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# Stability studies for growth, yield and yield attributing characters in brinjal (*Solanum melongena* L.)

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**Abstract**
The present present investigation entitled "Development of stable heterotic hybrids in brinjal (*Solanum melongena* L.)" was conducted at three locations *viz*., Horticultural Research Station, Nuzvid, Horticultural Research Station, Pandirimamidi and College of Horticulture, Venkataramannagudem to estimate heterosis, combining ability and to assess stability of parents and their crosses for yield and yield contributing characters employing half-diallel mating design. The experimental material consisted of 30 genotypes which included seven parents, 21 resultant $F_1$ hybrids and two checks *viz.*, Arka Anand and VNR-51, executed in a randomized block design replicated thrice during 2018-2019. The portioning of environments + (genotypes x environments) mean squares showed that environments (linear) differed significantly and were quite diverse with regards to their effect on the performance of the genotypes for fruit yield and quality traits. A perusal of stability parameters indicated from the present study on stability, four hybrids *viz.*, Pennada x EC-169084, Bhagyamati x EC-169084, Bhagyamati x EC-169089 and EC-169084 x EC-169089 possessed higher fruit yield than the checks and were identified as stable crosses for fruit yield per plant and other traits.

**Keywords:** Brinjal, hybrids, stability

## Introduction
Brinjal, grown throughout the year, is a common and popular vegetable crop in the subtropics and tropics, therefore, can play a vital role in achieving the nutritional security. Being an important source of plant-derived nutrients, the identification of brinjal genotypes with higher nutrients and better consumer preference could be beneficial for society, particularly for poor consumers. But the development of cultivars with improved fruit quality and good phytochemical properties, a pressing need for better market value, through breeding has received relatively little attention in vegetables especially in brinjal (Sabolu *et al.*, 2014) [22]. Phenols and ascorbic acids are important determinants of brinjal fruit flavour (Stommel and Whitaker, 2003) [24]. Brinjal fruit is a rich source of ascorbic acid and phenolics, both of which are powerful antioxidents (Vinson *et al.*, 1998) [27] and have been reported to successfully suppress the development and growth of tumors, lung cancer, inhibit inflammation, and cardiovascular diseases (Somawathi *et al.*, 2014) [23]. Higher ascorbic acid content in brinjal fruit is associated with increased nutritive value of the fruits which would help better retention of colour and flavour (Kumar and Arumugam, 2013) [19]. The proximate compositions of fruits not only determine fruit quality but also are associated with the tolerance attribute of the genotype against biotic stresses (Karak *et al.*, 2012) [18]. However, a very scanty work is being reported regarding the stability analysis of quality traits inbrinjal in and outside the country. Therefore, the present investigation was carried out to determine the stable genotypes both in terms of yield as well as qualitative traits.

## Material and Methods
The present investigation 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. situated at Nuzvid is in Krishna district, situated at an altitude of 167 m above mean sea level at $17.14^0$ N latitude and $81.80^0$ E longitude. The soil is well drained, deep sandy loam in texture and granular to sub granular,

blocky in structure. $E_2$ = Pandirimamidi is in high altitude tribal zone of Andhra Pradesh and is situated at an altitude of 340 m above mean sea level at $81.45^0$ latitude and $17.25^0$ longitude. The average annual rainfall is 1186 cm. Soil is well drained, deep sandy loam in texture and granular to sub granular, blocky in structure. $E_3$ = Venkataramannagudem is located in west Godavari district with an average rainfall of 900 mm, situated at an altitude of 34 m above sea level and at $16.38^0$ N latitude and $81.50^0$ E longitude. The soil is red sandy loam with good drainage and moderate water holding capacity. The experimental material comprised of biometric data of all the 30 genotypes (21 single crosses + 7 parents + 2 standard checks) were used for heterosis and stability. The individual experiment was conducted in randomized block design with three replications. The uniform, healthy seedlings were planted on ridges maintaining inter and intra row spacing of 90 x 75 cm, respectively. All the package of practices were followed to raise a healthy crop. Observationon fruit yield per plant was recorded as an average of five randomly selected plants of each genotype and replication whereas fruit yield per hectare was calculated on the basis of total plot yield. Qualitative parameter i.e. ascorbic acid content were estimated through titration method as given by Rangana, (1976) [21] and total phenol content was estimated with Folin- Ciocalteu reagent using catechol as standard as suggested by Thimmaiah, (1999) [26]. Genotype × environment interaction and stability analysis of different genotypes across the six environments were worked out as per statistical technique proposed by Eberhart and Russel (1966) [17] and analysed through windowstat software.

## Results and Discussion

### Plant height (cm)

Mean values for plant height ranged from 92.17 cm (EC-169089) to 143.04 cm (EC-169084 x Babajipet-2) with an overall mean of 121.05 cm. The regression coefficient (bi) values ranged from -0.97 (Pennada x Babajipet-2) to 3.05 (Pennada x Tuni Local) (Table 1). The $F_1$ hybrids *viz.*, Bhagyamati x Babajipet-2 ($b_i$=1.07) and Babajipet-1 x Tuni Local ($b_i$=1.09) had recorded mean plant height higher than grand mean with unit regression coefficient ($b_i$) and non-significant deviation from regression ($s^2d_i$) and were found to be stable for plant height over locations. The $F_1$ hybrids *viz*., Pennada x EC-169084 ($b_i$=0.74), Pennada x Babajipet-1 ($b_i$=-0.55), Bhagyamati x EC-169084 (bi=-0.89), Babajipet-1 x Babajipet-2 ($b_i$=-0.28) and Babajipet-2 x EC-169089 ($b_i$=0.88) had higher mean than general mean with $b_i < 1$ and were suitable for poor environments. Whereas, the hybrids EC-169084 x Babajipet-2 ($b_i$=1.49), Babajipet-1 x EC-169089 ($b_i$=1.66) and Babajipet-2 x Tuni Local ($b_i$=1.37) had $b_i$ values greater than one with higher than grand mean and non-significant deviation from regression and were considered to perform well in favourable conditions. Similar results were reported by Chaurasia *et al.* (2005) [16] and Vaddoria *et al.* (2009) [2], Mehta *et al.* (2011) [20], Chaudhari *et al*. (2015) [4], Aakanksha (2016) [5], Bhushan and Samnotra (2017) [6] and Sivakumar *et al*. (2017) [7] in brinjal

### Number of priamary branches per plant

For primary branches per plant, mean values ranged from 8.83 (Babajipet-2 x Tuni Local) to 12.23 (Pennada x EC-169084) with a overall mean of 10.26. The regression coefficient ($b_i$) values ranged from 0.16 (Pennada x EC-169084) to 1.67 (Pennada x Babajipet-2) (Table 1). The hybrids *viz.*, Pennada x Babajipet-1 ($b_i$=1.03), EC-169084 x Babajipet-1 ($b_i$=1.01), EC-169084 x Tuni Local ($b_i$=1.01), Babajipet-1 x Babajipet-2 ($b_i$=1.08), Babajipet-1 x EC-169089 ($b_i$=1.08) and Babajipet-1 x Tuni Local($b_i$=1.01) recorded higher mean number of primary branches per plant than grand mean with nearer to unit regression coefficient ($b_i$) and non-significant deviation from regression ($s^2d_i$) and were found to be stable for number of primary branches per plant over locations. The hybrids *viz.*, Pennada x EC-169084 ($b_i$=0.16) and EC-169084 x Babajipet-2 ($b_i$=0.79) had more mean than general mean with regression values ($b_i$) <1 and these hybrids were considered to be suitable for unfavourable environments, whereas, the hybrids Pennada x EC-169089 ($b_i$=1.36), Bhagyamati x EC-169084 ($b_i$=1.38), EC-169084 x EC-169089 ($b_i$=1.12) and EC-169089 x Tuni Local ($b_i$=1.25) possessed above average mean values, showed $b_i$ values greater than one with predictable performance in favourable environments. Similar results were reported by Chaurasia *et al*. (2005) [16] and Vaddoria *et al*. (2009) [2] in brinjal.

### Days to first flowering

Mean values for days to first flowering and it ranged from 34.47 (EC-169089 x Tuni Local) to 45.27 (Pennada x Bhagyamti) with an overall mean of 40.17. The regression coefficient ($b_i$) values varied from 0.46 (EC-169084 x Tuni Local) to 1.50 (EC-169084 x EC-169089) (Table 1). The $F_1$ hybrid *viz.*, Babajipet-2 x EC-169089 (36.87) had lower mean than general mean with nearer to unit regression coefficient ($b_i$=1.04) and non-significant deviation from regression ($s^2d_i$) and were found to be stable for days to first flowering over environments. The hybrid *i.e.* Babajipet-2 x Tuni Local ($b_i$=0.58) had less mean than general mean with regression values ($b_i$) <1 and these hybrids were considered to be suitable for unfavourable environments, whereas, the hybrids Pennada x EC-169089 ($b_i$=1.20), Bhagyamati x Tuni Local ($b_i$=1.20), EC-169084 x Babajipet-2 ($b_i$=1.20), EC-169084 x EC-169089 ($b_i$=1.50), Babajipet-1 x EC-169089 ($b_i$=1.19), Babajipet-1 x Tuni Local ($b_i$=1.16) and EC-169089 x Tuni Local ($b_i$=1.20) had $b_i$ values greater than one with lower performance than grand mean and non-significant deviation from regression and were considered to perform well in favourable conditions. These results are in agreement with the findings of Vaddoria *et al*. (2009) [2] in brinjal.

