



P-ISSN: 2349-8528

E-ISSN: 2321-4902

www.chemijournal.com

IJCS 2020; 8(4): 3230-3236

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Received: 23-05-2020

Accepted: 24-06-2020

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Mean performance of growth, yield and quality parameters of parents and F₁ hybrids of pooled data in brinjal (*Solanum melongena* L.) over coastal Andhra Pradesh conditions

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DOI: <https://doi.org/10.22271/chemi.2020.v8.i4an.10152>

Abstract

The present study was conducted to assess the general combining ability effects of parents and specific combining ability effects of hybrids for qualitative and quantitative traits and explore their use in hybrid development. Twenty one eggplant hybrids generated by 7 × 7 half diallel and evaluated along with their 7 parents and 2 checks. Seven elite parents viz., Pennada, EC-169084, Bhagyamati, Babajipet-1, Babajipet-2, EC-169089 and Tuni Local were crossed in half-diallel fashion and the resultant 21 hybrids along with parents and two checks viz., Arka Anand and VNR-51 were evaluated for combining ability, heterosis and stability at three locations viz., Nuzvid, Pandirimamidi and Venkataramannagudem during summer, 2017-18. Data were recorded on nineteen quantitative traits viz., plant height, number of primary branches per plant, days to first flowering, days to 50% flowering, days to first harvest, days to final harvest, number of flowers per cluster, number of fruits per cluster, fruit length, fruit girth, fruit length to girth ratio, average fruit weight, number of fruits per plant, fruit yield per plant, fruit yield per plot, fruit yield per hectare, phenols, ascorbic acid and fruit borer damage percentage. A perusal of *per se* performance revealed that crosses Bhagyamati x EC-169084 (3.45 kg), Pennada x EC-169084 (3.05 kg), Bhagyamati x EC-169089 (2.94 kg), EC-169084 x EC-169089 (2.87 kg), Babajipet-1 x EC-169089 (2.79 kg) and Babajipet-2 x EC-169089 (2.79 kg) were the most promising F₁s for fruit yield per plant and other desirable traits over two checks, Arka Anand (2.52 kg) and VNR-51 (3.06 kg). Significant standard heterosis over two checks with regard to fruit yield and its components was exhibited by the crosses viz., Bhagyamati x EC-169084, Pennada x EC-169084 and Bhagyamati x EC-169089 in positive direction. Thus, it is concluded that four hybrids viz., Pennada x EC-169084, Bhagyamati x EC-169084, Bhagyamati x EC-169089 and EC-169084 x EC-169089 exhibited stable performance with desirable *per se* performance, *sca* effects and heterosis for fruit yield and other important traits.

Keywords: Brinjal, mean performance, and over environments

Introduction

Brinjal (*Solanum melongena* L.) is very important and popular vegetable crop which is a self-pollinated, annual herbaceous versatile crop adapted to different agro-climatic regions and grown throughout the year. Brinjal originated in India and major brinjal growing states in India are Andhra Pradesh, Karnataka, Maharashtra, Orissa, Bihar, Uttar Pradesh, Gujarat and West Bengal. The fruits of brinjal are widely consumed in various culinary preparations and are rich source of protective nutrients (Hedges and Lister) [2]. In the face of increasing population, there is a need for increased production and productivity levels of brinjal. In achieving the nutritional security through vegetables, brinjal crop also play a vital role. However, the present production and productivity of brinjal is not sufficient enough to meet the nutritional security of increasing population. The success of any breeding programme depends on the selection of parents together with information regarding nature of gene action controlling the various characters. Application of biometrical techniques like diallel analysis has appeared to be the immensely useful breeding tool, which gives generalized picture of genetics of the characters under study. Studies on combining ability help to identify the best parents and provide genetic information on the inheritance pattern of characters. The superiority of parents may not depend so much on their superior *per se* performance but in their ability to transmit desirable genes to

their progenies. Therefore, combining ability analysis was a powerful tool to discriminate the good and poor combiners. This analysis also furnishes useful information on nature of gene action involved for the expression of various quantitative characters, which can be utilized for planning an effective breeding programme.

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The superiority of parents may not depend so much on their superior per se performance but in their ability to transmit desirable genes to their progenies. Therefore, combining ability analysis was a powerful tool to discriminate the good and poor combiners. This analysis also furnishes useful information on nature of gene action involved for the expression of various quantitative characters, which can be utilized for planning an effective breeding programme. The main objective of this part of study was to identify the parents with better potential to transmit the desirable characteristics to the progenies and to sort out the best specific hybrids for yield and its component characters.

