



P-ISSN: 2349-8528

E-ISSN: 2321-4902

IJCS 2018; 6(3): 292-297

© 2018 IJCS

Received: 11-03-2018

Accepted: 14-04-2018

K JayalakshmiM.Sc. Student, Department of
Vegetable Crops, HC & RI,
TNAU, Coimbatore, Tamil
Nadu, India**Dr. S Praneetha**Professor (Hort.), Department of
Vegetable Crops, HC & RI,
TNAU, Coimbatore, Tamil
Nadu, India

Evaluation of brinjal (*Solanum melongena* L.) local types for yield and its quality characters

K Jayalakshmi and Dr. S Praneetha

Abstract

Fifty local types of brinjal were collected from several districts of Tamil Nadu and various other sources were evaluated during September 2016 and February 2017 to assess the mean performance for yield and its quality characters. Among the genotypes, Sevanthampatty Local (123.23 cm) recorded highest plant height. Pachai Round (8.80) had the highest number of branches per plant. Karur Local and Udumalai Samba recorded earliest to first flowering (47.65 and 47.73 days), 50% flowering (55.20 and 55.31 days) and days to first harvest (66.81 and 67.03 days). Highest marketable yield per plant was recorded by Karur local (2.97 kg) followed by Udumalai Samba (2.86 kg). Similarly Karur Local (19.82 per cent) had lowest fruit borer infestation followed by Udumalai Samba (20.57 per cent).

Keywords: Evaluation, brinjal, quality and yield

Introduction

Brinjal (*Solanum melongena* Linn.) commonly known as eggplant/aubergine is an important vegetable belongs to the family Solanaceae. The crop owes its nativity to our country, so cultivation dates back to time immemorial. Brinjal is a popular vegetable, highly cosmopolitan and is considered as poor man's crop, thereby grown in almost all parts of India except higher altitudes, all round the year. In India, it is having a production of 134.43 lakh tonnes from an area of 7.22 lakh hectares and with a productivity of 18.6 tonnes per hectare. In Tamil Nadu, it is grown over an area of 11, 100 ha with 1.04 lakh tonnes of annual production during the year 2014-2015 (www.nhb.gov.in). Brinjal has high nutritive value when compared with tomato. It contains high amount of carbohydrates (6.4%), protein (1.3%), fat (0.3%), calcium (0.02%), phosphorus (0.02%), iron (0.0013%) and other mineral matters.

It also contains β -carotene (34 mg), riboflavin (0.05 mg), thiamine (0.05 mg), niacine (0.5 mg) and ascorbic acid (0.9 mg) per 100 g of fruit (Kandoliya *et al.* 2015). India is the centre of variation for brinjal and is recommended even for patients with diabetes, asthma, cholera and bronchitis (Medina *et al.* 2014) [13]. There are many traditional land races of brinjal with distinct morphological characters that are found in the Indian sub-continent. Hence a large indigenous biodiversity exists in the crop and significant variation has been found in plant type, stem colour, leaf size, leaf tip, midrib colour, thorniness, fruit size, fruit shape, fruit colour, fruit yield, fruit quality, cooking quality, tolerance to pests and diseases *etc.* which would help to evolve a superior type from the existing local types of brinjal. *Per se* performance is the true realized mean of recorded data and this is a direct estimate based on the observation and not on assumption. Selection of superior genotypes based on *per se* performance is more reliable data than any other parameter for crop improvement programme.

Materials and Methods

The present investigation was carried out at the Department of Vegetable Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore which is situated at 11° N latitude and 77° E longitude and at an elevation of 426.6 m above mean sea level. The experimental material consisted of 50 local types of brinjal, which was collected from several districts of Tamil Nadu and various other sources. The field experiments with fifty genotypes of brinjal were laid out in a randomized block design (RBD) with two replications. Each replication consisted of 10 plants. A total of five plants under each replication was selected at random and tagged for recording observations. The standard packages of practices and plant protection measures were adopted uniformly. All other recommended cultivation practices were followed

Correspondence

Dr. S PraneethaProfessor (Hort.), Department of
Vegetable Crops, HC & RI,
TNAU, Coimbatore, Tamil
Nadu, India

(Crop Production Techniques of Horticultural Crops, 2014). Observations were recorded on the biometrical and biochemical characters in all the genotypes of brinjal. The mean values were subjected to statistical analysis. The statistical parameters like mean, standard error and coefficient of variation were calculated as per the standard methods of analysis (Panse and Sukhatme, 1957) ^[17].

