SHORT COMMUNICATION

EFFECT OF NITROGEN PHOSPHORUS AND SPACING ON GROWTH AND YIELD OF OKRA

A.K. Sharma*[1], D.K. Sharma[2], M. Kumar and R. Kumar[3]

[1]*Deptt. of Horiculture, J.V.C. Baraut, Baghpat*
**Deptt. of microbiology, C.C.S. Univ. Meerut*
[2]*Deptt. of microbiology, J.V.C. Baraut, Baghpat*
[3]*Deptt. of Hort.A.S.C. Lakhaoti , BSR*

Received-06.08.2015, Revised-14.08.2015

Abstract: An experiment was conducted to determine the effect of nitrogen phosphorus and spacing on growth and yield of okra. It revealed that application of 85 kg/ha. Nitrogen and phosphorus 60 kg/ha. produced significantly maximum plant height, internodes length, diameter of fruit and green fruit yield compared to 60 kg/ha, 35 kg/h and 40 kg/ha and 20 kg/ha phosphorus. The population responded significantly to spacing 60x30 cm and higher plant height, diameter of fruit, leaf length, width, weight per fruit highest recorded. But spacing of 30x30 cm length of inter node and green fruit per hectare were recorded. The green fruit yield could be economical and profitable with application 85 kg/ha and 60 kg phosphorus when planted 30x30 cm spacing of okra in western Uttar Pradesh condition.

Keywords: Nitrogen, Phosphorus, Effect, Growth, Okra

INTRODUCTION

Okra is annual vegetable crop in tropical and subtropical regions of the world. It is belongs to malvaceae family. Okra is one of the most important vegetable crops grown for its green fruits for vegetable purpose. It's more remunerative than the fresh leafy vegetable. Tender green fruits are cooked in curry. The root and stem are useful for clearing cane juice in preparation of jaggery. Okra fruits control goiter due to high iodine content, it is also used in manufacture of paper and cardboard. Consumable unripe okra fruit are source of carbohydrate, phosphorus, calcium protein, carotene, thiamine riboflavin niacin and vitamins C. Hence, the present study was conducted to study the combined effect of nitrogen, phosphorus and spacing levels on the growth and green fruit yield of in western Uttar Pradesh condition. The balance nutrition and optimum plant spacing are two important tools for obtaining higher fruits yields but the information on these two aspects of okra are meager. Therefore efforts were made to find out optimum and balanced fertilizer doses with suitable spacing for this okra variety.

MATERIAL AND METHOD

The field experiment was conducted at horticulture research farm A. S. College, Lakhaoti, Bulandshahr, UP. The experiment was laid out in a randomized block design with three level of nitrogen 60 kg (normal dose), 85 kg (normal dose +25) and 35 kg (normal dose -25 kg), three level of phosphorus viz. 40 kg (normal dose) 60 kg (normal dose+20 kg) and 20 kg (normal dose -20 kg) with three spacing (60x30 cm, 45x30 cm and 30x30 cm). Certified seeds of okra variety Pusa sawani procured from the national seed corporation (NSC) Ltd. New Delhi. Seeds were sown in Rabi season. The doses of nitrogen was applied in three Installment, half at the time of sowing as a basal dose, one fourth 30 days after sowing (DAS) as a first top dress and remaining one fourth of nitrogen was applied at the time of flowering as a second top dress. Phosphorus was applied as basal dressing through single super phosphate. Other intercultural operations were done time to time and data (Pool) were analyzed statically. The observations on fruiting and yield parameters were recorded by routine methods. The observations were recorded on the five randomly selected plants in each treatments plot.

RESULT AND DISCUSSION

Data showed that an application of 85 kg N/ha produced significantly maximum height of the plant (71.22 cm) followed by 60 kg N/ha (65.24 cm) and 35 kg N/ha (64.45 cm) respectively. Rastogi *et.al.* (1987), Hooda *et.al.* (1980) and Fageria *et.al.* (1992) also reported highest growth with higher dose of nitrogen. Maximum dose, phosphorus 60 kg/ha was significantly superior height of plant (67.57 cm) a followed by 40 kg P_2O_5 (65.73 cm) and 20 kg P_2O_5/ha (64.65 cm) respectively. In treatments a spacing of 60x30cm recorded maximum plant height and it was significantly superior to 45x30 cm 30x30 cm spacing. The results are accordance with finding of Hooda *et.al.* (1980). Okra crop which received higher nitrogen 85 kg/ha (43.12) and 60 kg P_2O_5 /ha (44.25) took minimum number of days to 50% flowering compared to 60 kg N/ha (45.61) and 40 kg P_2O_5/ha (45.56) and 35 kg N/ha (47.12) and 20 kg P_2O_5 (46.05) followed by respectively. Plants grown under various spacing did not significantly differ in