Materials and Methods

The present experiment was carried out at College of Horticulture, Venkataramannagudem, Horticultural Research Station, Pandirimamidi and Horticultural Research Station, Nuzvid during the period from January, 2017 to July, 2018. The experimental material consisted of seven parents namely, Pennada, Bhagyamati, EC-169084, Babajipet-1, Babajipet-2, EC-169089 and Tuni local and their 21 hybrids derived from 7 x 7 diallel (excluding reciprocal) mating design. The hybrids and parents were evaluated along with the two checks namely, Arka Anand and VNR-51 in a randomized block design with three replications. Each plot consisted of twenty four plants in a row at 90 x 75 cm inter and intra row spacing. All the recommended package of practices were adopted for raising a healthy crop. Five randomly selected plants, excluding the border ones, from each plot of all the three replications were tagged and used for recording the observations and average values were computed. The data recorded for 19 biometrical traits namely, plant height, number of primary branches per plant, days to first flower, days to 50 % flowering, days to first harvest, days to final harvest, fruit length(cm), fruit girth(cm), fruit length to girth ratio, fruit weight(g), fruits per plant, fruit yield per plant(g), fruit yield per plot, fruit yield per hectare, fruit borer damage per cent, ascorbic acid content and Total phenol (mg g⁻¹). Days to 50 per cent flowering noted by number of days from transplanting to first flowering in 50 % of plants in a entry. Observations on plant height, primary branches per plant at last picking. In contrast, data on fruit length, fruit girth, fruit weight, fruits per plant and fruit yield per plant was obtained for each picking and the total was computed. The observations on ascorbic acid content and total phenols were recorded on five random fresh fruits, taken from each genotype in each replication and the mean values were calculated. Estimates of ascorbic acid and total phenols were obtained following the standard procedures. The mean data of all recorded observations was made and replication-wise

mean data of the characters was analyzed through standard statistical procedures (Panse and Sukhatme, 1985)^[5].

Results and Discussion

Plant height (cm)

Significant variation was observed with respect to mean plant height which ranged from 92.17 to 143.04 cm in pooled analysis (Table 1). Grand mean of the genotypes was 121.05 cm. EC-169089 was dwarfest (92.17 cm) genotype, which was on par with Tuni Local (98.22 cm) but was significantly dwarfed than Bhagyamati (103.07 cm). EC-169084 x Babajipet-2 was the tallest (143.04 cm) F₁ hybrid, followed by Pennada x EC-169084 (139.53 cm), which were on par with each other and significantly superior to the two commercial checks.

Number of primary branches per plant

Pooled analysis over three locations revealed that, genotypes differed significantly for number of primary branches per plant and it ranged from 8.83 (Babajipet-2 x Tuni Local) to 12.23 (Pennada x EC-169084) with an overall mean of 10.26 (Table 1). Pennada x EC-169084 (12.23) was significantly superior to both the checks *i.e.* VNR-51 (11.48) and Arka Anand (10.07)

Days to first flowering

Pooled analysis over three locations revealed that, genotypes differed significantly for days to first flowering and it ranged from 34.47 (EC-169089 x Tuni Local) to 45.41 (Pennada) with an overall mean of 40.17. EC-169089 x Tuni Local (34.47) was on par with the best check VNR-51 (35.41) (Table 1).

Days to 50% flowering

Pooled analysis over three locations revealed that, parents and F₁ hybrids differed significantly for days to 50% flowering and it ranged from 43.11 (EC-169089 x Tuni Local) to 54.54 (Pennada x EC-169084) with an overall mean of 48.75 (Table 1). EC-169089 x Tuni Local (43.11), was on par with the best check VNR-51 (45.21).

Days to first harvest

Mean days to first harvest among the genotypes over the locations revealed that the parents and F₁ hybrid varied from EC-169089 x Tuni Local recorded the lowest number of days (50.05) and Pennada recorded the maximum days (65.56). Grand mean of the genotypes was 57.19 days. In case of parents the mean days taken to first harvest varied from 51.64 (EC-169089) to 65.56 (Pennada), while in F₁ hybrids it ranged from 50.05 (EC-169089 x Tuni Local) to 64.69 (Pennada x EC-169084). EC-169089 x Tuni Local (50.05) took least number of days for first harvest, followed by EC-169089 (51.64) and on par with best check VNR-51 (51.71) (Table 1).

6 Days to final harvest

Mean days to final harvest among the parents and F₁ hybrids over the locations revealed that the F₁ hybrid *i.e.*, Pennada x Babajipeta-2 recorded the highest number of days (194.12) and EC-169089 x Tuni Local recorded the lowest days (155.05) with a grand mean of 179.30 days. In case of parents, the mean days taken to final harvest varied from 160.57 (EC-169089) to 182.23 (EC-169084), while in F₁ hybrids, it exhibited a range from 155.05 (EC-169089 x Tuni Local) to 194.12 (Pennada x Babajipeta-2). F₁ hybrids *i.e.*,

Pennada x Babajepeta-2 (194.12), Pennada x Babajepeta-1(191.25), EC-169084 x Babajepeta-1(189.57) and Pennada x EC-169084 (189.40) were on par with best check VNR-51 (187.23 days) (Table 1).

