

Performance of okra [*Abelmoschus esculentus* (L.) Moench] cultivars under Red and Laterite Zone of West Bengal

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ABSTRACT

A field experiment was conducted at Horticulture Farm, Institute of Agriculture, Visva Bharati, Sriniketan during summer, 2015 with seven cultivars of okra. The objective of the study was to judge the performance of different okra cultivars under Red and Laterite zone of West Bengal. The experiment was laid out in Randomized Complete Block Design with three replications. Observations were recorded on various growths (plant height, flowering, nodes per plant and internodal length) and yield attributes (fruits per plant, pod length and diameter, pod weight and fruit dry weight), and yield (yield per plant). Among the cultivars, significant variation in plant height was noted on 15, 30, 45 and 60 days after sowing. Ankur 40, Krishna and Japani Jhar were found early in flowering but only for one or two days. Ankur 40 (15.0) produced maximum number of fruits per plant followed by Priyanka (13.7). Priyanka (17.2g) followed by Awantika 10 (15.9g) produced maximum average pod weight. Priyanka excel other cultivars on yield per plant (238.8g).

Keywords: Cultivars, growth, okra, yield

Okra, ladies' fingers or bhendi, *Abelmoschus esculentus* (L.) Moench is cultivated in tropical, subtropical and warm temperate regions around the world. It is a good source of vitamin A, B, C and is also rich in protein, carbohydrates, fats, minerals, iron and iodine. The immature pods are used as vegetable and its dried form is often used as soup thickener. In India, the total area of cultivation of okra was 532.7 thousand hectare, production was 6346.4 thousand tonnes and productivity was 11.9 t ha⁻¹. West Bengal (14 per cent production share) is the leading state in okra production (877 thousand tonnes) and it also occupies the maximum area under cultivation (NHB, 2015). Okra is a major summer vegetable in Red and Laterite zone of West Bengal. It is grown almost year round except colder months. Farmers mostly save their own seed for cultivation of okra. However, old cultivars and poor seed quality often result poor yield and productivity. A good number of improved cultivars (both open pollinated and hybrids) of private seed companies are now available locally. Farmers are also taking interest for these new cultivars. Keeping the above points in mind, a research work has been formulated with the objective to judge the performance of some locally available cultivars to support the farmers in okra cultivation.

The field experiment was conducted in Horticulture Farm, Institute of Agriculture, Visva-Bharati, Sriniketan during summer, 2015 with seven cultivars of okra in Randomized Block Design with three replications under Red and Laterite Zone of West Bengal. The cultivars were Awantika-10 (F1), Krishna

(F1), Nilima (F1), Japani Jhar (open pollinated), Priyanka (open pollinated), Subarno (open pollinated) and Ankur-40 (open pollinated). The plot size was kept 4.5m² and plant spacing was given 45×30 cm. The sowing was done in second week of April, 2015. Five competitive plants of each variety and replications were selected for taking data. The observation was recorded on various growth (plant height, flowering, nodes per plant and internodal length) and yield attributes (fruits per plant, fruit length and diameter, fruit weight and fruit dry weight), and yield (yield per plant).

The cultivars were found significant with regard to the plant height at 15, 30, 45, and 60 DAS, days to 50 per cent flowering, internodal length, number of nodes per plant number of fruits per plant, pod length and diameter, pod weight and yield per plant. It indicated that the okra cultivars differ among each other for different traits. However, it was non-significant for plant height at 75 DAS and for fruit dry weight (per cent). The mean data on various studied traits have been presented in table- 1, 2 and 3.

Average plant height was increased in each successive days of data collection. At 15 DAS the cultivars were statistically at par, except for Subarna. Ankur 40 at 30 DAS, Ankur 40, Krishna and Japani Jhar at 45 DAS and Japani Jhar, Krishna and Nilima at 60 DAS showed the maximum plant height. Plant height at 75 DAS was noted statistically non-significant. Variation in plant height due to cultivar in okra was reported by Jeyapandi and Balakrishnan (1992), Hazra and Basu (2000) and Ramanjinappa *et al.* (2001).

Vegetative plant structures such as final plant height and internodes length had no connection to fruit yield, implying that selection for semi-dwarf plant structure would not disturb final plant yield season (Duzyaman and Vural, 2003). However, short to medium internodal length and more number of nodes per plant are desirable. It helps to get manageable plant height. Awantika 10

(4.8), Priyanka (5.0), Ankur 40 (5.1) and Krishna (5.5) gave relatively shorted internodal length. Singh *et al.* (2004) reported high phenotypic coefficient of variation for internodal length. On the other hand Ankur 40 (19.1), Priyanka (17.7) and Krishna (16.7) noted with maximum number of nodes per plant. Hazra *et al.* (2000) reported variation in nodes per plant in okra cultivars. Early flowering is desirable in vegetable crops.