*Corresponding Author

respect of number of days for 50 % flowering in the years of experimentation.

Higher dose of nitrogen (85 kg/ha) produced significantly maximum length of internodes (3.32 cm) followed by 60 kg N/ha (2.83 cm) and 35 kg N/ha (2.32 cm) respectively. Maximum dose of phosphorus 60 kg/ha produced maximum length of internodes (3.02 cm) followed by 40 kg/ha (2.83) and 20 kg/ha (2.61) respectively. In closer spacing of 30x30 cm recorded maximum length of internodes (2.49 cm) followed by 60x30 cm (2.80 cm) and 45x30 (2.73 cm).

Highest rate of nitrogen and phosphorus application 85 kg/ha and 60 kg length of fruit (14.70 cm), (13.90 cm) followed by 60 kg N/ha (13.26 cm), 35 kg N/ha(11.64cm) and 40 kg P_2O_5/ha (13.26 cm) and 20 kg P_2O_5/ha (12.43 cm). Wider spacing 60x30 cm recorded maximum length (13.41cm) fruit length and was superior to 45x30 cm (13.28 cm) and 30x30 cm (13.10 cm) respectively.

Table 1. Effect of Nitrogen Phosphorus and spacing on growth and yield of okra (at the edible stage)

Treatments	Plant *height	Days to 50% flowering	Length of internodes (cm)	No.of node which Ist flowering	Diameter of fruits (cm)**	Lengthof fruits (cm)**	weight /fruit** (g)	Green fruits yield q/ha
Level of Nitrogen Kg/ha								
Normal dose(60)	65.24	45.61	2.83	3.91	1.71	13.27	7.32	88.56
Normal dose(60) +25	71.22	43.12	3.32	4.53	1.93	14.70	8.82	112.20
Normal dose(60) -25	61.45	47.12	2.32	2.96	1.39	11.64	5.92	63.14
CD at 5%	2.11	1.02	0.06	0.08	0.05	0.30	0.19	13.86
Level of Phosphorus Kg/ha								
Normal dose(40)	65.73	45.56	2.83	3.81	1.69	13.26	7.17	86.37
Normal dose(40)+20	67.57	44.25	3.02	4.11	1.81	13.90	7.99	97.82
Normal dose(40)-20	64.65	46.05	2.61	3.48	1.52	12.43	6.86	80.13
CD at 5%	2.11	1.03	0.06	0.08	0.05	0.30	0.19	13.86
Level of Spacing (cm)								
60 x30	66.33	45.73	2.80	3.62	1.71	13.41	7.46	61.67
45 x30	65.87	44.99	2.73	3.53	1.66	13.28	7.41	82.54
30 x30	65.74	45.13	2.94	4.25	1.62	13.10	7.13	120.10
CD at 5%	NS	NS	NS	0.08	0.05	0.30	0.19	13.86

* = 80 Days after sowing

**= at the edible stage

The highest rate of nitrogen application 85 kg N/ha produced maximum diameter (1.93 cm) of fruits followed by 60 kg N/ha (1.71 cm) these were significantly superior to 35 kg/ha (1.39 cm) with increase rate nitrogen application there was increased fruits diameter.

