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Performance of different types of brinjal for their physical fruit parameters and flowering parameters

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Abstract

The field experiment was conducted to study the performance of sixteen brinjal (*Solanum melongena* L.) genotypes in the new orchard of Main Agricultural Research Station, Raichur, during the year 2016-17 in *kharif*. All these sixteen brinjal genotypes showed significant variation in physical fruit characters and yield characters. Physical parameter viz., weight of fruit, length and Girth of fruit, Shape of fruit and colour of fruit showed notable variation among all the genotypes of brinjal. The genotype Arka Shirish recorded significantly the highest fruit length (18.50cm). However, the genotype R-2581 showed the highest fruit girth (184.75mm). The highest fruit weight was reported by the genotype R-2581 (60.50g). Days to first flowering and minimum days to 50 percent flowering were observed in Swarn Shyamli (42, 56.5 days, respectively).

Keywords: brinjal, fruit physical parameters, flowering, yield

Introduction

Brinjal (*Solanum melongena* L.) also known as eggplant or aubergine, is an important solanaceous vegetable crop of sub-tropics and tropics. According to De Candolle (1883) [6], eggplant was known in India in ancient times and probably a native of India (Vavilov, 1928) [11]. The varieties of brinjal display a wide range of fruit shapes and colours, ranging from oval or egg-shaped to long club-shaped and from white, yellow and green through degree of purple pigmentation to almost black colour. Most of the commercially important varieties have been selected from the long established types of tropical India and China.

Brinjal is being cultivated in India over an area of 0.72 million hectares with annual production of 13.55 million tonnes and average productivity of 19.5 tonnes per hectare (Anonymous, 2015) [1]. In Karnataka the cultivated area under brinjal is 16,000 hectares with annual production of 4.21 lakh tones and average productivity of 26.20 tonnes per hectare (Anonymous, 2015) [1]. Brinjal is having good nutritional and medicinal properties besides having high production potential, cultivars grown in Karnataka shows wide variation in plant and fruit characters due to consumer's acceptance difference varied from region to region. Thus it resulted in lack of larger area under a single variety. It has several medicinal properties and is good for diabetic patients. It has also been recommended as an excellent remedy for those suffering from liver complaints (Chauhan, 1981) [4]. It has been reported that on an average, the oblong-fruited eggplant cultivars are rich in total soluble sugars, whereas the long-fruited cultivars contain a higher content of free reducing sugars, anthocyanin, phenols, glycoalkaloids (such as solasodine), dry matter, and amide proteins (Bajaj *et al.*, 1979) [3].

In Karnataka, small-fruited egg plants are not preferred. Generally, the preference is for purple/ black colored with stripes on fruit, glossy surface with round oblong and long fruits with spiny calyx. The food products prepared in this region are stuffed curry, sliced bhaji, bharta *etc.* Various local cultivars are grown in this area which suffer from low productivity and susceptibility to insects-pest and diseases. Thus, under these circumstances, it is necessary to improve these genotypes or to develop superior hybrids to these genotypes in yield, maturity, better transportability, better fruit quality and other characters. Thus attempt was made for collection and evaluation of brinjal genotypes for Karnataka region to study the growth and yield characters.

Material and Method

The brinjal genotypes collected from different areas of India and grown at the new orchard of Main Agricultural Research Station, Raichur, during the *kharif* of the the year 2016-17. The sixteen treatments comprising 16 brinjal genotypes.

Sixteen genotypes of brinjal were evaluated in Randomized Complete Block Design with two replications. Analysis of variance revealed that considerable variability among the genotypes for all the characters. The spacing adopted was 75 cm in between two rows and 60 cm in between two plants within a row. All recommended cultural practices were followed to ensure good crop growth. To record the biometric observations, sampling technique was used. Five plants from the net plot were selected randomly from each treatment per replication. The selected plants were marked by labeling. The growth parameters were recorded at harvest of all the labeled plants and mean values for each observation were used for statistical analysis.

Result and Discussion

All these sixteen brinjal genotypes showed significant variation in physical characters of fruit, yield and earliness characters. Wide range of variation was observed in number of fruits per plant as well as yield per plant, per plot and per hectare.

1) Physical parameters of fruit

Physical parameter viz., weight of fruit, length and Girth of fruit, Shape of fruit and colour of fruit showed notable variation among all the genotypes of brinjal. Further, it was observed that all these fruit parameters significantly varied among all genotypes. Significant differences were observed among all the genotypes for average fruit weight. It ranged from 25.50 to 60.50 g. General mean for the character was 42.94 g. Maximum average fruit weight was recorded in R-2581 (60.50 g) whereas minimum fruit weight was observed in Swarn Shree (25.50 g). The variation in weight of the fruit was also recorded by the Mahaveer *et al.* (2004)^[4], Thapa *et al.* (2005)^[10], Mishra *et al.* (2008)^[9].