Number of flowers per cluster

Pooled analysis over three locations revealed that, among all the parents and F₁ hybrids tested, the number of flowers per cluster ranged from 3.18 (Tuni Local) to 5.71 (Pennada x EC-169084) with an overall mean of 4.31. The range was wide from 3.18 (Tuni Local) to 5.39 (EC-169084) among the parents. The F₁ hybrids showed a range of 3.28 (Babajepeta-1 x Tuni Local and Bhagyamati x Tuni Local) to 5.71 (Pennada x EC-169084). The Pennada x EC-169084 (5.71) was on par with best check VNR-51 (5.33) (Table 1).

Number of fruits per cluster

Pooled analysis over three locations revealed that, among all the parents and F₁ hybrids tested, the number of fruits per cluster ranged from 1.58 (Tuni Local) to 4.58 (Bhagyamati x EC-169084) with an overall mean of 2.99. The range was from 1.58 (Tuni Local) to 4.05 (EC-169084) among the parents. The F₁ hybrids showed a range of 2.02 (EC-169089 x Tuni Local) to 4.58 (Bhagyamati x EC-169084) (Table 1). Two F₁ hybrids *viz.*, Bhagyamati x EC-169084(4.58) and Pennada x EC-169084 (4.54) were significantly superior to the check VNR-51 (4.51).

Fruit length (cm)

For fruit length, all the parents and F₁ hybrids tested differed significantly from one another over the locations. The parent Pennada had minimum fruit length (7.79 cm) followed by EC-169084 (10.01 cm) and both were on par with each other, while the F₁ hybrids Babajipet-2 x EC-169089 had the longest (14.61 cm) fruits than others over all locations. Grand mean of the parents and F₁ hybrids over locations was 11.96 cm. Among all F₁ hybrids, only eight F₁ hybrids *viz.*, Babajipet-2 x EC-169089 (14.61 cm) followed by Babajipet-2 x Tuni Local (13.54 cm), Babajipet-1 x Tuni Local (12.81 cm), Bhagyamati x Tuni Local (13.23 cm), Bhagyamati x EC-169089 (13.93 cm), EC-169084 x EC-169089 (13.26 cm), Babajipet-1 x EC-169089 (13.62 cm) and EC-169089 x Tuni Local (14.43 cm) and were on par with one another and significantly superior to over check VNR-51 (11.67 cm) (Table 2).

Fruit girth (cm)

Pooled analysis over three locations revealed that significant variation was noticed among the parents and F₁ hybrids with respect to fruit girth (Table 2), which ranged from 7.60 to 20.86 cm with an overall mean of 13.80 cm over the locations. Maximum fruit girth was recorded in the Babajipet-2 x Tuni Local (20.86 cm) followed by Babajipet-1 x Tuni Local (18.06 cm), Bhagyamati x Tuni Local (17.68 cm), Babajipet-1 x Babajipet-2 (17.33 cm) and EC-169089 x Tuni Local (17.06 cm), which were on par with one another and significantly superior to the check VNR-51 (14.03cm), while the F₁ hybrid Pennada x EC-169084 recorded the minimum fruit girth (7.60 cm) over the locations.

Fruit length to girth ratio

Pooled analysis over three locations revealed that among all the parents and F₁ hybrids tested, the fruit length to girth ratio ranged from 0.65 (Babajipet-2 x Tuni Local) to 1.30 (Pennada x EC-169084) with an overall mean of 0.90 (Table 2). The range was 0.71 (Tuni Local) to 1.03 (EC-169084) among the

parents. The F₁ hybrids showed a range of 0.65 (Babajipet-2 x Tuni Local) to 1.30 (Pennada x EC-169084).

Average fruit weight (g)

In pooled analysis, all the parents and F₁ hybrids differed significantly for average fruit weight and it varied from 40.56 to 90.25 g with a grand mean of 67.34 g over all locations (Table 2). The F₁ hybrid EC-169089 x Tuni Local (90.25 g) recorded maximum fruit weight followed by Babajipet-2 x EC-169089 (85.01 g) and these two were on par with each other. Pennada (40.56 g) recorded minimum fruit weight. Only EC-169089 x Tuni Local (90.25 g) was found superior to the check VNR-51 (85.54 g) over all locations.