Results and Discussion

The success of any crop improvement programme depends on selection of superior genotypes. In this regard, fifty local types were evaluated for eighteen characters. Among the fifty local types highest plant height was recorded by

Sevanthampatty Local (123.23 cm) followed by Bavani Gold (122.47 cm). This is in accordance with Barsha Tripathy *et al.* 2017. Annamalai Local (68.51 cm) had lowest mean plant height. Pachai Round (8.80) had the highest mean value for more number of branches per plant.

And the lowest mean value for this trait was recorded by Dindigul Local (4.33) (Table. 1). Plant height is an important growth attributing character by which growth and vigour of plants are measured and number of branches per plant is another yield increasing trait in brinjal. This was in accordance with the results of Nirmala *et al.* (2013) ^[16] and Vidhya *et al.* (2015) ^[26].

Table 1: Mean performance of 50 brinjal genotypes for quality parameters

S. No.	Genotypes	DMC	PRO	ACA	TP	SOL
1	Poiyur Purple	7.18	11.11	10.65	1.22	0.042
2	Kangayampalayam local	7.29	10.41	9.29	1.06	0.039
3	Panamarathupatty local	7.37	11.20	7.27	1.04	0.039
4	Karur local	7.86	12.48	12.13	1.19	0.037
5	Nanthavana Kathiri	6.92	10.30	9.96	1.08	0.034
6	Kadavur Urundai	6.82	10.98	8.63	1.11	0.027
7	Annamalai local	7.03	11.69	11.00	1.18	0.040
8	Kanchipuram local	7.33	11.87	11.49	1.15	0.034
9	Vellore Mullu Kathiri	7.05	10.37	9.94	1.14	0.031
10	Ujala	7.48	10.48	11.51	1.18	0.034
11	Kannadi Kathiri	7.35	11.95	11.37	1.12	0.032
12	Salem Ootha	7.41	10.97	8.25	1.09	0.021
13	Salem Pachai	7.81	10.46	10.46	1.08	0.023
14	Salem Gundu	7.56	10.74	8.83	1.06	0.026
15	Salem Mullu Kathiri	7.27	11.17	7.45	1.07	0.040
16	Vazhapady local	7.31	10.49	8.28	1.07	0.036
17	Elavampady local	6.89	11.02	7.29	1.04	0.031
18	Cylinder Kathiri	6.82	10.38	8.95	1.06	0.024
19	Omalar local	7.56	11.00	10.27	1.10	0.020
20	Thevur local	7.50	10.53	8.84	1.04	0.023
21	Karamadai local	6.76	10.62	8.28	1.02	0.029
22	Udumalai Urundai	6.49	10.54	8.17	1.10	0.032
23	Udumai Samba	7.81	12.09	12.10	1.18	0.036
24	Negamam Vari Kathiri	6.76	10.80	8.48	1.09	0.023
25	Antipatty local	6.83	10.47	9.05	1.07	0.025
26	Bavani Gold	7.23	11.47	10.66	1.13	0.033
27	Gobi Pachai	7.00	10.34	10.04	1.10	0.029
28	Vilakkethi local	7.68	11.62	7.41	1.08	0.030
29	Manapparai local	7.84	10.18	11.63	1.09	0.033
30	Musiri local	7.25	10.72	8.55	1.01	0.032
31	Cuddalore local	7.47	10.87	8.55	1.13	0.028
32	Gundu Mullu Kathiri	6.53	10.31	7.46	1.10	0.024
33	Natham Keeri Kathiri	6.83	11.45	8.64	1.10	0.036
34	Odavai Pachai	6.77	11.38	9.97	1.11	0.032
35	Namakkal local	6.67	11.92	11.33	1.06	0.030
36	Kumbagonum Gundu Kathiri	6.81	11.89	11.20	1.15	0.031
37	Sevanthampatty local	7.49	10.41	10.30	1.10	0.031
38	Purple Round	7.25	10.68	9.43	1.06	0.025
39	Pachai Round	6.76	10.08	7.50	1.07	0.025
40	Kangayam Short	7.13	11.64	11.64	1.13	0.038
41	Virudhunagar local	6.79	11.21	11.09	1.17	0.022
42	Kangayam long	7.43	12.03	11.79	1.23	0.024
43	Dindigul local	6.97	10.09	11.63	1.10	0.025
44	Pachai Neelum I	6.68	9.86	11.68	1.23	0.030
45	Pachai Neelum II	6.98	9.82	9.93	1.14	0.028
46	Neelikonampalayam	6.37	9.32	10.38	1.16	0.029
47	Mettur local	7.16	11.12	11.43	1.12	0.024
48	Singampunari	7.09	10.93	11.37	1.23	0.038
49	Andarkulam	7.16	11.28	10.70	1.24	0.036
50	Valuthanai	7.03	10.48	10.50	1.23	0.025
	Mean	7.13	10.95	9.91	1.12	0.030
	SEd	0.16	0.17	0.19	0.03	0.003
	C.D (0.05)	0.32	0.35	0.39	0.07	0.005

