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## Evaluation of F<sub>1</sub> progenies for growth characters and flower attributes of okra (*Abelmoschu sesculentus* (L.) Moench)

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**Abstract**

The present investigation entitled “Evaluation of F<sub>1</sub> progenies for growth character and flower attributes of okra (*Abelmoschus esculentus* (L.) Moench)” was carried out during *kharif* season, 2016-2017, at the Instructional cum-Research-Farm, Department of Horticulture, College of Agriculture, Latur, VNMKV, Parbhani. The experiment was laid out in a Complete Randomized Block Design with eight treatments and three replications. The experiment consisted of eight different treatments viz: T<sub>1</sub> (Parbhani Kranti [checks]), T<sub>2</sub> (Pusa-A4 x Parbhani Bhendi), T<sub>3</sub> (Parbhani Bhendi x Phule Utkarsha), T<sub>4</sub> (Pusa A4 x BO-2), T<sub>5</sub> (BO- 2x Kashi Pragati), T<sub>6</sub> (Pusa-A4x Phule Utkarsha), T<sub>7</sub> (BO-2 x Phule Utkarsha), T<sub>8</sub> (Hybrid No. 10 [Check]). Significantly maximum height of plant (104.33 cm), stem girth (3.32 cm), number of branches per plant (4.0), number of nodes per plant (15.6), inter nodal length (6.43 cm) and leaf area (492.53 cm<sup>2</sup>) were recorded by treatment T<sub>2</sub>. The minimum days to first flowering, days to 50% flowering were recorded by treatment T<sub>2</sub>. The maximum length of pod (cm), diameter of pod (cm), number of pods per plant, average weight of pod (g), weight of seed per fruit and seed yield were obtained in treatment T<sub>2</sub>. Minimum incidence of pest and diseases was recorded by treatment T<sub>2</sub>. Present investigation indicated that, the highest yield (q/ha) with good quality of okra fruit should be obtained by treatment T<sub>2</sub>.

**Keywords:** F<sub>1</sub> progenies, growth characters, *Abelmoschu sesculentus* (L.) Moench

**Introduction**

The total commercial production of Okra in the world was estimated at 4.8 million tons, with India and Nigeria being the predominant producers. Other minor producers include Pakistan, Ghana, Egypt, Ethiopia, Iran, Japan and USA. Worldwide production of the Okra as a fruit vegetable is estimated at 6 million tonnes per year. In West Africa, it is estimated at 500,000 to 600,000 tonnes per year. In Nigeria, there are two distinct season of Okra, the peak and the lean seasons. During the lean season Okra fruits are produced in low quantities, scarce and expensive to get (Bamire and Oke, 2003) in the peak season, it is produced in large quantities much more than what the local populace can consume. To the total production of 4.8 million ton pods of okra in the world, India contributes 70%, Nigeria 15%, Pakistan 2%, Ghana 2%, Egypt 1.7% and Iraq 1.7%. To the total production of 4.8 million ton pods of okra in the world, India contributes 70%, Nigeria 15%, Pakistan 2%, Ghana 2%, Egypt 1.7% and Iraq 1.7%.

**Materials and Methods**

The present investigation entitled “studies on evaluation of F<sub>1</sub> progenies for growth character and flower attributes of okra (*Abelmoschus esculentus* (L.) Moench.)” was undertaken at Experimental Farm, Department of Horticulture, College of Agriculture, Latur, Vasanttrao Naik Marathwada Krishi Vidyapeeth, Parbhani with the object to evaluate F<sub>1</sub> progenies for growth and yield of okra and to study the correlation for different characters of F<sub>1</sub> progeny. The study involved six genetically diverse F<sub>1</sub> of okra viz. Pusa-A4 x Parbhani Bhendi, Parbhani Bhendi x Phule Utkarsha, Pusa-A4 x BO-2, BO-2 x Kashi Pragati, Pusa-A4 x Phule Utkarsha, BO-2 x Phule Utkarsha. The six F<sub>1</sub>'s were evaluated along with two checks Parbhani Kranti and Hybrid No.10 during *kharif*-2016 in Randomized Block Design with three replications. The data was recorded on five randomly selected plants for the characters viz., Plant height (cm), stem girth. (cm), number of branches per plant, number of nodes per plant, inter nodal length (cm), leaf area, days to first flowering, days to 50% flowering.

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## Results and discussion

Various Growth parameters and Flower attributes showed significant differences for various Okra varieties.

**Growth parameters:** plant growth is measured in terms of plant height, Girth of stem, number of branches per plants, all these parameters showed significant difference among various cultivars.