Number of fruits per plant

Pooled analysis over three locations revealed that among all the parents and F₁ hybrids tested, the number of fruits per plant ranged from 15.22 (Tuni Local) to 70.21 (Pennada x EC-169084) with an overall mean of 37.55. The range was wide from 15.22 (Tuni Local) to 51.52 (EC-169084) among the parents (Table 2). The F₁ hybrids showed a range of 26.14 (Pennada x Tuni Local) to 70.21 (Pennada x EC-169084). Two F₁ hybrids *viz.*, Pennada x EC-169084 and Bhagyamati x EC-169084 were significantly superior over the check VNR-51 (54.63) and Four F₁ hybrids *viz.*, Pennada x EC-169084, Bhagyamati x EC-169084, EC-169084 x Babajipet-1 and EC-169084 x Babajipet-2 significantly superior over the check Arka Anand (44.76)

Fruit yield per plant (kg)

In pooled analysis over the locations, yield per plant ranged from 1.32 to 3.45 kg with a grand mean of 2.29 kg (Table 2). Bhagyamati x EC-169084 recorded the highest yield (3.45 kg) followed by Pennada x EC-169084 (3.05 kg), Bhagyamati x EC-169089 (2.94 kg) and EC-169084 x EC-169089 (2.87 kg) and these were on par with one another. Tuni Local (1.32 kg) recorded the lowest yield, followed by Pennada x Tuni Local (1.60 kg), Babajipet-1 (1.61 kg) and Babajipet-2 (1.74 kg) and were on par with one another. Only one F₁ hybrid *viz.*, Bhagyamati x EC-169084 was recorded significantly superior fruit yield than the check VNR-51 (3.06 kg) and Six F₁ hybrids *viz.*, Pennada x EC-169084, Bhagyamati x EC-169084, Bhagyamati x EC-169089, EC-169084 x EC-169089, Babajipet-1 x EC-169089 and Babajipet-2 x EC-169089 were recorded significantly superior fruit yield than the check Arka Anand (2.52 kg)

Fruit yield per plot (kg)

In pooled analysis over the locations, yield per plot ranged from 24.00 to 61.97 kg with a grand mean of 41.24 kg (Table 2). Bhagyamati x EC-169084 recorded the highest yield (61.97) followed by Pennada x EC-169084 (55.45), Bhagyamati x EC-169089 (53.09) and EC-169084 x EC-169089 (52.40) and these were on par with one another. Tuni Local (24.00 kg) recorded the lowest yield, followed by Pennada x Tuni Local (27.95 kg) and Babajipet-1 (29.92 kg) were on par with one another. One F₁ hybrid *viz.*, Bhagyamati x EC-169084 was recorded significantly superior yield than the check VNR-51 (54.55 kg) and Nine F₁ hybrids were recorded significantly superior plot yield than the check Arka Anand (42.21 kg).

Fruit yield per hectare (t ha⁻¹)

In pooled analysis over the locations, yield per hectare ranged from 18.32 to 47.67 t ha⁻¹ with a grand mean of 31.54 t ha⁻¹.

Bhagyamati x EC-169084 recorded the highest yield (47.67 t ha⁻¹) followed by Pennada x EC-169084 (42.32 t ha⁻¹), Bhagyamati x EC-169089 (40.52 t ha⁻¹) and EC-169084 x EC-169089 (39.99 t ha⁻¹) and were found on par with one another. Tuni Local (18.32 t ha⁻¹) recorded the lowest yield, followed by Pennada x Tuni Local (21.33 t ha⁻¹) and Babajipet-1 (22.84 t ha⁻¹) and was found on par with one another. Two F₁ hybrids viz., Bhagyamati x EC-169084 (47.67 t ha⁻¹) and Pennada x EC-169084 (42.32 t ha⁻¹) were recorded significantly superior yield than the best check VNR-51 (41.63) (Table 2).

Phenol content in fruit (mg 100 g⁻¹)

Pooled analysis over three locations revealed that among all the parents and F₁ hybrids tested, the phenol content of fruit ranged from 3.56 (Bhagyamati) to 6.12 mg 100 g⁻¹ (Bhagyamati x EC-169084) with an overall mean of 4.73 mg 100 g⁻¹. Phenol content ranged from 3.56 (Bhagyamati) to 4.92 mg 100 g⁻¹ of fruit (EC-169084) among the parents. The F₁ hybrids showed a range of 3.96 (Bhagyamati x Tuni Local) to 6.12 mg 100 g⁻¹ (Bhagyamati x EC-169084). Bhagyamati x EC-169084 (6.12 mg 100 g⁻¹), recorded the highest value, followed by Pennada x EC-169084 (5.75 mg 100 g⁻¹) and were found on par with each other and significantly superior to the check VNR-51 (5.40 mg 100 g⁻¹) (Table 3).

