



Evaluation of Brinjal Accessions for High Yield and Quality Characters

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Thirty accessions of brinjal were collected from diverse source and evaluated during 2016 to assess the performance for yield and quality characters. Among the thirty accessions, maximum plant height (158.8 cm) was observed in Sevathampatti Local. However, the accession Seetipulam Local showed earliness for 50 % flowering (49.3 days) and fruit harvest (61.0 days). The accession Marthandam Local-2 recorded the highest marketable yield per plant (2.64 kg) number of fruits per plant (68.38), fruit yield per plant (3.12 kg) and the lowest shoot (10.0 %) and fruit infestation (15.43 %). The three accessions viz., Marthandam Local -2, Sevathampatti Local and Seetipulam Local were performed superior in growth, yield and yield contributing characters with lesser incidence of shoot and fruit borer. Whereas the accession Seetipulam Local was superior in quality characters with high protein content of 16.8g/mg 100g-1.

Key words: Evaluation, Brinjal, Yield, Quality, Mullukathiri

Brinjal (*Solanum melongena* L, 2n=24) is an important and popular vegetable crop of family Solanaceae, grown throughout the year all over the country. In India, brinjal is cultivated in an area of 0.67 million ha with an annual production of 12.59 million tonnes. In Tamil Nadu, it is grown over an area of 11, 100 ha with 1, 04,900 tonnes of annual production during the year 2014-2015 (NHB, 2016). Brinjal is a crop having regional preference for its varying colour, size and quality characters. Hence there is an increasing demand for its varieties/hybrids which are preferred in different regions for different purposes. This can be achieved by genetic improvement of crop by various breeding programmes.

Though the principal method used for improvement of this crop is selection from indigenous germplasm, yet comprehensive characterization has not been done. An evaluation of germplasm gives considerable data to classify the material. Germplasm collection, maintenance and its evaluation for economically important traits is a pre-requisite for starting any breeding programme for the genetic improvement of the crop. An attempt has been made in the present study to evaluate the germplasm from different eco-geographic sources for some important characters in terms of yield and other yield attributing characters in brinjal. Based on this, promising genotypes can be identified and 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.

Materials and Methods

The present investigation on evaluation of brinjal accessions with yield and quality characters was carried out in the Department of vegetable crops,

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Faculty of Horticulture, Tamil Nadu Agricultural University, Coimbatore during 2016 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 brinjal accessions. All the thirty accessions collected from different districts of Tamil Nadu were evaluated in randomized block design with two replications. Forty five days old seedlings were transplanted on the ridges with a spacing of 60 x 60 cm. Twenty five plants were maintained for each accession in each replication. Five plants from the net plot were selected randomly from each treatment per replication. The selected plants were marked by labeling. The growth parameters were recorded at harvest in all the labeled plants and mean values for each observation were used for statistical analysis. Cultural practices were followed as per the package of practices recommended for Tamil Nadu. The data were analyzed statistically by the methods outlined by Panse and Sukhatme (1967).

Results and Discussion

The success of crop improvement lies in the selection of genotypes for yield and yield contributing characters. While evaluating the genotypes, high mean value is considered as the acceptable procedure for a long time among the breeders. In this context, the thirty brinjal accessions assembled from different geographical locations were evaluated for sixteen characters.

Among the thirty accessions, significantly the highest plant height was recorded in Sevathampatti Local (158.8 cm). The lowest height was recorded in the accession ACC 21 (55.10 cm). The accession Spiny recorded highest number of branches per plant

Table 1. Mean performance of thirty brinjal accessions for growth and yield parameters

