

Original Research Article

Mean performance of brinjal (*Solanum melongena L.*) genotypes for high yield and fruit and shoot borer tolerance

ABSTRACT

Seventeen genotypes of brinjal were collected from various places of Tamil Nadu and evaluated during 2022 for high yield and fruit and shoot borer tolerance. Based on the *per se* performance of the genotypes, CBE SM-006 was adjudged as the best one since, it has recorded superior performance for the characters studied *viz.*, number of branches, fruit weight, number of fruits per plant, fruit yield per plant. Also, CBE –SM-006 found to have minimum fruit borer infestation and shoot borer infestation hence providing maximum marketable yield per plant. The genotype CBE-SM-105 also performed the best for most of the desirable characters .Thus, CBE-SM-006 could be a promising genotype for further breeding programme.

Key Words: Genotype, brinjal, yield, mean.

Introduction

Brinjal (*Solanum Melongena L inn .*) is a vital crop of India which belongs to the family Solanaceae with a chromosome number of $2n=24$. It is one of the most common, versatile, popular and principal vegetable crop grown throughout the country. Internationally, it is also referred as eggplant / aubergine / poor man's crop. It is probably originated in India and secondary diversity of origin is believed to be in South East Asia (Rameshkumar *et al .*, 2021)

In India it is cultivated in an area of 7,36,000 ha with production of 1,27,77,000 MT as per the data of National Horticulture Board 2019-2020 (2nd advance estimate) (www.nhb.gov.in). The major countries cultivating brinjal around the world are India, Bangladesh, china, Pakistan, Nepal, U.S.A, Sri Lanka, Cyprus, Egypt, Japan, Philippines, Syria and other tropical countries. The major brinjal producing states in India are West Bengal, Orissa, Bihar, Karnataka, Andhra Pradesh, Maharashtra, Uttar Pradesh and Tamil Nadu. In case of Tamil Nadu, it is grown in almost all the districts and intensively in Coimbatore, Dindigul, Salem, Cuddalore,

Kancheepuram, Madurai, Namakkal, Thirunelveli, Thiruvallur, Thiruvanamalai and Erode districts. (Akshay *et al.*.,2018) .

Brinjal play a vital role to achieve the nutritional security through vegetables (Kumar *et al.*,2019). It is rich in minerals like iron (0.0013%), phosphorous(0.02%), calcium(0.02%) and other vitamins like β -carotene(34 mg), riboflavin(0.05 mg), thiamine 90.05mg), niacin (0.5mg) and ascorbic acid (0.9 mg) per 100 g of fruit (Kandoliya *et al.*, 2015).

From region to region and locality to locality, the consumer preference varies a lot among various genotypes. Hence, it becomes important to evaluate the genotypes for wider adaptability, acceptance as per consumers choice. In Tamil Nadu the consumers choice depends on fruit size, fruit shape, color, taste etc. Information regarding the range of variability present with respect to different quantitative characters is of higher importance in their crop improvement programme. The success of phenotypic selection depends upon the genetic variability range present in the population. Hence, identifying genotypes with greater variability will serve as a potential genotypes for further generations. Also, it is not only about obtaining higher yield for the selection of brinjal genotypes since, yield is a complex character. So the selection is influenced by many component characters (Dineshkumar *et al.*, 2013). Hence, the present investigation is used to evaluate and select the brinjal genotypes based on various quantitative and variability parameters.

Material and methods

The present investigation is carried at Horticultural College orchard, Tamil Nadu Agricultural University, Coimbatore during 2021-2022 which is situated at 11.5 ° latitude and 79.8° longitude and at an elevation of 426.6 m above sea level. The experimental design was Randomized Block Design with three replications. The experimental materials consisted of seventeen genotypes *viz.*, CBE -SM-083, CBE -SM-084, CBE -SM-085, CBE -SM-086, CBE -SM-93, CBE -SM-006, CBE -SM-104, CBE -SM-105, CBE -SM-106, CBE -SM-107, CBE -SM-108, CBE -SM-109, CBE -SM-110, CBE -SM-111, CBE -SM-112 which are local types and two checks *viz.*, CO 2 and PLR-1 collected from various districts of Tamil Nadu. Randomized block design was followed with three replications and the crop was raised during Kharif 2021.