Ascorbic acid content in fruit (mg 100 g⁻¹)

Pooled analysis over three locations revealed that among all the parents and F₁ hybrids tested, the ascorbic acid content in fruit ranged from 5.52 (Tuni Local) to 11.76 mg 100 g⁻¹ (Bhagyamati x EC-169084) with an overall mean of 8.71 mg 100 g⁻¹ (Table 3). Ascorbic acid content ranged from 5.52 (Tuni Local) to 8.94 mg 100 g⁻¹ (Pennada) among the parents. The F₁ hybrids viz., Bhagyamati x EC-169084 (11.76 mg 100 g⁻¹), Pennada x EC-169084 (11.48 mg 100 g⁻¹), Bhagyamati x EC-169089 (10.89 mg 100 g⁻¹) and EC-169084 x EC-169089 (10.59 mg 100 g⁻¹) were significantly superior over the checks Arka Anand (9.29) and VNR-51 (10.45) with respect to ascorbic acid content of fruit.

Fruit borer damage percentage

In pooled analysis over the locations, the mean fruit borer infestation ranged from 20.80 (Bhagyamati x EC-169084) to 38.25 per cent (Bhagyamati x Tuni Local) with a grand mean of 31.74 per cent (Table 3). The fruit borer damage among the parents varied from 22.46 (EC-169084) to 36.70 per cent (Tuni Local) and the F₁ hybrids, it varied from 20.80 (Bhagyamati x EC-169084) to 38.25 per cent (Bhagyamati x Tuni Local). High yielding F₁ hybrids viz., Bhagyamati x EC-169084 and Pennada x EC-169084 recorded relatively low fruit borer infestation. Among parents and F₁ hybrids evaluated, Bhagyamati x EC-169084 (20.80 %) recorded the lowest fruit borer infestation and found significantly superior to both the checks viz., VNR-51 (27.72 %) and Arka Anand (31.02 %).

Plant height and number of primary branches are important growth parameters from production point of view. Genotypes having medium height and more number of branches give more yield in brinjal.

In the present study, parents and hybrids differed significantly among themselves for growth characters. The F₁ hybrid EC-169084 x Babajipet-2 recorded the highest plant height, while the high yielding F₁ hybrids viz., Bhagyamati x EC-169084 and Pennada x EC-169084 had relatively medium plant height with more number of primary branches. These results are in

line with finding of Suresh *et al.* (2012)^[13] and Rajasekhar (2014)^[9] in brinjal.

The earliest flowering and harvest was observed in EC-169089 x Tuni Local and it was on par with the best check VNR-51. As the above F₁ hybrid recorded less number of days for days to 50% flowering, it might have contributed for early fruit harvest. These findings are in consonance with Chowdhury *et al.* (2010)^[11] and Suresh *et al.* (2012)^[13].

Pennada x Babajipet-2 took more number of days to final picking, while EC-169089 took the least number of days to final harvest. The F₁ hybrid Pennada x EC-169084 had more number of flowers per cluster, while number of fruits per cluster was at the highest in the cross Bhagyamati x EC-169084. This variation might be due to more number of long or medium styled flowers results in more fruit set in Bhagyamati x EC-169084 as compared to Pennada x EC-169084. Similar results were reported by Shafeeq (2005)^[11] and Murthy *et al.* (2011a)^[4].

Fruit length, fruit girth, fruit weight and number of fruits per plant are important yield attributing characters. Maximum fruit length was recorded in Babajipet-2 x EC-169089, while maximum fruit girth was noticed in Babajipet-2 x Tuni Local. The F₁ hybrid *i.e.*, EC-169089 x Tuni Local recorded more average fruit weight and regarded as superior for this trait. The F₁ hybrid *i.e.*, Pennada x EC-169084 had recorded maximum number of fruits per plant followed by Bhagyamati x EC-169084. Similar differential response for yield and yield attributes in different genotypes of brinjal was reported by Rameshbabu and Patil (2008), Prabhu *et al.* (2009)^[6], Suresh *et al.* (2012)^[13] and Rajasekhar (2014)^[9].

Two F₁ hybrids viz., Bhagyamati x EC-169084 and Pennada x EC-169084 recorded significantly higher yield per plant, yield per plot and estimated yield per hectare than the two commercial checks. The F₁ hybrid *i.e.*, Bhagyamati x EC-169084 had relatively more number of primary branches, medium plant height, more fruit length, fruit girth, average fruit weight, number of fruits per plant and less fruit borer infestation. The F₁ hybrid, Pennada x EC-169084 recorded medium plant height, highest number of primary branches, relatively early flowering, number of fruits per plant, highest average fruit weight and less fruit borer infestation. Similar results were reported by Shafeeq *et al.* (2007)^[12], Murthy *et al.* (2011a)^[4], Rameshkumar *et al.* (2012) and Rajasekhar (2014)^[9] in brinjal.

Quality characters are very important in any crop because these characters impart nutritional quality. In the present study, different parents and F₁ hybrids showed significant variation in quality characters like ascorbic acid content and total phenols content. Ascorbic acid content was found to be highest in Bhagyamati x EC-169084.