Genotypes	Fruit girth (cm)	Single fruit weight (g)	No. of fruits per plant	Fruit yield per plant (kg)	Shoot borer incidence (%)	Fruit borer incidence (%)
Spiny	11.8	44.6	58.50	2.60	11.7	19.23
Kumbakonam Local	15.7	95.3	19.43	1.85	13.0	25.19
Poiyur Purple	11.8	37.5	43.35	1.62	10.9	27.03
Nagarcoil Local	16.8	88.4	24.69	2.17	12.7	26.87
Thirupananthal local	15.2	69.6	32.50	2.26	11.1	30.77
Ottanchathiram Local	12.9	80.5	30.20	2.43	12.0	25.67
Ochery Local	14.9	112.5	12.60	1.23	14.1	32.08
Thanjavur Local	17.8	93.8	26.50	2.35	10.4	27.16
Sevathampatti Local	13.8	49.7	60.25	3.04	11.1	18.81
Ujala	13.2	80.4	27.82	2.27	13.1	20.19
Vettayamangalam Local	8.9	28.5	48.63	1.39	10.3	23.59
Manapparai Local	11.9	44.6	62.43	2.72	10.9	23.59
Karungal Local	13.08	48.5	43.26	2.10	12.0	25.61
Yenthal	11.1	32.7	52.10	1.70	11.0	23.31
Vengalur Local	13.2	54.5	29.50	1.61	14.1	22.14
Mullukathiri	9.9	45.3	35.61	1.61	12.9	21.14
Marthandam Local -2	10.9	44.6	68.38	3.12	10.0	15.43
Marthandam Local	15.0	69.6	23.40	1.63	12.1	20.47
Seetipulam Local	11.9	40.5	68.25	2.76	10.8	16.45
Paramakudi Local	15.8	70.6	25.65	1.80	12.0	22.38
ACC 21	11.0	36.4	15.70	0.57	15.2	31.17
ACC 22	11.7	43.6	31.75	1.67	13.1	25.13
ACC 23	9.7	28.3	38.60	1.09	12.1	22.09
ACC 24	15.1	39.3	21.50	0.84	16.0	32.76
ACC 25	14.4	25.2	19.40	0.49	14.1	31.06
ACC 26	12.1	42.4	25.10	1.06	12.2	23.90
ACC 27	14.1	71.3	9.50	0.67	11.8	32.14
ACC 28	9.9	32.5	16.65	0.54	15.7	29.85
ACC 29	7.1	35.2	21.50	0.76	13.2	23.11
ACC 30	16.0	65.3	14.30	0.93	11.5	27.07
Mean	12.9	55.0	33.57	1.69	12.3	24.85
SEd	0.413	1.082	1.271	0.243	4.483	2.388
CD (0.5%)	0.839	2.209	2.599	0.497	0.987	5.063

Table 1 contd.,

Genotypes	Plant height (cm)	No. of branches per plant	Days to 50% flowering	Days to first harvest	Plant spread (E-W)	Plant spread (N-S)	Fruit length (cm)
Spiny	139.9	14.4	55.7	63.8	122.5	152.0	9.9
Kumbakonam Local	102.4	7.3	57.6	67.6	80.9	60.7	10.9
Poiyur Purple	132.5	9.9	51.4	62.4	159.5	149.0	8.0
Nagarcoil Local	121.9	10.6	52.7	63.6	91.4	99.6	9.1
Thirupananthal Local	135.8	13.3	55.1	65.8	86.4	78.3	10.0
Ottanchathiram Local	129.4	11.6	54.5	66.3	60.4	106.5	10.9
Ochery Local	143.2	9.9	58.5	71.5	97.4	101.3	10.8
Thanjavur Local	140.7	9.5	51.8	62.3	113.9	103.3	9.5
Sevathampatti Local	158.8	15.5	52.5	63.1	154.6	130.6	7.7
Ujala	136.6	8.8	59.2	74.0	94.0	106.7	11.2
Vettayamangalam Local	118.6	8.6	50.8	63.3	84.1	103.5	6.9
Manapparai Local	119.8	8.0	55.6	66.7	106.3	77.3	5.9
Karungal Local	95.0	12.1	55.4	64.3	102.4	76.4	6.4
Yenthal	158.6	14.2	54.7	65.5	115.4	103.8	4.9
Vengalur Local	115.4	8.4	53.5	65.3	122.2	86.3	7.9
Mullukathiri	127.8	10.9	58.2	66.4	93.7	102.1	10.9
Marthandam Local -2	139.9	12.1	57.4	64.2	152.9	151.5	7.9
Marthandam Local	131.8	6.0	51.4	62.6	92.1	55.5	10.8
Seetipulam Local	78.2	14.1	49.3	61.0	122.8	95.8	5.8
Paramakudi Local	105.3	9.4	57.0	68.0	78.4	75.6	8.1
ACC 21	55.1	5.4	52.9	61.8	63.1	47.2	6.9
ACC 22	67.0	5.5	62.6	73.2	76.0	50.3	8.6
ACC 23	74.8	6.0	59.4	66.6	52.5	39.2	5.4
ACC 24	83.4	9.8	59.1	72.6	46.6	75.0	6.7
ACC 25	64.9	3.7	63.4	72.6	39.9	40.6	6.0
ACC 26	59.3	4.7	59.3	70.3	50.1	51.4	4.7
ACC 27	65.9	5.9	54.7	66.3	38.3	53.2	6.4
ACC 28	66.4	3.8	59.0	68.8	45.4	57.5	4.7
ACC 29	84.6	5.3	60.9	71.0	89.3	66.0	4.3
ACC 30	70.5	5.8	60.7	71.9	74.2	55.3	8.6
Mean	107.4	9.0	56.1	66.7	90.2	85.0	7.8
SEd	2.319	0.921	1.925	2.647	1.906	1.373	1.231
CD (0.5%)	4.916	1.885	3.938	5.612	3.901	2.808	2.612

(14.4), while the lowest number (3.8) was observed in the accession ACC 28. The variation of plant height and number of branches per plant might be due to the specific genetic makeup of different genotypes

and vigour of the crop. The present results are in agreement with results obtained by Ramesh Singh and Vishwakarma (2009), Ramesh Kumar et al. (2012) and Vidhya (2015) (Table 1).