DMC-Dry matter content per fruit	TP-Total phenols
PRO-Protein content	SOL-Solasodine content
ACA-Ascorbic acid content	

In brinjal, estimation of earliness is an advantageous character for selecting breeding lines for commercial importance. The earliest for days to first flowering was recorded by Karur Local (47.65 days) followed by Udumalai Samba (47.73 days) and Andipatty Local (47.73 days). Gopi Pachai recorded late flowering (54.55 days) (Table 1). Similar results of earliness in flowering were reported by Kant *et al.* (2013) [10]. Earliest to 50% flowering was recorded by Karur Local (55.20 days) followed by Udumalai Samba (55.31 days) and Kangayam

Short (67.97 days) was the late one for this trait (Table 1 and Fig.1). Similar results were cited by Chowdhury *et al.* (2010) [4] and Kalpana Dahatonde *et al.* (2010) [8]. Karur Local took 66.81 days for days to first harvest. This was followed by Udumalai Samba (67.03 days) and Valuthanai (75.99 days) took more days to first harvest (Table.1 and Fig.1). Similar results of earliness in first harvest was reported by Chowdhury *et al.* (2010) [4] and Nirmala *et al.* (2013) [16].

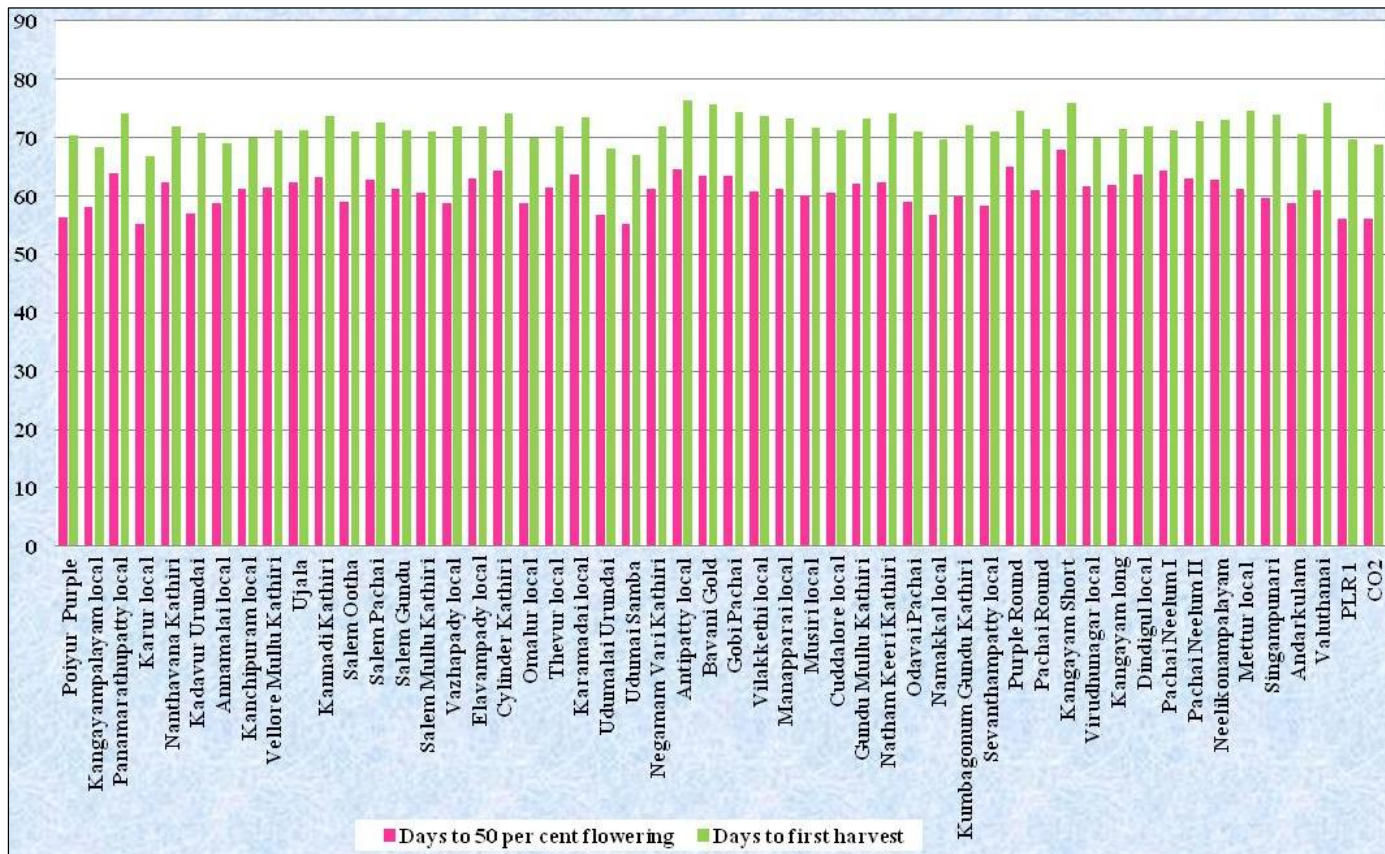


Fig 1: per se performance of brinjal local types for days to 50 percent flowering and days to first harvest

