

Performance of advanced breeding lines of brinjal (*Solanum melongena* L.) under hill zone of Karnataka

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ABSTRACT

An experiment was carried out to assess performance in twenty advanced breeding of brinjal along with three checks (Arka Keshav, Arka Neelanchal Shyama and Devanur Local) during *Summer* season 2022-2023 at College of Horticulture, Mudigere. The experiment was laid out in randomized complete block design with three replications. The results indicated that highest number of primary branches (17.52), number of fruits per cluster (3.19), fruit setting percentage (73.67 %), number of fruits per plant (37.45) and fruit yield per plant (1.78 kg) recorded in line CHMB-2, days to first flowering (28.22 days) and days to first harvest (37.04 days) recorded minimum days in CHMB-11, maximum number of flowers per cluster (7.06) recorded in CHMB-13, highest plant height in CHMB-6 (66.35 cm), maximum fruit length and fruit diameter in CHMB-18 (14.90 cm) and Arka Neelanchal Shyama (67.49 mm) respectively. With respect to quality parameters, maximum dry matter content (12.13 g/100 g) and minimum moisture content (86.97 %) recorded in CHMB - 7, highest fruit phenol content recorded in Arka Keshav (72.54 mg/100g).

Key words: Brinjal, Evaluation, Yield and phenol content.

Introduction

Brinjal (*Solanum melongena* L.) 2n=24 belongs to the family Solanaceae which is one of the most important vegetable crop. It is popular among people and hence, it is rightly called as vegetable of masses. Originated in the Indo-Burma region. It is a perennial crop but commercially cultivated as an annual vegetable and it is often cross pollinated crop. Brinjal is grown on commercial scale in India, China, Turkey, Japan, Egypt, Italy and Indonesia. In India, brinjal is grown with an area of 7.64 million hectares with the production of 1.26 million MT. In Karnataka, brinjal covers an area of 11,360 hectares

with the production of 2,84,030 metric tonnes and productivity is 25.02 metric tonnes per hectare Anon (2022).

Eggplant is having many medicinal properties and it is useful in the treatment of inflammatory conditions, cardiac debility, neuralgias, bronchitis and asthma. Analysis of edible parts of fruit (except stalk and calyx) revealed that 100 g fresh weight of brinjal contains moisture (96 %), carbohydrates (4 g), protein (1.4 g), fat (0.3 g), fibre (1.3 g) and essential minerals like calcium (18 mg), magnesium (16 mg), phosphorus (47 mg), iron (0.38 mg), sodium (3 mg), copper (0.17 mg) and manganese (2.4 mg). It is also a rich source of vitamins and 100 g of edible portion

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of fruit contains Vitamin - A (124 IU), riboflavin (0.11 mg), thiamine (0.4 mg), niacin (0.9 mg), folic acid (5 mg), choline (52 mg) and 12 mg of Vitamin - C (Aykroyd, 1963).

The present studies were therefore, initiated with an objective to determine the performance of advanced breeding lines of brinjal for growth and yield attributes along with quality components in a collection of twenty advanced breeding lines of brinjal.

Materials and Methods

The present investigation conducted at the College of Horticulture, Mudigere, Karnataka during *Summer* season 2022-2023. Twenty advanced breeding lines of brinjal along with three checks (Arka Keshav, Devanur Local and Arka Neelanchal Shyama) were evaluated in randomized complete block design with three replications. Thirty days old seedlings from nursery were transplanted in the main field with a spacing of 75 cm × 60 cm. All the

recommended cultural practices and plant protection measures were followed to raise healthy seedlings. Observations were recorded from five randomly selected tagged plants of each line in each replication for fourteen traits *viz.* plant height (cm), number of primary branches, days to first flowering, days to first harvest, number of flowers per cluster, number of fruits per cluster, fruit setting percentage, fruit length (cm), fruit diameter (mm), number of fruits per plant, fruit yield per plant (kg), dry matter content (g/100 g), moisture content (%), phenol content (mg/100 g) and mean data were statistically analysed following standard procedure as suggested by Panse and Sukhatme (1967).

Results and Discussion

Statistically, significant results were obtained for all attributes in advanced breeding lines of brinjal is furnished in Table 1 and 2.

