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# EVALUATION AND SCREENING STUDIES OF IDENTIFIED PUDUKKOTTAI LOCAL BRINJAL FOR YIELD AND BIOTIC STRESS (*SOLANUM MELONGENA* L.)

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## ABSTRACT

The Evaluation studies of Identified Pudukkottai local Brinjal was conducted during 2018-2019 in Agricultural College & Research Institute, Kudumiyanmalai of Pudukkottai district of Tamil Nadu with an objective to identify the elite genotypes to the Farmers. Since, it was a continuous study Performance assessment of Pudukkottai local Brinjal in villages in and around Pudukkottai district, Tamil Nadu from 2017-2018 of which 2 genotypes were shortlisted based on their superior characters. Various morphometric and quality characters were observed in all the 4 genotypes and finally two best performing genotypes were selected. In this study, closer study of two selected best performing genotypes G1 (sellugudi), G2 (alavayal) were compared with other popular varieties like G3 (CO 2), G4 (PLR 1), G5 (PLR2), G6 (KKM1), G7 (VRM Thorny), G8 (PPI) and G9 (VRM Non thorny) were evaluated based on PPV & FRA descriptor.

The plant height showed a variation ranging from 90.00 cm to 45.09 cm with mean of 69.00 cm. Plant width showed a variation ranging from 68.40 to 32.90 cm with mean of 51.03 cm. Out of the nine genotypes studied for plant growth habit, all are having semi spreading growth habit and G5 is having erect growth habit. Regarding, stem pubescence, G6 and G7 are having strong stem pubescence.

Leaf characters *viz.*, Leaf length, Leaf width, Leaf spininess, Leaf blade colour, Colour of veins, Intensity of colour of veins exhibited considerable variations. The leaf length showed a variation from 15.00 cm to 9.25 cm with the mean of 11.79 cm. The width showed a variation from 9.0 cm to 3.50 cm with the mean of 7.10 cm. Genotypes *viz.*, G7 showed presence of spines in leaves, G1, G2, G5 and G9 showed purple colouration of veins and G1, G5 showed strong intensity of vein colouration.

Flower characters like Flower size, Flower colour, Flowering time, Number of flowers per plant were observed. From the observations, G7 and G8 have large sized flowers. G1, G2, G4 and G6 have medium sized flowers. G3 and G5 have small sized flower. Genotypes G1, G4, G5 have dark purple coloured flowers. Other genotypes have light purple colour flowers. Regarding flowering period G3, G5 and G9 showed an late flowering period of more than 75 days. Other genotypes showed medium flowering period of 65 to 75 days. Number of flowers per plant showed a variation from 5.00 to 8.00 with a mean of 5.88.

Variation in fruiting pattern was observed as follows. Fruit diameter (cm), Fruit Length (cm) for the selected brinjal genotypes was observed. The genotypes G2, G3, G5 and G9 are having solitary fruiting pattern. G1, G4, G7 and G8 are having cluster fruiting pattern and G6 is having mixed fruiting pattern. Fruit length showed a variation of 13.50 cm to 6.15 cm with a mean of 9.50 cm. Fruit diameter showed a variation of 12.50 cm to 4.00 cm with a mean of 6.20 cm. G2 and G8 showed globular shape and G9 showed obovate shape and other genotypes showed ovoid shape. Fruit stripes were found in G1, G3. Spininess was found more in G7. G1 showed a higher fruit yield of 45.00 t/ha followed by G7 with a yield of 40.00 t/ha. Fruit to seed ratio was found to be more in G6 followed by G1. Lesser fruit borer incidence was observed in G2.

In a nutshell, based on the yield and in quality aspects, the genotype G1 (sellugudi) was found to be highly promising. Hence, to recommend the G1 (sellugudi) brinjal suitable for Pudukkottai district brinjal growing farmers.

***Key words*:** Brinjal, yield, quality, fruit borer, variety, genotypes local brinjal

## Introduction

Brinjal (*Solanum melongena* L.) is one of the most common vegetable grown throughout the country for its purple, green or white pendulous fruit. It is a member of the Solanaceae family and is closely related to Tomato and Potato. Aubergine is the British name for Brinjal and in United States, Australia and Canada, it is known by the name eggplant, because fruits of the earlier cultivars resembled eggs of goose or hen.

Brinjal is an erect annual plant, often spiny, with large, coarsely lobed fuzzy leaves, 10-20 cm long and 5-10 cm broad. The plants usually grow 45 to 60 cm high and bears long to oval shaped, purple or greenish fruits. Flowers are white to purple, with five-lobed corolla and yellow stamens. The fruit is a fleshy berry, containing numerous small, soft seeds (Sandeep Yadav *et al.,* 2018).

Brinjal is a native of India and Sri Lanka. The ancestors of Brinjal grew wild in south India and were in cultivation in southern and eastern Asian countries since prehistoric times. Although it has a long and rich history, Brinjal did not always hold the revered place in food culture that it does today. At one time Brinjal had a bitter and inauspicious reputation of being able to cause insanity, leprosy and cancer, and it was even believed to be poisonous; and hence was used more as a garden plant than as a food in many parts of the world. But it was only in the 18$^{th}$ century, after the evolution of less bitter varieties, Brinjal lose its bitter taste and bitter reputation to gain its now esteemed place in the cuisines. Today, Italy, Turkey, Egypt, China and Japan are the leading growers of Brinjal. In India, it is a popular vegetable crop of southern states and is also cultivated in certain parts of Maharashtra, Gujarat and Uttar Pradesh (Alam, 1970).

Brinjal is a warm season crop and requires a long warm growing season. But, it can be successfully grown as a rainy season and summer season crop and can be cultivated even at an elevation of 1200 m above MSL. However, the crop is very susceptible to frost and crop growth is severely affected when temperature falls below 17°C. Brinjal can be grown on all types of soils. However, it grows best in loose, friable, well-drained silt loam or clay loam soils rich in organic matter. An early crop gives good yield in light soils. The crop is moderately tolerant to acidic soils and a pH range of 6.0 to 6.8 is considered optimum for its growth and development.

As a native plant, Brinjal is widely used in the South Indian cuisine like *sambhars*, *chutneys*, *curries,* and *porial*. It can be baked, stewed, fried, or added to soups, curries, etc. The Brinjal can also be stuffed with meat, rice or other fillings and then baked. Owing to its versatile nature and wide use it is being used in everyday South Indian food, it is often described as the 'King of Vegetables' in South India.

