



Effect of Sowing Time and Plant Spacing on Seed Production in Okra (*Abelmoschus esculentus* L.) in Madhya Pradesh

H M Singh¹, U S Mishra² and T S Mishra³

Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, Satna (Madhya Pradesh)

ABSTRACT

An experiment was conducted during rainy season to evaluate the effect of sowing time and plant spacing on the seed production of okra. The experiment was laid out in split plot design with three replications having four sowing times viz., 2nd week of June, 4th week of June, 2nd week of July and 4th week of July as main plot treatment and four spacing viz., 45 x 20 cm, 45 x 30 cm, 60 x 20 cm and 60 x 30 cm, were taken as sub-plot treatments. Thus, making a total of sixteen treatment combinations and parameters observed were plant height (cm) days to 50 per cent flowering, fruit set (%), number of fruit/plant, seed yield/ha, test weight (g), seed germination (%), and seed vigour Index 1. Thus, it was found that values for test weight, seed germination, seedling length and vigour index were more in 2nd week of June sown crop as compared to other sowing dates.

Key Words: Okra, Plant Spacing, Production, Seed, Sowing time.

INTRODUCTION

Okra (*Abelmoschus esculentus* L. Moench) is an important annual vegetable crop propagated through seed in tropical and sub tropical regions. It is grown mainly for its tender green fruits which are used as vegetable. A number of high yielding and good quality varieties are grown in the country; however supply of quality seed is problem. The seed production technology may vary among cultivars. Hence, there is a need to develop and standardize the technology for seed production of the important cultivars. Besides the environmental factors, the seed production in okra is influenced by sowing time and plant spacing. Therefore, the study was conducted to note down the effects of different sowing times and plant spacing on seed production of okra.

MATERIALS AND METHODS

The experiment was conducted at the Vegetable Research Farm, Faculty of Agriculture, Mahatma Gandhi Chitrakoot Gramodaya University, Chitrakoot, Satna M.P during rainy season to

evaluate the effect of sowing time and plant spacing on quality seed production of okra cv. Arka Anamika. The experiment was laid out in split plot design with three replications having four sowing times viz., 2nd week of June, 4th week of June, 2nd week of July and 4th week of July as main plot treatment and four spacing viz., 45 x 20 cm, 45 x 30 cm, 60 x 20 cm & 60 x 30 cm were taken as sub-plot treatments. Thus, a total of sixteen treatment combinations were tested.

RESULTS AND DISCUSSION

Growth parameters

The plant height (114.15 cm) was maximum in second week of June sown crop followed by last week of June (102.06 cm). The shortest plants (81.23 cm) were observed in last week of July sowing (Table 1). The plant density also had a significant effect on plant height. The tallest plants (105.63 cm) were observed at a spacing of 60x30 cm whereas, shortest plants (84.76 cm) were recorded at a spacing of 45x20 cm.

Corresponding Author's Email: hmsingh1983@gmail.com

¹National Horticultural Research and Development Foundation, Indore

²Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, Satna (M.P.)

³KVK West Kameng Arunachal Pradesh

Days to 50 percent flowering was recorded maximum (55.50) when crop was sown on last week of July, where as minimum number of days (50.25) was recorded in second week of June. It seems that decreasing temperature at the time of flowering increased the number of days to 50 percent flowering. Similarly, plant density also had a significant effect on 50 percent flowering. The highest fruit set (89.64 %) was recorded in second week of June sown crop, where as lowest fruit set (80.71 %) was recorded in last week of July sown. Maximum fruit set (89.16%) was recorded at a spacing 60x30 cm followed by 45x30 cm. The number of fruits/plant were highest (18.65) in second week of June sowing which was significantly superior to other sowing times. The lowest number of fruit (11.72) were recorded when crop was sown in last week of July. Plant density also influenced number of fruits per plant significantly. The number of fruits per plant (16.73) was recorded maximum at a spacing of 60x30 cm, while minimum (12.69) were recorded at 45x20 cm spacing. This might be due to availability of more feeding area in terms of nutrients and light to plants in comparison to plants at closer spacing's. Singh *et al* (1988) also observed maximum plant height, number of fruits per plant and number of seeds per fruit in 15 or 20th June sown crop.

The maximum seed yield per plant (69.80 g) was recorded in second week of June sown crop. This may be due to more number of flowers, number of fruits, number of branches and number of seeds per fruit and per plant in second week of June sown crop. The seed yield per plant was recorded minimum (35.91 g) in last week of July sowing. Plant density also influenced seed yield per plant significantly. Per plant seed yield (63.24 g) was observed maximum under 60x30 cm plant spacing. However, the minimum seed yield (36.46 g) was recorded at 45x20 cm spacing.