It is a proven fact that the phenol content should be less for cooking purpose, but for resistance / tolerance to fruit borer, high phenol content is desirable. In the present investigation, the phenol content of genotypes ranged from 3.56 to 6.12 mg 100g⁻¹. Similar results were reported by Prabhu *et al.* (2009)^[6] and Khorsheduzzaman *et al.* (2010)^[3]. Screening experiments by various workers have indicated highly differential response of brinjal germplasm to the attack of fruit and shoot borer (Prabhu *et al.*, 2009; Khorsheduzzaman *et al.*, 2010; Rameshkumar *et al.*, 2012 and Praneetha *et al.*, 2013)^[6, 3, 7]. In the present investigation also the genotypes showed significant variation for the incidence of fruit and shoot borer infestation. Bhagyamati x EC-169084 recorded the lowest fruit borer incidence, while Bhagyamati x Tuni Local recorded the highest fruit borer incidence.

Table 1: Mean performance of different growth parameters of Brinjal

Genotypes	Plant height (cm)	Number of branches per plant	Days to first flowering	Days to 50% flowering	Days to first harvest	Days to final harvest	Number of flowers per cluster	Number of fruits per cluster
Pennada	119.72	11.78	45.41	53.01	65.56	178.90	4.86	3.74
Bhagyamati	103.07	10.02	42.28	49.10	59.97	174.90	3.38	2.80
EC-169084	128.14	10.95	41.50	50.37	63.04	182.23	5.39	4.05
Babajipeta-1	105.09	10.47	38.92	46.91	56.00	181.34	3.61	3.06
Babajipeta-2	115.72	9.16	40.20	48.45	60.95	170.53	4.09	2.47
EC-169089	92.17	9.87	36.15	45.33	51.64	160.57	3.43	1.71
Tuni Local	98.22	8.95	38.06	45.60	54.78	166.90	3.18	1.58
Parental Mean	108.88	10.17	40.36	48.40	58.85	173.63	3.99	2.77
Pennada x Bhagyamati	121.69	9.97	45.27	52.63	63.00	183.90	4.03	2.93
Pennada x EC-169084	139.53	12.23	42.97	54.54	64.69	189.40	5.71	4.54
Pennada x Babajipet-1	130.58	11.10	42.57	48.27	57.97	191.25	4.47	3.58
Pennada x Babajipet-2	119.09	9.85	42.64	53.54	61.26	194.12	4.40	3.39
Pennada x EC-169089	104.93	10.69	38.44	48.03	56.51	179.33	4.52	3.03
Pennada x Tuni Local	110.60	9.65	40.24	48.79	57.20	183.90	3.73	2.68
Bhagyamati x EC-169084	130.87	10.92	42.77	52.52	61.22	186.06	5.56	4.58
Bhagyamati x Babajipet-1	119.78	10.07	39.50	48.05	57.82	188.92	4.19	3.15
Bhagyamati x Babajipet-2	124.14	9.17	40.74	50.18	61.01	180.90	4.78	2.95
Bhagyamati x EC-169089	112.10	10.16	41.24	47.93	54.98	171.02	4.14	2.35
Bhagyamati x Tuni Local	120.70	9.97	39.10	49.46	57.15	174.90	3.28	2.05
EC-169084 x Babajipet-1	132.12	10.88	40.80	50.39	57.07	189.57	5.12	3.37
EC-169084 x Babajipet-2	143.04	10.65	40.07	53.05	61.41	177.90	5.41	4.49
EC-169084 x EC-169089	118.06	10.72	39.14	49.05	57.71	185.23	4.94	3.65
EC-169084 x Tuni Local	124.83	10.30	40.33	47.79	55.32	177.90	3.81	2.75
Babajipet-1 x Babajipet-2	136.23	10.97	40.80	46.24	54.56	186.57	5.00	3.49
Babajipet-1 x EC-169089	123.84	11.07	36.53	46.30	53.77	181.57	4.41	2.93
Babajipet-1 x Tuni Local	129.86	9.43	39.59	45.33	52.73	186.90	3.28	2.11
Babajipet-2 x EC-169089	129.22	9.22	36.87	45.35	52.51	173.46	4.37	2.21
Babajipet-2 x Tuni Local	137.37	8.83	38.28	45.74	52.99	167.26	4.38	2.09
EC-169089 x Tuni Local	118.69	10.32	34.47	43.11	50.05	155.05	3.33	2.02
Crosses Mean	125.11	10.29	40.11	48.87	57.19	181.19	4.42	3.06
Arka Anand	106.61	10.07	36.77	47.20	55.28	180.23	3.99	3.48
VNR-51	131.33	11.48	35.41	45.21	51.71	187.23	5.33	4.51
G.Mean	121.05	10.26	40.17	48.75	57.19	179.30	4.31	2.99
SE (m)	2.68	0.27	0.87	0.99	1.42	3.51	0.17	0.09
C.D. (0.05)	7.48	0.74	2.43	2.77	3.97	9.78	0.47	0.24
C.D. (0.01)	9.86	0.98	3.65	3.66	5.23	12.89	0.62	0.32

