram local (74.90). This indicated

that early flowering genotypes could be used in the breeding programme to necessitate serial harvesting over wide number of days to avoid market glut and to exploit higher prices during certain parts of the year. Earliness was reported by Baswana *et al.*, (2002), Omkar Singh and Kumar (2005), Lohakare *et al.*, (2008), Ramesh Babu and Patil (2008), Kalpana Dahatonde *et al.*, (2010), Dhaka and Soni (2012) and Ramesh Kumar *et al.*, (2012) in brinjal.

Table 1. Analysis of variance for yield and quality characters

Characters	Mean sum of squares		
	Replications	Genotypes	Error
Degrees of freedom	1	29	29
Plant height (cm)	0.020	641.999**	1.509
Number of branches per plant	0.504	5.683**	0.092
Days to first flowering	2.688	25.983**	0.181
Days to 50% flowering	0.641	36.054**	0.281
Days to first harvest	0.726	35.436**	0.313
Fruit length (cm)	0.113	4.818**	0.023
Fruit girth (cm)	0.280	15.265**	0.017
Single fruit weight (g)	4.213	398.964**	0.323
No. of fruits per plant	5.581	609.892**	1.081
Fruit yield per plant (kg)	0.044	0.726**	0.003
Protein (mg 100g ⁻¹)	6.099	2.252**	0.001
Ascorbic acid (mg 100g ⁻¹)	4.598	2.362**	0.001

** Significance at 1% level

Arka Shirish had produced significantly longest fruit of 13.35 cm and IC 310889 produced shortest fruit (5.55) whereas maximum fruit girth (18.40) was observed in Kumbakonam local. Arka Kusumakar produced the fruits with minimum girth of 7.15 cm. The variation might be due to the genetic and environmental effect. The single fruit weight (g) was high (84.95) in Kumbakonam local whereas less fruit weight of 33.15 was recorded in Musuri local. The higher fruit weight recorded in genotype might be attributed due to large fruit size. These findings are in agreement with the results obtained by Ramesh Babu and Patil (2008), Ramesh Singh and Vishwakarma (2009), Kalpana Dahatonde *et al.*, (2010), Satish Kumar *et al.*, (2011) and Ramesh Kumar *et al.*, (2012) in brinjal.

The yield being polygenic trait, is a result of component character like number of fruits per plant. Among the thirty genotypes, ABR-2 recorded maximum number of fruits (68.55) followed by EC 316201 (67.00), Notchidaipatti local (62.90) and IC 090907 (62.10) respectively. The minimum number of fruits (13.95) was recorded by IC 111013 and the maximum yield was recorded by ABR-2 (2.68)

followed by EC 316201 (2.62), IC 090907 (2.54) and Devachinnampatti local (2.46) (Fig.1). These three genotypes produced fruits in cluster and medium sized fruits than as a solitary fruits. The cluster bearing genotypes were yielded more number of fruits than the others, which directly influences the yield. IC 111013 recorded the lowest yield per plant (0.51). Generally, the increase in fruit yield in the present finding is attributed to number of fruits. Similar results were obtained by Baswana *et al.*, (2002), Mohanty (2002), Omkar Singh and Kumar (2005), Ramesh Babu and Patil (2008), Lohakare *et al.*, (2008), Ramesh Singh and Vishwakarma (2009), Kalpana Dahatonde *et al.*, (2010), Satish Kumar *et al.*, (2011), Dhaka and Soni (2012) and Ramesh Kumar *et al.*, (2012) in brinjal. Any deviation in the results with the findings of others was attributed to environmental conditions and the stage of harvest of fruits.

From the nutrient point of view, quality is considered as an important factor in any vegetable crop. Brinjal being a commercial and popular vegetable in India and Tamil Nadu, it is needless to emphasize the importance of quality parameter for consumption of fresh and processed produce.

Generally, the higher ascorbic acid content would increase the nutritive value of the fruits, which would help better retention of colour and flavor (Sasikumar, 1999). The highest content of protein was observed

Table 2. Mean performance of brinjal genotypes for growth, yield and quality parameters

