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# Response of plant growth regulators and micronutrients on growth and yield in okra (*Abelmoschus esculentus* L. Moench)

**Shivaleela, K Deepika, Radhika, AR Tummod and Pawar AA**

**Abstract**
The present investigation on "Response of plant growth regulators and micronutrients on growth and yield of okra (*Abelmoschus esculentus* L. Moench)" was undertaken at the experimental field, Department of Horticulture, College of Agriculture, V.N.M.K.V, Parbhani, during *Summer* 2021. The experiment was laid out in randomized block design (RBD) with three replications by using cultivar Parbhani Kranti. It comprised 13 treatments $T_1$ ($GA_3$ 100 ppm at 45 DAS), $T_2$ (NAA 100 ppm at 45 DAS), $T_3$ ($GA_3$ 100 ppm at 30 DAS), $T_4$ (NAA 100 ppm + CCC 750 ppm at 45 DAS), $T_5$ ($GA_3$ 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS, $T_6$ (NAA 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS, $T_7$ ($GA_3$ 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS, $T_8$ (NAA 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS), $T_9$ ($GA_3$ 100 ppm at 30 DAS + $M_2$ 100 ppm at 45 DAS), $T_{10}$ (NAA 100 ppm at 30 DAS + CCC 750 ppm + $M_2$ 100 ppm at 45 DAS), $T_{11}$ (NAA 100 ppm at + CCC 750 ppm + $M_1$ 100 ppm at 30 DAS), $T_{12}$ (NAA 100 ppm + CCC 750 ppm + $M_2$ 100 ppm at 30 and 45 DAS), $T_{13}$ (control). The periodical observations on growth and yield parameters were recorded and subjected to statistical analysis.
However, among the various treatment combinations, overall performance of treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS) was superior over all other treatment.

**Keywords:** Okra, PGR's, Parbhani Kranti, micronutrients, yield, ppm

## 1. Introduction

Okra {*Abelmoschus esculentus* (L.)} is a popular vegetable in tropical regions of the world, okra belongs to the family Malvaceae and bears a chromosome no. 2n=130. Several species of the genus *Abelmoschus* are grown in many parts of the world, among them *Abelmoschus esculentus* is most commonly cultivated in Asia and has a great commercial demand due to its nutritional values. It is commonly known as bhendi or lady`s finger, it is cooked with meat for flavouring and because of high mucilaginous content, the fruits are ideal for both thickening and flavouring stews and soups. The fruits can also be boiled or fried and eaten as a vegetable. Okra is a nutritious vegetable with good source of vitamins like A, B, C and also rich in protein, carbohydrates, fats, minerals, iron and iodine. Fruit contains moisture (89.6%), K (103 mg), Ca (90 mg), Mg (43 mg), vitamin C (18 mg) in 100 g of fresh fruit. Metals such as iron and aluminium are found between 500 and 400 ppm.

Physiological and bio-chemical role of plant growth regulators in crop production is a well-known phenomenon which enables a rapid change in the phenotype of the plant to achieve desirable results. The use of plant growth regulators promote growth along the longitudinal axis, increase in number of leaves, early flower initiation, pod set and subsequently contributes toward higher production and productivity when applied at optimum concentrations. At different stages of growth, $GA_3$ and NAA are used in many vegetable crops for increasing growth and yield by way of cell division and differentiation. In the light of the above facts, an investigation involving plant growth regulators on growth and yield in okra was conducted to find out suitable plant growth regulators for better growth and yield of okra.

## 2. Material and Methods

The field investigation entitled "Response of plant growth regulators and micronutrients on growth and yield in okra (*Abelmoschus esculentus* L. Moench)" was carried out at Department of Horticulture, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani. Seeds of "Parbhani Kranti" variety of okra were sown at a spacing of 45 cm x 30 cm.

The recommended cultural practices, seed treatment, sowing, weeding, fertilizer, irrigation and plant protection were done. The observations on vegetative growth and yield attributes were recorded from randomized selected five plants in each treatment. The results obtained along with relevant discussion are presented.

**Table 1:** Treatment details used in the study

| Treatment No. | Treatment combinations |
|---|---|
| $T_1$ | $GA_3$ 100 ppm foliar application at 45 DAS |
| $T_2$ | NAA 100 ppm foliar application at 45 DAS |
| $T_3$ | $GA_3$ 100 ppm foliar application at 30 DAS |
| $T_4$ | NAA 100 ppm + CCC 750 ppm foliar application at 45 DAS |
| $T_5$ | $GA_3$ 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS |
| $T_6$ | NAA 100 ppm + $M_1$ (micronutrient mixtures) at 30 DAS |
| $T_7$ | $GA_3$ 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS |
| $T_8$ | NAA 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS |
| $T_9$ | $GA_3$ 100 ppm at 30 DAS + $M_2$ 100 ppm at 45 DAS |
| $T_{10}$ | NAA 100 ppm at 30 DAS + CCC 750 ppm + $M_2$ 100 ppm at 45 DAS |
| $T_{11}$ | NAA 100 ppm + CCC 750 ppm + $M_1$ 100 ppm at 30 DAS |
| $T_{12}$ | NAA 100 ppm + CCC 750 ppm + $M_2$ 100 ppm at 30 and 45 DAS |
| $T_{13}$ | Control |