Fruit length, fruit girth and fruit weight are important parameters indirectly contributes towards the total yield. The highest fruit length was recorded by Valuthanai (17.49 cm). This was followed by Andarkulam Local (14.21 cm) and lowest fruit length was recorded in Gopi Pachai (7.31 cm). Andarkulam Local (25.16 cm) had maximum fruit girth and Dindigul Local (9.33 cm) recorded the lowest fruit girth. The highest fruit weight was recorded by Vellore Mullu Kathiri (104.84 g). This was followed by Manapaarai Local (89.47 g). Pachai Neelum I (43.64 g) had lowest mean fruit weight (Table 1). These findings are in agreement with the results obtained by Satesh kumar *et al.* (2011) [22], Kant *et al.* (2013) [10] and Solaimana *et al.* (2015) [24].

The maximum number of fruits per plant was 39.53 and 39.44 recorded by Karur Local and Udumalai Samba respectively.

Vellore Mullu Kathiri (27.76) recorded minimum number of fruits per plant ((Table 1 and Fig. 2). The increased fruit set might be due to more number of flower production, higher rate of anther dehiscence and higher pollen viability. This results are in confirmation with Kumar *et al.* (2013) [12], Solaimana *et al.* (2015) [24] and Vidhya *et al.* (2015) [26].

Karur Local (3.18 kg) registered highest fruit yield per plant. This was followed by Udumalai Samba (3.07 kg/plant) and Kannadi Kathiri (2.93 kg/plant). Gobi Pachai (1.39 kg/plant) registered lowest fruit yield per plant (Table 1 and Fig. 2). These findings are in agreement with the results obtained by Nirmala *et al.* (2013) [16], Praneetha *et al.* (2013) [16] and Akpan *et al.* (2016) [1].