Brinjal fruits are a fairly good source of calcium, phosphorus, iron and vitamins particularly B group. Analysis of edible parts of fruits except calyx and stalk (per 100g fresh weight) Protein 1.4 g, Fat 0.3 g, Fibre 1.3 g, Carbohydrates 4 g, Ca 18 g, Mg 16 g, small quantity of Iodine 7 mg per Kg. Low in energy (30 kcal/100g), vitamin C (5 mg/100g), They are also a good source of vitamin B6, Folate, magnesium and niacin S. Thamburaj and Narendra Singh (2001).

In addition to featuring a host of vitamins and minerals, Brinjal contains important phytonutrients, many of which are phenolic compounds that function as antioxidants, the predominant one being chlorogenic acid. Chlorogenic acid is one of the most potent free radical scavengers found in plant tissues and has proven anti-cancerous, antimicrobial, and antiviral activities. Brinjal also contains flavonoid namely *nasunin*, which is also a potent antioxidant and free radical scavenger and protects brain cell membranes. *Nasunin* also binds with the excess iron and remove it from the body, by a process known as chelation. Although iron is an essential nutrient, excess of which is harmful as it increases free radical production and increases risk of heart disease and cancer. By chelating iron, *nasunin* lessens free radical formation thereby lowering the risk of heart diseases, cancer and rheumatic arthritis (Tripathi *et al.*, 2014).

In Tamil Nadu, Pudukkottai is one of the districts in which cultivating a traditional variety of Brinjal is in practice. The people are cultivating several elite genotypes of which two were taken for evaluation.

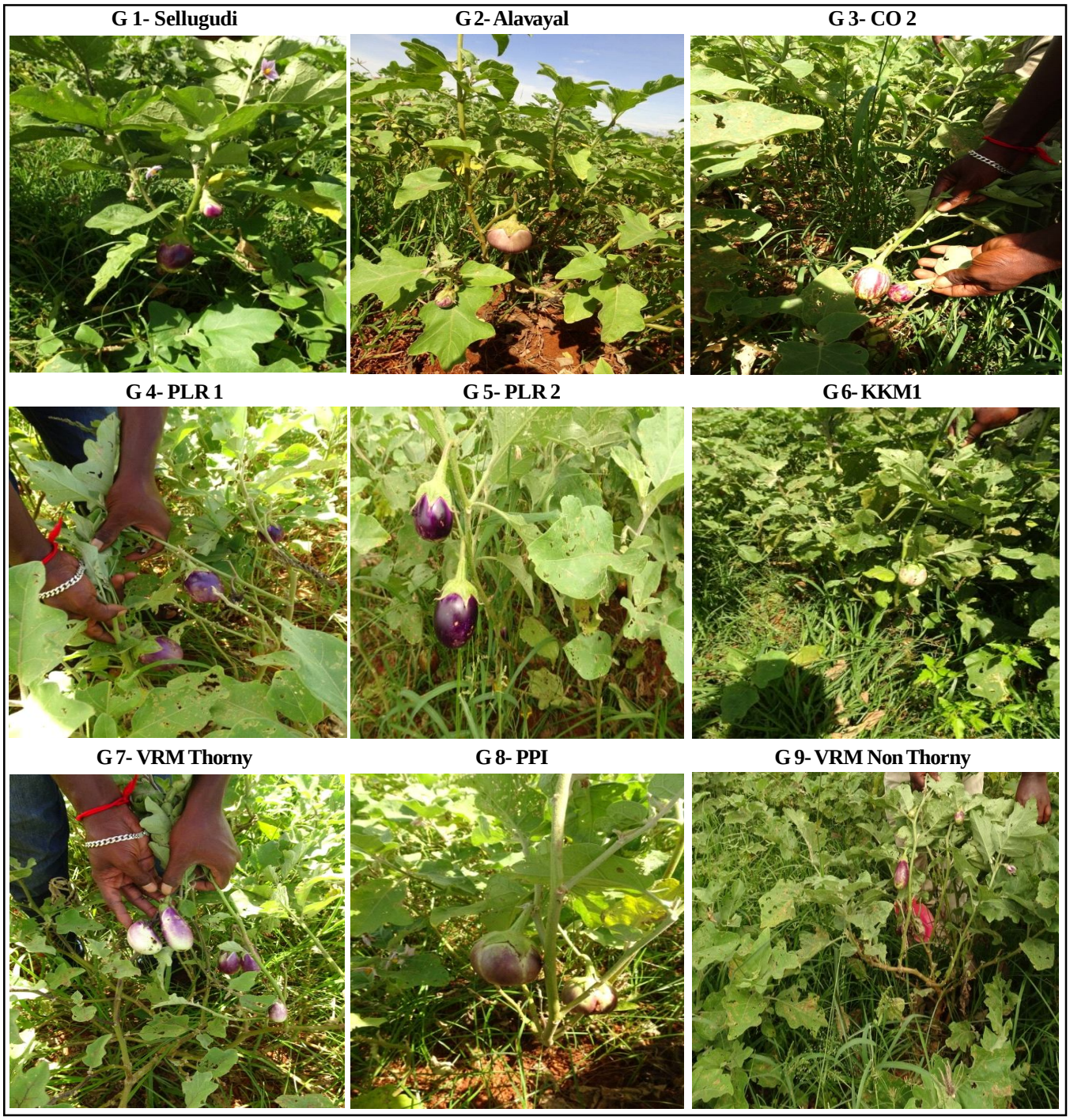
## Materials and Methods

A study on "Evaluation studies of Identified Pudukottai Local Brinjal (*Solanum melongena* L.)" was conducted at Agricultural College and Research Institute, Tamil Nadu Agricultural University, Kudumiyanmalai, Pudukkottai during 2019-2020 ,Various morphometric and quality characters were observed in nine varieties. The different materials used and methodologies adopted in this study are briefed hereunder.

### Experimental materials

The descriptor developed for (*Solanum melongena* L.) compiled by Protection of Plant Varieties and Farmers' Rights Authority (PPV & FRA) was used in this study for evaluation of the selected local brinjal varieties from 2019 - 2020. The brinjal varieties were marked and observations were made for morphological, yield and quality parameters (Plate 1).

**Plate 1:** Different genotypes/Varieties




## Materials

G1 (sellugudi), G2 (aalavayal) were compared with other popular varieties like G3 (CO 2), G4 (PLR 1), G5 (PLR2), G6 (KKM1), G7 (VRM Thorny), G8 (PPI) and G9 (VRM Non thorny)

## Methods

**Protection of Plant Varieties and Farmers' Rights Authority (PPV & FRA).**

The following observations on plant morphological characters, fruit and quality characters were recorded from the selected plants based on the Protection of Plant Varieties and Farmers' Rights Authority (PPV & FRA).