### Days to 50% flowering

The number of days to 50% flowering ranged from 43.11 (EC-169089 x Tuni Local) to 54.54 (Pennada x EC-169084) with a overall mean of 48.75 days (Table 2). One hybrid, EC-169089 x Tuni Local (43.11) had lower mean than grand mean with regression coefficient around unity ($b_i$=1.08) and non-significant deviation from regression. Hence, this hybrid was considered to possess the average stability for early flowering at different locations. Regression coefficient less than one ($b_i$<1) with low mean than general mean and non-significant deviation from regression were observed in Bhagyamti x EC169089 ($b_i$=0.91), EC-169084 x Tuni Local ($b_i$=0.10), Babajipet-1 x Babajipet-2 ($b_i$=0.90), Babajipet-1 x EC-169089 ($b_i$=0.06) and Babajipet-2 x Tuni Local ($b_i$=0.60). These hybrids perform better under unfavourable environments with early flowering, whereas, hybrids *viz.*, Pennada x Babajipet-1 ($b_i$=1.21), Bhagyamati x Babajipet-1 ($b_i$=1.20) Babajipet-1 x Tuni Local ($b_i$=2.05) and Babajipet-2 x EC-169089 ($b_i$=1.21) recorded low mean than grand mean with $b_i$ values greater than one and non-significant deviation from regression values and these were predicted to perform well under favourable environments for early flowering.

These results are in agreement with the findings of Vaddoria *et al*. (2009) [2] in brinjal.

**Days to first harvest**

The number of days to first harvest ranged from 50.05 (EC-169089 x Tuni Local) to 65.56 (Pennada) with a general mean of 57.19 days (Table 2). Regression coefficient less than one ($b_i$<1) with mean lower than general mean and non-significant deviation from regression were observed in Pennada x EC-169089 ($b_i$=0.95), Bhagyamati x EC-169089 ($b_i$=0.88), EC-169084 x Tuni Local ($b_i$=0.88), Babajipet-1 x EC-169089 ($b_i$=-0.23), Babajipet-2 x EC-169089 ($b_i$=0.85), Babajipet-2 x Tuni Local ($b_i$=0.54) and EC-169089 x Tuni Local ($b_i$=0.55). These hybrids perform better in unfavourable environments with early first harvest, whereas, hybrids *viz.*, Bhagyamati x Tuni Local ($b_i$=1.25), EC-169084 x Babajipet-1 ($b_i$=1.63), Babajipet-1 x Babajipet-2 ($b_i$=1.66) and Babajipet-1 x Tuni Local ($b_i$=2.60) recorded mean lower than grand mean with $b_i$ values greater than one and non-significant deviation from regression values and these were predicted to perform well under favourable environments for early first harvest. The results indicated that linear and non linear components of G x E interaction were significant. Similar result was also observed by Suneetha *et al*. (2006) [25] and Vaddoria *et al*. (2009) [2] in brinjal.

**Days to final harvest**

Among the $F_1$ hybrids Pennada x Babajepeta-2 recorded the highest number of days (194.12) and EC-169089 x Tuni Local (155.05) recorded the lowest days to final harvest. Grand mean of the genotypes was 179.30 days (Table 2). The regression coefficient ($b_i$) values range from -1.20 (Pennada x Babajipet-2) to 4.15 (Babajipet-2 x EC-169089). The hybrids Pennada x Bhagyamati ($b_i$=1.03), Pennada x EC-169089 ($b_i$=1.03), Pennada x Tuni Local ($b_i$=1.03), Bhagyamati x Babajipet-2 ($b_i$=1.03), EC-169084 x Babajipet-1 ($b_i$=1.03), EC-169084 x EC-169089 ($b_i$=1.03), Babajipet-1 x Babajipet-2 ($b_i$=1.03), Babajipet-1 x EC-169089 ($b_i$=1.03) and Babajipet-1 x Tuni Local ($b_i$=1.03) had recorded mean days to final harvest higher than grand mean with regression coefficient around unity ($b_i$=1) and non-significant deviation from regression ($s^2d_i$) and was found to be stable for days to final harvest over locations. The hybrids *viz.*, Pennada x Babajipet-1 ($b_i$= -0.47) and Pennada x Babajipet-2 ($b_i$= -1.20) and Bhagyamati x Babajipet-1 ($b_i$=0.57) had more mean than general mean with $b_i$ <1 and were found to have predictable performance in poor environments, whereas, the hybrids Pennada x EC-169084 ($b_i$=2.11) and Bhagyamati x EC-169084 ($b_i$=2.34) had $b_i$ values greater than one with higher mean than grand mean and non-significant deviation from regression and were considered to be perform well in favourable conditions. These results are supported by the findings of Suneetha *et al*. (2006) [25], Vaddoria *et al*. (2009) [2], Chaudhari *et al*. (2015) [4], Bhushan and Samnotra (2017) [6] and Sivakumar *et al*. (2017) [7] in brinjal.

**Number of flowers per cluster**

For number of flowers per cluster, the regression coefficient ($b_i$) values ranged from 0.28 (Bhagyamati x Babajipet-2) to 1.78 (Pennada x Babajipet-2) and mean values ranged from 3.18 (Tuni Local) to 5.71 (Pennada x EC-169084) with an overall mean of 4.31(Table 3). The hybrids *viz.*, Bhagyamati x EC-169084 ($b_i$=1.01) and EC-169084 x Babajipet-2 ($b_i$=1.02) had recorded mean flowers per cluster higher than grand mean with unit regression coefficient ($b_i$) and non-significant deviation from regression ($s^2d_i$) and was found to be stable for number of flowers per cluster over locations. The hybrids *viz.*, Pennada x EC-169084 ($b_i$=0.91), Bhagyamati x Babajipet-2 ($b_i$=0.28), Babajipet-1 x Babajipet-2 ($b_i$=0.92) recoded mean above grand mean with regression values less than unity and non-significant $s^2d_i$ and these hybrids were suitable to unfavourable environments, whereas, the hybrids Pennada x Babajipet-1 ($b_i$=1.25), Pennada x Babajipet-2 ($b_i$=1.78), Pennada x EC-169089 ($b_i$=1.12), EC-169084 x Babajipet-1 ($b_i$=1.18), EC-169084 x EC-169089 ($b_i$=1.12), Babajipet-1 x EC-169089 ($b_i$=1.27), Babajipet-2 x EC-169089 ($b_i$=1.23) and Babajipet-2 x Tuni Local ($b_i$=1.13) exhibited means greater than grand mean with regression values more than unity and non-significant deviation from regression. These hybrids were stable for number of flowers per cluster which would be expected to perform uniformly well over variable environments.

**Number of fruits per cluster**

For number of fruits per cluster, the regression coefficient ($b_i$) values range from 0.53 (Babajipet- 1 x Babajipet-2) to 1.44 (Pennada x Babajipet-1) and mean values ranged from 1.58 (Tuni Local) to 4.58 (Bhagyamati x EC-169084) with a overall mean of 2.99 (Table 3). The hybrids *viz.*, Pennada x EC-169084 ($b_i$=0.98), Pennada x Babajipet-2 ($b_i$=0.98), Pennada x EC-169089 ($b_i$=0.98), Bhagyamati x EC-169084 ($b_i$=0.98), Bhagyamati x Babajipet-1 ($b_i$=0.98), EC-169084 x Babajipet-1 ($b_i$=0.98) and EC-169084 x EC-169089 ($b_i$=0.98) recorded mean number of fruits per cluster higher than grand mean with unit regression coefficient ($b_i$) and non-significant deviation from regression ($s^2d_i$) and was found to be stable for number of fruits per cluster over locations. The hybrids *viz.*, EC-169084 x Babajipet-2 ($b_i$=0.84) and Babajipet-1 x Babajipet-2 ($b_i$=0.53) recoded mean above grand mean with regression values less than unity and non-significant $s^2d_i$ and these hybrids were suitable to unfavourable environments, whereas, the hybrid ie Pennada x Babajipet-1 ($b_i$=1.44) exhibited means greater than grand mean with regression values more than unity and non-significant deviation from regression. These hybrids was stable for number of fruits per cluster which would be expected to perform uniformly well over fovourable environments.

**Fruit length (cm)**

Mean values of fruit length ranged from 7.79 cm (Pennada) to 14.61 cm (Babajipet-2 x EC-169089) with an overall mean of 11.96 cm. The regression coefficient ($b_i$) values ranged from -1.75 (VNR-51) to 1.95 (Pennada x Babajipet-1) (Table 3).