Plant height (cm) at harvest the data showed in Table 1 in respect of height of plant revealed that maximum height of plant was recorded in treatment T<sub>2</sub> (104.33) which was followed by treatment T<sub>4</sub> (98.07) and treatment T<sub>6</sub> (96.27) respectively. However T<sub>4</sub> was at par with T<sub>6</sub>. The minimum height of plant was recorded in treatment T<sub>1</sub> (76.91) which was followed by treatment T<sub>8</sub> (81.86) and treatment T<sub>7</sub> (84.86) respectively. However treatment T<sub>1</sub> was at par with treatment T<sub>8</sub>. Rest of the treatments were intermediate. At harvest the data showed in Table 2 in respect of girth of stem revealed that maximum girth of stem was recorded in treatment T<sub>2</sub>(3.32) which was followed by treatment T<sub>4</sub> (3.14) and treatment T<sub>6</sub>(3.1) respectively. However T<sub>2</sub> was at par with T<sub>4</sub>. The minimum girth of stem was recorded in treatment T<sub>1</sub> (2.86) which was followed by treatment T<sub>7</sub> (2.92) and

treatment T<sub>5</sub> (2.94) respectively. However treatment T<sub>1</sub> was at par with treatment T<sub>7</sub> and T<sub>5</sub>. Rest of the treatments were intermediate.

Anwanobong and Brisibe (2015) [2] reported that hybrid of okra LD88 was recorded maximum plant height (128 cm) while minimum in Local variety (49.75 cm). Kumar *et al.* (2015) found that okra VRO- 6 recorded maximum plant height (140.70 cm) while minimum in IIHR-53 (83.27 cm).

Number of branches per plants at harvest the data showed in Table 1 in respect of number of branches per plant revealed that maximum number of branches were recorded in treatment T<sub>2</sub> (4.0) which was followed by treatment T<sub>4</sub> (3.34) and treatment T<sub>6</sub> (2.47) respectively. The minimum number of branches were recorded in treatment T<sub>7</sub> (1.33) which was followed by treatment T<sub>1</sub> (1.80) and treatment T<sub>5</sub> (2.07) respectively. However treatment T<sub>1</sub> was at par with treatment T<sub>5</sub>. Rest of the treatments were intermediate. Kumar *et al.* (2015) reported that hybrids of okra IC-14600 recorded maximum number of branches (4.30) while minimum in IC-90219 (1.12). Maheshwari *et al.* (2016) reported that genotypes of okra Sonal recorded maximum number of branches (13.53) while minimum in Harita (9.87).

**Table 1:** Plant height (cm), stem girth (cm) and number of branches per plant of different hybrids of okra

Tr. No.	Treatment	Plant height (cm)	Stem girth(cm)	No. of branches/ plant
T <sub>1</sub>	Parbhani kranti	76.91	2.86	1.8
T <sub>2</sub>	Pusa- A4x Parbhani Bhendi	104.33	3.32	4.0
T <sub>3</sub>	Parbhanni Bhendix Phule Utkarsha	94.03	2.98	2.1
T <sub>4</sub>	Pusa- A4 xBO-2	98.07	3.14	3.34
T <sub>5</sub>	BO-2X Kashi pragati	92.70	2.94	2.07
T <sub>6</sub>	Pusa- A4x Phule Utkarsha	96.27	3.10	2.47
T <sub>7</sub>	BO-2X Phule Utkarsha	84.86	2.92	1.33
T <sub>8</sub>	Hybrid No.-10	81.86	2.99	2.46
	SE	1.83	0.07	0.12
	CD 5%	5.56	0.21	0.38

Number of nodes per plant at harvest the data showed in Table 2 in respect of number of nodes per plant revealed that maximum number of nodes was recorded in treatment T<sub>2</sub> (15.6) which was followed by treatment T<sub>6</sub> (15.56) and treatment T<sub>4</sub> (15.03) respectively. However T<sub>2</sub> was at par with T<sub>6</sub> and T<sub>4</sub>. The minimum number of nodes was recorded in treatment T<sub>1</sub> (11.72) which was followed by treatment T<sub>8</sub> (12.56) and treatment T<sub>7</sub> (13.53) respectively. Rest of the treatments were intermediate. Hamed *et al.* (2003) [7] found that okra genotype Balady Green recorded the maximum number of nodes per plant (11.31). Maheshwari *et al.* (2016)

reported that genotypes of okra Sonal recorded maximum number of node (15.67) while minimum in Harita (6.67).

Inter nodal length (cm) at harvest the data showed in Table 2 in respect of internode length revealed that maximum length of internode was recorded in treatment T<sub>2</sub> (6.43) which was followed by treatment T<sub>4</sub> (6.41) and treatment T<sub>8</sub> (6.05) respectively. However T<sub>2</sub> was at par with T<sub>4</sub>. The minimum length of internode was recorded in treatment T<sub>5</sub> (5.23) which was followed by treatment T<sub>3</sub> (5.6) and treatment T<sub>1</sub> (5.63) respectively. However T<sub>3</sub> was at par with T<sub>1</sub>. Rest of the treatments were intermediate.