The sterilized cocopeat (300kg) is mixed with 5 kg neem cake along with Azospirillum and phosphobacteria each 1 kg. Overnight soaked brinjal seeds are sown in pro-tray at 1 seed per cell. Then, the portrays are kept one over the other and covered with polythene sheets and left undisturbed for 3-4 days. Once germination starts they are kept individually on the raised beds inside the shadenet. Everyday the portrays are watered with rose-can and after 18 days after sowing it is drenched with 19:19:19 @ 0.5% (5g/l) . Plant protection measures were undertaken.

The seedlings at the age of 30 days are transplanted to the main field at the spacing of 60*60 cm. The average temperature , relative humidity, and light intensity recorded during the cropping period were 34.5° c, 63% and 34044 .54 respectively. All the package of practices were followed as per the standards given in the crop production guide 2019 prepared by TNAU (Anonymous 2019).

Data collection and statistical analysis

Observations were recorded on the growth and yield parameter's like plant height, number of branches per plant, days to flowering, days to 50 %flowering , days to first harvest, fruit length , fruit girth, fruit weight, number of fruits per plant, fruit yield per plant, shoot borer infestation, fruit borer infestation, marketable yield per plant. The mean values were subjected to statistical analysis.

Results and Discussion

The successful selection of genotypes depends in the selection of suitable parents. From long time, breeders use high mean values, which is considered and accepted as a basis for selection. In this concern, seventeen genotypes which were collected from different geographical location were evaluated for 13 characters. The mean performance of all seventeen brinjal types is given in table 1.

Plant Height

Plant height is considered as one of the vital character for growth and vigour of the plants. In this experiment, the plant height ranged between CBE -SM-093 (95.15) and CBE -SM-083 (62.93). The genotype CBE-SM-093 was taller (95.15 cm) followed by the genotype CBE-

SM-105. This results was in line with results of (Rai *et al.*, 2000). Similar findings was reported by (Kannan *et al.*,2017) .

Number of branches per plant

Number of branches per plant is another important character in brinjal which leads to increasing the yield. In this character, CBE -SM-006 (7.7) recorded the maximum number of branches followed by CBE –SM- 110 (6.72). This was in accordance with the results of Vidhya and Kumar (2015).

Days to first flowering

Earliness is considered as one of the most important characters in any crop improvement programme, and most of the germplasms are preferred when higher yield coupled with earliness. The present study also projected with significant earliness in days to first flowering. The genotype CBE-SM-086 recorded the least number of days to first flowering 29.9 days followed by CBE-SM-006 (30.01). The genotype CBE-SM-093 recorded the maximum days to flower 51.50 days. Similar findings was reported in Kumar and Arumugam *et al.*(2013) .

Days to first harvest

Days to first harvest was ranged from 49.41 to 72.05 days with CBE-SM-111 showing the least value of 49.41 days followed by the accession CBE-SM-006 with 50.19 days (Table 1). The accession CBE-SM-108 took around 72.05 days for first harvest is the maximum. Similar results were cited by Nirmala *et al.* (2013).

Fruit length and Fruit girth

Fruit length is an important character to be considered to select a brinjal type exhibiting high yield indirectly. The longest fruits were observed in the accession CBE –SM-083 (13.81 cm) followed by CBE-SM-006 (13.80 cm) and the lowest in CBE-SM-085 (9.33 cm). Greater fruit girth was recorded highest in the round type fruits. CBE-SM-084 (18.60 cm) was found to have the highest value of fruit girth among the accessions followed by the accession CBE-SM-106 (13.73 cm) and the range was between 18.6 cm to 10.05 cm.

Fruit weight and Number of fruits per plant

The individual fruit weight was found to be highest in the genotype CBE-SM-006 (48.71 g) and CBE-SM-109 (36.89 g) recorded the minimum fruit weight (Table 1). Number of fruits per plant is the prime criterion for yield contributing characters and it is found to be

influence the yield indirectly. CBE-SM-006 beared the maximum number of fruits (54.19) and the least was found in CBE-SM-086 (21.03). These findings are in agreement with the results obtained by Kannan *et al.*(2017).

Fruit yield per plant

Among the seventeen genotypes investigated in the present study, the highest yield per plant is CBE-SM-006 (2.73 kg) and the least yield per plant is obtained in CBE-SM-086 (0.81 kg). Also, marketable yield was also the maximum in CBE-SM-006 (2.02 kg) which is the maximum among all the accessions. CBE-SM-086 showed the least marketable yield per plant (0.55 kg).