Table 2: Mean performance of different yield parameters of brinjal

Genotypes	Fruit length (cm)	Fruit girth (cm)	Fruit length to girth ratio	Fruit weight (g)	Number of fruits per plant	Fruit yield per plant (kg)	Fruit yield per plot (kg)	Fruit yield per hectare (t ha ⁻¹)
Pennada	7.79	8.47	0.94	40.56	44.44	2.00	36.09	27.55
Bhagyamati	11.31	12.95	0.88	51.37	33.21	1.89	33.96	25.92
EC-169084	10.10	9.89	1.03	45.82	51.52	2.18	38.21	29.17
Babajipeta-1	11.10	11.92	0.94	48.69	30.10	1.61	29.92	22.84
Babajipeta-2	12.22	14.71	0.84	59.58	19.18	1.74	32.19	25.10
EC-169089	13.24	13.42	0.99	69.45	25.30	1.83	33.33	25.44
Tuni Local	12.39	17.38	0.72	71.98	15.22	1.32	24.00	18.32
Parental Mean	11.16	12.68	0.90	55.35	31.28	1.80	32.53	24.90
Pennada x Bhagyamati	11.02	11.92	0.93	75.41	40.80	2.64	41.79	31.89
Pennada x EC-169084	9.72	7.60	1.30	68.17	70.21	3.05	55.45	42.32
Pennada x Babajipet-1	10.60	10.21	1.04	50.38	42.54	2.07	37.75	28.81
Pennada x Babajipet-2	11.78	14.37	0.82	57.97	36.21	2.03	37.10	28.31
Pennada x EC-169089	13.67	12.19	1.13	72.34	30.98	2.31	40.77	31.11
Pennada x Tuni Local	12.11	15.38	0.79	61.02	26.14	1.60	27.95	21.33
Bhagyamati x EC-169084	9.84	9.92	1.00	74.66	66.31	3.45	61.97	47.67
Bhagyamati x Babajipet-1	11.30	12.73	0.90	53.25	39.04	2.22	39.53	30.17
Bhagyamati x Babajipet-2	11.78	14.86	0.80	68.31	36.61	2.42	43.53	33.22
Bhagyamati x EC-169089	13.93	13.76	1.02	83.60	33.80	2.94	53.09	40.52
Bhagyamati x Tuni Local	13.23	17.68	0.75	62.34	26.97	1.96	36.04	27.51
EC-169084 x Babajipet-1	10.45	11.46	0.92	65.02	57.77	2.53	47.99	36.63
EC-169084 x Babajipet-2	11.56	13.23	0.88	72.80	49.19	2.69	48.44	36.97
EC-169084 x EC-169089	13.26	12.25	1.09	82.30	42.71	2.87	52.40	39.99
EC-169084 x Tuni Local	11.93	15.56	0.77	78.05	33.64	1.98	35.51	27.10
Babajipet-1 x Babajipet-2	11.66	17.33	0.68	82.51	44.05	2.72	48.95	37.40

Babajipet-1 x EC-169089	13.62	15.26	0.90	73.67	37.12	2.79	51.35	39.19
Babajipet-1 x Tuni Local	12.81	18.06	0.71	57.74	29.01	1.98	36.89	28.16
Babajipet-2 x EC-169089	14.61	15.85	0.92	85.01	33.63	2.79	49.83	38.57
Babajipet-2 x Tuni Local	13.54	20.86	0.65	83.47	27.95	2.44	41.97	32.33
EC-169089 x Tuni Local	14.43	17.06	0.85	90.25	27.84	2.20	38.78	29.60
Crosses Mean	12.23	14.17	0.90	71.34	39.64	2.46	44.14	33.75
Arka Anand	17.38	9.99	1.76	77.46	44.76	2.52	42.21	33.07
VNR-51	11.67	14.03	0.84	85.54	54.63	3.06	54.55	41.63
G.Mean	11.96	13.80	0.90	67.34	37.55	2.29	41.24	31.54
SE (m)	0.21	0.27	0.03	1.57	1.41	0.08	1.67	1.30
C.D. (0.05)	0.60	0.74	0.08	4.37	3.94	0.24	4.64	3.62
C.D. (0.01)	0.79	0.98	0.10	5.76	5.12	0.31	6.12	4.77

