



# EVALUATION OF HYBRIDS FOR GROWTH, YIELD AND ITS COMPONENT TRAITS IN BHENDI (*ABELMOSCHUS ESCULENTUS* L. MOENCH)

P. Siva Ranjani, R. Ebenezer Babu Rajan<sup>1\*</sup>, C. Praveen Sampath Kumar<sup>1</sup>,  
J.L. Joshi<sup>1</sup> and J. Sam Ruban<sup>2</sup>

<sup>1</sup>Department of Genetics and Plant Breeding, Faculty of Agriculture, Annamalai University,  
Annamalai Nagar – 608 002, Tamilnadu, India.

<sup>2</sup>Department of Horticulture, Faculty of Agriculture, Annamalai University,  
Annamalai Nagar – 608 002, Tamilnadu, India.

## Abstract

In Bhendi, through line × tester (7×3) analysis, the combination Kallakkurichi local × Salkeerthi was identified as the high yielder. It recorded maximum mean value for number of branches per plant, internodal length, fruit length, average fruit weight, number of fruits per plant, number of seeds per fruit, 100 seed weight and fruit yield per plant. The hybrid Chidambaram local × Arka Anamika recorded higher mean value for days to 50 percent flowering and Bhuvanagiri local × Salkeerthi recorded highest mean value for plant height at maturity and Trichy local × Salkeerthi for fruit grith.

**Keywords:** Bhendi, line × tester, hybrids, yield.

## Introduction

Bhendi (*Abelmoschus esculentus* L. Moench) is also referred as Okra or lady's finger in India, which is one of the most popular vegetables grown through out of the tropical, sub tropical and warm temperature regions around the world. The geological origin of bhendi is disputed, with supporters of South Asia, Ethiopian and West African origins. Bhendi has  $2n = 8x = 72$  or 130 or 144 chromosomes and is allopolyploid in nature (Joshi and Hardas, 1956; Suresh Babu, 1987). Martin (1982) reported that it behaves as a diploid. Under the genus *Abelmoschus*, there are thirty species in the old world and four in the new world. Out of them, *Abelmoschus esculentus* is the only species known to be cultivated. Bhendi is often cross-pollinated where the natural cross pollination occurs from 8.75 to 9.61 percentage. Bhendi is gaining importance with regard to its nutritional, medicinal and industrial value. Bhendi is rich in various nutrients and average nutritive value (ANV) of okra is 3.21 percent. It is a good source of folic acid, vitamin B,

vitamin C providing 21.1 percent of daily value for a 2000 calorie and has high dietary fibre content. For a well balanced diet 300g of vegetable is needed (Dwivedi *et al.*, 2003). Medicinal values of bhendi are it has anti-diabetic property which helps in reducing blood sugar levels, while in Turkey roasted okra seeds have been used as a traditional diabetes medicine for generations. Bhendi has highest amount of iodine which prevents from goitre disease. Bhendi also helps in preventing and improving constipation, lowering cholesterol, aids in treating sore throat, irritable bowel, ulcers and lung inflammation. Bhendi has various industrial uses, young immature pods of okra can be consumed in different forms (Ndunguru and Rajabu, 2004). The fruits are harvested when immature and eaten as vegetable. The tender leaves of bhendi often used as a vegetable in areas where a wide variety of leaves are used as greens (West Africa, South East Asia). Mature fruits containing crude fibre are used in the paper industry. Its ripe seeds can be dried, roasted and ground to be used as a coffee substitute (Gemede *et al.*, 2015). Keeping these considerations in view, the present study was to evaluate the growth and yield parameter of bhendi hybrids.

\*Author for correspondence : ebenezer.babu18@gmail.com

## Materials and Methods

The present investigation was carried out at the Breeding Farm, Department of Genetics and Plant Breeding, Faculty of Agriculture, Annamalai University, Annamalainagar during January to April (crossing) and July to October (evaluation) of 2018. Twenty one  $F_1$  hybrids were obtained by crossing 7 lines and 3 testers. The hybrids along with the parents were raised in Randomized Block Design with three replications. Cultural and agronomic practices were followed as per the standard recommendations and need based plant protection measures were taken up to maintain healthy crop stand. The data was recorded in five randomly selected plants in each replication for yield and its component traits were subjected to statistical analysis.

## Results and Discussions

Data obtained on yield and quality traits of 21 hybrids were evaluated along with their parents is presented Table 1. Significant difference were detected among the parents and hybrids with respect to all the characters studied. The days to 50 percent flowering ranged from 37.92 days (Kallakurichi local) to 48.87 days (Bhuvanagiri local) in lines and among the testers, it ranged from 35.47 days (Salkeerthi) to 42.03 days (Ankur-40). The highest mean value was recorded by the hybrid Bhuvanagiri local  $\times$  Arka Anamika (47.52 days).

