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Evaluation of long fruited brinjal (*Solanum melongena* L.) genotypes for growth and yield traits under Chhattisgarh plains

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Abstract

The experiment was carried out at Horticultural Research cum Instructional Farm, under the project AICRP on vegetable crops, at Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) during *kharif* 2019-2020. The experiment was laid out in Randomized Block Design (RBD) with fourteen treatments (genotypes) and three replications. Based on mean performance study, the highest total fruit yield per hectare (q) was recorded in genotype 2018/BRLVAR-11 followed by 2018/BRLVAR-8. The genotype 2018/BRLVAR-11 also exhibited highest value for most of the traits *viz.*, plant height (cm), fruit weight (cm), fruit length (cm), stalk length (cm), fruit yield per plant (kg) and marketable fruit yield (q/ha), whereas, genotype 2018/BRLVAR-8 was recorded with maximum fruit girth (cm) and maximum pericarp thickness (mm).

Keywords: brinjal, genotypes, mean performance, yield

Introduction

Brinjal (*Solanum melongena* L.) also known as eggplant or aubergine belongs to family solanaceae has chromosome number $2n = 24$ is one of the most important vegetable crops grown in India having major share in terms of both quantity and area under cultivation. Vavilov (1928) [9] considered that the centre of origin of eggplant was in the Indo-Burma region. It is the fourth most important vegetable crop after potato, onion and tomato. It covers 8.14 percent of total area under vegetable producing 9 percent of total vegetable production in India (Selvakumar, 2014) [7]. In India, it is cultivated over an area of 730.35 thousand hectares with production of 12800.77 thousand metric tonnes (Anon, 2018). In Chhattisgarh, it is cultivated in an area of 37.93 thousand hectares with production of 705.40 thousand metric tonnes (Anon, 2018).

In view of growing population and increasing public demand. There is an urgent need to increase the production as well as yield of brinjal genotypes. In addition, people's preferences also varies from one place to another depending upon colour, shape and taste of specific genotype. In Chhattisgarh region, small fruited type brinjal are not preferred. Generally the preference is given to black/green/purple coloured having glossy and shiny surface with round, oblong and long fruits. Various local cultivars are available which are traditionally grown by farmers but low productivity is one of the main constraints which ultimate leads to low return. Thus under these circumstances it is necessary to improve these genotypes. In this context existing genetic stock provides an opportunity for selecting the suitable genotype among various available genotypes. In respect to Chhattisgarh the information regarding the best suitable brinjal genotype is lacking and particularly of long type. Keeping in view the above facts the present experiment has been conducted to identity most suitable long fruited brinjal genotype suitable for Chhattisgarh plains.

Materials and Methods

The present investigation was conducted at Horticultural Research cum Instructional Farm, under the project AICRP on vegetable crops, at Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) during *kharif* 2019-2020. The experiment was laid out in Randomized Block Design (RBD) with three replications. The experimental material was consisted of fourteen long fruited brinjal genotypes *viz.*, 2017/BRLVAR-1, 2017/BRLVAR-2, 2017/BRLVAR-3,

2017/BRLVAR-4, 2017/BRLVAR-5, 2017/BRLVAR-6, 2018/BRLVAR-6, 2018/BRLVAR-7, 2018/BRLVAR-8, 2018/BRLVAR-9, 2018/BRLVAR-10, 2018/BRLVAR-11, including two check varieties Kashi Taru and Punjab Sadabahar. From each experimental unit five plants were selected randomly. The selected plants were tagged and all the observations were recorded from tagged plant for various growth and yield traits viz., plant height (cm), number of branches per plant, days to first flowering, days to 50% flowering, number of flowers per cluster, number of fruits per cluster, fruit setting percentage, fruit weight (g), fruit length (cm), fruit girth (cm), stalk length (cm), pericarp thickness (mm), number of pickings, number of fruits per plant, fruit yield per plant (kg), marketable fruit yield (q/ha), total fruit yield per hectare (q). The data was analyzed by adopting the standard procedure as suggested by Panse and Sukhatme (1967) [6].

Results and Discussion

The analysis of variance for experiment showed that the mean sum of square due to genotypes were significant for all the traits which indicated the presence of sufficient variability among the genotypes for growth and yield traits. The data on mean performance of long fruited brinjal genotypes for yield and its component are presented in Table-1.