**Fruit Borer Incidence**:

The harvested fruits were observed for fruit borer damage. Fruit samples (ten fruits) were randomly selected from each genotype. The per cent damage was worked out using the following formula.

$$\text{Per cent of damage} = \frac{\text{Number of affected fruits}}{\text{Total number of fruits observed}} \times 100$$

**Table 1:** Mean, Range and CV % for plant height, plant spread of selected genotypes of Brinjal.

| Name of genotypes | Plant height (cm) | Plant spread (cm) |
|---|---|---|
| G1 | 82.60 | 57.60 |
| G2 | 67.60 | 40.00 |
| G3 | 52.40 | 57.40 |
| G4 | 58.00 | 60.50 |
| G5 | 40.30 | 35.80 |
| G6 | 50.60 | 64.40 |
| G7 | 57.60 | 53.60 |
| G8 | 60.20 | 60.20 |
| G9 | 57.70 | 57.70 |
| Mean | 58.70 | 54.10 |
| Maximum | 82.60 | 64.40 |
| Minimum | 40.30 | 35.80 |
| SD | 2.58 | 2.16 |
| CV | 4.41 | 4.01 |

## Discussion

Brinjal (*Solanum melongena* L.) is a common vegetable crop grown in the tropics and sub tropics. Brinjal is a hardy crop and is cultivated under a wide range of soils. Since a long duration crop with high yield, well -drained and fertile soil is preferred for the crop. Crops grown in sandy soils yield early and those grown in clayey soils yield more. Ideal pH for cultivation of crop is 5.5 - 6.6. Asia is the largest Brinjal producing region which comprises about 90% of the world production area and 87% of the world fruit production. Brinjal is a native of India and has been in cultivation for a long time. Traditional Brinjal varieties cultivation followed in and around the Pudukkottai districts of Tamil Nadu. Some of the varieties are good in fruit quality traits but majority of these are inferior to medium in quality because of extensive variation normally observed under field study. The types differ widely among themselves in bearing, shape, size, maturity, yield and in quality components minerals, vitamins and taste. Development of high yielding

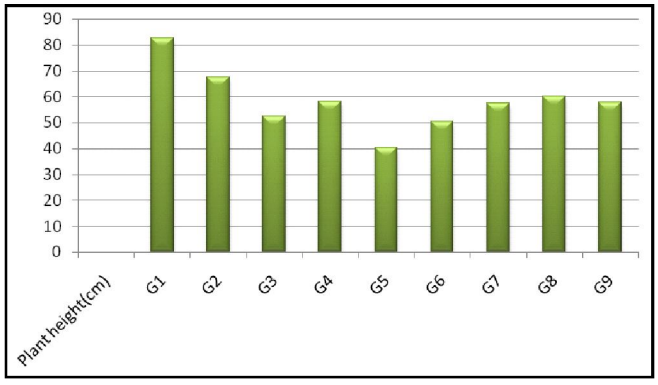



**Fig. 1a:** Variation in plant height in selected genotypes of Brinjal.

**Table 2:** Variation in Plant characters of selected genotypes of Brinjal.

| Name of the genotype | Plant growth habit | Stem Anthocyanin colouration | Stem pubescence |
|---|---|---|---|
| G1 | 5 | Present | 3 |
| G2 | 5 | Present | 5 |
| G3 | 5 | Absent | 3 |
| G4 | 5 | Absent | 5 |
| G5 | 1 | Absent | 5 |
| G6 | 5 | Absent | 7 |
| G7 | 5 | Absent | 7 |
| G8 | 5 | Absent | 5 |
| G9 | 5 | Absent | 3 |

Plant growth habit: 1-Erect, 5-Semi spread, 7-Spread, 9-Horizontal
Stem Anthocyanin colouration: 1-Absent, 9-Present
Stem pubescence: 3-weak, 5-Medium, and 7-Strong

varieties of crops require information about the nature and magnitude of variation present in the available genotypes and selection depends on judicious assessment of available data on phenotypic characters that are connected with yield and quality characters, the results of which are discussed hereunder.

### Plant characters

Plant characters like plant height, plant spread, stem anthocyanin colouration; stem pubescence and plant growth habit showed remarkable variation in the genotypes studied which may be due to plants of heterozygous nature and influence environment in addition. Adding to that, variation for height of plant is also high. It is an important criterion for selection of superior plus plant as higher. Among the genotypes studied, the genotypes, G5 have recorded lower plant height and the highest plant height was recorded on the genotype G1 (Fig. 1a). More than the plant height, plant spread is another important character which has more effect on productivity in brinjal as it supports many side branches,

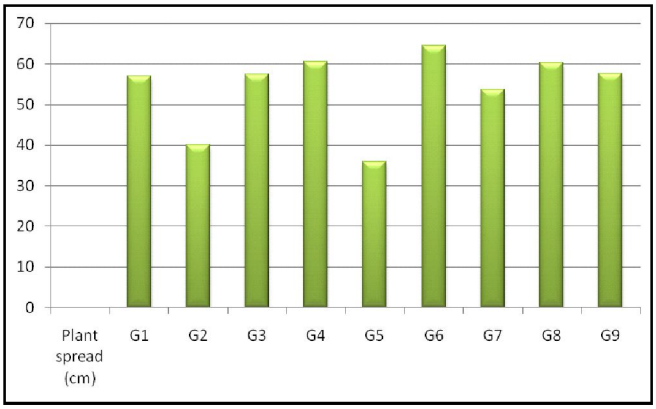
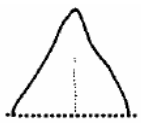
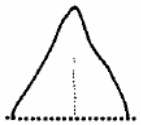
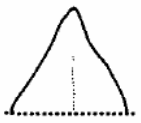
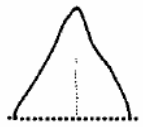
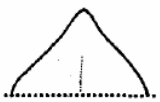
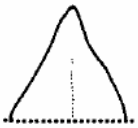
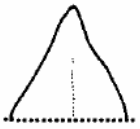
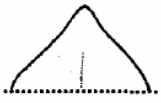



**Fig. 1b:** Variation in plant spread in selected genotypes of Brinjal.

**Plate 1a:** Leaf blade and lobing in selected genotypes.

| NAME OF THE GENO-TYPES | SELECTED GENO-TYPES –LEAVES | LEAF BLADE | LOBING |
|---|---|---|---|
| G1 |  |  | Strong |
| G2 |  |  | Intermediate |
| G3 |  |  | Intermediate |
| G4 |  |  | Intermediate |
| G5 |  |  | Intermediate |
| G6 |  |  | WEAK |
| G7 |  |  | STRONG |
| G8 |  |  | STRONG |
| G9 |  |  | STRONG |