The plant height is an important trait by which growth and vigour of plants are measured. Among the parents, the plant height for lines ranged from 75.93 cm (Kallakurichi local) to 98.97 cm (Bhuvanagiri local) and among the testers, it ranged from 78.62 cm (Salkeerthi) to 95.54 cm (Arka Anamika). The highest mean value was recorded by the hybrid Bhuvanagiri local  $\times$  Arka Anamika (112.61 cm).

The number of branches per plant ranged from 2.70 (Chinnasalem local) to 4.67 (Kallakurichi local) among the lines and 3.10 (Arka Anamika) to 3.77 (Ankur-40) among the testers. The maximum number of branches per plant was observed in the hybrid Kallakurichi local  $\times$  Salkeerthi (5.60).

The internodal length ranged from 4.91 cm (Bhuvanagiri local) to 6.08 cm (Kallakurichi local) among the lines and 4.82 cm (Ankur-40) to 6.11 cm (Salkeerthi) among the testers. The highest mean value of hybrids recorded in Chinnasalem local  $\times$  Ankur-40 (3.92 cm).

The fruit length ranged from 14.56 cm (Kallakurichi local) to 18.69 cm (Trichy local) among the lines and 14.43 cm (Ankur-40) to 17.56 cm (Salkeerthi) among the

testers. The maximum and minimum fruit length was observed in the hybrid Kallakurichi local  $\times$  Salkeerthi (21.27 cm) and Madurai local  $\times$  Salkeerthi (14.03 cm) respectively.

The fruit girth ranged from 4.75 cm (Bhuvanagiri local) to 5.58 cm (Kallakurichi local) among the lines and 4.42 cm (Ankur-40) to 4.96 cm (Salkeerthi) among the testers. The mean value of hybrids ranged from 4.48 cm Bhuvanagiri local  $\times$  Ankur-40) to 6.58 cm (Trichy local  $\times$  Salkeerthi).

The fruit weight ranged from 14.89 gm (Bhuvanagiri local) to 19.82 gm (Kallakurichi local) among the lines and 15.12 gm (Ankur-40) to 16.24 gm (Salkeerthi) among the testers. The maximum and minimum fruit weight was observed in the hybrid Kallakurichi local  $\times$  Salkeerthi (19.93 gm) and Thalaivasal local  $\times$  Ankur-40 (14.62 gm), respectively.

The number of fruits per plant ranged from 15.56 (Bhuvanagiri local) to 19.03 (Kallakurichi local) among the lines and 20.48 (Ankur-40) to 22.68 (Salkeerthi) among the testers. The mean value of hybrids ranged from 16.98 (Bhuvanagiri local  $\times$  Ankur-40) to 22.97 (Kallakurichi local  $\times$  Salkeerthi).

The number of seeds per plant ranged from 38.55 (Bhuvanagiri local) to 53.32 (Kallakurichi local) among the lines and 44.25 (Ankur-40) to 49.09 (Salkeerthi) among the testers. The highest mean value was recorded by the hybrids 75.26 (Kallakurichi local  $\times$  Salkeerthi) while the lowest was recorded in 40.72 (Thalaivasal local  $\times$  Ankur-40).

The 100 seed weight ranged from 5.81 gm (Bhuvanagiri local) to 7.34 gm (Kallakurichi local) among the lines and 5.86 gm (Ankur-40) to 7.01 gm (Salkeerthi) among the testers. The highest mean value was recorded by the hybrids Kallakurichi local  $\times$  Salkeerthi (9.79 gm) while the lowest was recorded in Bhuvanagiri local  $\times$  Ankur-40 (7.33 gm).

The Fruit yield per plant ranged from 318.31 gm (Thalaivasal local) to 392.97 gm (Kallakurichi local) and 235.58 gm (Ankur-40) to 259.32 gm (Salkeerthi) among lines and testers, respectively. Among the hybrids, the mean values of fruit yield per plant ranged from 278.11 gm (Chidambaram local  $\times$  Ankur-40) to 413.62 gm (Kallakurichi local  $\times$  Salkeerthi). It is concluded that based on the mean performance of all of the eleven characters, Kallakurichi local  $\times$  Salkeerthi, Trichy local  $\times$  Salkeerthi, Chidambaram local  $\times$  Salkeerthi, Bhuvanagiri local  $\times$  Arka Anamika were found superior hybrids. Similar results were also reported by Rajesh *et al.*, (2018).

