

**Evaluation of okra [*Abelmoschus esculentus* (L.) Moench] hybrids for growth, yield attributes and yield**

**ARJUN LAL OLA\*, A.K. PANDEY, GAURAV SHARMA, MANEESH PANDEY, LAVLESH AND DEVESH TIWARI**

Rani Lakshmi Bai Central Agricultural University, Jhansi, Uttar Pradesh-284003

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**ABSTRACT**

The present experiment was carried out at RLBCAU, Jhansi with okra hybrids during summer season of 2020 to evaluate the performance of okra hybrids for growth and yield. Fourteen okra hybrids were evaluated in randomized block design with three replications. The results revealed that 50 % seed germination was observed in hybrid NS-7772. The highest plant height (133.7cm) was recorded in hybrid Somaya, while, highest number of nodes per plant (27.4) was observed in NOH-05. The minimum length of node (3.27cm) was noticed in SW 001. The maximum number of primary branches per plant (3.73) was noticed in hybrid NOH-1053. On the basis of yield attributes, the maximum pod length (12.4 cm), 10 pod weight (160.7g), yield per plant (461.2g) and yield (17.08 t ha<sup>-1</sup>) were observed in hybrid NS 7772.

**Keyword:** Evaluation, growth, hybrid, okra, yield

**INTRODUCTION**

Okra [*Abelmoschus esculentus* (L.) (Moench)], is an economically important vegetable crop grown in tropical and sub-tropical parts of the world. This crop is suitable for cultivation as a garden crop as well as on large commercial farms. In India, it is grown in 5.26 lakh hectare area with a production of 6460 lakh tons with productivity of 12.28 t ha<sup>-1</sup>. India has first position in area and production in the world (NHB, 2019-20). Okra has captured a prominent position among vegetables, being native of tropical Africa. It is commonly known as okra or lady's finger in India. Its tender green fruits are used for making vegetables. They are also sometimes marketed as canned or dehydrated. The antioxidant activity in okra is due to presence of vitamin A, B and C that prevents the oxidative damages by free radicals and also helps to reduce the aging process (Phisut *et al.*, 2013). Okra production and productivity is seriously affected by the use of low yielding local varieties, sub optimal plant density, heavy attack of insect pests, diseases and weeds etc. Most of the growers are cultivating the private sector hybrid varieties but they don't have knowledge about their performance and suitability to the particular agro-climatic zone. One of major problem in okra cultivation is the selection of low performing varieties due to which productivity in India is less as compared to other countries.

Higher production of this crop is possible by the cultivation of varieties or hybrids which show remarkable enhanced returns, compared to other cultivars grown at same climatic conditions and inputs applied. However, productivity could be improved through careful evaluation and selection of suitable okra varieties or hybrids based on location. Hence, the present investigation was carried out with an objective to find out the suitability of various okra hybrids from private sector to find out their suitability and also to study their performance with respect to evaluate the growth and yield parameters.

**MATERIALS AND METHODS**

The present investigation was carried out at Rani Laxmi Bai Central Agricultural University, Jhansi, (Uttar Pradesh) during summer- 2020. Experimental material comprised 14 okra hybrids, viz. NS -7772, Lucky Asha, Bhindi No. 10, Anmol, Maury No.1, Somaya, SW 001, Mona 002, NOH-05, SW 005, Suprim, SW 006, NOH-1053 and Indu. All the hybrids were evaluated in a randomized block design with three replications. After field preparation seeds were sown in well-prepared soil in lines with a distance of 45 cm in rows and plant to plant distance of 30 cm within the row. Recommended package of practices and need based plant protection measures were adopted. The data were recorded on five randomly selected plants

\*Corresponding author e-mail: arjunola11@gmail.com

from each plot on 50% germination, plant height (cm), number of nodes per plant, length of internodes (cm) number of primary branches, days to 50% flowering, number of pods per plant, pod length (cm), pod diameter (cm), 10 pod weights (g), yield per plant (g) and yield per hectare (t). The data obtained from selected plants were subjected to analysis of variance as per methods of Panse and Sukhamate (1961).