**Plate 1b:** Leaf blade and tip angle in selected genotypes.

| NAME OF THE GENO-TYPES | SELECTED GENO-TYPES –LEAVES | LEAF BLADE | LOBING |
|---|---|---|---|
| G1 |  |  | Acute (45°) |
| G2 |  |  | Acute (45°) |
| G3 |  |  | Acute (45°) |
| G4 |  |  | Acute (45°) |
| G5 |  |  | Intermediate (75°) |
| G6 |  |  | Very Acute (<15°) |
| G7 |  |  | Acute (45°) |
| G8 |  |  | Acute (45°) |
| G9 |  |  | Intermediate (75°) |

which in turn support secondary and tertiary branches. The genotype G6 is having higher plant spread and the lowest plant spread was observed on the genotype of G5 (Fig. 1b). Higher plant spread gives better support for the main branches and reflects the plants indirectly on bearing more number of fruits leading to higher yield. Lesser the plant height with spreading nature, greater will be the number of fruits per plant due to more primary and secondary branches. Plant growth characters like growth habit, anthocyanin colouration and stem pubescence showed considerable variations. In the present study, various growth habits (spreading, semi spreading and erect) were noticed. Among the genotypes studied all the genotypes are having semi spreading growth habit except G5. The 'semi spreading' canopy shape is a desirable factor for better fruit set and higher yield since most of the areas of canopy is exposed to sunlight which facilitates more photosynthates production.

**Table 3:** Mean, Range and CV % for leaf blade length and leaf blade width of selected genotypes of Brinjal.

| Name of genotypes | Leaf length (cm) | Leaf width (cm) |
|---|---|---|
| G1 | 15.60 | 9.40 |
| G2 | 13.30 | 8.00 |
| G3 | 10.80 | 4.50 |
| G4 | 8.70 | 2.40 |
| G5 | 12.60 | 5.50 |
| G6 | 9.00 | 4.90 |
| G7 | 11.80 | 5.60 |
| G8 | 12.60 | 6.30 |
| G9 | 10.40 | 6.00 |
| Mean | 11.60 | 5.80 |
| Maximum | 15.60 | 9.40 |
| Minimum | 8.70 | 2.40 |
| SD | 0.70 | 0.62 |
| CV | 6.05 | 10.85 |

Variation in plant spread was well reported (Bansal and Mehta (2008), Lohakare *et al.*, (2008). Similarly stem pubescence also important character in plants because it shows against pest resistant. Among the genotypes G6 and G7 have strong stem pubescence, G2, G4, G5 and G8 have medium stem pubescence, G1, G3 and G9 having weak stem pubescence. Similar variation was reported by Thangamani and Jansirani (2012), Nair and Mehta (2007), Sharma and Singh (2012).

## Leaf characters

Wide variation was noticed among the genotypes studied in respect of leaf characters (Plate 1a and 1b.). Leaf traits like leaf blade length, leaf blade width, leaf blade colour, leaf spininess and intensity of colour of veins also exhibited considerable variations. Genotypes *viz.*, G1 and G2 having higher leaf length whereas G4 having lesser leaf length. Regarding the leaf blade width G1 and G2 having more leaf blade width. These leaf traits might be probably useful to identify a chosen plus genotypes

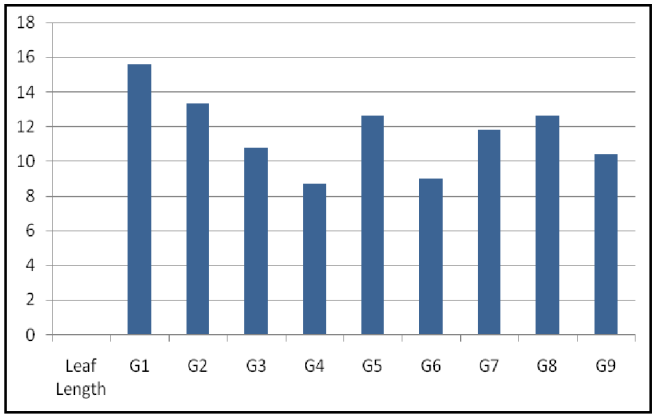



**Fig. 2a:** Variation in leaf length in selected genotypes of Brinjal.

**Table 4:** Variation in Leaf spininess, Leaf blade colour, Colour of veins, Intensity of colour of veins of the selected genotypes of selected Brinjal genotypes.

| Selected geno-types | Leaf spin-iness | Leaf blade colour | Colour of veins | Intensity of colour of veins |
|---|---|---|---|---|
| G1 | Absent | 1 | 2 | 7 |
| G2 | Absent | 1 | 2 | 5 |
| G3 | Absent | 1 | 1 | 3 |
| G4 | Absent | 1 | 1 | 7 |
| G5 | Absent | 1 | 2 | 7 |
| G6 | Absent | 1 | 1 | 3 |
| G7 | Present | 1 | 1 | 5 |
| G8 | Absent | 1 | 1 | 5 |
| G9 | Absent | 1 | 2 | 3 |

**Leaf Spininess:** 1-Absent, 9-Present
**Leaf Blade Colour :** 1-Green, 2-Purple
**Colour of Veins:** 1-Green, 2-Purple
**Intensity of Colour of Veins:** 3-Light, 5-Medium,7-Strong

from the rest of the genotypes (Fig. 2a and Fig. 2b). Variability in leaf blade length and leaf blade width has been well documented by Datta and Jana (2010)

## Inflorescence characters

Variations were noticed among the genotypes with respect to the No. of flowers, Flower size, Flower colour, Flowering time were noticed. Number of flowers also important character to decide the fruit yield. Among the genotypes G1, G2 and G5 having more no. of flowers (Fig. 3). Kalda *et al*., (1996), Sharma and Swaroop (2000) reported in inflorescence characters.