The hybrid *i.e* Pennada x EC-169089 ($b_i$=1.05) had recorded mean fruit length higher than grand mean with regression coefficient around unity ($b_i$=1) and non-significant deviation from regression ($s^2d_i$) and was found to be stable for fruit length over locations. Regression values ($b_i$) greater than one recorded by Pennada x Tuni Local ($b_i$=1.21), Bhagyamati x EC-169089 ($b_i$=1.17), Bhagyamati x Tuni Local ($b_i$=1.17), EC-169084 x EC-169089 ($b_i$=1.18), Babajipet-1 x EC-169089 ($b_i$=1.17), Babajipet-1 x Tuni Local ($b_i$=1.18), Babajipet-2 x EC-169089 ($b_i$=1.17), Babajipet-2 x Tuni Local ($b_i$=1.17) and EC-169089 x Tuni Local ($b_i$=1.17) with mean greater than the grand mean and non-significant deviation from regression. These were considered to be performed well in favourable environments. This is in conformity with those reported earlier by Prasad *et al*. (2002) [9], Chaurasia *et al*. (2005) [16], Vaddoria *et al*. (2009) [2] and Lila *et al*. (2011) [10] in brinjal.

**Fruit girth (cm)**

Mean values for fruit girth ranged from 7.60 (Pennada x EC - 169084) to 20.86 cm (Babajipet-2 x Tuni Local) with a overall mean of 13.80 cm. The regression coefficient ($b_i$) values ranged from 0.91 (VNR-51) to 1.10 (Bhagyamati x Tuni Local) (Table 4).

The hybrids *viz.*, Pennada x Babajipet-2 ($b_i$=1.03), Pennada x Tuni Local ($b_i$=1.03), Bhagyamati x Babajipet-2 ($b_i$=1.04), EC-169084 x Tuni Local ($b_i$=0.99), Babajipet-1 x Babajipet-2 ($b_i$=0.99), Babajipet-1 x EC-169089 ($b_i$=0.99), Babajipet-1 x Tuni Local ($b_i$=0.99), Babajipet-2 x EC-169089 ($b_i$=0.99), EC-169089 x Tuni Local ($b_i$=0.99) and Babajipet-2 x Tuni Local ($b_i$=1.04) had recorded mean fruit girth higher than grand mean with regression coefficient around unity ($b_i$=1) and non-significant deviation from regression ($s^2d_i$) and was found to be stable for fruit girth over locations. Regression values ($b_i$) greater than one recorded by Bhagyamati x Tuni Local ($b_i$=1.10) with mean greater than the grand mean and non-significant deviation from regression. These were considered to be performed well in favourable environments. Similar results were also observed by Mohanty and Prusti (2000) [12], Rao (2003) and Vaddoria *et al*. (2009) [2] in brinjal.

**Fruit length to girth ratio**

Mean values for 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 4). The hybrid *i.e* Bhagyamati x EC-169089 ($b_i$=1.03) had recorded mean fruit length to girth ratio than grand mean with regression coefficient around unity ($b_i$=1) and non-significant deviation from regression ($s^2d_i$) and was found to be stable for fruit length to girth ratio over locations. The hybrids *viz.*, Pennada x Bhagyamati ($b_i$=0.63), Pennada x Babajipet-1 ($b_i$=0.73), EC-169084 x Babajipet-1 ($b_i$=0.94) and Babajipet-2 x EC-169089 ($b_i$=0.70) had more mean than general mean with $b_i$ <1 and were suitable for poor environments, whereas, the hybrids, Pennada x EC-169084 ($b_i$=1.91), Pennada x EC-169089 ($b_i$=1.35), Bhagyamati x EC-169084 ($b_i$=1.29), EC-169084 x EC-169089 ($b_i$=1.15) had $b_i$ values greater than one with higher mean than grand mean and non-significant deviation from regression and were considered to be perform well in favourable conditions.

**Average fruit weight (g)**

The average fruit weight of mean values range from 40.56 (Pennada) to 90.25 g (EC-169089 x Tuni Local) with a grand mean of 67.34 g (Table 4). The regression coefficient ($b_i$) values ranged from -2.46 (Pennada x Bhagyamati) to 5.07 (EC-169089 x Tuni Local). The hybrids Babajipet-1 x Babajipet-2 ($b_i$=1.04), had recorded mean fruit weight higher than grand mean with regression coefficient ($b_i$) nearer to one and non-significant deviation from regression ($s^2d_i$) and were found to be stable for fruit weight over locations. The hybrids *viz.*, Pennada x EC-169089 ($b_i$=-1.65), Bhagyamati x EC-169084 ($b_i$= 0.81), Bhagyamati x EC-169089 ($b_i$=-0.10), EC-169084 x EC-169089 ($b_i$=-1.70), Babajipet-1 x EC-169089 ($b_i$=-0.30) and Babajipet-2 x Tuni Local ($b_i$=0.64) had more mean than general mean with $b_i$ <1 and were predictable under poor environments, whereas, the hybrids, Bhagyamati x Babajipet-2 ($b_i$=2.39), EC-169084 x Babajipet-2 ($b_i$=2.38), EC-169084 x Tuni Local ($b_i$=1.84), Babajipet-2 x EC-169089 ($b_i$=1.11) and EC-169089 x Tuni Local ($b_i$=5.07) had $b_i$ values greater than one with higher mean than grand mean and non-significant deviation from regression and were considered to be perform well in favourable conditions. This is in agreement with the finding of Mohanty (2002) [12], Prasad *et al*. (2002) [9], Chaurasia *et al*. (2005) [16] and Vaddoria *et al*. (2009) [2] Chaudhari *et al*. (2015) [4], Aakanksha (2016) [5], Bhushan and Samnotra (2017) [6] and Sivakumar *et al*. (2017) [7] in brinjal.

**Number of fruits per plant**

The regression coefficient ($b_i$) values ranged from 0.41 (Arka Anand) to 1.98 (Pennada x EC-169084). Number of fruits per plant had mean values ranged from 15.22 (Tuni Local) to 70.21 (Pennada x EC-169084) with an overall mean of 37.55 (Table 5).

The hybrid Pennada x Babajipet-1 ($b_i$=1.05) were considered to be stable for fruits per plant over environments as they recorded mean higher than grand mean with good average stability ($b_i$=1) and non-significant deviation from regression. The hybrids *viz.*, Pennada x Bhagyamati ($b_i$=0.70), Bhagyamati x EC-169084 ($b_i$=0.78) and Bhagyamati x Babajipet-1 ($b_i$=0.71) had more mean than general mean with $b_i$ <1 and will better suited to poor environments, whereas, the hybrids Pennada x EC-169084 ($b_i$=1.98), EC-169084 x Babajipet-1 ($b_i$=1.51), EC-169084 x Babajipet-2 ($b_i$=1.17), EC-169084 x EC-169089 ($b_i$=1.10) and Babajipet-1 x Babajipet-2 ($b_i$=1.22) had $b_i$ values greater than one with higher than grand mean and non-significant deviation from regression and were considered to perform well in favourable conditions. Similar results were also observed by Rai *et al*. (2000), Chaurasia *et al*. (2005) [16], Chaudhari *et al*. (2015) [4], Bhushan and Samnotra (2017) [6] and Sivakumar *et al*. (2017) [7] in brinjal. Pennada x Babajipet-1 had average regression (bi, nearer unity), non significant deviation from regression ($S^2d_i$) value and had high mean the population mean (42.54).

**Fruit yield per plant (kg)**

For fruit yield per plant the mean values ranged from 1.60 (Pennada x Tuni Local) to 3.45 kg (Bhagyamati x EC-169084) with a grand mean of 2.29 kg. The regression coefficient ($b_i$) values ranged from 0.34 (Babajipet-1) to 1.69 (Pennada x Bhagyamati) (Table 5).

The hybrids, Pennada x EC-169084 ($b_i$=1.03), Bhagyamati x EC-169084 ($b_i$=1.01), Bhagyamati x EC-169089 ($b_i$=1.04) and EC-169084 x EC-169089 ($b_i$=0.97) recorded mean fruit yield per plant higher than grand mean with unit regression coefficient ($b_i$) and non-significant deviation from regression ($s^2d_i$) and was found to be stable for fruit yield per plant over locations. The hybrid, Babajipet-1 x EC-169089 ($b_i$=0.79) had more mean yield per plant than general mean with $b_i$ <1 with non-significant deviation from regression ($s^2d_i$) and is better suited to poor environments, whereas, the hybrids, Pennada x Bhagyamati ($b_i$=1.69), Pennada x EC-169089 ($b_i$=1.26), Bhagyamati x Babajipet-2 ($b_i$=1.24), EC-169084 x Babajipet-1 ($b_i$=1.52), EC-169084 x Babajipet-2 ($b_i$=1.29), Babajipet-1 x Babajipet-2 ($b_i$=1.14), Babajipet-2 x EC-169089 ($b_i$=1.14) and Babajipet-2 x Tuni Local ($b_i$=1.32) had $b_i$ values greater than one with higher than grand mean and non-significant deviation from regression were considered to perform well in favourable conditions. Similar results were also reported by Mohanty and Prusti (2000) [12] and Prasad *el al.* (2002) [9], Rao (2003) [14], Suneetha *et al*. (2006) [25], Vaddoria *et al*. (2009) [2] Chaudhari *et al*. (2015) [4], Aakanksha (2016) [5], Bhushan and Samnotra (2017) [6] and Sivakumar *et al*. (2017) [7] in brinjal. All parents, $F_1$ hybrids and checks possessed non significant deviation from regression *i.e.*, the performance of the genotypes can be predicted.