## 3. Results and Discussion

## 3. Growth parameters

### 3.1.1 Plant Height (cm)

The plant height of different treatment combination of okra was recorded at 30, 45, 60, 75 and 90 DAS was significantly under the impact of the foliar application of plant growth regulators.

At 30 DAS, plant height resulted significant differences among different treatments. The highest plant height (15.04 cm) was found in $T_3$ ($GA_3$ 100 ppm at 30 DAS) treatment. Whereas, least plant height (10.27 cm) was found in treatment $T_{13}$ (control).

At 60 DAS, significantly highest plant height (78.34 cm) was recorded in $T_3$ ($GA_3$ 100 ppm at 30 DAS) and was statistically at par with the treatments $T_6$ (77.12 cm), $T_5$ (72.56 cm), $T_{11}$ (72.12 cm) and $T_{10}$ (71.43 cm). Whereas, least plant height (63.33 cm) was reported in treatment $T_{13}$ (control).

At 90 DAS, the highest plant height (152.65 cm) was displayed in $T_3$ ($GA_3$ 100 ppm at 30 DAS) treatment. While, lowest plant height (113.43 cm) was resulted in treatment $T_{13}$ (Control).

The above result confirmed that the foliar application of $GA_3$ 100 ppm was recorded maximum plant height at 30, 45, 60, 75 and 90 DAS respectively. The increased plant height might be due to the presence of plant growth regulators have been identified as the chemicals such as $GA_3$ that enhance cell division and cell elongation in shoot apex.

**Table 2:** Effect of plant growth regulators and micronutrients on plant height of okra at different growth stages

| Tr. No. | Treatments | Plant height (cm) | | | | |
|---|---|---|---|---|---|---|
| | | 30 | 45 | 60 | 75 | 90 |
| $T_1$ | $GA_3$ 100 ppm foliar application at 45 DAS | 12.85 | 37.67 | 70.74 | 115.16 | 138.83 |
| $T_2$ | NAA 100 ppm foliar application at 45 DAS | 12.57 | 36.29 | 70.72 | 112.73 | 143.10 |
| $T_3$ | $GA_3$ 100 ppm foliar application at 30 DAS | 15.04 | 40.16 | 78.34 | 122.68 | 152.65 |
| $T_4$ | NAA 100 ppm + CCC 750 ppm foliar application at 45 DAS | 13.23 | 39.13 | 70.18 | 118.66 | 139.10 |
| $T_5$ | $GA_3$ 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS | 12.69 | 37.27 | 72.56 | 114.60 | 145.50 |
| $T_6$ | NAA 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS | 13.30 | 38.65 | 77.12 | 121.33 | 143.76 |
| $T_7$ | $GA_3$ 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS | 12.15 | 36.67 | 71.19 | 116.50 | 138.46 |
| $T_8$ | NAA 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS | 12.51 | 37.07 | 69.86 | 113.70 | 139.30 |
| $T_9$ | $GA_3$ 100 ppm at 30 DAS + $M_2$ 100 ppm at 45 DAS | 12.47 | 34.33 | 71.07 | 116.10 | 137.43 |
| $T_{10}$ | NAA 100 ppm at 30 DAS + CCC 750 ppm + $M_2$ 100 ppm at 45 DAS | 12.52 | 36.10 | 71.43 | 103.10 | 137.33 |
| $T_{11}$ | NAA 100 ppm + CCC 750 ppm + $M_1$ 100 ppm at 30 DAS | 13.06 | 36.48 | 72.12 | 120.46 | 141.16 |
| $T_{12}$ | NAA 100 ppm + CCC 750 ppm + $M_2$ 100 ppm at 30 and 45 DAS | 12.28 | 35.33 | 70.78 | 109.36 | 136.86 |
| $T_{13}$ | Control | 10.26 | 30.07 | 63.33 | 96.87 | 113.43 |
| | SEm ± | 0.477 | 1.435 | 2.163 | 4.92 | 5.104 |
| | CD at 5% level | 1.400 | 4.215 | 6.352 | 14.446 | 14.987 |

### 3.1.2 Number of nodes per plant

At 30 DAS, significantly maximum number of nodes (4.53) were recorded in treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS). While, minimum number of nodes (2.70) were found in treatment $T_{13}$ (control).