## Fruit characters.

Variations were noticed among the genotypes with respect to Fruit length, fruit diameter and fruiting pattern (Fig. 4a, 4b). Based on the fruit length and fruit width we can decide the yield in tonnes. Among these genotypes, G1 having highest fruit yield than the other genotypes. All the genotypes show solitary fruit bearing habit. Fruit quantitative character like Fruit length and width is the

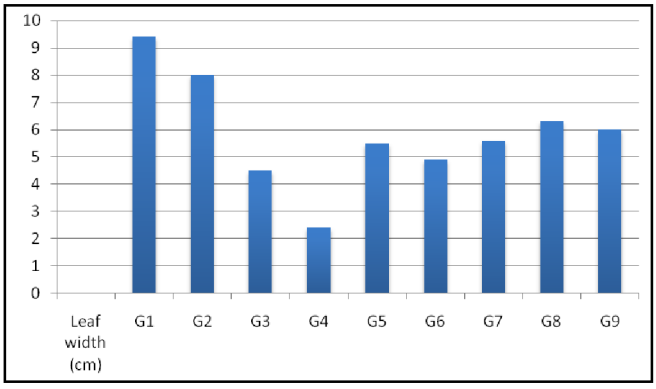



**Fig. 2b:** Variation in leaf width in selected genotypes of Brinjal.

**Table 5:** Variation in Flower size, Flower colour, Flowering time (DAS) for the selected Brinjal genotypes.

| Selected genotypes | Flower size | Flower colour | Flowering time (DAS) |
|---|---|---|---|
| G1 | 5 | 4 | 65-75 |
| G2 | 5 | 4 | 65-75 |
| G3 | 3 | 2 | >75 |
| G4 | 5 | 2 | 65-75 |
| G5 | 3 | 2 | >75 |
| G6 | 5 | 2 | 65-75 |
| G7 | 7 | 2 | 65-75 |
| G8 | 7 | 2 | 65-75 |
| G9 | 5 | 2 | >75 |

**Flower size:** 3-Small, 5-Medium, 7-large
**Flower colour:** 4-Dark purple, 2-Light purple
**Flowering time:** < 65-Early, 65-75-Medium, >75-Late

**Table 5a:** Variation in No. of Flowers for the selected Brinjal genotypes.

| Selected genotypes | No. of Flowers |
|---|---|
| G1 | 9.00 |
| G2 | 8.00 |
| G3 | 5.00 |
| G4 | 4.00 |
| G5 | 8.00 |
| G6 | 6.00 |
| G7 | 4.00 |
| G8 | 5.00 |
| G9 | 6.00 |
| Mean | 6.10 |
| Maximum | 9.00 |
| Minimum | 4.00 |
| SD | 0.56 |
| CV | 9.30 |

important trait which decides total yield per plant as well as market potential. Regarding fruit shapes, fruit shininess, colour of calyx, spininess of calyx considerable variation was found among the genotypes. Fruit shape of brinjal is one of the desirable characters for consumer