**Table 2:** Number of nodes per plant, Inter nodal length (cm) and leaf area (cm<sup>2</sup>) of different hybrids of okra

Tr. No.	Treatment	No. of nodes/ plant	Inter nodal length	Leaf area cm <sup>2</sup>
T <sub>1</sub>	Parbhani kranti	11.72	5.63	456.15
T <sub>2</sub>	Pusa- A4x Parbhani Bhendi	15.6	6.43	492.53
T <sub>3</sub>	Parbhanni Bhendix Phule Utkarsha	13.59	5.60	445.74
T <sub>4</sub>	Pusa- A4 xBO-2	15.03	6.41	477.05
T <sub>5</sub>	BO-2X Kashi pragati	13.55	5.23	461.41
T <sub>6</sub>	Pusa- A4x Phule Utkarsha	15.56	5.83	480.68
T <sub>7</sub>	BO-2X Phule Utkarsha	13.53	5.99	464.05
T <sub>8</sub>	Hybrid No.-10	12.56	6.05	466.34
	SE	0.20	0.06	8.89
	CD 5%	0.62	0.19	26.98

Leaf area (cm<sup>2</sup>) At harvest the data showed in Table 2 in respect of leaf area revealed that maximum leaf area was recorded in treatment T<sub>2</sub> (492.53) which was followed by

treatment T<sub>6</sub> (480.68) and treatment T<sub>4</sub> (477.05) respectively. Tercula *et al.* (2012) found that leaf area of okra cultivar 47-7 (326.0 cm<sup>2</sup>) and local (84.0 cm<sup>2</sup>) had the highest and least leaf

area observed in the present study. The result indicated that LD88 (279.0 cm<sup>2</sup>) and NGO-07 (228.0 cm<sup>2</sup>) had leaf area that were statistically at par but significantly higher than the local (84.0 cm<sup>2</sup>). Maheshwari *et al.* (2016) reported that genotype of okra Sahiba recorded maximum leaf area (245.47cm) while minimum in Harita (195.40cm).

**Flowering attributes:** Days to first flowering: The data presented in Table 3 in respect of number of days required for flowering revealed that the minimum number of days required for flowering (43.46) were recorded in the treatment T<sub>1</sub> and was followed by treatment T<sub>4</sub> (43.93) and treatment T<sub>6</sub>

(44.13) respectively. However treatment T<sub>2</sub> was at par with treatment T<sub>4</sub>, and T<sub>6</sub>. The maximum number of days required for flowering (46.46) were recorded in the treatment T<sub>1</sub> and was followed by treatment T<sub>3</sub> (45.26) and treatment T<sub>5</sub> (45.06) respectively. However treatment T<sub>1</sub> was at par with treatment T<sub>3</sub>. Rest of the treatments were intermediate. Saitwal *et al.* (2011) revealed that hybrids of okra Syngenta 016 recorded minimum average number of days for flower initiation (41.43). Ojo *et al.* (2012) [10] reported that hybrid of okra Dogo recorded minimum days to flowering (24.56 days) while maximum in Guntu (94.80 days).

**Table 3:** Days to first flowering and days to 50 percent flowering of different hybrids of okra.

Tr. No.	Treatment	Days to first flowering	Days to 50% flowering
T <sub>1</sub>	Parbhani kranti	46.46	45.66
T <sub>2</sub>	Pusa- A4x Parbhani Bhendi	43.46	41.33
T <sub>3</sub>	Parbhani Bhendix Phule Utkarsha.	45.26	43.66
T <sub>4</sub>	Pusa- A4 xBO-2	43.93	42.33
T <sub>5</sub>	BO-2X Kashi pragati	45.06	43.00
T <sub>6</sub>	Pusa- A4x Phule Utkarsha	44.13	42.66
T <sub>7</sub>	BO-2X Phule Utkarsha	44.53	48.66
T <sub>8</sub>	Hybrid No.-10	44.46	44.33
	SE	0.45	1.29
	CD 5%	1.39	3.91

Days to 50% flowering: The data presented in Table 3 in respect of days to 50% flowering revealed that the minimum days required for 50% flowering (41.33) were recorded in the treatment T<sub>2</sub> and was followed by treatment T<sub>4</sub> (42.33) and treatment T<sub>3</sub> (43.66) respectively. However treatment T<sub>2</sub> was at par with treatment T<sub>4</sub>, and T<sub>3</sub>. The maximum days required for 50% flowering (48.66) were recorded in the treatment T<sub>7</sub> and was followed by treatment T<sub>1</sub> (45.66) and treatment T<sub>8</sub> (44.33) respectively. However treatment T<sub>1</sub> was at par with treatment T<sub>8</sub>. Rest of the treatments were intermediate. Saitwal *et al.* (2011) revealed that hybrids of okra Syngenta 016 was recorded minimum number of days to 50 percent flowering (44.33 days) while maximum in Rashami (51.13 days). Tercula *et al.* (2012) reported that maximum days to 50% flowering of okra occurred in LD88 (64.75) closely followed by local (60.75) and 47-7 (60.50) in that order, but all these cultivar were statistically at par with one another.

### Conclusion

The studies revealed that the treatment T<sub>2</sub> (Pusa-A4 x Parbhani Bhendi) had shown significantly superior results in terms of growth characters like Plant height (cm), stem girth, number of branches per plant, number of nodes per plant, inter nodal length (cm), leaf area (cm<sup>2</sup>), days to first flowering, days to 50% flowering and Pusa-A4xBo-2 were being the second of okra followed by pusa-A4x Phule Utkarsha. Therefore, on the basis of result obtained in present studies, it is suggested that the variety Pusa-A4 x Parbhani Bhendi these variety are suggested for commercial cultivation.

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