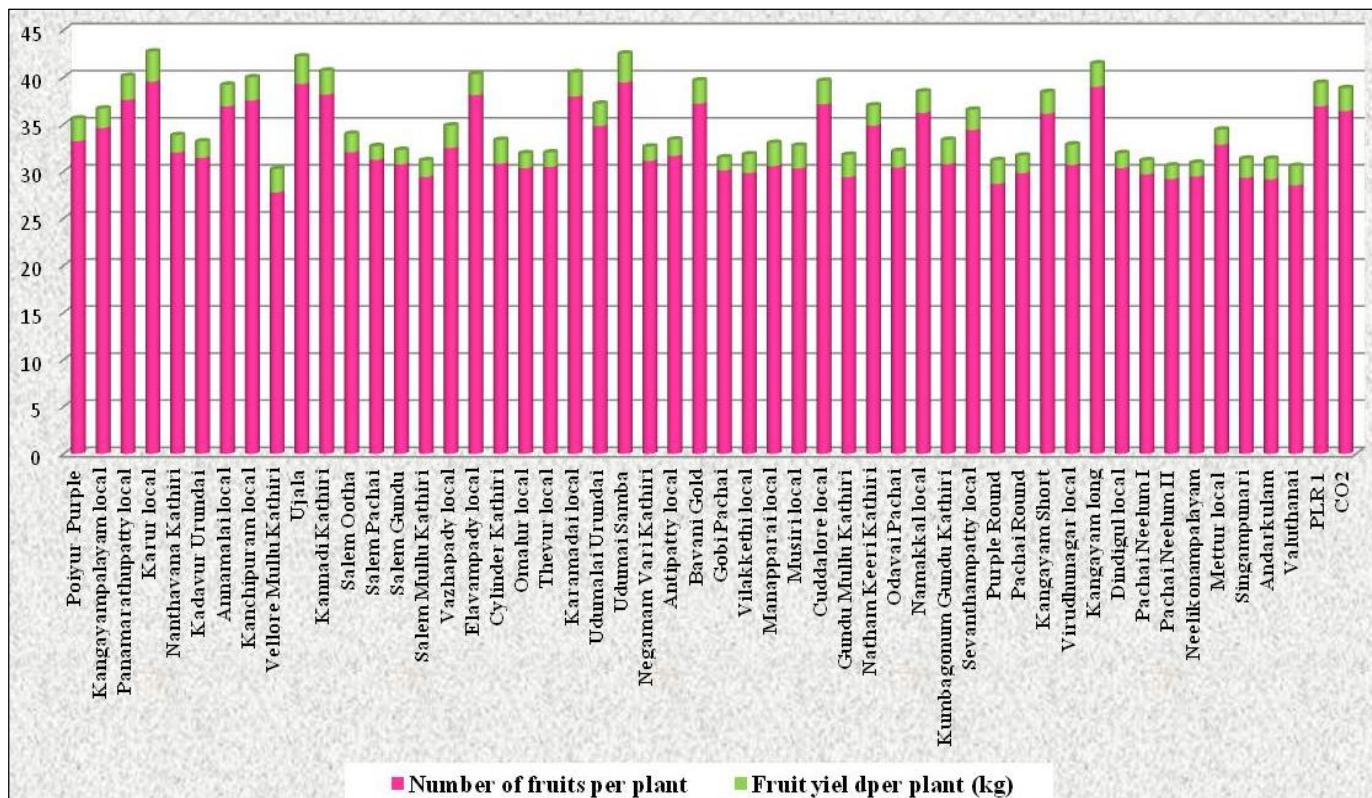


Fig 2: per se performance of local types for number of fruits per plant and fruit yield per plant (kg)

Karur Local (11.33 and 19.82 per cent) was least affected by shoot and fruit borer. This was followed by Udumalai Samba (11.61 and 20.57 per cent). The most shoot borer affected local type was Salem Gundu Kathiri (15.77 per cent) followed by Pachai Round (15.01 per cent). Highest fruit borer infestation was recorded by Salem Pachai (28.95 per cent) (Table 1 and Fig. 3). The results of the present study are in

confirmation with the findings of Niranjana *et al.* (2015) [15] and Vidhya *et al.* (2015) [26]. The highest marketable yield per plant was recorded by Karur local (2.97 kg) followed by Udumalai Samba (2.86 kg) and Kannadi Kathiri (2.74 kg). Pachai Neelum II (1.43 kg/plant) registered lowest marketable yield per plant (Table 1 and Fig. 3). Similar results were recorded by Roy Chowdhury *et al.* (2011) [3], Nirmala *et al.* (2013) [16] and Vidhya (2015) [26].