Table 3: Mean performance of different bio chemical parameters of Brinjal

Genotypes	Phenols content in fruit (mg 100 g ⁻¹)	Ascorbic acid content in fruit (mg 100 g ⁻¹)	Fruit borer damage (%)
Pennada	4.81	8.94	27.27
Bhagyamati	3.56	6.83	29.91
EC-169084	4.92	7.89	22.46
Babajipeta-1	4.27	7.38	30.72
Babajipeta-2	3.95	5.55	35.05
EC-169089	3.72	7.43	32.82
Tuni Local	3.68	5.52	36.70
Parental Mean	4.13	7.08	30.71
Pennada x Bhagyamati	4.62	9.36	29.65
Pennada x EC-169084	5.75	11.48	25.66
Pennada x Babajipet-1	5.00	9.93	32.12
Pennada x Babajipet-2	4.50	9.61	35.01
Pennada x EC-169089	4.90	9.52	30.56
Pennada x Tuni Local	4.23	8.83	35.36
Bhagyamati x EC-169084	6.12	11.76	20.80
Bhagyamati x Babajipet-1	4.95	8.62	31.95
Bhagyamati x Babajipet-2	4.57	8.24	35.90
Bhagyamati x EC-169089	5.53	10.89	26.71
Bhagyamati x Tuni Local	3.96	6.98	38.25
EC-169084 x Babajipet-1	5.07	9.38	30.94
EC-169084 x Babajipet-2	5.08	7.28	32.41
EC-169084 x EC-169089	5.41	10.59	28.99
EC-169084 x Tuni Local	4.93	7.47	34.70
Babajipet-1 x Babajipet-2	5.07	9.41	33.74
Babajipet-1 x EC-169089	4.95	10.29	30.04
Babajipet-1 x Tuni Local	4.37	7.74	36.14
Babajipet-2 x EC-169089	5.14	9.32	30.60
Babajipet-2 x Tuni Local	4.58	7.85	36.71
EC-169089 x Tuni Local	4.74	9.68	37.49
Crosses Mean	4.93	9.24	32.08
Arka Anand	4.99	9.29	31.20
VNR-51	5.40	10.45	27.72
G.Mean	4.73	8.71	31.74
SE (m)	0.08	0.12	0.88
C.D. (0.05)	0.24	0.34	2.45
C.D. (0.01)	0.31	0.45	3.23

References

- Chowdhury MJ, Ahmad S, Uddin N. Expression of heterosis for productive traits in F₁ brinjal (*Solanum melongena* L.) hybrids. The Agriculture. 2010; 8(9):8-13.
- Hedges LJ, Lister CE. Nutritional attributes of spinach, silver beet and eggplant. Crop Food Res Confidential Rep No, 2007, 1928
- Khorsheduzzaman AKM, Alam MZ, Rahman MM, Khaleque MMA, Hossain MMI. Biochemical basis of resistance in eggplant to *Leucinodes orbonalis* Gennee and their correlation with shoot and fruit infestation, Bangladesh Journal of Agriculture Research. 2010; 35(9):149-55.
- Murthy SRKR, Lingaiah HB, Naresh P, Vinay Kumar Reddy P, Satish KV. Heterosis for yield and yield attributing characters in brinjal (*Solanum melongena* L.). Plant Archives. 2011a; 11(2):649-53.
- Panse VG, Sukhatme PV. Statistical methods for agricultural workers. Indian Council of Agricultural Research, New Delhi, 1985.
- Prabhu M, Natarajan S, Veeraragavatham D, Pugalendhi L. The biochemical basis of brinjal shoot and fruit borer resistance in interspecific progenies of brinjal. Eurasian Journal of Bioscience. 2009; 3(3):50-57.
- Praneetha S, Sarasvathy T, Veeraragavatham D, Pugalendhi L. Per se performance and heterosis for shoot and fruit borer (*Leucinodes orbonalis* Gn.) resistance and yield in brinjal (*Solanum melongena* L.). Electronic Journal of Plant Breeding. 2013; 4(1):1061-66.

8. Prasath D, Natarajan S, thamburaj S. Line x tester analysis for heterosis in brinjal (*solanum melongena* l.). The orissa journal of horticulture. 2000; 28(1):132-37.
9. Rajasekhar P. Diallel analysis in brinjal (*Solanum melongena* L.). M. Sc. (Agriculture) thesis, Kerala Agricultural University, Trissur, 2014, 134-78.
10. Rameshbabu S, Patiln RV. Characterization and evaluation of brinjal genotypes, Madras Agriculture Journal. 2008; 95(6):18-23.
11. Shafeeq A. Heterosis and combining ability studies in brinjal (*Solanum melongena* L.). M. Sc. (Agriculture), Thesis, University of Agricultural Sciences, Dharwad, 2005.
12. Shafeeq A, Madhusudan K, Hanchinal RR, Vijayakumar AG, Salimath PM. Heterosis in Brinjal. Karnataka Journal of Agricultural Science. 2007; 20(1):33-40.
13. Suresh KP, Singh TH, Sadashiva AT, Reddy KM. Performance of parents and hybrids for yield and yield attributing characters in manjarigota type of brinjal (*Solanum melongena* L.). Madras Agriculture Journal. 2012; 99(9):438-41.