The highest plant height was recorded in genotype 2018/BRLVAR-11 (82.27 cm), whereas, the lowest plant height was recorded in genotype 2018/BRLVAR-10 (50.67 cm) with an overall mean of 57.72 cm. The genotype 2018/BRLVAR-9 (8.67) was recorded with maximum number of branches per plant, while, least number of branches per plant was recorded in genotype 2018/BRLVAR-8 (5.47) with an overall mean for number of branches per plant was 6.93. The overall mean for days to first flowering was recorded as 40.52 days with genotype 2018/BRLVAR-9 (33.67 days) taken shortest duration for first flowering, whereas, genotype 2017/BRLVAR-2 (56.67 days) taken longest duration for first flowering. The genotype 2017/BRLVAR-6 (43.33 days) taken least number of days to reach 50% flowering, while, genotype 2017/BRLVAR-2 (64.00 days) taken longest duration for 50% flowering with average value for days to 50% flowering was 50.17 days. The maximum number of flowers per cluster was obtained in genotype 2017/BRLVAR-5 (4.60), while, minimum number of flowers per cluster was obtained in genotype 2018/BRLVAR-8 (1.40) with an overall mean as 3.18. The genotype 2017/BRLVAR-1 (2.53) was recorded with maximum number of fruits per cluster, whereas, least number of fruits per cluster (1.00) was recorded for genotypes 2017/BRLVAR-2, 2017/BRLVAR-3, 2018/BRLVAR-8 and 2018/BRLVAR-11 with an average value of 1.55. The overall mean value for fruit setting percentage was obtained as 51.72%. The highest fruit setting percentage was recorded in genotype 2018/BRLVAR-9 (80.55%), while, lowest fruit

setting percentage (28.32%) was recorded in genotypes 2018/BRLVAR-11 and 2017/BRLVAR-3. Similar findings were also reported by Singh *et al.* (2014) [8], Haldavenkar *et al.* (2019) [5] and Bhambure *et al.* (2020) [2].

The maximum fruit weight was obtained in genotype 2018/BRLVAR-11 (435.50 g), while, minimum fruit weight was found in genotype 2018/BRLVAR-10 (80.79 g) with grand mean value of 131.36 g. The maximum fruit length was recorded in genotype 2018/BRLVAR-11 (42.75 cm), whereas, the minimum fruit length was recorded in Punjab Sadabahar (15.61 cm) with grand mean value of 20.82 cm. The overall average value for fruit girth was recorded as 14.55 cm with maximum fruit girth was obtained in genotype 2018/BRLVAR-8 (20.26 cm), whereas, the minimum fruit girth was obtained in Punjab Sadabahar (11.09 cm). The stalk length was recorded maximum in genotype 2018/BRLVAR-11 (7.41 cm), whereas, minimum stalk length was recorded in genotype 2017/BRLVAR-1 (3.78 cm) with overall average value for stalk length was 5.46 cm. The maximum pericarp thickness was obtained in genotype 2018/BRLVAR-8 (7.16 mm), while, the minimum pericarp thickness was obtained in genotype 2017/BRLVAR-4 (3.67 mm) with over all mean of 5.34 mm. Similar findings were also reported by Gogoi *et al.* (2018) [4] and Haldavenkar *et al.* (2019) [5].

The maximum number of pickings was taken in genotype 2017/BRLVAR-6 (4.33), whereas, least number of pickings was taken in genotype 2018/BRLVAR-10 (2.93) with overall mean number of pickings was 3.69. The highest number of fruits per plant was recorded in genotype 2017/BRLVAR-4 (19.07), whereas, the genotype 2018/BRLVAR-10 (8.93) was recorded with least number of fruits per plant with over all mean value for number of fruits per plant was 12.32.

The fruit yield per plant ranged from 0.72 kg (2018/BRLVAR-7) to 2.98 kg (2018/BRLVAR-11) with over all mean of 1.37 kg. The maximum fruit yield per plant was obtained in genotype 2018/BRLVAR-11 (2.98kg) followed by genotype 2017/BRLVAR-1 (1.70 kg), while, minimum fruit yield per plant was obtained in genotype 2018/BRLVAR-7 (0.72 kg). The marketable fruit yield (q/ha) ranged from 115.37 q/ha (2018/BRLVAR-7) to 290.30 q/ha (2018/BRLVAR-11) with overall mean of 149.42 q/ha. The maximum marketable fruit yield (q/ha) was recorded in genotype 2018/BRLVAR-11 (290.30 q/ha) followed by Kashi Taru (167.68 q/ha), while, minimum marketable fruit yield (q/ha) was recorded in genotype 2018/BRLVAR-7 (115.37 q/ha). The variation in total fruit yield per hectare ranged from 134.31 q (2018/BRLVAR-7) to 326.33 q (2018/BRLVAR-11) with overall mean of 180.68 q. The maximum total fruit yield per hectare was recorded in genotype 2018/BRLVAR-11 (326.33 q) followed by genotype 2018/BRLVAR-8 (201.12 q), while, minimum total fruit yield per hectare was recorded in genotype 2018/BRLVAR-7 (134.31 q). Similar findings were also reported by Chaudhary *et al.* (2017) [3] and Gogoi *et al.* (2018) [4].