Table 1: Plant height of different okra cultivars (cm)

Variety	Plant height (cm)				
	15 DAS	30 DAS	45 DAS	60 DAS	75 DAS
Subarna	5.5	19.6	43.7	74.1	98.6
Japani Jhar	7.1	25.5	59.5	92.2	111.2
Nilima	6.6	22.8	52.0	83.1	104.2
Krishna	7.0	26.6	60.6	92.1	103.0
Ankur 40	6.9	32.2	66.3	81.7	114.8
Priyanka	6.4	19.2	43.0	71.7	95.2
Awantika 10	7.0	26.5	56.4	77.2	101.1
Mean	6.6	24.6	54.5	81.7	104.0
SEd	0.4	2.3	3.4	4.8	7.6
LSD (0.05)	0.9	5.1	7.3	10.4	NS
CV (%)	7.9	11.6	7.5	7.2	8.9

Note: NS-non significant

Table 2: Flowering, internodal length and number of nodes per plant in okra

Variety	Days to 50% flowering	Internodal length (cm)	Number of nodes per plant
Subarna	43.7	6.2	16.3
Japani Jhar	42.0	6.1	15.3
Nilima	43.3	5.8	16.2
Krishna	41.7	5.5	16.7
Ankur 40	40.7	5.1	19.1
Priyanka	43.0	5.0	17.7
Awantika 10	43.7	4.8	14.5
Mean	42.6	5.5	16.6
SEd	0.6	0.4	1.2
LSD (0.05)	1.4	0.9	2.6
CV (%)	1.8	9.6	8.7

Days to 50 per cent flowering and days to maturity are most important traits for exploiting earliness, which are significantly associated (Dakahe *et al.*, 2007). Early flowering behaviour might also be integrated to local okras due to the high market prices in the early season (Duzyaman and Vural, 2003). On an average the crop took 42.7 days for flowering. Ankur 40 (40.7), Krishna (41.7) and Japani Jhar (42.0) were found early in flowering but only for one or two days. Fruits per plant and fruit weight are the direct and positive contributory characters to fruit yield due to their direct effects in okra (Balakrishnan and Balakrishnan,

1990; Jeyapandi and Balakrishnan, 1992). On an average the crop recorded 12.6 fruits per plant. Ankur 40 (15.0) followed by Priyanka (13.7) recorded maximum number of fruits per plant. Patil *et al.* (1996) and Hazra and Basu (2000) reported variation in fruits per plant among the cultivars. Priyanka (17.2 g) closely followed by Awantika10 (15.9 g) recorded maximum average fruit weight. Hazra and Basu (2000) and Mehta *et al.* (2006) reported variation in fruits weight among the okra cultivars. Maximum fruit length was noted in Priyanka (16.2 cm), Awantika 10 (16.1cm) and Ankur 40 (15.0). On the other hand, maximum fruit diameter

Table 3: Yield attributes and yield in okra

Variety	Number of fruits per plant	Pod length (cm)	Pod diameter (mm)	Average Pod weight (g)	Yield per plant (g)	Fruit dry weight (%)
Subarna	12.1	12.0	14.7	11.3	144.6	8.2
Japani Jhar	11.4	12.7	15.4	13.1	164.0	8.2
Nilima	11.9	12.6	15.1	13.6	178.6	7.5
Krishna	12.6	13.5	14.6	12.1	170.0	7.3
Ankur 40	15.0	15.0	14.5	13.5	208.6	8.3
Priyanka	13.7	16.2	16.4	17.2	238.8	7.3
Awantika 10	11.3	16.1	16.1	15.9	189.2	8.2
Mean	12.6	14.0	15.2	13.8	184.8	7.8
SEd	0.8	0.6	0.4	1.2	13.8	0.7
LSD (0.05)	1.7	1.3	0.8	2.6	30.0	NS
CV (%)	7.6	5.3	3.1	10.7	9.1	10.4

was noted in Priyanka (16.4mm) and Awantika 10 (16.1 mm). Fruit diameter positively affected total yield (Duzyaman and Vural, 2003). Higher yield per plant is highly desirable to achieve increased yield per unit area. Priyanka (238.8g) recorded maximum yield per plant and it was also statistically superior to other cultivars. Maximum fruit length, fruit diameter and fruit weight might help to achieve maximum yield per plant in cultivar Priyanka. Ankur 40 (208.6 g), Awantika 10 (189.2 g) and Nilima (178.6 g) were the next best cultivars with respect to yield per plant. Jeyapandi and Balakrishnan (1992), Hazra and Basu (2000) and Singh *et al.* (2004) reported variation in fruits yield per plant among the cultivars. The mean yield per plant was noted 184.8 g. Fruit dry weight percentage was found statistically at par. It may be concluded that open pollinated cultivar Priyanka is superior to other cultivars with respect to fruit yield. Another open pollinated cultivar Ankur 40 also performed well. These may be suggested to the local farmers for cultivation. Two hybrids Awantika 10 and Nilima may also be suggested to the farmers for cultivation.

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