**Fruit yield per plot (kg)**

The fruit yield per plot ranged from 24.00 (Tuni Local) to 61.97 (Bhagyamati x EC-169084) kg with a grand mean of 41.24 kg. The regression coefficient ($b_i$) values ranged from -0.09 (EC-169084) to 1.91 (EC-169084 x Tuni Local) (Table 5).

The hybrid, Bhagyamati x EC-169084 ($b_i$=1.02) recorded mean fruit yield per plot higher than grand mean with unit regression coefficient ($b_i$) and non-significant deviation from regression ($s^2d_i$) and was found to be stable for fruit yieldper plot over locations. The hybrids, Bhagyamati x EC-169089 ($b_i$=0.92), EC-169084 x EC-169089 ($b_i$=0.92), Babajipet-1 x Babajipet-2 ($b_i$=0.50), Babajipet-1 x EC-169089 ($b_i$=0.77), Babajipet-2 x EC-169089 ($b_i$=0.79) and Babajipet-2 x Tuni Local ($b_i$=0.90) had more mean than general mean with $b_i$ <1 with non-significant deviation from regression ($s^2d_i$) and will better suited to poor environments, whereas, the $F_1$ hybrids *viz.*, Pennada x EC-169084 ($b_i$=1.55), Bhagyamati x Babajipet-2 ($b_i$=1.57), EC-169084 x Babajipet-1 ($b_i$=1.39), EC-169084 x Babajipet-2 ($b_i$=1.59) had $b_i$ values greater than one with higher than grand mean and non-significant deviation from regression were considered to perform well in favourable conditions. Similar results were also reported by Mohanty and Prusti (2000) [12] and Prasad *el al.* (2002) [9], Rao (2003) [14], Suneetha *et al*. (2006) [25] and Vaddoria *et al*. (2009) [2] in brinjal. All parents, $F_1$ hybrids and checks possessed non significant deviation from regression *i.e.*, the performance of the genotypes can be predicted and except one genotype Pennada x Bhagyamati (72.64).

**Phenol content in fruit (mg 100 $g^{-1}$)**

Phenol content ranged from 3.56 (Bhagyamati) to 6.12 (Bhagyamati x EC-169084) with an overall mean of 4.73 (Table 6). The $F_1$ hybrid *ie.*, EC-169084 x Babajipet-1 (1.02) considered to be stable for phenols over environments as they recorded mean higher than grand mean with good average stability ($b_i$ =1) and non-significant deviation from regression. The $F_1$ hybrids *viz.*, Pennada x Babajipet-1 ($b_i$=0.52), Pennada x EC-169089 ($b_i$=0.46), EC-169084 x Babajipet-2 ($b_i$=0.01), EC-169084 x Tuni Local ($b_i$=0.36) had more mean than general mean with $b_i$ <1 and were predictable under poor environments. Whereas, the $F_1$ hybrids, Pennada x EC-169084 ($b_i$=1.62), Bhagyamati x EC-169084 ($b_i$=1.16), Babajipet-1 x Babajipet-2 ($b_i$=2.53) and Babajipet-2 x EC-169089 ($b_i$=1.65) had $b_i$ values greater than one with higher mean than grand mean and non-significant deviation from regression and were considered to be perform well in favourable conditions. Similar results were also reported by Aakanksha (2016) [5], Bhushan and Samnotra (2017) [6] and Sivakumar *et al*. (2017) [7] in brinjal.

**Ascorbic acid content in fruit (mg 100 $g^{-1}$)**

The ascorbic acid content ranged from 5.52 (Tuni Local) to 11.76 (Bhagyamati x EC-169084) with an overall mean of 8.71 (Table 6). The $F_1$ hybrid *ie.*, EC-169084 x EC-169089 ($b_i$=0.99) had recorded mean ascorbic acid higher than grand mean with unit regression coefficient ($b_i$) and non-significant deviation from regression ($s^2d_i$) and was found to be stable for ascorbic acid content over locations. The $F_1$ hybrids *viz.*, Pennada x EC-169084 ($b_i$=0.69), Pennada x Babajipet-1 ($b_i$=0.44), Pennada x Babajipet-2 ($b_i$=0.47) and Bhagyamati x EC-169084 ($b_i$=0.61), had more mean than general mean with $b_i$ <1 and were predictable under poor environments, whereas, the $F_1$ hybrids, Pennada x Tuni Local ($b_i$=1.96), Bhagyamati x EC-169089 ($b_i$=1.49), Babajipet-1 x Babajipet-2 ($b_i$=1.15), Babajipet-1 x EC-169089 ($b_i$=1.24) and Babajipet-2 x EC-169089 ($b_i$=1.99) had $b_i$ values greater than one with higher mean than grand mean and non-significant deviation from regression and were considered to perform well in favourable conditions. Similar results were also reported by Vaddoria *et al*. (2009) [2], Chaudhari *et al*. (2015) [4] and Aakanksha (2016) [5] in brinjal.

**Fruit borer damage percentage**

Mean values for 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 6). One $F_1$ hybrid *i.e.*, Bhagyamati x EC-169084 ($b_i$=0.97) had low mean than grand mean with regression coefficient around unity ($b_i$=1) and non-significant deviation from regression. Hence, these hybrids were considered to possess the average stability for fruit borer damage at different locations. Regression coefficient less than one ($b_i$<1) with low mean than general mean and non-significant deviation from regression were observed in Pennada x Bhagyamati ($b_i$=0.56), Pennada x EC-169084 ($b_i$=0.28),

Bhagyamati x EC-169089 ($b_i$=0.52), EC-169084 x EC-169089 ($b_i$=0.78) and Babajipet-1 x EC-169089 ($b_i$=0.93). These hybrids perform better in unfavourable environments with fruit borer damage ercent, whereas, the hybrids *viz.*, EC-169084 x Babajipet-1 ($b_i$=1.12) and Babajipet-2 x EC-169089 ($b_i$=1.14) recorded low mean than grand mean with $b_i$ values greater than one and non-significant deviation from regression values and these were predicted to perform well under favourable environments for fruit borer damage percentage.

**Table 1:** Stability parameters for plant height (cm), number of primary branches per plant and days to first flower per plant in brinjal

