

Effect of NAA on Growth and Yield of Brinjal (*Solanum melongena* L.)

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Abstract

The investigation was carried out during the *rabi* season of 2008-2009. The field trial included two factors namely, genotypes (Punjab Barsati and ABH-1) and NAA levels (control, 30, 50 and 70 ppm), replicated three times and was laid out in a factorial randomized block design. The observations were recorded on 10 parameters like height of plant, number of branches, number of fruits per plant, fruit length, fruit diameter, average fruit weight, weight of seeds per fruit, number of seeds per fruit, fruit yield per plant, fruit yield per hectare. The yield increased by about 30% with application of NAA (50 ppm) under field condition. Application of 50 ppm NAA and genotype Punjab Barsati was found to be better. On the basis of these results, it can be suggested that NAA has beneficial role on growth and yield of brinjal.

Key words : Brinjal, NAA (naphthalene acetic acid), Growth, Yield.

Brinjal or eggplant (*Solanum melongena* L. 2n = 24) is a vegetable from Solanaceae family that has originated from warm India and China regions (1). It is the third most important vegetable crop after potato and onion and contributes a share of 9.4% of the total production of vegetables in the country. It is a heavy yielder and high remunerative crop but sometimes grower suffer with recurring economic loss due to poor plant vigor, low fruit setting and small fruit size. In general, under arid ecosystem the productivity of brinjal is low due to prevailing edapho-climatic constraints. Therefore, besides varieties evaluation standardization of location specific approach is essential to improve the productivity of brinjal. However, use of plant growth regulators like NAA (naphthalene acetic acid) have been found beneficial in improving growth, fruit set, fruit development, yield of various Solanaceous vegetable but efficacy vary with the climatic condition. So crops give good response to use of chemicals like NAA. Synthetic auxin analogs include naphthalene acetic acid (NAA), 2, 4-dichlorophenoxyacetic acid (2, 4-D), and others. Due to heavy rise in the price of chemical fertilizers and also to maintain the eco-system of soil, it has become necessary to use eco-friendly chemical like NAA. The specific quantity in the plants is directly respon-

sible for the promotion, inhibition or otherwise modification in the physiological processes. It is obvious that the growth is directly related to the yield. The brinjal flowers can be stimulated for fruit development by applying plant growth regulators such as NAA on to the flowers and fruit setting can be induced before flower pollination. This leads to the assumption that pollination leading to fruit and seed formation is associated with production of endogenous growth regulators such as auxins. There are many methods adopted to increase the yield of the crops which comprise mainly of cultural and chemical practices. These techniques have been successfully exploited by many to increase the yield of brinjal. Hence, the present studies were carried out at the Vegetable Research Farm, Department of Horticulture, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi (UP) to assess the influence of growth and yield with varied levels of NAA.

Methods

The investigation was carried out at the Vegetable Research Farm, Department of Horticulture, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi (UP), during the *rabi* season of

Table 1. Effect of different treatment combinations of NAA on various characters of brinjal varieties.

Treatments	Plant height (cm)	Number of branches	Number of fruits per plant	Fruit length (cm)	Fruit diameter (cm)	Average fruit weight (g)	Weight of seeds	Number of seeds per fruit	Fruit yield per plant (kg)	Fruit yield per hectare (q/ha)
V1N0	50.33	8.63	8.53	15.16	4.14	70.22	0.47	597.23	625.74	271.18
V1N1	51.28	8.83	10.03	16.27	4.15	72.32	0.47	604.83	725.83	279.43
V1N2	52.84	9.80	10.56	17.19	4.49	71.20	0.49	647.80	753.02	328.40
V1N3	52.53	9.40	9.57	15.50	4.42	70.35	0.50	602.23	675.30	277.93
V2N0	65.30	9.03	7.63	15.81	5.10	88.86	0.45	454.66	678.64	275.70
V2N1	68.04	8.86	8.23	16.11	4.55	89.84	0.49	459.40	739.65	254.63
V2N2	69.29	8.30	8.80	17.21	5.04	91.17	0.45	472.13	867.59	279.89
V2N3	67.67	8.24	10.31	16.75	4.52	91.65	0.46	461.93	945.01	257.69
SE \pm	0.46	0.28	0.51	0.35	0.22	0.48	33.03	0.01	76.19	3.80
CD at 5%	1.34	0.83	NS	1.02	0.64	1.38	94.75	NS	218.52	10.92