## RESULTS AND DISCUSSION

### Growth Characters

The results presented in Table 1 and 2 indicated the presence of significant variation for all the growth and yield parameters of the different hybrids of okra in Bundelkhand region. Days taken to 50% seed germination ranged from 3.2 to 4.8 (Table 1). The minimum days taken to 50% seed germination was found in hybrid NS-7772 (3.2 days) followed by Somaya

(3.7 days) while, the maximum days taken to 50% seed germination was observed in hybrid Suprim (4.8 days). The early seed germination in hybrid NS-7772 may be due to soft seed coat and good ability of the seed to adapt in the soil conditions and the other reason may be due to hard seed coat characteristic of other varieties except NS-7772. The results are in confirmation with the findings of Falusi *et al.* (2012) and Falodun *et al.* (2016). Significant differences were observed among the entries with respect to plant height. The plant height of okra hybrids at 90 DAS varied from 95.4 to 133.7 cm. Among the entries, significantly maximum plant height (133.7cm) at 90 DAS was recorded in Somaya, followed by NOH-1053 (132.4 cm). However, minimum plant height was observed in hybrid Indu (98.8 cm). The variation observed in different hybrids in the present study may be due to the genetic nature of the hybrids. Similar findings were reported by Chadha *et al.* (2014) and Singh *et al.* (2015).

Table 1: Mean performance of okra hybrids for growth and yield attributes under Bundelkhandregion

Treatment	50% germination (days)	Plant height (cm)	Nodes per plant	Length of nodes (cm)	Primary branches	50% flowering (days)
NS-7772	3.2	108.3	20.8	4.97	3.37	45.8
Lucky Asha	3.8	110.1	21.6	4.77	2.63	44.0
Bhindi No. 10	4.0	115.4	20.1	5.63	2.63	41.3
Anmol	3.9	119.1	21.6	5.10	2.43	42.1
Maury No.1	4.6	129.3	22.9	5.47	3.23	42.4
Somaya	3.7	133.7	21.8	5.93	2.60	40.7
SW 001	4.3	72.1	19.9	3.27	2.43	40.2
Mona 002	3.9	95.4	21.3	4.10	1.93	42.0
NOH-05	4.0	118.8	27.4	3.97	2.57	42.8
SW 005	4.5	124.7	22.6	5.30	2.67	44.0
Suprim	4.8	128.4	22.4	5.47	3.23	42.8
SW 006	4.2	126.7	24.0	4.93	2.77	41.3
NOH-1053	4.0	132.4	22.9	5.57	3.73	41.5
Indu	3.9	98.8	22.9	4.00	2.83	42.5
SEm±	0.17	4.05	0.96	0.22	0.13	1.88
CD (P=0.05%)	0.50	11.77	2.79	0.65	0.38	NS

Number of nodes per plant varied from 19.9 to 27.4 (Table 1). The maximum number of nodes per plant was reported in hybrid NOH-05 (27.4) followed by SW 006 (24.0) while, the minimum number of nodes per plant was observed in SW 001 (19.9). Inter-nodal length varied from 3.2 to 5.9cm. The minimum inter-nodal length was observed in SW 001 (3.2 cm) followed by NOH-05 (3.9 cm) whereas, the maximum inter-nodal length (5.9 cm) was reported in hybrid Somaya. The variation in

length of inter-nodes per plant might be due to specific genetic make-up of different hybrids and prevailing environmental condition (Reddy *et al.*, 2013).

The optimum number of primary branches per plant with upright behavior is considered as desirable trait in okra. Number of primary branches per plant varied from 2.43 to 3.73. The largest number of primary branches per plant was noticed in hybrid NOH-1053 (3.73) followed by NS-7772 (3.37). However, the lowest

number of primary branches per plant was observed in Anmol and SW 001 (2.43). This variation in number of primary branches per plant might be due to variation in plant height as well as photosynthetic ability of each genotype. The result from present study is in confirmation

with the findings of Nwangburuka *et al.* (2012), Singh and Jain (2012) and Reddy *et al.*, (2013). Days to 50% flowering varied from 40.2 to 45.8. The days to 50% flowering was found to have non-significant differences among all the hybrids under this study.