| Parent / $F_1$ hybrid | Plant height (cm) | | | Number of primary branches per plant | | | Days to first flowering | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ |
| Pennada | 119.72 | 0.61 | -15.75 | 11.78 | 0.81 | -0.11 | 45.41 | 0.65 | -2.86 |
| Bhagyamati | 103.07 | 1.72 | -13.55 | 10.02 | 0.58 | -0.22 | 42.28 | 0.31 | -2.62 |
| EC-169084 | 128.14 | 0.77 | -15.27 | 10.95 | 1.12 | -0.26 | 41.50 | 0.53 | -2.80 |
| Babajipeta-1 | 105.09 | 0.19 | 37.09 | 10.47 | 1.01 | -0.27 | 38.93 | 0.62 | -2.85 |
| Babajipeta-2 | 115.72 | 0.99 | -13.57 | 9.16 | 0.84 | -0.25 | 40.20 | 0.57 | -2.82 |
| EC-169089 | 92.17 | 0.87 | -13.71 | 9.87 | 1.14 | -0.26 | 36.15 | 0.58 | -2.83 |
| Tuni local | 98.22 | 1.36 | -19.02 | 8.95 | 0.99 | -0.27 | 38.06 | 0.59 | -2.83 |
| Pennada x Bhagyamati | 121.69 | 1.90 | 126.51** | 9.97 | 0.93 | -0.25 | 45.27 | 1.20 | -2.92 |
| Pennada x EC-169084 | 139.53 | 0.74 | 5.62 | 12.23 | 0.16* | -0.20 | 42.97 | 1.20 | -2.92 |
| Pennada x Babajipet-1 | 130.58 | -0.55 | 9.87 | 11.10 | 1.03 | -0.26 | 42.57 | 1.20 | -2.92 |
| Pennada x Babajipet-2 | 119.09 | -0.97 | 333.67** | 9.85 | 1.67 | -0.27 | 42.64 | 1.20 | -2.92 |
| Pennada x EC-169089 | 104.93 | 1.72* | -19.19 | 10.69 | 1.36 | -0.17 | 38.44 | 1.20 | -2.92 |
| Pennada x Tuni local | 110.60 | 3.05 | 15.72 | 9.65 | 1.51 | -0.26 | 40.24 | 1.20 | -2.92 |
| Bhagyamati x EC-169084 | 130.87 | -0.89* | -19.17 | 10.92 | 1.38 | -0.06 | 42.77 | 1.20 | -2.92 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Bhagyamati x Babajipet-1 | 119.78 | 0.75 | -19.14 | 10.07 | 0.94 | -0.26 | 39.50 | 1.20 | -2.92 |
| Bhagyamati x Babajipet-2 | 124.14 | 1.07 | -11.48 | 9.17 | 0.84 | -0.20 | 40.74 | 1.20 | -2.92 |
| Bhagyamati x EC-169089 | 112.10 | 0.96 | -6.91 | 10.16 | 1.10 | -0.18 | 41.24 | 1.20 | -2.92 |
| Bhagyamati x Tuni local | 120.70 | 1.26 | -16.48 | 9.97 | 1.41 | -0.15 | 39.10 | 1.20 | -2.92 |
| EC-169084 x Babajipet-1 | 132.12 | -0.54 | 166.97** | 10.88 | 1.01 | 0.11 | 40.80 | 1.20 | -2.92 |
| EC-169084 x Babajipet-2 | 143.04 | 1.49 | -17.56 | 10.65 | 0.79 | -0.22 | 40.07 | 1.20 | -2.92 |
| EC-169084 x EC-169089 | 118.06 | 2.56 | 31.05 | 10.72 | 1.12 | -0.26 | 39.14 | 1.50 | -2.77 |
| EC-169084 x Tuni local | 124.83 | 1.49 | 75.99* | 10.30 | 1.01 | -0.27 | 40.33 | 0.46 | -2.74 |
| Babajipet-1 x Babajipet-2 | 136.23 | -0.28 | 53.75 | 10.97 | 1.08 | -0.27 | 40.80 | 1.20 | -2.92 |
| Babajipet-1 x EC-169089 | 123.84 | 1.66 | -18.10 | 11.07 | 1.08 | -0.18 | 36.53 | 1.19 | -2.92 |
| Babajipet-1 x Tuni local | 129.86 | 1.09 | 7.22 | 9.43 | 1.01 | -0.27 | 39.59 | 1.16 | -2.93 |
| Babajipet-2 x EC-169089 | 129.22 | 0.88 | -19.24 | 9.22 | 0.83 | -0.24 | 36.87 | 1.04 | -2.95 |
| Babajipet-2 x Tuni local | 137.37 | 1.37* | -19.24 | 8.83 | 0.70 | -0.19 | 38.28 | 0.58 | -2.83 |
| EC-169089 x Tuni local | 118.69 | 2.01 | -2.62 | 10.32 | 1.25 | -0.22 | 34.47 | 1.20 | -2.92 |
| Arka anand | 106.61 | 1.43* | -19.24 | 10.07 | 0.87 | -0.25 | 36.77 | 1.20 | -2.92 |
| VNR-51 | 131.33 | 1.31 | -18.27 | 11.48 | 0.45 | -0.15 | 35.41 | 0.98 | -2.95 |
| G.Mean | 121.05 | | | 10.26 | | | 40.17 | | |
| SEm ± | 4.4 | | | 0.17 | | | 0.18 | | |

*: Significant at 5% level; **: Significant at 1% level

**Table 2:** Stability parameters for days to 50% flowering, days to first harvest and days to final harvest in brinjal

| Parent / $F_1$ hybrid | Days to 50% flowering | | | Days to first harvest | | | Days to final harvest | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ |
| Pennada | 53.01 | 0.87 | -2.52 | 65.56 | 1.17 | -7.25 | 178.90 | 1.03 | -45.46 |
| Bhagyamati | 49.10 | 0.81 | -2.27 | 59.97 | 1.11 | -6.94 | 174.90 | 1.03 | -45.46 |
| EC-169084 | 50.37 | 0.89 | -2.57 | 63.04 | 1.11 | -6.94 | 182.23 | 1.03 | -45.46 |
| Babajipeta-1 | 46.90 | 0.82 | -2.34 | 56.00 | 1.11 | -6.94 | 181.35 | 1.24 | -41.15 |
| Babajipeta-2 | 48.45 | 0.84 | -2.39 | 60.95 | 1.11 | -6.94 | 170.53 | 1.03 | -45.46 |
| EC-169089 | 45.33 | 0.81 | -2.27 | 51.64 | 1.11 | -6.94 | 160.57 | 1.03 | -45.46 |
| Tuni local | 45.60 | 0.93 | -2.70 | 54.78 | 1.59 | -6.90 | 166.90 | 1.03 | -45.46 |
| Pennada x Bhagyamati | 52.63 | 1.21 | -3.29 | 63.00 | 1.12 | -7.12 | 183.90 | 1.03 | -45.46 |
| Pennada x EC-169084 | 54.54 | 1.27 | -3.34 | 64.69 | 0.88 | -7.10 | 189.40 | 2.11 | -37.00 |
| Pennada x Babajipet-1 | 48.27 | 1.21 | -3.29 | 57.97 | 0.88 | -7.10 | 191.25 | -0.47 | -37.58 |
| Pennada x Babajipet-2 | 53.54 | 1.21 | -3.29 | 61.26 | 0.88 | -7.10 | 194.12 | -1.20 | -25.40 |
| Pennada x EC-169089 | 48.03 | 0.96 | -2.80 | 56.51 | 0.95 | -7.11 | 179.33 | 1.03 | -45.46 |
| Pennada x Tuni local | 48.79 | 0.91 | 2.60 | 57.20 | 0.91 | -7.10 | 183.90 | 1.03 | -45.46 |
| Bhagyamati x EC-169084 | 52.52 | 1.21 | -3.29 | 61.22 | 0.88 | -7.10 | 186.06 | 2.34 | -33.65 |
| Bhagyamati x Babajipet-1 | 48.05 | 1.20 | -3.27 | 57.82 | 0.50 | -6.99 | 188.92 | 0.57 | -45.47 |
| Bhagyamati x Babajipet-2 | 50.18 | 1.21 | -3.29 | 61.01 | 0.88 | -7.10 | 180.90 | 1.03 | -45.46 |
| Bhagyamati x EC-169089 | 47.93 | 0.91 | -1.80 | 54.98 | 0.88 | -7.10 | 171.02 | 0.80 | -33.91 |
| Bhagyamati x Tuni local | 49.46 | 1.22 | -3.30 | 57.15 | 1.25 | -7.53 | 174.90 | 1.03 | -45.46 |
| EC-169084 x Babajipet-1 | 50.39 | 1.24 | 2.00 | 57.07 | 1.63 | -7.16 | 189.57 | 1.03 | -45.46 |
| EC-169084 x Babajipet-2 | 53.05 | 1.21 | -3.29 | 61.41 | 0.86 | -7.19 | 177.90 | 1.03 | -45.46 |
| EC-169084 x EC-169089 | 49.05 | 0.72 | -1.91 | 57.71 | 0.13 | -7.01 | 185.23 | 1.03 | -45.46 |
| EC-169084 x Tuni local | 47.79 | 0.10* | -3.34 | 55.32 | 0.88 | -7.11 | 177.90 | 1.03 | -45.46 |
| Babajipet-1 x Babajipet-2 | 46.24 | 0.90 | -1.36 | 54.56 | 1.66 | -0.84 | 186.57 | 1.03 | -45.46 |
| Babajipet-1 x EC-169089 | 46.30 | 0.06 | 1.80 | 53.77 | -0.23 | -1.26 | 181.57 | 1.03 | -45.46 |
| Babajipet-1 x Tuni local | 45.33 | 2.05 | 1.48 | 52.73 | 2.60 | -6.80 | 186.90 | 1.03 | -45.46 |
| Babajipet-2 x EC-169089 | 45.35 | 1.21 | -3.28 | 52.51 | 0.85 | -7.45 | 173.46 | 4.15 | -41.03 |
| Babajipet-2 x Tuni local | 45.74 | 0.60 | -1.32 | 52.99 | 0.54 | -5.02 | 167.26 | -0.73 | 61.26 |
| EC-169089 x Tuni local | 43.11 | 1.08 | -3.08 | 50.05 | 0.55 | -7.46 | 155.05 | 0.64 | -41.19 |
| Arka anand | 47.20 | 1.10 | -0.47 | 55.29 | 1.03 | -6.08 | 180.23 | 1.03 | -45.46 |
| VNR-51 | 45.21 | 1.28 | -3.34 | 51.71 | 1.20 | -6.93 | 187.23 | 1.03 | -45.46 |
| G.Mean | 48.75 | | | 57.19 | | | 179.30 | | |
| SEm ± | 0.81 | | | 0.69 | | | 1.80 | | |