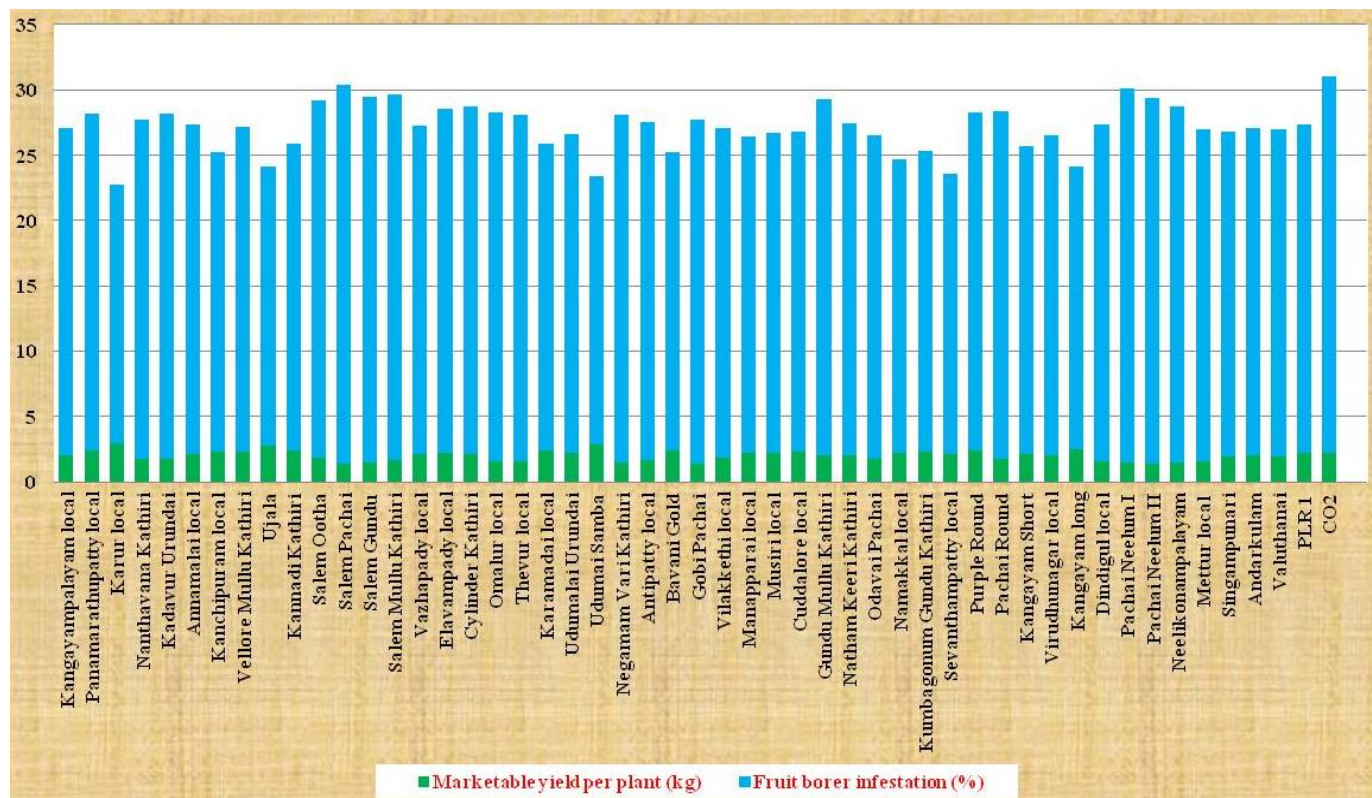


Fig 3: per se performance of local types for marketable yield per plant (kg) and fruit borer infestation (%)

Karur Local (7.86%) had the highest dry matter content per fruit. This was followed by Manapparai Local (7.84%) and Udumalai Samba (7.81%). The Lowest mean value for this trait were recorded by Neelikonampalayam Local (6.37%) and Udumalai Urundai (6.49%) (Table 2). Highest dry matter content was also reported by Jansirani (2000).

High protein content was recorded by Karur Local (12.48 mg/100g) and Udumalai Samba (12.09 mg/100g). The lowest protein content was recorded by Neelikonumpalayam Local (9.32 mg/100g) and Pachai Neelum II (9.82 mg/100g) (Table 2). Similar results were obtained by Prasad *et al.* (2014) [21].

Karur Local (12.13 mg/100g) recorded the highest ascorbic acid content. This was followed by Udumalai Samba (12.10 mg/100g), Kangayam Long (11.79 mg/100g) and Pachai Neelum I (11.68 mg/100g). Panamarathupatty Local and Elavampady Local recorded the least ascorbic acid content of 7.27 mg/100g and 7.29 mg/100g respectively (Table 2). This is in accordance with the findings of Sherly (2006) [23] and Kumar (2013) [12].