Table 2. Mean performance of thirty brinjal accessions for quality parameters

Genotypes	Protein content (mg 100 g ⁻¹)	Ascorbic acid (mg 100 g ⁻¹)	Solasodine (%)
Spiny	16.09	16.13	0.031
Kumbakonam Local	14.90	11.67	0.039
Poiyur Purple	14.84	15.34	0.028
Nagarcoil Local	15.04	13.05	0.033
Thirupananthal Local	14.76	14.22	0.041
Ottanchathiram Local	11.33	13.32	0.027
Ochery Local	15.39	14.83	0.030
Thanjavur Local	14.42	11.74	0.023
Sevathampatti Local	15.80	14.81	0.031
Ujala	15.58	13.53	0.021
Vettayamangalam Local	14.99	11.10	0.038
Manapparai Local	14.13	10.04	0.038
Karungal Local	16.21	14.05	0.031
Yenthal	14.67	13.47	0.033
Vengalur Local	11.85	10.47	0.039
Mullukathiri	15.48	12.77	0.043
Marthandam Local -2	14.56	13.38	0.023
Marthandam Local	14.02	13.93	0.033
Seetipulam Local	16.81	11.79	0.026
Paramakudi Local	14.39	14.97	0.022
ACC 21	15.12	10.90	0.031
ACC 22	15.54	11.80	0.036
ACC 23	13.98	13.64	0.033
ACC 24	12.93	13.46	0.041
ACC 25	14.33	11.76	0.038
ACC 26	13.38	14.58	0.033
ACC 27	14.60	15.03	0.027
ACC 28	16.01	10.17	0.044
ACC 29	13.53	13.11	0.041
ACC 30	14.10	12.27	0.037
Mean	14.62	13.01	0.033
SEd	0.762	0.901	0.002
CD (0.5%)	1.555	1.843	0.004

In brinjal, estimation for earliness is an advantageous character for selecting breeding lines of commercial importance. Significant variation was observed for days to 50 % flowering and

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.

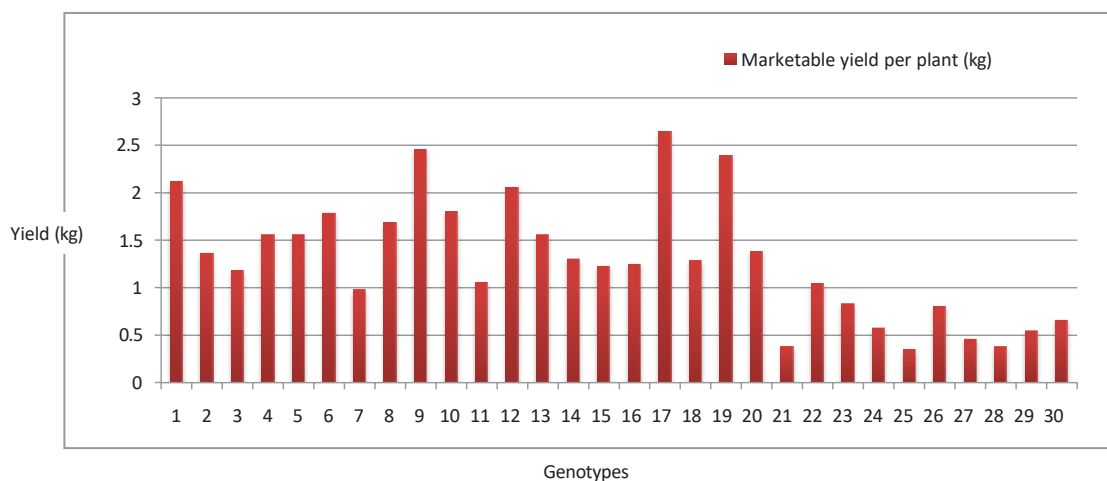


Fig. 1 Mean performance of thirty brinjal accessions for marketable yield per plant (kg)