*: Significant at 5% level; **: Significant at 1% level

**Table 3:** Stability parameters for number of flowers per cluster, number of fruits per cluster and fruit length (cm) in brinjal

| Parent / $F_1$ hybrid | Number of flowers per cluster | | | Number of fruits per cluster | | | Fruit length (cm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ |
| Pennada | 4.86 | 0.71 | -0.04 | 3.74 | 1.18 | -0.02 | 7.79 | 0.32 | -0.13 |
| Bhagyamati | 3.38 | 0.80 | -0.06 | 2.80 | 1.14 | -0.02 | 11.31 | 0.58* | -0.14 |
| EC-169084 | 5.39 | 0.80 | -0.06 | 4.05 | 1.14 | -0.02 | 10.10 | 0.74 | -0.13 |
| Babajipeta-1 | 3.61 | 0.89 | -0.07 | 3.06 | 1.18 | -0.02 | 11.10 | 0.37 | -0.13 |
| Babajipeta-2 | 4.09 | 0.69 | -0.04 | 2.47 | 1.18 | -0.02 | 12.22 | 0.49* | -0.14 |
| EC-169089 | 3.43 | 0.65 | -0.03 | 1.71 | 1.18 | -0.02 | 13.24 | 0.57 | -0.13 |
| Tuni local | 3.18 | 0.72 | -0.05 | 1.58 | 1.18 | -0.02 | 12.39 | 0.42 | -0.13 |
| Pennada x Bhagyamati | 4.03 | 1.53 | 0.04 | 2.93 | 0.98 | -0.03 | 11.02 | 1.66 | -0.13 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pennada x EC-169084 | 5.71 | 0.91 | -0.07 | 4.54 | 0.98 | -0.03 | 9.72 | 1.78 | -0.13 |
| Pennada x Babajipet-1 | 4.47 | 1.25 | -0.04 | 3.58 | 1.44 | -0.02 | 10.60 | 1.95 | -0.12 |
| Pennada x Babajipet-2 | 4.40 | 1.78 | 0.17 | 3.39 | 0.98 | -0.03 | 11.78 | 1.17 | -0.13 |
| Pennada x EC-169089 | 4.52 | 1.12 | -0.06 | 3.03 | 0.98 | -0.03 | 13.67 | 1.05 | -0.12 |
| Pennada x Tuni local | 3.73 | 1.02 | -0.07 | 2.68 | 0.98 | -0.03 | 12.11 | 1.21 | -0.13 |
| Bhagyamati x EC-169084 | 5.56 | 1.01 | -0.07 | 4.58 | 0.98 | -0.03 | 9.84 | 1.17 | -0.13 |
| Bhagyamati x Babajipet-1 | 4.19 | 0.58 | -0.01 | 3.15 | 0.98 | -0.03 | 11.30 | 1.17 | -0.13 |
| Bhagyamati x Babajipet-2 | 4.78 | 0.28 | 0.10 | 2.95 | 0.98 | -0.03 | 11.78 | 1.17 | -0.13 |
| Bhagyamati x EC-169089 | 4.14 | 0.55 | 0.00 | 2.35 | 0.66 | 0.03 | 13.93 | 1.17 | -0.13 |
| Bhagyamati x Tuni local | 3.28 | 0.78 | -0.05 | 2.05 | 0.98 | -0.03 | 13.23 | 1.17 | -0.13 |
| EC-169084 x Babajipet-1 | 5.12 | 1.18 | 0.05 | 3.37 | 0.98 | -0.03 | 10.45 | 1.16 | -0.13 |
| EC-169084 x Babajipet-2 | 5.41 | 1.02 | -0.07 | 4.49 | 0.84 | -0.01 | 11.56 | 1.17 | -0.13 |
| EC-169084 x EC-169089 | 4.94 | 1.12 | -0.06 | 3.65 | 0.98 | -0.03 | 13.26 | 1.18 | -0.13 |
| EC-169084 x Tuni local | 3.81 | 1.55 | 0.05 | 2.75 | 0.98 | -0.03 | 11.93 | 1.17 | -0.13 |
| Babajipet-1 x Babajipet-2 | 5.00 | 0.92 | 0.15 | 3.49 | 0.53** | -0.03 | 11.66 | 1.18 | -0.13 |
| Babajipet-1 x EC-169089 | 4.41 | 1.27 | -0.04 | 2.93 | 1.01 | -0.03 | 13.62 | 1.17 | -0.13 |
| Babajipet-1 x Tuni local | 3.28 | 1.74 | 0.14 | 2.11 | 0.98 | -0.03 | 12.81 | 1.18 | -0.13 |
| Babajipet-2 x EC-169089 | 4.37 | 1.23 | -0.04 | 2.21 | 0.98 | -0.03 | 14.61 | 1.17 | -0.13 |
| Babajipet-2 x Tuni local | 4.38 | 1.13 | -0.04 | 2.09 | 0.98 | -0.03 | 13.54 | 1.17 | -0.13 |
| EC-169089 x Tuni local | 3.33 | 0.74 | -0.05 | 2.02 | 0.98 | -0.03 | 14.43 | 1.17 | -0.13 |
| Arka anand | 3.99 | 1.24 | -0.04 | 3.48 | 0.67 | 0.08* | 17.38 | 1.83 | 0.05 |
| VNR-51 | 5.33 | 0.80 | -0.06 | 4.52 | 0.98 | -0.03 | 11.67 | -1.75 | 2.74** |
| G.Mean | 4.31 | | | 2.99 | | | 11.96 | | |
| SEm ± | 0.16 | | | 0.06 | | | 0.23 | | |

*: Significant at 5% level; **: Significant at 1% level

**Table 4:** Stability parameters for fruit girth (cm), fruit length to girth ratio and fruit weight (g) per fruit in brinjal

| Parent / $F_1$ hybrid | Fruit girth (cm) | | | Fruit length to girth ratio | | | Fruit weight (g) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ |
| Pennada | 8.47 | 0.99 | -0.27 | 0.94 | 2.09* | 0.00 | 40.56 | 2.24 | -5.96 |
| Bhagyamati | 12.95 | 1.03 | -0.22 | 0.88 | 1.14 | 0.00 | 51.37 | -1.99 | 7.51 |
| EC-169084 | 9.89 | 0.99 | -0.26 | 1.03 | 1.63 | 0.00 | 45.82 | 2.27 | 44.48* |
| Babajipeta-1 | 11.92 | 1.01 | -0.26 | 0.94 | 1.47 | 0.00 | 48.69 | 3.09 | 4.51 |
| Babajipeta-2 | 14.71 | 1.01 | -0.26 | 0.84 | 0.97 | 0.00 | 59.58 | -0.64 | -2.70 |
| EC-169089 | 13.42 | 0.98 | -0.23 | 0.99 | 1.22 | 0.00 | 69.45 | 1.57 | -7.47 |
| Tuni local | 17.38 | 1.02 | -0.24 | 0.72 | 0.72 | 0.00 | 71.98 | 1.27 | -7.69 |
| Pennada x Bhagyamati | 11.92 | 1.01 | -0.26 | 0.93 | 0.63 | 0.00 | 75.41 | -2.46 | 31.72* |
| Pennada x EC-169084 | 7.60 | 0.99 | -0.26 | 1.30 | 1.91 | 0.00 | 68.17 | 3.06 | 26.82* |
| Pennada x Babajipet-1 | 10.21 | 0.99 | -0.26 | 1.04 | 0.73 | 0.00 | 50.38 | 1.28 | -7.69 |
| Pennada x Babajipet-2 | 14.37 | 1.03 | -0.14 | 0.82 | 0.62 | 0.00 | 57.97 | 0.87 | -7.57 |
| Pennada x EC-169089 | 12.19 | 0.99 | -0.26 | 1.13 | 1.35 | 0.00 | 72.34 | -1.65 | 4.39 |
| Pennada x Tuni local | 15.38 | 1.03 | -0.22 | 0.79 | 0.50 | 0.00 | 61.02 | -0.83* | -7.70 |
| Bhagyamati x EC-169084 | 9.92 | 0.99 | -0.26 | 1.00 | 1.29 | 0.00 | 74.66 | 0.81 | -3.24 |
| Bhagyamati x Babajipet-1 | 12.73 | 1.04 | -0.15 | 0.90 | 0.83 | 0.00 | 53.25 | 1.83 | -7.05 |
| Bhagyamati x Babajipet-2 | 14.86 | 1.04 | -0.15 | 0.80 | 0.58 | 0.00 | 68.31 | 2.39 | -5.44 |
| Bhagyamati x EC-169089 | 13.76 | 1.04 | -0.15 | 1.02 | 1.03 | 0.00 | 83.60 | -0.10** | -7.71 |
| Bhagyamati x Tuni local | 17.68 | 1.10 | -0.20 | 0.75 | 0.50 | 0.00 | 62.34 | -0.52 | -3.34 |
| EC-169084 x Babajipet-1 | 11.46 | 0.99 | -0.26 | 0.92 | 0.94 | 0.00 | 65.02 | 1.83 | -7.05 |
| EC-169084 x Babajipet-2 | 13.23 | 0.99 | -0.26 | 0.88 | 0.76 | 0.00 | 72.80 | 2.38 | -5.47 |
| EC-169084 x EC-169089 | 12.25 | 0.94 | -0.06 | 1.09 | 1.15 | 0.00 | 82.30 | -1.70 | 4.83 |
| EC-169084 x Tuni local | 15.56 | 0.99 | -0.26 | 0.77 | 0.53 | 0.00 | 78.05 | 1.84 | -7.03 |
| Babajipet-1 x Babajipet-2 | 17.33 | 0.99 | -0.26 | 0.68 | 0.33 | 0.00 | 82.51 | 1.04 | -7.68 |
| Babajipet-1 x EC-169089 | 15.26 | 0.99 | -0.26 | 0.90 | 0.68 | 0.00 | 73.67 | -0.30 | -4.44 |
| Babajipet-1 x Tuni local | 18.06 | 0.99 | -0.26 | 0.71 | 0.42 | 0.00 | 57.74 | 1.77 | -7.16 |
| Babajipet-2 x EC-169089 | 15.85 | 0.99 | -0.26 | 0.92 | 0.70 | 0.00 | 85.01 | 1.11 | -7.70 |
| Babajipet-2 x Tuni local | 20.86 | 1.04 | -0.15 | 0.65 | 0.29 | 0.00 | 83.47 | 0.64 | -7.28 |
| EC-169089 x Tuni local | 17.06 | 0.99 | -0.26 | 0.85 | 0.54 | 0.00 | 90.25 | 5.07 | -4.63 |
| Arka anand | 9.99 | 0.90 | 0.37 | 1.76 | 2.30 | 0.01* | 77.46 | 2.93 | -3.00 |
| VNR-51 | 14.03 | 0.91 | 0.01 | 0.84 | 2.15 | 0.02** | 85.54 | 0.99 | -7.66 |
| G.Mean | 13.80 | | | 0.90 | | | 67.34 | | |
| SEm ± | 0.18 | | | 0.03 | | | 1.89 | | |