Genotypes	Plant height (cm)	No. of branches per plant	Days to first flowering	Days to 50% flowering	Days to first harvest	Fruit length (cm)	Fruit girth (cm)
Notchidaipatti local	87.35	8.85	44.70	56.25	68.15	9.35	8.35
ABSR -2	84.10	9.30	42.15	53.35	65.65	6.35	10.40
Namakkal local	71.40	6.45	45.50	56.55	67.95	7.15	9.40
IC 261786	80.95	6.35	48.75	59.85	71.85	6.35	13.10
Karur local	92.35	7.60	44.00	57.45	67.90	8.15	8.70
Patteswaram local	69.50	6.35	50.40	63.70	74.90	8.55	16.60
Arka Shirish	125.95	8.45	50.90	62.35	72.40	13.35	8.35
Mathukadipattu local	102.55	7.30	45.40	56.75	68.40	7.75	10.40
Sathirampatti local	114.75	8.65	43.50	55.55	66.85	6.45	10.70
Kumbakonam local	102.95	6.55	49.00	61.90	70.85	9.75	18.40
Kurumbapatti local	114.20	8.35	47.60	60.45	72.55	7.75	9.40
Devachinnampatti local	94.90	9.50	40.30	50.95	63.10	6.45	9.45
IC 354546	58.25	4.50	51.45	63.05	72.35	7.35	15.35
IC 111033	92.55	6.60	44.70	56.05	68.95	8.35	13.35
Swamimalai local	112.95	7.45	46.35	58.50	67.15	7.40	12.60
Ottanchathiram local	99.05	9.40	43.10	53.95	65.75	8.80	11.40
IC 090907	83.80	7.55	42.05	52.60	61.50	7.70	12.25
Andipatti local	94.55	9.55	40.90	52.90	60.75	8.10	9.70
EC 316201	121.05	11.65	42.50	51.05	62.55	7.15	9.10
EC 315014	85.85	7.45	48.00	61.15	72.65	6.95	13.20
Arka Kusumakar	121.65	7.75	40.95	51.15	63.95	10.65	7.15
Thirchy local	91.75	6.50	47.65	59.20	67.95	7.65	12.40
Mettupalayam local	91.00	8.65	50.85	62.40	73.30	8.10	15.25
Musuri local	101.20	10.40	42.50	53.15	63.00	7.40	9.30
IC 249344	54.40	4.70	46.70	58.15	67.90	6.65	8.20
IC 354721	113.50	8.65	52.15	63.95	74.05	6.05	9.30
IC 383345	94.75	7.50	41.90	53.05	62.75	8.10	13.50
IC 454561	103.40	8.50	48.60	59.85	70.35	7.35	11.55
IC 310889	81.40	5.50	49.40	63.50	73.50	5.55	12.55
IC 111013	77.40	4.85	50.40	62.55	74.05	6.10	8.05
Mean	93.98	7.70	46.08	57.71	68.43	7.76	11.25
SEd	1.228	0.303	0.426	0.530	0.560	0.153	0.131
CD (0.5%)	2.513	0.619	0.871	1.084	1.145	0.313	0.267

Table 2 contd.,

Table 2 contd.,

Genotypes	Single fruit weight (g)	No. of fruits per plant	Fruit yield per plant (kg)	Protein (mg 100g ⁻¹)	Ascorbic acid (mg 100g ⁻¹)
Notchidaipatti local	34.85	62.90	2.19	14.78	13.45
ABSR -2	39.10	68.55	2.68	16.50	14.53
Namakkal local	35.40	57.70	2.04	16.85	15.25
IC 261786	48.85	24.35	1.19	15.45	12.56
Karur local	35.85	56.30	1.92	16.23	15.12
Patteswaram local	62.50	26.05	1.63	16.86	13.65
Arka Shirish	40.55	39.95	1.62	17.25	14.46
Mathukadipattu local	35.45	36.10	1.28	15.03	12.74
Sathirampatti local	35.10	48.45	1.70	17.11	11.26
Kumbakonam local	84.95	21.45	1.82	15.77	13.45
Kurumbapatti local	33.80	31.65	1.07	14.62	14.52
Devachinnampatti local	40.90	60.15	2.46	17.45	15.05
IC 354546	57.75	21.40	1.24	15.74	13.26
IC 111033	54.10	19.35	1.05	16.45	14.82
Swamimalai local	77.90	21.05	1.64	17.15	11.63
Ottanchathiram local	38.05	56.55	2.15	17.03	14.45
IC 090907	40.90	62.10	2.54	16.45	15.13
Andipatti local	35.85	60.35	2.22	15.78	15.43
EC 316201	39.15	67.00	2.62	16.37	13.31
EC 315014	65.85	27.05	1.78	14.43	12.45
Arka Kusumakar	37.85	56.90	2.11	16.56	14.76
Thirchy local	49.10	31.95	1.57	15.65	14.63
Mettupalayam local	68.95	30.90	1.95	13.31	13.21
Musuri local	33.15	37.15	1.23	16.78	13.54
IC 249344	34.75	15.00	0.54	14.05	14.31
IC 354721	38.05	23.00	0.88	15.56	14.72
IC 383345	56.10	35.90	1.86	14.53	13.56
IC 454561	58.85	31.40	1.85	16.72	13.35
IC 310889	43.05	27.15	1.17	16.28	14.02
IC 111013	36.85	13.95	0.51	15.04	12.53
Mean	46.45	39.39	1.71	15.93	13.84
SEd	0.568	1.039	0.054	0.0299	0.030
CD (0.5%)	1.162	2.126	0.111	0.0612	0.063

in the genotype Devachinnampatti local (17.45 mg 100g⁻¹) whereas the lowest protein content of fruit was

recorded by the genotype mettupalayam local (13.31 mg 100g⁻¹). Ascorbic acid content of the fruit was high

in Andipatti local (15.43 mg 100g⁻¹) and the lowest content was recorded by Sathirampatti local (11.26

mg 100g⁻¹). These results are in confirmation with the findings of Ramesh Kumar *et al.*, (2012) in brinjal.