2008-2009. Geographically, Varanasi falls under humid sub-tropical climate and is located between 25°15' North latitude and 60°3' East longitude about 129.3 meters above mean sea level. The treatment consisted of four levels of NAA (30, 50 and 70 ppm) along with control. Thus eight treatment combinations were put in factorial randomized block design with three replications. Brinjal genotypes (Punjab Barsati and ABH 1) were taken as test crop. A basal dose of 25 tons / FYM was applied one week before transplanting the seedlings at the time of field preparation. Application of total doses of phosphorus and potash at 60 kg/ha each along with 1/2 N, 60 kg/ha was applied before transplanting. The observations were recorded on five randomly selected plants in each treatment. The data were recorded on ten parameters like height of plant, number of branches, number of fruits per plant, fruit length, fruit diameter, average fruit weight, weight of seeds per fruit, number of seeds per fruit, fruit yield per plant, fruit yield per hectare. The data were analyzed statistically following the standard procedure (2).

Results and Discussion

The result revealed significant effect of various treatments on all characters (Table 1). Spray of NAA resulted in maximum plant height (63.29 cm) obtained in V₂N₂ which was at par with V₂N₁ (68.04 cm) while it was recorded minimum (50.33 cm) in V₁N₀. The increase in plant height was due to fact that NAA promotes vegetative growth by active cell division and

cell elongation (3). In the present investigation, the numbers of branches per plant were increased significantly with spray of NAA. It was increased upto 50 ppm with NAA and had detrimental effect on the number of branches per plant. At final stage of sampling, maximum number of branches per plant (9.80) was obtained in case of V₁N₂. The difference among themselves as well as over the control were highly significant. In fact, fruit bearing in brinjal takes place in the axil of leaves on the nodes. More number of branches intend to more number of nodes and ultimately probability of better fruiting. The results are in conformity with Dod et al. (4).

Table 1 reveals that there was significant increase in number of fruits per plant, fruit length (cm), fruit diameter (cm), average fruit weight (g), weight of seed per fruit (g), number of seeds per fruit and total yield of marketable fruits with the spray of NAA 50 ppm as compared to control. The maximum number of fruits per plant (10.56) was registered by treatment combination V₁N₂ and maximum fruit length was recorded by V₂N₂ (17.21 cm), while least fruit weight, fruit length and number of fruits were recorded with control. The maximum fruit diameter recorded in treatment combination V₂N₂ (5.04 cm) while, average fruit weight (91.65 g) was recorded highest with treatment combination V₂N₃ followed by V₂N₂ (91.17 g) were recorded with spray of NAA 50 ppm followed by control. The various treatments of NAA significantly increased number of seeds per fruit. Maximum (647.80) number of seeds per fruit were recorded in treatment combination V₁N₂, while it is minimum (454.66) under control

V_1N_0 . Data recorded on weight of seeds per fruit under varying treatments indicated that there was variation in weight of seed due to different treatments. Maximum (0.50 g) weight of seed was exhibited under combination V_1N_3 of NAA and minimum (0.45 g) weight of seed with control V_2N_0 . Observation recorded in respect of yield of fruits that is significantly affected by different treatments of NAA. Maximum fruit yield per plant (753.02 g) was recorded with treatment combination V_1N_2 while it was minimum (625.74 g) with V_0N_0 control. The yield was increased considerably by application of different treatments of NAA. The combination V_1N_2 gave the highest yield (368.40 q/ha) while, lowest yield was obtained with the treatment combination of V_2N_3 (257.69 q/ha). From the result it is obvious that the number of fruits per plant had greater influence on the yield attributing traits and was due to the improvement in the level of carbohydrates owing to greater photosynthesis and ultimately increased fruit size, weight and yield (5). The results of Chauhan et al. (6) and Meena and Dhaka (7) in brinjal are in complete agreement with the present study.

Conclusion

Thus there was an increase in vegetative growth, flowering, and yield characters with NAA application. The yield increased by about 30% with

application of NAA (50 ppm) under field condition. Application of 50 ppm NAA and genotype Panjab Barsati was found to be better. On the basis of these results, it can be suggested that NAA has beneficial role on growth and yield of brinjal.

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