The genotype Arka Shirish recorded significantly the highest fruit length (18.50 cm), while the lowest in the genotype R-2580 (6.50 cm). Thus range of fruit length was in between 6.50 cm to 18.50 cm with a general mean of 11.19 cm. The variation in above characters was also reported by Mahaveer *et al.* (2004)^[4], Thapa *et al.* (2005)^[10], Maharana *et al.* (2006)^[8], Mishra *et al.* (2008)^[9] in brinjal genotypes. Fruit girth showed significant differences among all the genotypes. It ranged from 152.5-184.75 mm. General mean for the character was 168.42 mm. Maximum fruit girth was observed in R-2581 (184.75 mm). Minimum fruit girth was recorded in Swarn Shree (152.5 mm). Whereas significant differences

were observed among the genotypes for fruit shape index. It was observed more in Arka Shirish (2.32) and it was observed less in R-2580. Genotypes which had more value they longer in shape and which have less value they round and oblong in shape.

The data presented in Table 2 revealed that brinjal genotypes under study show the variation in shape of fruit. The genotype Arka Anand, Arka Kusumakar, Arka Neelkant, Arka Nidhi, Arka Shirish and L-2232 produce the long fruits, while the genotypes EPH-718, Simran, Matti Gulla, Pant Samrat, Swarn Shyamli and R-2580 had the oblong fruits. The oval shape fruits were observed in the genotypes Swarn Shree and Swarn Mani. Further the genotype L-3268 and R-2581 had the round shaped fruits. The data presented in Table 2 showed wide variation in fruit colour among the different brinjal genotypes under study. The fruit colours viz green, green with whitish stripes, green with purplish strips, purple, dark purple were observed in most of the brinjal genotypes.

2) Flowering Parameters

Significant differences were observed among all the genotypes for days to first flowering. Mean performance of genotypes for days to first flowering ranged from 42 days to 55 days with an overall mean of 49.7 days. The earliest flowering was recorded in Swarn Shyamli (42 days) followed by Matti Gulla (46 days), Arka Neelkant and Arka Anand (47 days). Above findings regarding to variation in first flowering in different brinjal genotypes are in conformity with, Ashwani and Khandelwal (2003)^[2] and Mahaveer *et al.* (2004)^[4]. Days to 50 per cent flowering showed significant differences among all the genotypes. Mean performance of genotypes for days to 50 per cent flowering ranged from 56.5 to 69 days. General mean for the character was 62.50 (days). Minimum days to 50 per cent flowering were recorded in the genotype Swarn Shyamli (56.5 days), whereas the genotype R-2581 had taken maximum days to 50 per cent flowering (69 days).

It was revealed from the data presented in table 3 that the number of days from 50 percent flowering to first fruit harvesting ranged in between 23.50 days and 33.50 days. The genotype Simran, Pant Samrat and L-2232 recorded less number of days (23.50 days) from 50 percent flowering to first fruit harvesting and was significantly superior over all other genotypes. However the genotype EPH-718 reported the highest number of days (33.50 days) from 50 percent flowering to first fruit harvesting.

Table 1: Variation in fruit weight, length, girth and fruit shape index among brinjal genotypes

| Sl. No. | Genotype | Avg. wt of fruit (gm) | Fruit length (cm) | Fruit girth (mm) | Fruit shape index |
|---------|----------------|-----------------------|-------------------|------------------|-------------------|
| 1 | Arka Anand | 35.50 | 15.50 | 155.60 | 1.98 |
| 2 | Arka Neelkant | 38.00 | 15.00 | 156.50 | 1.90 |
| 3 | Arka Nidhi | 38.50 | 15.50 | 157.00 | 1.96 |
| 4 | EPH-718 | 40.75 | 7.50 | 179.60 | 0.82 |
| 5 | Simran | 39.25 | 8.20 | 180.00 | 0.90 |
| 6 | Matti Gulla | 42.87 | 7.20 | 178.00 | 0.80 |
| 7 | Pant Samrat | 52.00 | 9.50 | 180.00 | 1.04 |
| 8 | Swarn Shyamli | 45.50 | 8.60 | 181.00 | 0.92 |
| 9 | R-2580 | 55.00 | 6.50 | 177.00 | 0.72 |
| 10 | Arka Shirish | 39.00 | 18.50 | 158.70 | 2.32 |
| 11 | L-3268 | 58.50 | 8.80 | 182.40 | 0.96 |
| 12 | R-2581 | 60.50 | 9.70 | 184.75 | 1.04 |
| 13 | Swarn Shree | 25.50 | 9.80 | 152.50 | 1.28 |
| 14 | L-2232 | 52.00 | 15.40 | 164.20 | 1.86 |
| 15 | Swarn Mani | 28.00 | 9.40 | 153.00 | 1.22 |
| 16 | Arka Kusumakar | 36.25 | 14.00 | 154.60 | 1.80 |
| | S.Em ± | 1.6 | 0.78 | 6.02 | 0.028 |
| | CD (5%) | 4.80 | 2.35 | 18.06 | 0.084 |
| | Mean | 42.94 | 11.19 | 168.42 | 0.67 |