*: Significant at 5% level; **: Significant at 1% level

**Table 5:** Stability parameters for number of fruits per plant, fruit yield per plant (kg) and fruit yield per plot (kg) in brinjal

| Parent / $F_1$ hybrid | Number of fruits per plant | | | Fruit yield per plant (kg) | | | Fruit yield per plot (kg) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ |
| Pennada | 44.44 | 0.89 | -5.37 | 2.01 | 0.42 | -0.02 | 36.09 | 0.60 | -9.55 |
| Bhagyamati | 33.21 | 1.45 | -6.31 | 1.89 | 0.68 | -0.02 | 33.96 | 0.81 | -6.51 |
| EC-169084 | 51.52 | 1.19 | -5.61 | 2.19 | 0.82 | -0.01 | 38.21 | -0.09 | -6.01 |
| Babajipeta-1 | 30.10 | 1.32 | -6.39 | 1.61 | 0.34 | -0.02 | 29.92 | 0.76 | -7.64 |
| Babajipeta-2 | 19.18 | 0.65 | -6.79 | 1.74 | 0.46 | -0.01 | 32.19 | 0.98 | -7.52 |
| EC-169089 | 25.30 | 0.88 | -6.88 | 1.83 | 0.58 | -0.02 | 33.34 | 0.77 | -6.81 |
| Tuni local | 15.22 | 0.56 | -6.47 | 1.33 | 0.41 | -0.02 | 24.00 | 0.59 | -6.69 |
| Pennada x Bhagyamati | 40.80 | 0.70 | -6.59 | 2.64 | 1.69* | -0.02 | 41.79 | 1.23 | 72.64** |
| Pennada x EC-169084 | 70.21 | 1.98* | -7.14 | 3.05 | 1.03 | -0.02 | 55.45 | 1.55 | -9.32 |
| Pennada x Babajipet-1 | 42.54 | 1.05 | -6.72 | 2.07 | 1.05 | -0.02 | 37.75 | 1.21 | -9.66 |
| Pennada x Babajipet-2 | 36.21 | 0.95 | -6.94 | 2.03 | 0.86 | -0.02 | 37.10 | 1.35 | -9.63 |
| Pennada x EC-169089 | 30.98 | 0.90 | -5.79 | 2.31 | 1.26 | -0.02 | 40.77 | 1.05 | 6.42 |
| Pennada x Tuni local | 26.14 | 0.80 | -7.04 | 1.60 | 1.28 | -0.02 | 27.95 | 1.14 | -9.03 |
| Bhagyamati x EC-169084 | 66.31 | 0.78 | -2.67 | 3.45 | 1.01 | -0.01 | 61.97 | 1.02 | 2.53 |
| Bhagyamati x Babajipet-1 | 39.04 | 0.71 | -6.68 | 2.22 | 1.01 | -0.02 | 39.53 | 0.74 | -8.76 |
| Bhagyamati x Babajipet-2 | 36.61 | 0.91 | -7.11 | 2.42 | 1.24 | -0.02 | 43.53 | 1.57 | -3.89 |
| Bhagyamati x EC-169089 | 33.80 | 1.80 | -6.90 | 2.94 | 1.04 | -0.02 | 53.09 | 0.92 | -9.65 |
| Bhagyamati x Tuni local | 26.97 | 0.69 | -5.93 | 1.96 | 0.56 | -0.01 | 36.04 | 0.96 | -3.41 |
| EC-169084 x Babajipet-1 | 57.77 | 1.51 | -0.42 | 2.53 | 1.52 | -0.02 | 47.99 | 1.39 | -7.52 |
| EC-169084 x Babajipet-2 | 49.19 | 1.17 | -5.68 | 2.69 | 1.29 | -0.02 | 48.44 | 1.59 | -6.66 |
| EC-169084 x EC-169089 | 42.71 | 1.10 | 2.43 | 2.87 | 0.97 | -0.02 | 52.40 | 0.92 | -9.39 |
| EC-169084 x Tuni local | 33.64 | 1.19 | 26.22* | 1.98 | 1.06 | 0.04 | 35.51 | 1.91 | 15.27 |
| Babajipet-1 x Babajipet-2 | 44.05 | 1.22 | -6.09 | 2.72 | 1.14 | 0.01 | 48.95 | 0.50 | -9.46 |
| Babajipet-1 x EC-169089 | 37.12 | 0.77 | -7.05 | 2.79 | 0.79 | -0.03 | 51.35 | 0.77 | -9.27 |
| Babajipet-1 x Tuni local | 29.01 | 1.33 | -2.39 | 1.98 | 1.03 | -0.03 | 36.89 | 1.73 | -7.05 |
| Babajipet-2 x EC-169089 | 33.63 | 0.65* | -7.14 | 2.79 | 1.14 | -0.02 | 49.83 | 0.79 | -9.03 |
| Babajipet-2 x Tuni local | 27.95 | 0.94 | -5.08 | 2.44 | 1.32** | -0.03 | 41.97 | 0.90 | 3.04 |
| EC-169089 x Tuni local | 27.84 | 0.60* | -7.14 | 2.20 | 0.89 | -0.02 | 38.78 | 0.21 | -9.42 |
| Arka anand | 44.76 | 0.41 | -5.53 | 2.53 | 1.34 | -0.02 | 42.21 | 0.65 | -6.10 |
| VNR-51 | 54.63 | 0.89 | -7.08 | 3.06 | 1.11 | 0.00 | 54.55 | 1.48 | -8.99 |
| G.Mean | 37.55 | | | 2.29 | | | 41.24 | | |
| SEm ± | 1.12 | | | 0.06 | | | 1.80 | | |

*: Significant at 5% level; **: Significant at 1% level

**Table 6:** Stability parameters for phenols content in fruit (mg 100 $g^{-1}$), ascorbic acid content in fruit (mg 100 $g^{-1}$) and fruit borer damage percentage in binjal