Genotype no.	Genotypes	Genotype no.	Genotypes
1	Spiny	16	Mullukathiri
2	Kumbakonam Local	17	Marthandam Local -2
3	Poiyur Purple	18	Marthandam Local
4	Nagarcoil Local	19	Seetipulam Local
5	Thirupananthal Local	20	Paramakudi Local
6	Ottanchathiram Local	21	ACC 21
7	Ochery Local	22	ACC 22
8	Thanjavur Local	23	ACC 23
9	Sevathampatti Local	24	ACC 24
10	Ujala	25	ACC 25
11	Vettayamangalam Local	26	ACC 26
12	Manapparai Local	27	ACC 27
13	Karungal Local	28	ACC 28
14	Yenthal	29	ACC 29
15	Vengalur Local	30	ACC 30

first harvest. The days for fifty per cent flowering among thirty brinjal accessions varied significantly from 49.3 days (Seetipulam Local) to 63.4 days (ACC 25). The earliest first harvest was noticed in the accession Seetipulam Local (61.0 days) and longest period for the first harvest was recorded by Ujala (74.0 days). This indicated that early

Earliness was reported by Kalpana Dahatonde et al. (2010) and Dhaka and Soni (2012) in brinjal.

The accession Poiyur Purple showed the highest plant spread in East –West direction (159.5 cm) whereas North-South direction was observed in Spiny (152.0 cm). Similar results were obtained by Balaji Lokesh et al. (2013). Ujala (11.20 cm) produced

longest fruit and ACC 29 produced shortest fruit (4.3 cm) while maximum fruit girth was observed in Nagarcoil Local (16.8 cm). ACC 29 produced the fruits with lowest girth of 7.1 cm. The variation in fruit length and girth might be due to the genetic and environmental effect. The fruit with maximum average fruit weight was produced by Ochery Local (112.5 g). The higher fruit weight recorded in this accession might be attributed to large fruit size. The results are in consonance with Ramesh Singh and Vishwakarma (2009), Satesh Kumar et al. (2011) and Ramesh Kumar et al. (2012).

Among the thirty accessions, Maximum number of fruits per plant was produced by Marthandam Local -2 (68.38) followed by Seetipulam Local (68.25) and Manapparai Local (62.43). The highest fruit yield per plant was recorded in Marthandam Local -2 (3.12 kg) followed by Sevathampatti Local (3.04 kg), Seetipulam Local (2.76 kg) and Manapparai Local (2.72 kg). Generally, the increase in fruit yield in the present finding is attributed to number of fruits. These findings are in agreement with the results obtained by Omkar and Kumar (2005), Ramesh and Patil (2008), Dhineshkumar (2013) and Vidhya (2015).

The fruit and shoot infestation by the shoot and fruit borer decides the marketable yield. The accessions viz., Marthandam Local - 2 (10.0 %), Vettayamangalam Local (10.3 %), Thanjavur Local (10.4 %) and Seetipulam Local (10.8 %) recorded lesser incidence of shoot and fruit borer on shoot. The infestation of shoot and fruit borer on fruit was less in Marthandam Local -2 (15.43 %) followed by Seetipulam Local (16.45 %), Sevathampatti Local (18.81 %) and Spiny (19.23 %). The results are in consonance with Ahmad et al. (2009) and Dhineshkumar (2013). The highest marketable yield per plant was recorded in the accession Marthandam Local -2 (2.64 kg) followed by Sevathampatti Local (2.45 kg) and Seetipulam Local (2.39 kg). The lowest marketable yield was recorded by ACC 25 (0.35 kg) (Fig.1). The similar results were recorded by Vidhya (2015).

Protein content and ascorbic acid is an important nutritive quality trait in brinjal. The highest protein content was recorded by the accession Seetipulam Local (16.81 mg 100 g⁻¹) while the lowest protein content of fruit was recorded by Ottanchathiram Local (11.33 mg 100 g⁻¹). Ascorbic acid content of the fruit was high in Spiny (16.13 mg 100 g⁻¹) and the lowest content was reported by Manapparai Local (10.04 mg 100 g⁻¹). These results are in confirmation with the findings of Ramesh Kumar et al. (2012). The lowest solasodine content was found in Paramakudi Local (0.022 %) and the highest was measured in ACC 28 (0.044 %). Similar trend was observed by Dhruve et al. (2014).

Conclusion

The three accessions viz., Marthandam Local -2,

Sevathampatti Local, Seetipulam Local were found to be best for growth, yield and yield contributing characters with lesser incidence of shoot and fruit borer. Whereas the accession Seetipulam local was also found to be with highest protein content of fruit. Hence these three accessions could be used for further breeding programmes to develop hybrids/varieties with high yield and quality characters.

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