Table 2: Variation in colour and shape of fruits among brinjal genotypes

| Sl. No. | Genotypes | Fruit shape | Fruit colour |
|---------|----------------|-------------|-----------------------------|
| 1 | Arka Anand | Long | Green |
| 2 | Arka Kusumakar | Long | Green |
| 3 | Arka Neelkant | Long | Purple |
| 4 | Arka Nidhi | Long | Purple |
| 5 | EPH-718 | Oblong | Purple with white stripes |
| 6 | Simran | Oblong | Purple with green stripes |
| 7 | Matti Gulla | Oblong | Green with purple stripes |
| 8 | Pant Samrat | Oblong | Purple |
| 9 | Swarn Shyamli | Oblong | Purple |
| 10 | R-2580 | Oblong | Green with white at blossom |
| 11 | Arka Shirish | long | Green |
| 12 | L-3268 | Round | Purple with green stripes |
| 13 | R-2581 | Round | Greenish white |
| 14 | Swarn Shree | oval | White |
| 15 | L-2232 | Long | Green with white stripes |
| 16 | Swarn Mani | oval | Purple |

Table 3: Flowering parameters as influenced by different types of brinjal

| SI. no. | Genotype | Days to first flowering | Days to 50 per cent flowering | Days to first harvest | Days taken from 50 percent flowering to first fruit harvesting |
|---------|----------------|-------------------------|-------------------------------|-----------------------|--|
| 1 | Arka Anand | 47.00 | 58 | 83.50 | 25.50 |
| 2 | Arka Neelkant | 47.00 | 59 | 85.50 | 26.50 |
| 3 | Arka Nidhi | 48.75 | 61 | 88.50 | 27.50 |
| 4 | EPH-718 | 52.00 | 64 | 97.50 | 33.50 |
| 5 | Simran | 51.00 | 63 | 86.50 | 23.50 |
| 6 | Matti Gulla | 46.00 | 57 | 85.50 | 28.50 |
| 7 | Pant Samrat | 48.00 | 62 | 85.50 | 23.50 |
| 8 | Swarn Shyamli | 42.00 | 56.5 | 89.50 | 33.00 |
| 9 | R-2580 | 50.00 | 63 | 88.50 | 25.50 |
| 10 | Arka Shirish | 49.00 | 63 | 90.50 | 27.50 |
| 11 | L-3268 | 51.00 | 65 | 93.50 | 28.50 |
| 12 | R-2581 | 53.00 | 69 | 95.50 | 26.50 |
| 13 | Swarn Shree | 55.00 | 67 | 92.50 | 25.50 |
| 14 | L-2232 | 53.00 | 68 | 91.50 | 23.50 |
| 15 | Swarn Mani | 54.00 | 65 | 90.50 | 25.50 |
| 16 | Arka Kusumakar | 48.50 | 60 | 87.50 | 27.50 |
| | S.Em ± | 1.98 | 2.96 | 3.19 | 0.99 |
| | CD (5%) | 5.95 | 8.92 | 9.58 | 2.97 |
| | Mean | 49.70 | 62.50 | 89.50 | 26.96 |

Conclusion

Thus, from the results obtained and analyzed during the present investigation, it was concluded that all these sixteen genotypes of brinjal differed significantly for most of the physical fruit characters under study. The fruit shape varies from long to oval to oblong in shape. The fruit colours viz green, green with whitish stripes, green with purplish strips, purple, dark purple were observed in most of the brinjal genotypes. All the flowering parameters varied significantly among all the brinjal genotypes under study. The genotype Swarn Shymali was found to be the earliest in initiation of days to first flowering and days to fifty percent flowering.

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