Shoot borer infestation and Fruit borer infestation

The shoot borer infestation was found to be least in CBE-SM-006 with 13.67 % and fruit borer infestation also found to be less around 12.28 %. Similar results were cited by Jayalakshmi and Praneetha *et al.* (2018).

Conclusion

In respect to fruit yield per plant, the accessions CBE-SM-006 excelled the best followed by CBE-SM-105. CBE-SM-086 showed the least marketable yield per plant (0.55 kg). Highest marketable yield in CBE-SM-06 may be due to the very less fruit and shoot borer infestation comparing to the other genotypes. The stability of the above best genotypes CBE-SM-006 and CBE-SM-105 can be assessed and these genotypes can be used for further breeding programme for improvement.

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Table 1: Mean performance of brinjal genotypes for growth and yield parameters

ACC NO	PH	NOB	DFF	50%F	DFH	FL	FG	FW	NOF	FYP	SI	FI	MYP
CBE -SM-083	62.93	4.91	46.94	56.59	62.91	13.81	13.71	43.57	50.09	2.28	13.67	12.28	1.77
CBE -SM-084	83.34	5.10	30.50	42.25	50.57	12.22	18.60	40.12	49.98	2.12	14.11	15.04	1.61
CBE -SM-085	70.89	5.40	30.50	42.50	50.95	9.33	13.19	45.34	46.57	2.22	15.00	14.00	1.57
CBE -SM-086	74.13	5.19	29.90	40.17	49.83	10.17	12.95	37.71	21.03	0.81	16.00	15.00	0.55
CBE -SM-093	95.15	6.50	51.50	60.11	71.71	10.66	13.56	43.21	46.01	2.01	15.00	14.00	1.44
CBE -SM-006	85.60	7.70	30.01	40.35	50.19	13.80	12.05	48.71	54.19	2.73	13.67	12.28	2.02
CBE -SM-104	81.94	4.70	45.21	56.23	60.52	10.25	11.42	42.23	49.61	2.23	15.41	14.65	1.55
CBE -SM-105	86.12	7.50	34.12	46.03	59.08	12.14	10.81	46.91	52.88	2.57	13.88	13.98	1.85
CBE -SM-106	79.50	4.95	32.02	43.70	54.80	11.64	13.73	41.53	48.97	2.14	15.00	14.34	1.51
CBE -SM-107	75.10	5.60	34.10	44.50	52.00	13.74	12.71	38.82	47.09	1.92	16.00	15.40	1.34
CBE -SM-108	85.12	6.60	50.17	60.20	72.05	12.56	12.10	39.98	51.42	2.27	14.00	13.98	1.63
CBE -SM-109	68.60	5.20	30.12	43.82	51.81	11.43	11.15	36.89	22.39	0.92	16.00	15.80	0.65
CBE -SM-110	71.68	6.72	41.91	53.88	63.85	10.67	10.16	41.66	49.90	2.19	14.11	13.04	1.59
CBE -SM-111	73.70	5.67	30.12	42.62	49.41	11.72	12.45	43.28	47.08	2.13	14.00	15.90	1.69
CBE-SM-112	84.72	5.02	30.56	43.12	59.97	12.12	10.05	38.53	21.17	0.82	15.00	14.80	0.68
C0-2	83.50	4.80	45.12	57.20	66.15	9.89	12.75	42.87	47.09	2.13	16.00	14.56	1.47
PLR-1	80.20	5.60	44.21	56.31	65.32	10.45	11.43	41.21	46.17	2.12	14.00	13.98	1.52
Mean	78.95	5.72	37.47	48.80	58.30	11.56	12.52	41.92	44.21	1.98	14.76	14.30	1.44
Sed	7.77	0.91	7.86	7.29	7.53	1.35	1.89	3.08	10.74	0.55	0.86	1.02	0.41

PH-Plant height

NOB-Number of branches plant

DFF-Days to first flowering

D 50 %F-Days to 50% flowering

DFH-Days to first harvest

FL-Fruit length

FG-Fruit girth

FW-fruit weight

NOF-Number of fruits plant

SI-Shoot borer infestation

FI-Fruit borer infestation

MYP-marketable yield plant