| Parent / $F_1$ hybrid | Phenols content in fruit (mg 100 $g^{-1}$) | | | Ascorbic acid content in fruit (mg 100 $g^{-1}$) | | | Fruit borer damage (%) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ | Mean | $b_i$ | $S^2d_i$ |
| Pennada | 4.81 | 1.72 | -0.01 | 8.94 | 0.97 | -0.02 | 27.27 | 1.00 | -2.37 |
| Bhagyamati | 3.56 | 1.42 | 0.03 * | 6.84 | 0.10 | 0.05 | 29.91 | 0.82 | -1.52 |
| EC-169084 | 4.92 | 1.07 | 0.11** | 7.89 | 0.46 | 0.01 | 22.46 | 0.59 | 3.25 |
| Babajipeta-1 | 4.27 | 0.81 | -0.01 | 7.38 | 0.97 | -0.02 | 30.73 | 1.22 | -1.90 |
| Babajipeta-2 | 3.95 | 0.80 | -0.01 | 5.56 | 1.09 | -0.03 | 35.06 | 1.23 | -0.89 |
| EC-169089 | 3.72 | 0.37 | 0.05 * | 7.43 | 0.97 | -0.02 | 32.83 | 0.92 | -2.22 |
| Tuni local | 3.68 | 1.10 | -0.01 | 5.52 | 0.89 | -0.02 | 36.70 | 0.98 | -1.44 |
| Pennada x Bhagyamati | 4.62 | 4.54 | 0.09 ** | 9.36 | 0.58 | 0.73** | 29.65 | 0.56 | 2.09 |
| Pennada x EC-169084 | 5.75 | 1.62 | -0.01 | 11.48 | 0.69 | -0.02 | 25.66 | 0.28 | -2.26 |
| Pennada x Babajipet-1 | 5.00 | 0.52 | -0.01 | 9.93 | 0.44 | 0.01 | 32.12 | 0.80 | -2.40 |
| Pennada x Babajipet-2 | 4.50 | 1.92 | 0.17** | 9.61 | 0.47 | 0.01 | 35.01 | 1.30 | -1.48 |
| Pennada x EC-169089 | 4.90 | 0.46 | 0.00 | 9.52 | 2.53 | 0.38** | 30.56 | 0.82 | -2.40 |
| Pennada x Tuni local | 4.23 | 1.98 | 0.20** | 8.83 | 1.96 | -0.02 | 35.36 | 1.22 | -1.24 |
| Bhagyamati x EC-169084 | 6.12 | 1.16 | 0.00 | 11.76 | 0.61 | -0.03 | 20.80 | 0.97 | -2.10 |
| Bhagyamati x Babajipet-1 | 4.95 | -1.13 | 0.08** | 8.62 | 1.07 | -0.03 | 31.95 | 1.14 | -1.57 |
| Bhagyamati x Babajipet-2 | 4.57 | 1.42 | 0.03* | 8.24 | 1.28 | -0.03 | 35.90 | 1.34 | -1.56 |
| Bhagyamati x EC-169089 | 5.53 | 1.14 | 0.15** | 10.89 | 1.49 | -0.03 | 26.71 | 0.52 | -2.28 |
| Bhagyamati x Tuni local | 3.96 | 1.31 | 0.02 | 6.98 | 1.49 | -0.03 | 38.25 | 1.27 | -0.93 |
| EC-169084 x Babajipet-1 | 5.07 | 1.02 | -0.01 | 9.38 | 1.13 | 0.34** | 30.94 | 1.12 | -1.86 |
| EC-169084 x Babajipet-2 | 5.08 | 0.01 | -0.01 | 7.28 | 1.06 | -0.03 | 32.41 | 1.21 | -1.24 |
| EC-169084 x EC-169089 | 5.41 | 0.34 | 0.05 * | 10.59 | 0.99 | -0.02 | 28.99 | 0.78 | -1.92 |
| EC-169084 x Tuni local | 4.93 | 0.36 | -0.01 | 7.47 | 1.49 | -0.03 | 34.70 | 0.76 | 3.29 |
| Babajipet-1 x Babajipet-2 | 5.07 | 2.53 | -0.01 | 9.41 | 1.15 | -0.03 | 33.74 | 1.00 | 8.19 * |
| Babajipet-1 x EC-169089 | 4.95 | -1.18 | 0.82** | 10.29 | 1.24 | -0.03 | 30.04 | 0.93 | -2.03 |
| Babajipet-1 x Tuni local | 4.37 | 1.51 | 0.05 * | 7.74 | -0.27 | 0.10 * | 36.14 | 1.26 | -1.10 |
| Babajipet-2 x EC-169089 | 5.14 | 1.65 | -0.01 | 9.32 | 1.99 | 0.07 | 30.60 | 1.14 | -2.08 |
| Babajipet-2 x Tuni local | 4.58 | 0.88 | -0.01 | 7.85 | 1.49 | -0.03 | 36.71 | 1.02 | 4.22 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| EC-169089 x Tuni local | 4.74 | -0.84 | 0.33** | 9.68 | 0.94 | 0.12 * | 37.49 | 2.21 | 8.90* |
| Arka anand | 4.99 | 0.70 | 0.00 | 9.29 | 0.82 | -0.02 | 31.20 | 0.93 | -2.23 |
| VNR-51 | 5.40 | 0.80 | -0.01 | 10.45 | -0.10 | 0.08 | 27.72 | 0.87 | -2.32 |
| G.Mean | 4.73 | | | 8.71 | | | 31.74 | | |
| SEm ± | 0.20 | | | 0.20 | | | 1.00 | | |

*: Significant at 5% level; **: Significant at 1% level

**Table 7:** Pooled analysis of variance for stability for yield and yield components in brinjal

| Source of variation | d.f | Fruit length to girth ratio | Fruit weight (g) | Number of fruits per plant | Fruit yield per plant (kg) | Fruit yield per plot (kg) | Phenols (mg100g$^{-1}$) | Ascorbic acid (mg100g$^{-1}$) | Fruit borer damage percentage |
|---|---|---|---|---|---|---|---|---|---|
| Rep within Env. | 6 | 0.01 | 1.45 | 8.61 | 0.02 * | 10.00 | 0.01 | 0.03 | 1.19 |
| Varieties | 29 | 0.13** | 533.49 | 492.89 | 0.77** | 244.01 | 1.11** | 7.54 | 55.56 * |
| Env.+ (Var.* Env.) | 60 | 0.01** | 6.31 | 13.53 | 0.08** | 8.91 | 0.06 | 0.19 | 8.26 * |
| Environments | 2 | 0.10** | 21.46 | 325.77 | 2.065** | 142.97 | 0.35* | 3.42 | 195.46 * |
| Var.* Env. | 58 | 0.01 | 5.79 | 2.76 | 0.01 | 4.29 | 0.05 | 0.08 | 1.81 |
| Environments (Lin.) | 1 | 0.21** | 42.91 | 651.54 | 4.11** | 285.95 | 0.69** | 6.85 | 390.91* |
| Var.* Env.(Lin.) | 29 | 0.01 | 4.24 | 2.91 | 0.02* | 1.90 | 0.03 | 0.08 | 1.55 |
| Pooled Deviation | 30 | 0.00 | 7.10 | 2.53 | 0.01 | 6.46 | 0.08** | 0.08 | 2.00 |
| Pooled Error | 174 | 0.01 | 7.92 | 7.09 | 0.02 | 9.68 | 0.01 | 0.03 | 2.49 |

*: Significant at 5% level; **: Significant at 1% level

| Source of variation | d.f | Plant height (cm) | Number of primary branches per plant | Days to first flower | Days to 50% flowering | Days to first harvest | Days to final harvest | Number of flowers per cluster | Number of fruits per cluster | Fruit length (cm) | Fruit girth (cm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rep within Env. | 6 | 1.13 | 0.36 | 2.52 | 0.66 | 1.39 | 0.66 | 0.05 | 0.02 | 0.03 | 0.11 |
| Varieties | 29 | 476.37** | 2.10 | 21.61 | 25.73** | 50.85 | 252.22 | 1.70** | 2.19 | 10.02 | 28.68* |
| Env.+ (Var.* Env.) | 60 | 33.99 | 0.41 | 2.92 | 7.80** | 3.62 | 8.97 | 0.98** | 0.14 | 0.33 | 1.70* |
| Environments | 2 | 240.61** | 10.63 | 78.85 | 190.12** | 76.44 | 98.46 | 25.62** | 4.05 | 5.84 | 49.98* |
| Var.* Env. | 58 | 26.87 | 0.06 | 0.30 | 1.52 | 1.11 | 5.88 | 0.13** | 0.01 | 0.14 | 0.04 |
| Environments (Lin.) | 1 | 481.22 ** | 21.26 | 157.70 | 380.24** | 152.88 | 196.92 | 51.24** | 8.09 | 11.67 | 99.95* |
| Var.* Env.(Lin.) | 29 | 14.32 | 0.07 | 0.53 | 1.67 | 1.23 | 5.29 | 0.21** | 0.01 | 0.17 | 0.01 |
| Pooled Deviation | 30 | 38.103** | 0.06 | 0.07 | 1.31 | 0.95 | 6.26 | 0.05 | 0.01 | 0.11 | 0.07 |
| Pooled Error | 174 | 19.86 | 0.26 | 2.96 | 3.45 | 7.75 | 47.29 | 0.07 | 0.03 | 0.14 | 0.27 |

*: Significant at 5% level; **: Significant at 1% level

## Conclusion

The results of the present study considering all the yield attributing traits and yield together, it was found that four hybrids were most stable for fruit yield per plant with high mean yield performance. Bhagyamati x EC-169084 had the highest mean value for fruit yield and fruit yield per plot, number of fruits per cluster, numbr of flowers per cluster and fruit borer damage percentage. The second high yielding hybrid Pennada x EC-169084 was found to be highly stable for number of fruits per cluster, fruit length, fruit yield per plant, number of fruits per plant and days to final harvest. The third high yielding hybrid Bhagyamati x EC-169089 was found to be hihely stable for fruit length to girth ratio, fruit yield per plant and number of flowers per cluster. The fourth high yielding hybrid EC-169084 x EC-169089 had the highest mean values per fruit yield per plant, days to final harvest, number of fruits per cluster and ascorbic acid content.

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