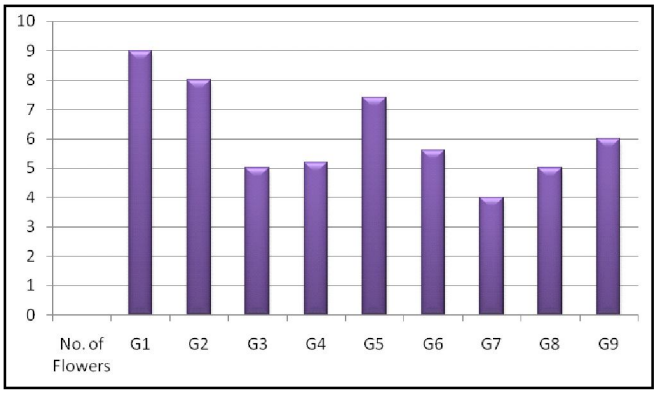



**Fig. 3:** Variation in flower characters in selected genotypes of Brinjal.

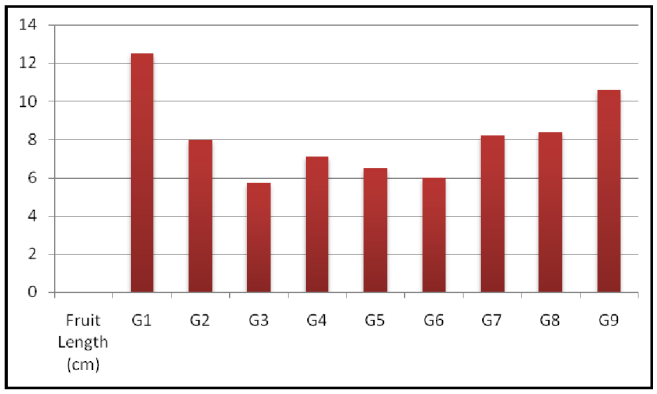



**Fig. 4a:** Variation in fruit length in selected genotypes of Brinjal.

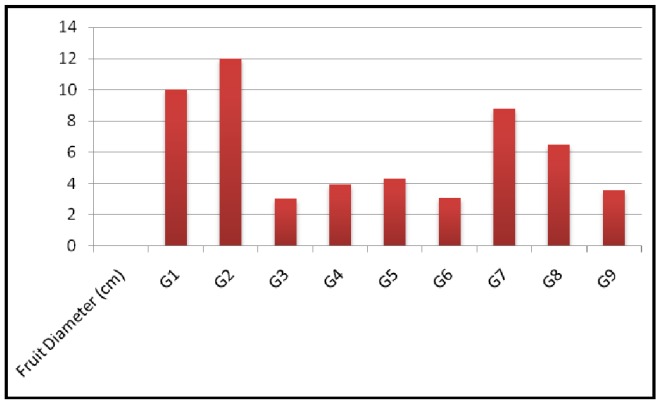



**Fig. 4b:** Variation in fruit diameter in selected genotypes of Brinjal.

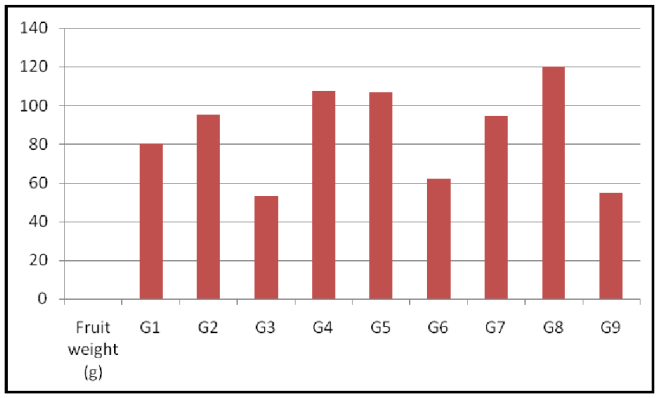



**Fig. 4c:** Variation in fruit weight of the selected genotypes.

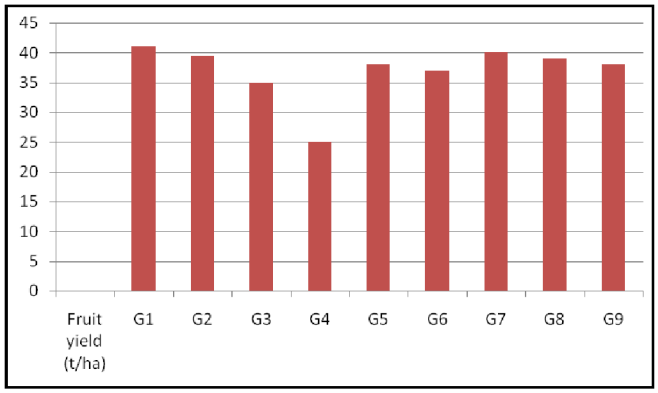



**Fig. 4d:** Variation in fruit yield in selected genotypes of Brinjal.

**Table 6:** Variation in Fruiting Pattern for the selected Brinjal genotypes.

| Selected genotypes | Fruiting Pattern |
|---|---|
| G1 | 2 |
| G2 | 1 |
| G3 | 1 |
| G4 | 2 |
| G5 | 1 |
| G6 | 3 |
| G7 | 2 |
| G8 | 2 |
| G9 | 1 |
| **Fruiting pattern:** 1-solitary, 2-cluster, 3-mixed | |

preference. Genotypes G2 and G8 having ovoid shapes of fruit and G9 having the obovate shape of fruits and other genotypes have obovate shape. Mostly ovoid shapes are generally preferred in the market (Plate 2.). The fruit colour was measured using Munsell colour chart (Table 8). G2 showed darker colour than the others. The average fruit weight contributes more to yield and it will decide the market rate. Among the genotypes, G4 and G5 recorded on highest fruit weight followed by G2 (Fig. 4c.). Similar variations were reported by Nair and Mehta (2007) and Bansal and Mehta (2008).

Fruit stripes also show some variation among the genotypes. Among the genotypes, G1 and G3 having fruit stripes. Fruit shininess also contributes make variation in brinjal genotypes. Here fruit shininess refers to glossiness of harvestable fruit. The genotypes G2, G4 and G9 showed very strong glossiness at harvestable time. These are mostly preferred by consumers because of its attracting colour. The genotypes G1 and G5 showed very medium glossiness at harvestable time (Table 7.). Similar findings in fruit characters were reported by Senapathi and Senapathi (2006).

## Yield characters

In a breeding programme, yield is one of the most

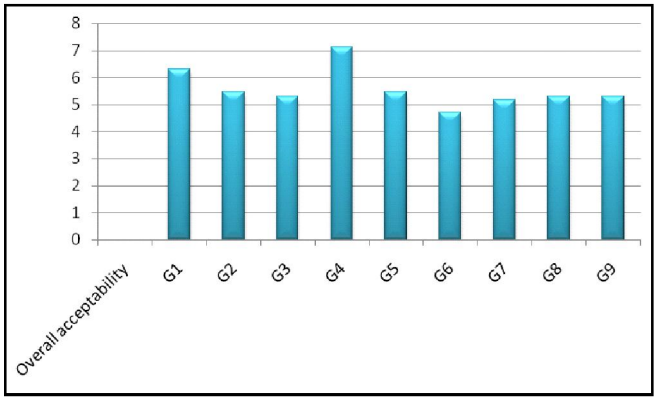



**Fig. 5:** Organoleptic evaluation of fruits of selected genotypes of brinjal.

**Table 6a:** Variation in Fruit Length (cm) and Fruit diameter (cm) for the selected Brinjal genotypes.

| Name of genotypes | Fruit length (cm) | Fruit Diameter (cm) |
|---|---|---|
| G1 | 12.50 | 10.00 |
| G2 | 8.00 | 12.00 |
| G3 | 5.70 | 3.00 |
| G4 | 7.10 | 3.90 |
| G5 | 6.50 | 4.30 |
| G6 | 6.00 | 3.10 |
| G7 | 8.20 | 8.80 |
| G8 | 8.40 | 6.50 |
| G9 | 10.60 | 3.60 |
| Mean | 8.10 | 6.10 |
| Maximum | 12.50 | 12.0 |
| Minimum | 5.70 | 3.00 |
| SD | 0.96 | 0.13 |
| CV | 11.91 | 2.22 |

important traits by which a genotype or variety will be evaluated. In the case of brinjal, plants with more number of fruits are generally preferred as it has close bearing on total yield. In the present study, wide variation was recorded in number of fruits per plant and yield per plant per season. Genotype *viz*., G1 followed by G2 recorded higher number of fruits per plant and higher yield per plant per season (Fig. 4d). Nair and Mehta (2007) and Lohakare *et al.*, (2008) reported that the yield characters of brinjal.

## Organoleptic evaluation

The acceptance of fruit quality of brinjal can be well judged only after evaluating the fruits by organoleptic test. To avoid variation or biased nature of individual, organoleptic evaluation was carried out with minimum of 20 individuals. All the characters considered for organoleptic evaluation in the present study showed considerable variation. Genotypes *viz*., G4 followed by G1 had higher score for overall quality of fruits (Table

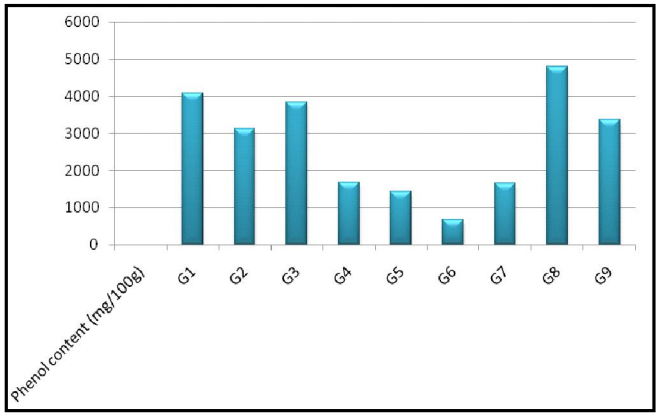



**Fig. 6:** Phenol content estimation of selected genotypes of brinjal.

**Plate 2:** Ftuiy shape in selected genotypes.

| NAME OF THE GENO-TYPES | SELECTED GENO-TYPES –LEAVES | LEAF BLADE | LOBING |
|---|---|---|---|
| G1 |  |  | Ovoid |
| G2 |  |  | Globular |
| G3 |  |  | Ovoid |
| G4 |  |  | Ovoid |
| G5 |  |  | Ovoid |
| G6 |  |  | Ovoid |
| G7 |  |  | Ovoid |
| G8 |  |  | Globular |
| G9 |  |  | Obovate |

11). This may be due to genetic nature of the genotypes and partly due to the environment (Fig. 5). Ahmad *et al.*, (2009) did similar works on organoleptic evaluation.