Diameter of fruits affected significantly by phosphorus. Higher dose of phosphorus application 60 kg/ha produced maximum fruits diameter (1.81cm) followed by 40 kg P_2O_5/ha (1.69 cm) and 20 kg P_2O_5/ha (1.52cm) respectively. In wider spacing of 60x30 cm recorded maximum fruit diameter (1.71 cm) and it was superior to 45x30 cm (1.66 cm) and 30x30 cm (1.62).similar result were also reported by Pandey *et.al* (1976). The maximum weight per fruit (8.82 g) were recorded 85 kg N/ha followed by 60 kg N/ha (7.32 g) and 35 kg N/ha (5.92) respectively. Wider spacing 60x30 cm recorded maximum weight per fruit (7.46 g) and superior to 45x30 cm (7.41 g) and 30x30 cm (7.13g) respectively. The highest rate of phosphorus application (60kg/ha) produced maximum weight per fruit (7.99 g) followed by 40 kg P_2O_5/ha. (7.17 g) and both were significantly superior to 20 kg P_2O_5 /ha (6.86 g) .With increase in rate of phosphorus application the weight was increased per fruit.

The highest rate of nitrogen application 85 kg/ha produced maximum green fruits yield (112.20 q/ha) followed by 60 kg N/ha (88.56 q/ha) and both were significantly to superior 35 kg N/ha (63 kg/ha). The result has been also reported by Gandhi *et.al.* (1990), Hooda *et.al*. (1984) Mani *et.al.* (1981).

Maximum green fruit yield per hectare was recorded when 60 kg P_2O_5 /ha (97.822) was applied and it was significantly superior to 40 kg P_2O_5/ha (86.67q/ ha) and 20 kg P_2O_5/ha (80.13 q/ha).similar result were also reported Mani *et.al* (1981), Hooda *et.al.* (1980), Sharma *et.al.* (1973) and Singh *et.al.* (1967). Increase in rate of nitrogen and phosphorus application the fruit yield was increased. In closer spacing of 30x30 cm recorded highest green fruit yield and it was significantly superior to 45 x30 m (82.54 q/ha) and 60x30 cm (61.67 q/ha) spacing ,due to more plant in 30x30 cm unit area compared to 45x30 cm and 60x30 cm spacing. These result were also reported by Randhawa (1967), Pandey *et. al.* (1979) Khan and Jaiswal (1988).

REFFRENCES

Hooda, R.S; Pandita, M.L. and Sindhu, A.S. (1980). Studies on the effect of nitrogen and phosphorus on growth and green pod yield of okra *(Abelmoschus esculentus*). Haryana J. Hort. Sci. 9 (3-4) 180-183.

Pandey, UC.Pandit, M.L Lal and Singh Kirti (1976) Effect of Spacings and Green fruit pickings in okra. Veg. Sci . (2) : 97-102.

Fageria, MS; Arya, P.S; Kumar, J. and Singh, A.K. (1992) Effect of sowing of dates and nitrogen

levels on growth and seed yield of okra (*Abelmoschus esculentus* var. pusa sawani). Veg. Sci. 19 (1) : 25-29.

Mani, S. and Ramanathan, K.M. (1980) Effect of N and K on the yield of bhindi fruit south Indian hort. 28 : 136-138**.**

Mishra, H.P. and Pandey, R.G. (1987) Effect of N and K on the seed production of okra (*Abelmoschus esculantus* (L) in calcareous soil. Indian J. Argon. 32 : 425-427.

Pandey, U.C. and Singh I.J. (1979) Effect of nitrogen plant population and soil moisture regimes on the seed production of okra (*Abelmoschus esculantus* (L) moench). Veg. Sci. 6 : 81-91.

Sarnaik, D.A; Baghel, B.S. and Singh, K. (1986) Response of okra seed crop to major nutrients. Res & dev. Rep. 3 (2) : 10-12.

Khan, A.R. and Jaiswal, R.C. (1988). Effect of nitrogen spacing and green fruit pickings on the seed production okra.(*Abelmoschus esculantus* (L) moench). Veg. Sci. 15(1) : 814.

Randhawa, G.S. (1967) Growth and development of okra. (*Abelmoschus esculantus* (L) moench) as influenced by time of sowing and row spacing. J. Res. P. A. U. Ludhiana. 4 : 365-369.

Singh, Hari and Gill, S.S. (1988) Effect of time of sowing and spacing on seed yield of okra. (*Abelmoschus esculantus* (L) moench). J. Res. P. A. U. Ludhiana. 25 (1) : 44-48.

Sharma, C.B. and Shukla V. (1988) Nature of response of okra to nitrogen phosphorus and potassium application and their economic optma. Indian J. Agric. Sci. 43 (10) : 930-933.