The highest seed yield (18.61q) per hectare was observed in second week of June sown crop, which proved to be statistically superior over all other sowing dates. Because all the growth and yield

attributing characters directly or indirectly favored the total seed yield in second week of June sown crop followed by last week of June sown crop. The lowest seed yield per hectare (8.52q) was observed in last week of July sowing. Higher seed yield of okra in June sown crop has been reported by Yadav *et al* (2001). Plant density also had a significant effect on seed yield per hectare. Seed yield was recorded highest (15.57q) at 60x30 cm spacing compared to other spacing's. These findings were similar to those of Sharma and Gupta (2005) who have observed higher seed yield 60x30 cm spacing in comparison to closer and wider spacing.

Quality parameters

The seed harvested from plants sown in second week of June had the highest test weight (64.31 g) and was found to be significantly superior over other sowing dates (Table 1). Plant density also had significant difference on test weight. Higher values of standard germination were observed in early crop sown on second week of June (75.73 %), which was significantly superior to all other dates of sowing. Lowest germination (70.98 %) was observed in last week of July sown crop. Similarly plant density also had significant effect on standard germination percentage. The crop sown at 60 x 30 cm spacing proved better than closer spacing. Similar findings were reported by Singh and Gill (1988). The vigour index-1 is a function of germination and total seedling length (root + shoot) which indicated that the highest value of vigour index (1345.66) was observed in second week of June sown crop, which was significantly higher than all other dates of sowing. Plant density also had significant effect on vigour index-1. The highest value of vigour index-1 (1348.93) was recorded at a spacing of 60 x 30 cm and it was significantly superior to all other plant spacing. The lowest vigour index value (1076.69) was recorded under 45 x 20 cm plant spacing. Yadav *et al* (2001) reported higher value for test weight, standard germination, seedling length and vigour index in second week of June sown crops as compared to other sowing dates.

Seed Production in Okra

Table 1. Effect of sowing time and date of planting on growth and quality characters of okra seed crop.

Sowing time	Plant Height (cm)	Days to 50% flowering	Fruit set (%)	No. of fruit/plant	Seed yield/plant (g)	Seed yield (q/ha)	Test weight (g)	Standard germination (%)	Seed vigour Index-1
2nd week of June	114.15	50.25	89.64	18.65	69.80	18.61	64.31	75.73	1345.66
4th week of June	102.06	52.00	87.90	15.27	54.37	15.57	62.64	73.83	1266.19
2nd week of July	88.35	53.75	84.04	13.00	41.91	11.59	60.74	72.40	1189.73
4th week of July	81.23	55.50	80.71	11.72	35.91	8.52	59.60	70.98	1123.90
CD at 5 %	1.07	0.92	0.88	0.45	1.71	0.49	0.49	0.79	61.15
Spacing, cm									
45 x 20	84.76	55.00	82.53	12.69	36.46	12.06	57.13	70.67	1076.69
45 x 30	103.92	52.25	86.66	15.51	57.72	13.94	64.62	73.86	1301.86
60 x 20	91.50	53.75	83.95	13.72	44.58	12.74	60.12	72.87	1198.00
60 x 30	105.63	50.50	89.16	16.73	63.24	15.57	65.41	75.54	1348.93
CD at 5 %	1.04	1.70	1.28	0.56	3.05	1.29	1.29	0.53	48.73

CONCLUSION

The plant height (114.15 cm) was maximum in second week of June sown crop. The highest fruit set (89.64 %) was recorded in second week of June sown crop, Maximum seed yield per plant (69.80 g) was recorded in second week of June sown crop. The highest seed yield (18.61q) per hectare was observed in second week of June sown crop, which proved to be statistically superior over all other sowing dates. The second week of June had the highest test weight (64.31 g) and was found to be significantly superior over other sowing dates. Plant density also had significant difference on test weight. Higher values of standard germination were observed in early crop sown on second week of June (75.73 %). The highest value of vigour index-1 (1348.93) was recorded at a spacing of 60 x 30 cm and it was significant superior to all other plant spacing. Thus on the basis of higher value for test weight, standard germination, seedling length and vigour index in second week of June sown crops as compared to other sowing dates.

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Received on 22/11/17

Accepted on 25/12/17