## Phenol content estimation

The phenol content of the brinjal is responsible for its browning. Hence estimation of phenol content is necessary to decide on the good quality brinjal. The phenol content was estimated and it was found to be lower inG6 followed by G5 (Fig. 6). Sadhasivam and Manickam *et al.*, (2007). Reported similar works on phenol content estimation.

**Table 7:** Variation in Fruit shape, Fruit stripes, Fruit shininess, Colour of calyx, Spininess of calyx for the selected Brinjal genotypes.

| Selected genotypes | Fruit shape | Fruit stripes | Fruit shininess | Colour of calyx | Spininess of calyx |
|---|---|---|---|---|---|
| G1 | 2 | 9 | 5 | 1 | 1 |
| G2 | 1 | 1 | 7 | 1 | 1 |
| G3 | 2 | 9 | 3 | 1 | 1 |
| G4 | 2 | 1 | 7 | 1 | 1 |
| G5 | 2 | 1 | 5 | 9 | 1 |
| G6 | 2 | 1 | 3 | 9 | 1 |
| G7 | 2 | 1 | 3 | 1 | 9 |
| G8 | 1 | 1 | 3 | 1 | 1 |
| G9 | 3 | 1 | 7 | 1 | 9 |

**Fruit shape:** 1-globular, 2-ovoid, 3-obovate, 4-pear, 5-club shaped, 6-ellipsoid, 7-cylindrical
**Fruit stripes:** 1-absent, 9-present
**Fruit shininess:** 3-weak, 5-medium, 7-strong
**Colour of calyx:** 1-green, 2-purple
**Spininess of calyx:** 1-absent, 3-weak, 5-medium, 7-strong

## Fruit borer incidence

The fruit borer incidence of the brinjal was recorded which is being the major reason for yield loss. It was found that G2 is having lesser fruit borer incidence followed by G7 (Fig. 7).

## Association analysis

The results obtained through the genetic correlation coefficients indicate a strong association between plant morphological characters with yield and fruit quality parameters with fruit borer incidence.

The nature and magnitude of association between yield and its component trait is important for effective selection in advance generations. Nature of population under consideration and the magnitude of correlation coefficient could often be influenced by the choice of the individuals upon which the observations are made

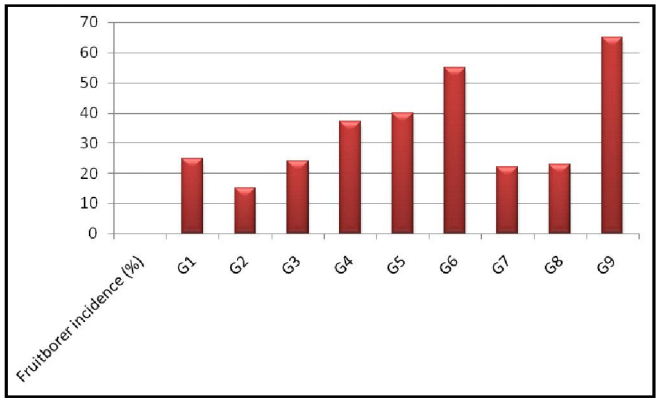



**Fig. 7:** Fruit borer incidence of selected genotypes of brinjal.

**Table 8:** Fruit colour for the selected Brinjal genotypes using Munsell colour chart Hue Value/Chroma.

| Selected genotypes | Fruit colour |
|---|---|
| G1 | 5 Red Purple 3/6 |
| G2 | 5Red Purple 3/10 |
| G3 | 5Red Purple 6/2 |
| G4 | 5Red Purple 3/2 |
| G5 | 5Red Purple 4/4 |
| G6 | 2.5 Green Yellow 8/2 |
| G7 | 5Red Purple 4/2 |
| G8 | 5Red Purple 6/2 |
| G9 | 5Red Purple 5/4 |

**Table 9:** Fruit weight for the selected Brinjal genotypes.

| Selected genotypes | Fruit weight (g) |
|---|---|
| G1 | 80.50 |
| G2 | 95.00 |
| G3 | 53.00 |
| G4 | 107.50 |
| G5 | 107.00 |
| G6 | 62.00 |
| G7 | 94.00 |
| G8 | 120.00 |
| G9 | 54.80 |
| Mean | 86.00 |
| Maximum | 120.00 |
| Minimum | 53.00 |
| SD | 1.89 |
| CV | 2.22 |

**Table 10:** Fruit yield for the selected Brinjal genotypes.

| Selected genotypes | Fruit yield (t/ha) |
|---|---|
| G1 | 41.00 |
| G2 | 39.50 |
| G3 | 35.00 |
| G4 | 25.00 |
| G5 | 38.00 |
| G6 | 37.00 |
| G7 | 40.00 |
| G8 | 39.00 |
| G9 | 38.00 |
| Mean | 37.28 |
| Maximum | 41.00 |
| Minimum | 25.00 |
| SD | 1.90 |
| CV | 5.10 |

correlations between pairs of characters are due to linkage of genes or pleiotropy of genes. Therefore, selection of one traits influence the other linked or pleiotropically affected traits. Considerable importance has been attached to correlation studies in the plant improvement because they are helpful in making effective selection.

**Table 11:** Organoleptic evaluation of fruits of selected genotypes of Brinjal.

| Name of the geno-types | Colour and appe-arance | Flavour | Texture or firmness | Taste | Overall accept-ability |
|---|---|---|---|---|---|
| G1 | 6.75 | 6.40 | 5.75 | 6.30 | 6.30 |
| G2 | 5.30 | 5.50 | 5.80 | 5.30 | 5.47 |
| G3 | 5.40 | 5.00 | 5.30 | 5.60 | 5.30 |
| G4 | 6.75 | 7.08 | 7.08 | 7.60 | 7.12 |
| G5 | 4.80 | 6.00 | 5.50 | 5.50 | 5.45 |
| G6 | 4.30 | 3.60 | 5.40 | 5.80 | 4.70 |
| G7 | 5.40 | 5.00 | 5.00 | 5.25 | 5.16 |
| G8 | 4.90 | 5.60 | 5.50 | 5.25 | 5.30 |
| G9 | 5.80 | 5.08 | 5.30 | 5.33 | 5.30 |
| Mean | 5.48 | 5.47 | 5.62 | 5.77 | 5.56 |
| Maximum | 6.75 | 7.08 | 7.08 | 7.60 | 7.12 |
| Minimum | 4.30 | 3.60 | 5.00 | 5.25 | 4.70 |
| SD | 0.54 | 0.57 | 0.64 | 0.65 | 0.42 |
| CV | 9.96 | 10.56 | 11.53 | 11.41 | 7.87 |

