Indian J. Hort. 67(Special Issue), November 2010: 477-478

Short communication

Effect of nitrogen, phosphorus and bio-fertilizer (*Azotobacter)* on growth, yield and quality of okra

P.K. Singh*, D.R. Singh and Ved Byas Singh
P.G. Department of Horticulture, P.G. College, Ghazipur 233001

The okra or Lady's finger (*Abelmoschus esculentus* (L.) Moench) is of old world origin. Somewhere in the African continent. There are 38 species of the genus *Abelmoschus*. It is an important vegetable crop grown in summer and rainy seasons throughout India.

The root and stem are used for clarification of sugarcane juice before it is converted into Jaggery and brown sugar. The medicinal properties of okra are associated with genitro-urinary disorders, spermatorrhoea and chronic dysentry. Okra is grown for its green, tender and nutritive fruits which are used for canning and freezing despite the use as vegetable. Okra produces fruits continuously for a longer period, therefore, it requires excess and regular supply of nutrients for obtaining regular picking. An attempt has been made to know the effect of nitrogen, phosphorus and biofertilizer (*Azotobacter)* on growth yield and quality of okra.

The experiment was laid out in randomized block design (RBD) with three replication comprising of two levels of nitrogen (N_1=40 kg/ ha, N_2=60 kg/ha), two levels of phosphorus (P_1=40 kg/ ha, P_2=60 kg/ha) and two levels of *Azotobacter* (B_0= no *Azotobacter*, B_1= Treated with *Azotobacter*) during summer season, 2008-09 at Horticulture Farm, Post Graduate College, Ghazipur, U.P., India. In the present experiment the average plant height was recorded to be 57.84 cm by applying 60 kg

Table 1. Effect of nitrogen, phosphorus and bio-fertilizer (*Azotobacter)* on growth, yield and quality of okra.

Treatments	Plant height (cm)	Number of leaves/ plant	Number of branches/ plant	Green pod weight/ plant	Number of green pod/ plant	Pod length/ plant	Fruit yield (q/ha)
$N_1P_1B_0$	55.10	11.57	0.40	76.00	7.13	11.67	68.67
$N_1P_1B_1$	56.10	12.03	0.40	80.00	7.40	11.80	72.56
$N_1P_2B_0$	56.23	12.13	0.47	84.33	7.67	12.17	75.69
$N_1P_2B_1$	57.75	12.33	0.60	87.67	8.13	12.47	81.25
$N_2P_1B_0$	57.17	12.37	0.60	91.00	8.60	13.13	87.44
$N_2P_1B_1$	57.90	12.77	0.73	93.33	9.00	13.57	93.81
$N_2P_2B_0$	57.80	12.83	0.80	96.00	9.67	13.87	100.20
$N_2P_2B_1$	58.53	13.03	1.20	99.00	9.00	14.03	106.66
CD at 5%	1.979	0.609	0.164	2.128	0.234	0.246	44.462
Nitrogen levels							
N_1	56.30	12.02	0.47	82.00	7.58	12.13	74.51
N_2	57.84	12.90	0.83	94.83	9.28	13.65	97.15
CD at 5%	0.989	0.304	0.082	1.064	0.177	0.123	22.23
Phosphorus levels							
P_1	56.57	12.18	0.53	85.08	8.03	12.54	80.69
P_2	57.58	12.58	0.77	91.75	8.83	13.13	90.93
CD at 5%	0.989	0.304	0.082	1.064	0.177	0.123	22.23
Azotobacter levels							
B_0	56.58	12.23	0.57	86.83	8.27	12.71	83.08
B_1	57.57	12.54	0.73	90.00	8.60	12.97	88.57
CD at 5%	0.989	0.304	0.082	1.064	0.177	0.12	22.23

*Corresponding author's E-mail:

N/ha and recorded 57.58 cm. by application of 60 kg P/ ha while 40 kg N/ha and 40 kg P/ha dose produced 56.30 cm and 56.57 cm. plant height respectively. Number of branches, pod length, pod weight and number of pod/ plant also were positively affected by 60 kg N and 60 kg P/ha against lower doses. This finding is similar to findings of Bharadiya, (1), Manga *et al.* (3).

The effect of interaction between nitrogen and phosphorus on growth characters like number of branches/plant, weight of pod, number of green pods and fruit yield q/ha was very positive. The similar findings have been reported by Shanke *et al.* (1998). In the present study, maximum height of plant, number of leaves/plant and number of branches/plant at various intervals (30, 45 and 60 days after sowing), number of green pods per plant, length of pods (cm)/plant and weight of pod/plant were obtained when inoculation of *Azotobacter* was used and it was found to be significantly superior over control.

As stated above the treatment by biofertilizer (*Azotobacter*) has also produced significant effect on number of leaves. The number of leaves was recorded to be 12.54 by use of *Azotobacter* (B_1), while only 12.23 number of leaves could be recorded under control. These findings are very similar to many other investigations. Nawalker *et al. (*4) have reported almost identical findings.

In the present experiment the result was very positive in effectiness affecting yield attributes and yield. The fruit yield was recorded to be 88.57 q/ha applying *Azotobacter* (B_1), while only 83.08 q/ha fruit yield reached without *Azotobacter*(B_0). These findings are very similar to many other investigators. Patil *et al.* (5) and Ganesh *et al.* (2) has reported similar results.

In the present experiment the interactions between nitrogen and phosphorus produced significant variations in may attributes but the interaction between nitrogen, phosphorus and biofertilizer produced increasing values in all the vegetative and yield attributes but the variation was however, nonsignificant. The highest yield was produced by N2P2B1 (The highest values of treatments) which was 106.66 q/ha while the yield recorded by N2P2B0 combination was only 100.20 q/ha. It may be concluded from the findings of present experiment that combined effect of nitrogen, phosphorus and biofertilizer treatment is superior over the combination where no biofertilizer was used.

REFERENCES

1. Bharadiya, P.S., Kalalbandi, B.N. and Shinde, V.N. 2007. Effect of inorganic and organic fertilizers on growth and yield of okra. *Asian J. Hort.* **2**: 199-201.
2. Ganeshe, R.K., Pandey, R.P. and Rawat, A.K. 2006. Comparative performance of biofertilizers and chemical nitrogen on the yield of okra okra [*Abelmoschus esculentus* (L.) *Moench*].
3. Manga, A.A. and Mohammed, S.G. 2006. Effect of plant population and nitrogen level of growth and yield of okra [*Abelmoschus esculentus* (L.) *Moench*]. *Advances in Hort, Sci.* 2**0**: 137-39.
4. Nawalkar, L.R., Khiratkar, S.D., Badge, S.A., Copde, N.K. and Dadgal, S.S. 2007. Effect of biofertilizers and growth regulator with reduce dose of NPK on growth and yield of okra. *J. Soil Crops* **7**: 145-49.
5. Patil, M.B., Jogdand, S.D. and Jadhav, A.S. 2000. Effect of organic and biofertilizers on yield and quality of okra. *J. Maharashtra Agric. Univ.* **25**: 213-14.

Received: February, 2010; Revised: May, 2010
Accepted: August, 2010