Andarkulam Local (1.24 mg/g) recorded the highest value for phenol content followed by Valuthanai (1.23 mg/g), Singampunari Local (1.23 mg/g), Kangayam Long (1.23mg/g) and Pachai Neelum I (1.23 mg/g) and Musiri Local (1.01 mg/g) had lowest total phenol (Table 2). Total phenols directly indicate the resistance for fruit borer in brinjal (Praneetha, 2003) [19]. Similar trend of higher total phenol content was observed in the genotypes studied by Prabhu (2004) [18], Sherly (2006) [23] and Suneetha *et al.* (2006) [25].

Poiyur Purple (0.042%) recorded the highest solasodine content. This was followed by Annamalai Local (0.040%) and Salem Mullu Kathiri (0.040%). Omalur Local (0.020%) recorded least value for solasodine content (Table 2). Generally, a bitter taste and off-flavour of brinjal fruits may be produced by higher content of glycoalkaloids. Similar trend was observed by Kaur *et al.* (2001) [11], Dhinesh kumar (2013) [12] and Dhruve *et al.* (2014) [6].

In the present investigation based on per se performance, the genotype Karur Local was adjudged as the best one among the fifty genotypes since, it has recorded superior performance for eight characters out of eleven characters studied *viz.* days to first flowering, days to 50% flowering, days to first harvest, number of fruits per plant, fruit yield per plant, marketable yield per plant, shoot borer infestation, fruit borer infestation, ascorbic acid content, protein content and dry matter content per fruit.

The other genotypes *viz.* Udumalai Samba, Kannadi Kathiri, Kangayam Long and Kanchipuram Local were also identified as good performers due to their better mean performance. In addition, Panamarathupatty Local, Ujala, Purple Round, Karamadai Local, Bavani Gold, Cuddalore Local, Poiyur Purple, Annamalai Local, Kangayam Short and Elavampady Local were also exhibited desirable performance over some important economic traits. Hence these genotypes could be better utilized for further breeding programme for the improvement of fruit yield.

Acknowledgement

The authors are thankful to Department of Vegetable Crops, Horticultural College and Research Institute, Coimbatore for providing all the facilities to conduct the research work successfully.

References

1. Akpan N, Ogbonna P, Onyia V, Okechukwu E, Atugwu I. Dominic. Studies on the variability and combining ability for improved growth and yield of local eggplant genotypes (*Solanum melongena* L.). Not. Sci. Biol. 2016; 8(2):226-231.
2. Barsha Tripathy, Dhananjay Sharma, Bhanu Pratap Jangde, Pappu Lal Bairwa. Evaluation of brinjal (*Solanum melongena* L.) genotypes for growth and yield characters under Chhattisgarh condition. The Pharma Innovation Journal. 2017; 6(10):416-420
3. Chowdhury R, Roy S, Tah J. Estimation of heritable components of variation and character selection in eggplant (*Solanum melongena* L.). For mutation breeding programme. Continental J Biol. Sci. 2011; 4(2):31-36.
4. Chowdhury MJ, Ahmad S, Nazim Uddin M, Quaruzzaman AKM, Patway MMA. Expression of heterosis for productive traits in F₁ brinjal (*Solanum melongena* L.) hybrids. Agriculturists. 2010; 8(2):8-13.
5. Dhineshkumar S. Evaluation of brinjal (*Solanum melongena* L.) local types of Tamil Nadu for yield, quality and shoot and fruit borer resistance. M.Sc. (Hort.) Thesis. Tamil Nadu Agricultural University, Coimbatore, 2013.
6. Dhruve JJ, Rutika Shah, Swati Gandhi, Talati JG. Biochemical and morphological traits of different cultivars of brinjal fruits growing in Anand (Gujarat). Indian J Agric. Biochem. 2014; 27(2):211-214.
7. Jansirani P. Studies on heterosis and combining ability in brinjal (*Solanum melongena* L.). Ph.D (Hort.) Thesis, Tamil Nadu Agricultural University, Coimbatore, 2000.
8. Kalpana Dahatonde VN, Dod Nagre PK, Wag AP. Genetic Variability in purple fruited brinjal. Asian J. Hort. 2010; 5(2):367-370.
9. Kandoliya UK, Bajaniya VK, Bhadja NK, Bodar NP, Golakiya BA. Antioxidant and nutritional components of eggplant (*Solanum melongena* L) fruit grown in Saurashtra region. Int. J Curr. Microbiol. App. Sci. 2015; 4(2):806-813.
10. Kant K, Singh KP, Singh VK, Ranjan A. Varietal performance of round fruited F₁ hybrid of eggplant (*Solanum melongena* L.) in East Bihar. The Asian J. Hort. 2013; 8(1):383-384.
11. Kaur J, Patel JA, Patel MJ, Acharya RR, Bhanvadia AS. Heterosis for fruit yield and its components in brinjal. Capsicum and Eggplant Newsletter. 2001; 20:102-105.
12. Kumar SR, Arumugam T. Phenotypic evaluation of indigenous brinjal types suitable for rainfed conditions of South India (Tamil Nadu). African J Biotech. 2013; 12(27):4338-4342.
13. Medina GN, Rangel DM, Bejar AG, Aguilar GG, Heredia B, Sanudo MB *et al.* Nutritional and nutraceutical components of commercial eggplant types grown in Sinaloa, Mexico. Not. Bot. Hort. Agrobo. 2014; 42(2):538-544.
14. NHB. Horticulture Data Base. National horticulture board, Ministry of Agriculture, Government of India, 2015.
15. Niranjana RF, Devi M, Shanika W, Philip Sridhar R. Influence of biophysical characteristics of brinjal varieties on the infestation of brinjal shoot and fruit borer, *Leucinodes Orbonalis* Guenee. J Univ. Ruhuna. 2015; 3(1):21-28.
16. Nirmala N, Praneetha S, Manivannan N. *Per se* performance of cluster bearing, glossy purple Brinjal