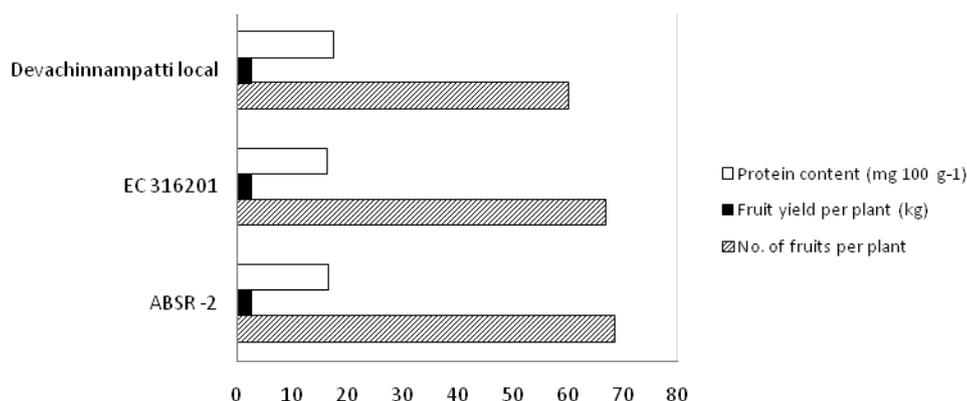


Fig. 1 Performance of selected genotypes for quality and yield characters

Conclusion

Thus, it can be concluded that the green fruited genotypes viz., ABSR -2, EC 316201 and Devachinnampatti local are found to be superior in terms of quality, yield, number of fruits and other yield contributing characters. These genotypes could be used as parents for further breeding programmes while selecting suitable varieties or hybrids specific to Dindugal, Theni and Maduari districts in Tamil Nadu.

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References

- Baswana, K.S., Bhatia M.K. and Dharamveer Duhan. 2002. Genetic variability and heritability studies in rainy season brinjal (*Solanum melongena* L.). *Haryana J. Hort. Sci.*, **31** (1&2) : 143-145
- Dalal, N.R., Dalal, S.R., Gollivar, V.J., Thombre, S.K. and Khobragade, R.1. (2000). Studies on growth and yield of some brinjal varieties. *J. Soils and Crops.*, **10** (1): 119-121.
- Dhaka, S.K. and Soni, A.K. 2012. Genetic variability in brinjal (*Solanum melongena* L.). *Asian J. Hort.*, **7**(2): 537-540
- Kalpana Dahatonde, Dod, V.N., Nagre P.K. and Wag. A.P. 2010. Genetic Variability in purple fruited brinjal. *Asian J. Hort.*, **5**(2): 367-370.
- Lohakare, A.S., Dod, V.N. and Peshattiwar. 2008. Genetic variability in green fruited brinjal, *Asian J. Hort.*, **3**(1): 114-116

- Mohanty, B.K. 2002. Variability, Heritability and genetic advance studies in brinjal (*Solanum melongena* L.). *Indian J. Agric. Res.*, **36** (4): 290-292
- Pansee, V. C. and Sukhatme, P.V. 1967. Statistical Methods for Agricultural Workers, Indian Council of Agricultural Research, New Delhi, pp. 152-161.
- Omkar Singh. and Kumar. J. 2005. Variability, heritability and genetic advance in brinjal. *Indian J. Hort.*, **62**(3): 265-267.
- Ramesh Babu, B. and Patil, R.V. 2005. Evaluation and variability studies of brinjal genotypes. *Madras Agric. J.*, **92** (7-9): 578-584
- Ramesh Babu, B. and Patil, R.V. 2008. Characterization and evaluation of brinjal genotypes. *Madras Agric. J.*, **95** (1-6) : 18-23
- Ramesh Kumar, S., Arumugam, T. and Premalakshmi, V. 2012. Evaluation and variability studies in local types of brinjal for yield and quality (*Solanum melongena* L.). *Electronic J. Plant. Breed.*, **3**(4): 977-982
- Ramesh Singh and Vishwakarma, A.K. 2009. Performance of different varieties of brinjal under agro-climatic condition of Sikkim. *International J. Tropical Agri.*, **27**: 3-4
- Sasikumar, A. 1999. Screening of eggplant (*Solanum melongena* L.) genotypes for quality and yield. M.Sc., (Hort.) Thesis, Tamil Nadu Agricultural University, Coimbatore
- Satesh Kumar, J.P., Sharma. and Sandeep Chopra. 2011. Studies on variability, heritability and genetic advance for morphological and yield traits in brinjal (*Solanum melongena* L.). *Mysore J. Agric. Sci.*, **45**(1): 63-66.