**Table 12:** Estimation of phenol content.

| Selected genotypes | Phenol content (mg/100g) |
|---|---|
| G1 | 4080 |
| G2 | 3210 |
| G3 | 3840 |
| G4 | 1680 |
| G5 | 1440 |
| G6 | 672 |
| G7 | 1650 |
| G8 | 4800 |
| G9 | 3360 |
| Mean | 2931.3 |
| Maximum | 4800 |
| Minimum | 672 |
| SD | 118.71 |
| CV | 4.05 |

**Table 13:** Estimation of Fruit borer incidence (%).

| Selected genotypes | Fruit borer incidence (%) |
|---|---|
| G1 | 25 |
| G2 | 15 |
| G3 | 24 |
| G4 | 37 |
| G5 | 40 |
| G6 | 55 |
| G7 | 22 |
| G8 | 23 |
| G9 | 65 |
| Mean | 34 |
| Maximum | 65 |
| Minimum | 15 |
| SD | 1.93 |
| CV | 5.69 |

**Table 14:** Genotypic correlation coefficients of morphological characters with yield and quality.

| Para-meters | Plant height | Plant spread | Leaf length | Leaf width | No. of flower | Fruit length | Fruit Diameter | Fruit weight | Colour and Appe-arence | Flavour | Texture or Firmness | Taste | Overall accept-ability | Phenol content | Fruit borer incidence | Fruit yield |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant height | 1.000 | | | | | | | | | | | | | | | |
| Plant spread | 0.196 | 1.000 | | | | | | | | | | | | | | |
| Leaf length | 0.600** | -0.455 | 1.000 | | | | | | | | | | | | | |
| Leaf width | 0.689** | -0.299 | 0.892** | 1.000 | | | | | | | | | | | | |
| No.of flowers | 0.484 | - 0.493 | 0.679** | 0.720** | 1.000 | | | | | | | | | | | |
| Fruit length | 0.789** | 0.106 | 0.604** | 0.705** | 0.489 | 1.000 | | | | | | | | | | |
| Fruit diameter | 0.712** | -0.392 | 0.756** | 0.758** | 0.480 | 0.494 | 1.000 | | | | | | | | | |
| Fruit weight | 0.005 | -0.434 | 0.259 | -0.019 | 0.121 | -0.045 | 0.351 | 1.000 | | | | | | | | |
| Colour and Appearance | 0.631** | -0.186 | 0.176 | 0.076** | 0.252 | 0.588* | 0.270 | 0.026 | 1.000 | | | | | | | |
| Flavour | 0.260 | -0.029 | 0.084 | -0.107 | 0.406 | 0.173 | 0.030 | 0.191 | 0.611** | 1.000 | | | | | | |
| Texture or Firmness | 0.188 | 0.097 | -0.246 | -0.360 | 0.150 | -0.036 | -0.044 | 0.392 | 0.595* | 0.885** | 1.000 | | | | | |
| Taste | 0.216 | 0.284 | -0.260 | -0.407 | 0.068 | 0.048 | -0.165 | 0.197 | 0.740** | 0.856** | 0.905** | 1.000 | | | | |
| Overall Acceptability | 0.398 | 0.061 | 0.047 | -0.156 | 0.244 | 0.278 | 0.102 | 0.361 | 0.868** | 0.893** | 0.879** | 0.919** | 1.000 | | | |
| Phenol content | 0.554 | 0.120 | 0.540* | 0.503** | 0.196 | 0.507 | 0.296 | 0.000 | 0.277 | -0.03 | -0.121 | -0.100 | 0.084 | 1.000 | | |
| Fruit borer Incidence | -0.406 | 0.296 | -0.573* | -0.330 | -0.102 | 0.009 | -0.698 | -0.465 | -0.134 | -0.067 | -0.023 | 0.023 | -0.175 | -0.394 | 1.000 | |
| Fruit yield | 0.264 | -0.298 | 0.703** | 0.823** | 0.349 | 0.421 | 0.522* | -0.116 | -0.380 | -0.563* | -0.809** | -0.809** | -0.637* | 0.312 | -0.186 | 1.000 |

*, ** significant at 5 and 1% level respectively.

In the present study, correlations between 16 characters were worked out in all possible combinations at phenotypic and genotypic levels are presented in Table 14. In general, the magnitudes of genotypic correlation coefficients were similar in nature and higher in magnitude than the corresponding values of the phenotypic correlation coefficients. This indicated a strong genetic association between the traits and the phenotypic expression which was suppressed due to environmental influence. The previous studies also suggested that both genotypic and phenotypic correlation were similar in direction as reported by Sharma *et al*., (2000) and Goto *et al*., (1953). A perusal of data (Table 14) revealed that the most important trait, leaf length, leaf width recorded highly positive significant correlation with total yield per tree. Fruit characters namely fruit width recorded positive significant correlation with total yield per plant. The plant morphological characters, plant height recorded highly positive significant correlation with leaf length. Leaf length recorded highly positive significant correlation with leaf width, number of flowers, fruit length, and fruit diameter and fruit yield and Leaf length recorded positive significant correlation with phenol content and negative correlation with fruit borer incidence.

Leaf width recorded highly positive significant correlation with total number of flowers per plant , fruit length ,fruit diameter ,colour and appearance and fruit yield and leaf width recorded positive significant correlation with total phenol content.

Fruit characters like fruit length recorded positive significant correlation with colour and appearance and phenol content and fruit width recorded positive significant correlation with fruit yield. Colour and appearance recorded highly positive significant correlation with flavor, taste overall acceptability and positive significant correlation with texture and firmness .

Quality characters like, flavor recorded highly positive significant correlation with texture or firmness, taste and overall acceptability and negative significant correlation with yield .Texture or Firmness recorded highly positive significant correlation with taste and overall acceptability and highly negative significant correlation with fruit .

Taste recorded highly positive significant correlation with overall acceptability and negative significant correlation with fruit yield. Over all acceptability negative significant correlation with fruit yield. Similar finding has also been reported by many workers *viz.*,for fruit yield (Naliyadhara *et al*., 1985., Chodhary *et al*.,).

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