Plant height was measured at final harvest, line

Table 1. Performance of advanced breeding lines of brinjal for morphological and flowering parameters

Breeding lines	Plant height (cm)	Number of primary branches	Days to first flowering	Days taken for first picking	Number of flowers per cluster	Number of fruits per cluster	Fruit setting percentage
CHMB-1	59.10	12.45	35.66	58.49	4.76	2.69	56.81
CHMB-2	66.35	17.52	30.16	54.69	4.34	3.19	73.67
CHMB-3	60.38	12.01	36.51	58.69	3.87	2.13	55.18
CHMB-4	57.30	11.35	45.74	66.80	4.28	2.21	51.89
CHMB-5	50.14	11.04	50.13	73.92	6.57	2.95	45.22
CHMB-6	67.12	15.11	32.16	55.97	3.59	2.23	62.76
CHMB-7	60.99	13.47	34.16	57.47	5.15	3.07	59.84
CHMB-8	46.16	9.66	51.19	74.59	3.16	1.12	35.51
CHMB-9	63.54	14.01	33.12	55.16	4.60	2.86	62.01
CHMB-10	54.31	10.13	47.91	70.16	4.00	2.01	50.47
CHMB-11	62.15	13.98	28.22	54.24	4.58	2.79	60.80
CHMB-13	56.32	10.33	52.38	75.55	7.06	2.62	37.29
CHMB-16	49.63	9.12	55.65	77.92	3.27	1.19	36.40
CHMB-17	58.37	11.34	47.83	69.63	5.41	2.25	41.79
CHMB-18	60.18	12.99	36.21	60.13	4.36	2.58	59.00
CHMB-19	59.75	11.00	49.90	74.41	3.26	1.55	47.99
CHMB-20	61.01	13.05	46.56	68.22	4.00	2.39	59.80
CHMB-21	54.81	10.62	54.48	78.37	3.01	1.45	48.22
CHMB-23	60.02	13.38	37.50	59.65	3.80	2.32	60.95
CHMB-26	52.14	11.11	56.35	78.29	3.58	1.75	48.93
Arka Keshav	54.31	9.33	52.12	73.16	4.27	2.23	52.60
Arka Neelanchal Shyama	46.22	7.25	38.11	64.22	3.24	1.14	35.21
Devanur Local	57.37	10.66	61.87	80.39	4.47	2.18	48.91
Mean	57.29	11.78	44.08	66.96	4.29	2.21	51.79
S. Em ±	1.03	0.36	2.09	1.59	0.15	0.10	1.20
CD @ 5%	2.92	1.03	5.95	4.52	0.44	0.27	3.41

CHMB-6 (67.12 cm) recorded maximum plant height while, least recorded in CHMB-8 (46.16 cm) with respect to primary branches per plant, highest recorded in CHMB-2 (17.52) while, least in Arka Neelanchal Shyama (7.25). This might be due to difference in genetic characteristics of lines as well as differential endogenous auxin and cytokinin contents. Results are in accordance with the findings of Patel and Chaurasiya (2022) and Sahu *et al.* (2022).

Days to first flowering and days taken for first picking is intended as an index to earliness. The time taken for flowering (28.22 days) and fruit picking (37.04 days) is less in line CHMB-11. This might be due to difference in genetic makeup of different lines that decides adaptability in a particular environment, reported by Akshay *et al.* (2018) and Paridha *et al.* (2020).

Maximum number of flowers per cluster was observed in line CHMB-13 (7.06) while, minimum in CHMB-21 (3.01), line CHMB-2 (3.19) had more number of fruits per cluster. While, least number of

fruits per cluster recorded in CHMB-8 (1.12), line CHMB-2 (73.67 %) had highest fruit setting percentage while, lowest recorded in Arka Neelanchal Shyama (35.21 %). This is due to genetic makeup of different lines as well as differential production of different flower types (long, medium and short styled) which directly affects the pollination and fertilization and ultimately fruit set. The findings are in accordance with the reports of Praneetha *et al.* (2021) and Lohani *et al.* (2023).