Table 1: Mean performance of long fruited brinjal genotypes for yield and its component characters

Genotype	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
2017/BRLVAR-1	52.23	8.20	46.00	56.33	4.13	2.53	61.35	91.17	16.18	14.09	3.78	4.98	4.00	15.33	1.70	159.64	195.51
2017/BRLVAR-2	54.60	6.77	56.67	64.00	2.50	1.00	40.04	92.06	22.37	11.88	6.09	4.81	3.40	13.80	1.56	130.82	181.34
2017/BRLVAR-3	58.60	7.13	34.00	45.00	3.53	1.00	28.32	129.09	21.67	15.20	5.11	5.35	4.00	12.73	1.32	120.28	161.80
2017/BRLVAR-4	59.20	7.67	37.33	47.00	3.33	1.27	37.99	107.98	18.47	16.21	5.21	3.67	4.27	19.07	1.32	125.25	153.09
2017/BRLVAR-5	53.07	6.30	37.67	47.00	4.60	2.33	50.72	117.10	18.18	16.18	4.89	6.47	4.13	14.27	1.40	132.59	157.14
2017/BRLVAR-6	51.47	6.60	35.67	43.33	3.47	2.27	65.52	112.32	18.00	15.51	3.99	5.05	4.33	13.33	1.34	144.59	169.20
2018/BRLVAR-6	54.80	7.20	41.67	48.00	4.33	1.27	29.33	104.31	17.95	13.93	6.06	6.14	3.40	10.07	1.08	149.84	178.59
2018/BRLVAR-7	60.20	6.87	41.67	50.67	2.47	1.87	75.85	89.58	18.50	12.54	4.85	4.42	3.47	10.20	0.72	115.37	134.31

2018/BRLVAR-8	65.40	5.47	41.00	46.33	1.40	1.00	72.42	180.93	18.97	20.26	6.37	7.16	3.33	9.93	1.63	158.12	201.12
2018/BRLVAR-9	55.00	8.67	33.67	51.00	1.73	1.40	80.55	92.44	23.39	11.23	5.83	5.61	3.40	9.27	0.96	124.99	155.60
2018/BRLVAR-10	50.67	6.40	48.00	55.33	2.60	1.73	66.54	80.79	21.57	11.22	5.11	4.93	2.93	8.93	0.79	117.48	137.96
2018/BRLVAR-11	82.27	7.20	40.00	49.00	3.53	1.00	28.32	435.50	42.75	19.54	7.41	6.80	3.67	12.53	2.98	290.30	326.33
Kashi Taru	56.67	6.00	39.67	50.00	3.53	1.67	47.16	114.53	17.81	14.86	6.45	5.45	3.60	11.87	1.34	167.68	196.96
Punjab Sadabahar	53.87	6.53	34.33	49.33	3.33	1.33	39.95	91.26	15.61	11.09	5.30	3.97	3.67	11.20	1.01	154.93	180.58
Grand mean	57.72	6.93	40.52	50.17	3.18	1.55	51.72	131.36	20.82	14.55	5.46	5.34	3.69	12.32	1.37	149.42	180.68
C.D. (0.5%)	5.12	0.64	10.89	10.08	0.29	0.20	7.85	36.98	2.63	1.59	0.77	0.58	0.76	3.63	0.38	45.04	48.15
SE(m)	1.75	0.22	3.72	3.45	0.10	0.07	2.69	12.65	0.90	0.54	0.26	0.20	0.26	1.24	0.13	15.49	16.56
SE(d)	2.48	0.31	5.27	4.88	0.14	0.09	3.80	17.89	1.27	0.77	0.37	0.28	0.37	1.76	0.18	21.91	23.43
C.V.	5.26	5.48	15.92	11.91	5.37	7.46	8.99	16.68	7.48	6.45	8.34	6.42	12.15	17.46	16.45	17.96	15.88

1	Plant height (cm)	7	Fruit setting percentage	13	No. of pickings
2	No. of branches per plant	8	Fruit weight (g)	14	No. of fruits per plant
3	Days to first flowering	9	Fruit length (cm)	15	Fruit yield per plant (kg)
4	Days to 50% flowering	10	Fruit girth (cm)	16	Marketable fruit yield (q/ha)
5	No. of flowers per cluster	11	Stalk length (cm)	17	Total fruit yield per hectare (q)
6	No. of fruits per cluster	12	Pericarp thickness (mm)		

Conclusion

In the present investigation based on mean performance, the genotypes 2018/BRLVAR- 11 and 2018/BRLVAR-8 were recorded as high yielder with respect to total fruit yield per hectare (q). Thus, among all the genotypes studied, the genotypes 2018/BRLVAR-11 and 2018/BRLVAR-8 can be recommended as best suitable long fruited brinjal genotypes for Chhattisgarh plains conditions. The genotype 2018/BRLVAR-11 also showed its superiority over other genotypes for characters *viz.*, plant height (cm), fruit weight (g), fruit length (cm), stalk length (cm), fruit yield per plant (kg) and marketable fruit yield (q/ha).

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