Table 2: Mean performance of okra hybrids for growth and yield attributes under Bundelkhand region

Treatment	Pod per plant	Pod length (cm)	Pod diameter (cm)	10 pod weight (g)	Yield per plant (g)	Yield (t ha <sup>-1</sup> )
NS-7772	28.7	12.4	1.57	160.7	461.2	17.08
Lucky Asha	28.0	12.4	1.71	159.7	447.1	16.56
Bhindi No. 10	26.6	11.8	1.68	136.3	362.5	13.42
Anmol	23.1	11.8	1.68	141.7	327.3	12.12
Maury No.1	24.4	11.8	1.57	144.3	352.0	13.04
Somaya	24.4	12.0	1.67	147.0	358.6	13.28
SW 001	22.0	12.2	1.56	149.3	328.4	12.16
Mona 002	22.7	11.4	1.70	144.0	326.8	12.10
NOH-05	23.0	10.7	1.51	150.3	345.6	12.80
SW 005	23.2	9.5	1.43	141.7	328.7	12.17
Suprim	30.2	8.1	1.50	140.7	424.9	15.73
SW 006	24.0	9.5	1.39	131.3	315.1	11.67
NOH-1053	22.3	10.9	1.41	139.3	310.6	11.50
Indu	23.8	9.8	1.42	135.7	322.9	11.96
SEm±	1.10	0.49	0.07	5.80	14.49	5.37
CD (P=0.05%)	3.19	1.42	0.19	16.85	42.13	15.61

### Yield attributes and yield

The data with respect to number of pods per plant showed significant differences among the hybrids under present study. Number of pods per plant varied from 22.0 to 30.2. The maximum number of pods per plant was recorded in Suprim (30.2) followed by NS-7772 (28.7), whereas, the minimum number of pods per plant was observed in SW 001 (22.0). The variation observed in the present study with respect to number of pods per plant may be due to genetic character of the hybrid or it may be due to the non-adoptability of the hybrid to the particular climate and soil condition. Similar results were observed by Saha *et al.* (2016). Pod length at marketable stage ranged from 8.1 cm to 12.4 cm (Table 2). The largest pod length at marketable stage was recorded in NS-7772 (12.4 cm) followed by Lucky Asha (12.4 cm). However, the smallest pod length at marketable stage was noticed in hybrid Suprim (8.1 cm). The variation in fruit length may be due to the varietal character of genotypes and also influenced by disease and insect pest attack. The results from the present investigation are supported by

Saifullah and Rabbani (2009). Diameter of pods varied from 1.39 cm to 1.71 cm and maximum value was reported in Lucky Asha (1.71 cm) followed by Mona 002 (1.70 cm), whereas minimum value was observed in SW 006 (1.39 cm). The maximum 10 pod weight was observed in hybrids NS-7772 (160.7 g) followed by Lucky Asha (159.7 g), whereas, minimum fresh weight was found in SW-006 (131.3 g). This variation might be due to differences in the vegetative growth of hybrids which leads to variation in photosynthesis and ultimately fruit weight, Saitwal *et al.* (2011) also reported more or less similar findings. Significant differences were observed among the entries with respect to yield. The yield of okra hybrids varied from 461.2 to 310.6 g plant<sup>-1</sup> and 11.50 to 17.08 t ha<sup>-1</sup>. Among the entries, significantly the highest pod yield per plant (461.2g) and pod yield per hectare (17.08 t) were recorded in the hybrid NS-7772 followed by Lucky Asha, while, the lowest pod yield per plant (310.64g) and pod yield per hectare (11.5 tonnes) were observed in hybrids NOH-1053. This might be due to high accumulation of photosynthates in fruits which is responsible for higher weight. The yield of fruit

per plant is directly related with high number of branches consisting of high number of nodes and number of fruits and fruit weight. Similar results were obtained by Simon *et al.* (2013) and Singla *et al.* (2018). The difference in pod yield in different hybrids may be due to difference in genetic make-up and also their adaptability for Bundelkhand agro climatic conditions. Similar results were reported by Phad *et al.* (2008).

On the basis of present study, it may be concluded that NS-7772 hybrid of okra was found superior in respect of pod per plant, pod length, 10 pod weight, pod yield per plant and pod yield as compared to other hybrids. Hence, this variety (NS-7772) may be recommended for the cultivation in Bundelkhand region of Uttar Pradesh.

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