**Table 1:** Mean performance of quantitative characters of Bhendi hybrids

Sl no	Characters Treatments	Days to 50 percent flowering	Plant height (cm)	Number of branches per plant	Internodal length (cm)	Fruit length (cm)	Fruit grith (cm)	Fruit weight (g)	Number of fruits per plant	Number of seeds per fruit	100 seed weight (g)	Fruit yield per plant (g)
1.	Thalaivasal local	48.36	92.56	2.80	5.14	15.32	4.93	15.29	16.32	40.58	5.84	318.31
2.	Kallakurichi local	37.92	75.93	4.67	6.08	14.56	5.58	19.82	19.03	53.32	7.34	392.97
3.	Bhuvanagiri local	48.87	98.87	3.63	4.91	16.91	4.75	14.89	15.56	38.55	5.81	289.75
4.	Chinnasalem local	42.47	81.32	2.70	5.85	16.93	5.19	16.95	17.93	48.90	7.09	364.12
5.	Madurai local	43.20	83.68	3.93	5.43	16.48	5.06	16.53	17.48	43.22	6.55	358.37
6.	Trichy local	40.53	78.14	4.30	5.89	18.69	5.37	17.58	18.69	49.51	7.12	387.24
7.	Chidambaram local	47.87	86.43	3.20	5.37	15.95	4.89	15.43	16.95	43.05	5.93	322.03
8.	Salkeerthi	35.36	78.62	3.40	6.11	17.56	4.96	16.24	22.68	49.09	7.01	259.32
9.	Ankur-40	42.03	81.26	3.77	4.82	14.43	4.42	15.12	20.48	44.24	5.86	235.67
10.	Arka Anamika	37.73	95.54	3.10	5.58	15.96	5.03	15.14	22.16	46.57	6.63	239.58
11.	Thalaivasal local × Salkeerthi	49.93	92.48	3.70	5.36	18.33	5.03	15.32	19.33	43.59	8.33	324.55
12.	Thalaivasal local × Ankur 40	43.53	99.54	3.50	4.92	16.12	4.92	14.62	17.12	40.72	7.90	289.47
13.	Thalaivasal local × Arka Anamika	47.00	109.47	4.60	4.76	17.52	5.03	18.07	18.52	45.56	7.52	312.15
14.	Kallakurichi local × Salkeerthi	37.85	73.554	5.60	6.47	21.27	6.13	19.93	22.97	75.26	9.79	413.62
15.	Kallakurichi local × Ankur 40	38.07	97.37	5.10	5.32	17.21	5.56	18.10	18.21	50.61	7.89	309.06
16.	Kallakurichi local × Arka Anamika	34.14	97.69	4.17	6.28	19.83	6.09	17.86	20.42	55.18	9.04	405.07
17.	Bhuvanagiri local × Salkeerthi	45.20	96.32	3.60	5.12	18.72	4.91	17.37	19.72	43.45	8.28	342.23
18.	Bhuvanagiri local × Ankur 40	45.80	105.62	3.53	4.96	15.98	4.48	16.90	16.98	47.19	7.33	283.45
19.	Bhuvanagiri local × Arka Anamika	47.52	112.61	3.43	3.83	17.39	4.65	15.57	18.39	45.56	7.47	316.86
20.	Chinnasalem local × Salkeerthi	41.20	81.48	4.80	6.19	19.27	5.64	17.70	20.27	61.59	9.15	373.63
21.	Chinnasalem local × Ankur40	40.53	102.48	3.83	3.92	17.13	5.58	15.33	18.13	43.18	7.54	302.67
22.	Chinnasalem local × Arka Anamika	36.80	102.33	4.32	4.89	19.93	5.61	14.77	20.93	61.59	7.71	396.42
23.	Madurai local × Salkeerthi	47.53	82.99	4.37	6.12	14.03	5.08	16.90	20.03	59.16	8.43	345.53
24.	Madurai local × Ankur 40	41.07	107.33	3.70	5.01	17.02	5.16	17.02	18.02	47.19	7.45	393.75
25.	Madurai local× Arka Anamika	38.33	105.79	3.60	4.56	18.98	4.98	17.83	19.98	49.14	7.71	337.71
26.	Trichy local × Salkeerthi	37.80	75.14	5.13	6.43	21.14	6.58	18.12	22.45	65.42	9.26	409.96
27.	Trichy local × Ankur 40	40.47	95.76	4.43	5.04	16.87	6.54	16.56	17.87	50.03	7.92	306.62
28.	Trichy local × Arka Anamika	34.80	99.554	4.42	6.10	19.56	5.83	15.57	20.56	54.75	8.72	389.42
29.	Chidambaram local × Salkeerthi	45.20	85.18	4.07	5.48	16.31	6.32	17.23	19.31	57.39	8.37	368.54
30.	Chidambaram local × Ankur 40	42.28	97.87	3.30	4.95	1.98	4.97	16.37	17.98	43.18	7.42	278.11

Table 1 continued .....

**Table 1 continued .....**

31.	Chidambaram local ×ArkaAnamika	38.73	108.02	3.56	4.83	18.82	4.73	18.07	18.87	46.95	7.62	294.37
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