- (*Solanum melongena* L.) hybrids for economic traits. *Elect. J Plant Breed.* 2013; 4(2):1188-1192.
17. Panse VG, Sukhatme PV. *Statistical Methods for Agricultural Workers.* Indian Council of Agricultural Research, New Delhi, 1957, 97.
 18. Prabhu M. Breeding for high yield with shoot and fruit borer (*Leucinodes orbonalis* guen.) resistance in brinjal (*Solanum melongena* L.). Ph.D. (Hort.) Thesis. Tamil Nadu Agricultural University, Coimbatore, 2004.
 19. Praneetha S, Saraswathy T, Veeraragavathatham D, Pugalendhi L. *Per Se* performance and heterosis for shoot and fruit borer (*Leucinodes orbonalis* G.) resistance and yield in brinjal (*Solanum melongena* L.). *Elect. J Plant Breed.* 2003; 4(1):1061-1066.
 20. Praneetha S, Saraswathy T, Veeraragavathatham D, Pugalendhi L. *Per Se* performance and heterosis for shoot and fruit borer (*Leucinodes orbonalis* G.) resistance and yield in brinjal (*Solanum melongena* L.). *Electronic journal of plant breeding.* 2013; 4(1):1061-1066.
 21. Prasad TV, Rakesh Bhardwaj KK, Gangopadhyay M, Arivalagan MK, Bag Meena BL *et al.* Biophysical and biochemical basis of resistance to fruit and shoot borer (*Leucinodes orbonalis* Guennee) in eggplant. *Indian J Hort.* 2014; 71(1):67-71.
 22. Satesh Kumar, Sharma JP, Sandeep Chopra. Studies on variability, heritability and genetic advance for morphological and yield traits in brinjal (*Solanum melongena* L.). *Mysore J Agric. Sci.* 2011; 45(1):63-66.
 23. Sherly J. Evaluation of local types of brinjal (*Solanum melongena* L.). M.Sc. (Hort.) Thesis. Pandit Jawaharlal Nehru College of Agriculture and Research Institute, Karaikal, 2006.
 24. Solaimana AHM, Nishizawa T, Khatun M, Ahmad S. Physio-morphological characterization genetic variability and correlation studies in brinjal genotypes of Bangladesh. *Computational and Mathemat. Biol.* 2015. 4(1): 23-28.
 25. Suneetha Y, Kathiria KB, Kathiria PK, Srinivas T. Studies on heterosis for yield, quality and physiological characters in summer brinjal. *Crop Res.* 2006; 31(1):120-124.
 26. Vidhya C, Kumar N. Studies on Correlation and Path Coefficient Analysis in Brinjal (*Solanum melongena* L.). *Trends in Biosci.* 2015; 8(6):1560-1562.