The line CHMB-18 (14.90 cm) had the longest fruit length. While, the shortest fruit length recorded in line CHMB-3 (5.87). Fruit diameter was highest in Arka Neelanchal Shyama (67.49 mm) and lowest in Arka Keshav (22.48 mm). It is due to their genetic makeup also due to variation in dry matter partitioning ability of plants which could have been further influenced by the prevailing environmental factors. Similar results were noted by Rajatha *et al.* (2020) and Nanthakumar and Savitha (2021).

The maximum number of fruits (37.45) and fruit

Table 2. Performance of advanced breeding lines of brinjal for yield and biochemical parameters

Breeding lines	Fruit length (cm)	Fruit diameter (mm)	Number of fruits per plant	Yield per plant (kg)	Dry matter content (g/100g)	Moisture content (%)	Fruit phenol content (mg/100g)
CHMB-1	7.64	37.88	25.17	1.45	8.01	92.24	52.03
CHMB-2	10.56	42.87	37.45	1.78	9.87	90.21	37.56
CHMB-3	5.87	39.72	27.59	1.36	7.69	92.87	47.25
CHMB-4	6.52	43.19	24.18	1.25	8.21	91.58	44.25
CHMB-5	7.98	36.51	20.16	1.10	6.59	94.87	38.46
CHMB-6	9.43	34.29	35.14	1.73	9.58	90.38	41.29
CHMB-7	10.79	46.25	29.78	1.48	12.13	86.97	39.53
CHMB-8	8.47	35.53	14.76	0.98	6.88	94.05	50.67
CHMB-9	6.41	50.62	32.72	1.62	10.42	88.96	40.37
CHMB-10	7.87	34.19	24.05	1.09	8.06	92.18	46.30
CHMB-11	11.06	49.09	32.07	1.59	11.96	87.52	45.27
CHMB-13	9.55	35.15	19.64	1.20	8.57	91.26	35.12
CHMB-16	10.69	38.50	17.81	1.01	7.01	93.76	55.23
CHMB-17	8.16	34.16	20.17	1.21	8.37	91.39	41.57
CHMB-18	14.90	36.26	28.77	1.49	10.69	89.06	43.27
CHMB-19	10.66	40.21	18.54	1.25	8.36	91.43	55.21
CHMB-20	11.30	44.28	28.52	1.47	10.02	90.15	46.25
CHMB-21	8.25	30.78	19.81	1.15	7.97	92.74	49.52
CHMB-23	6.87	45.87	30.45	1.54	9.63	90.55	42.57
CHMB-26	12.45	29.56	18.33	1.09	8.96	91.11	53.49
Arka Keshav	13.97	22.48	21.50	1.20	10.38	91.18	72.54
Arka Neelanchal Shyama	5.95	67.49	13.01	1.13	8.51	91.01	51.28
Devanur Local	10.99	26.57	19.77	1.06	8.14	90.76	59.79
Mean	9.41	39.19	24.32	1.31	8.96	91.14	47.34
S. Em ±	0.36	1.43	0.83	0.03	0.21	1.14	1.12
CD @ 5%	1.02	4.06	2.36	0.08	0.60	3.25	3.19

yield per plant (1.78 kg) were noticed in CHMB-2 line. While, minimum noticed in Arka Neelanchal Shyama for number of fruits per plant (13.01) and for fruit yield per plant in CHMB-8 (0.98 kg). This might be due to higher number of branches, number of fruits per cluster and higher fruit set in different lines reported by Sahu *et al.* (2022) and Lohani *et al.* (2023).

The maximum dry matter (12.13 g/100g) and minimum moisture content (86.97 %) recorded in line CHMB-7. While, minimum dry matter (6.59 g/100g) and maximum moisture content (94.87 %) recorded in line CHMB-5. It mainly depends on climatic conditions and intercultural operations like watering, fertilizer applications, *etc.*, the findings are in accordance with the reports of Praneetha *et al.* (2021) and Patel and Chaurasiya (2022). The highest phenol content was recorded in Arka Keshav (72.54 mg/100g) and least in CHMB-13 (35.12g/100g). The variation in phenol content depending on genetic nature of different lines and also on harvesting stage of the crop as reported by Nayanathara *et al.* (2016).

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Conflict of interest

The authors declare that no conflict of interest exists.

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