At 45 DAS, the data showed significant difference among various treatments. The higher number of nodes (9.23) were obtained in treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS) and statistically at par with treatments $T_6$ (8.46) and $T_{11}$ (8.16). Whereas, lower number of nodes (6.86) were reported in treatment $T_{13}$ (Control).

At 60 DAS, significantly highest number of nodes (24.96) was found in treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS). While, least number of nodes (16.06) were resulted in treatment $T_{13}$ (Control).

At 90 DAS, the higher number of nodes (36.26) were resulted in treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS). While, lower number of nodes (25.23) were manifested by treatment $T_{13}$ (Control).

In the above data it has been resulted that, the application of $GA_3$100 ppm recorded maximum number of nodes per plant of crop at 30, 45, 60, 75 and 90 DAS, respectively. The presence of plant growth regulators may be the reason for increased number of nodes per plant have been established as the enzymatics such as $GA_3$ helps to increase number of nodes per plant which helps to reducing intermodal distance.

**Table 3:** Effect of plant growth regulators and micronutrients on number of nodes per plant of okra at different growth stages.

| Tr. No. | Treatments | Number of nodes per plant | | | | |
|---|---|---|---|---|---|---|
| | | 30 | 45 | 60 | 75 | 90 |
| $T_1$ | $GA_3$ 100 ppm foliar application at 45 DAS | 3.73 | 7.83 | 18.46 | 21.36 | 29.26 |
| $T_2$ | NAA 100 ppm foliar application at 45 DAS | 3.63 | 8.13 | 19.10 | 22.36 | 30.06 |
| $T_3$ | $GA_3$ 100 ppm foliar application at 30 DAS | 4.53 | 9.23 | 24.96 | 28.36 | 36.26 |
| $T_4$ | NAA 100 ppm + CCC 750 ppm foliar application at 45 DAS | 3.86 | 7.56 | 20.16 | 23.63 | 32.10 |
| $T_5$ | $GA_3$ 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS | 3.70 | 7.80 | 21.73 | 24.63 | 29.63 |
| $T_6$ | NAA 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS | 4.20 | 8.46 | 21.60 | 25.03 | 28.26 |
| $T_7$ | $GA_3$ 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS | 3.50 | 7.76 | 18.20 | 21.23 | 28.93 |
| $T_8$ | NAA 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS | 3.73 | 7.36 | 19.83 | 22.00 | 30.36 |
| $T_9$ | $GA_3$ 100 ppm at 30 DAS + $M_2$ 100 ppm at 45 DAS | 3.33 | 7.50 | 19.16 | 22.13 | 29.86 |
| $T_{10}$ | NAA 100 ppm at 30 DAS + CCC 750 ppm + $M_2$ 100 ppm at 45 DAS | 3.66 | 7.53 | 18.96 | 23.56 | 33.56 |
| $T_{11}$ | NAA 100 ppm + CCC 750 ppm + $M_1$ 100 ppm at 30 DAS | 4.16 | 8.16 | 19.40 | 22.23 | 28.46 |
| $T_{12}$ | NAA 100 ppm + CCC 750 ppm + $M_2$ 100 ppm at 30 and 45 DAS | 3.36 | 7.23 | 18.53 | 21.13 | 28.50 |
| $T_{13}$ | Control | 2.70 | 6.86 | 16.06 | 19.56 | 25.23 |
| | SEm ± | 0.137 | 0.362 | 0.975 | 1.007 | 1.104 |
| | CD at 5% level | 0.402 | 1.063 | 2.862 | 2.957 | 3.241 |

### 3.2 Flowering Parameters

#### 3.2.1 Days to initiation of flowering

The days taken to first flower initiation was least (42.66) significantly under the treatment of $T_3$ ($GA_3$ 100 ppm at 30 DAS) which was at par with the treatments $T_7$ (43.33), $T_2$ (43.66), $T_{11}$ (43.66), $T_8$ (45.00) and $T_{12}$ (45.00). Whereas, highest (50.00) number of days taken to initiation of flower was exhibited in treatment $T_{13}$ (control).

In the above results it has been revealed that the treatment $T_3$ recorded early initiation of flowering. This might be due to under influence of plant growth regulators have been defined as chemicals such as $GA_3$ encourages desirable effect on days required for flowering.

#### 3.2.2 Nodal position of first flower

Data found that the treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS) displayed statistically lowest nodal position for 1st flower initiation (3.33) which was at par with treatments $T_{11}$ (3.66), $T_6$ (4.00), $T_7$ (4.00), $T_{10}$ (4.00), $T_5$ (4.66) and $T_{12}$ (4.66). While, treatment $T_{13}$ (control) recorded maximum nodes for 1st flower initiation (6.00).

The nodal position of 1st flower is desirable character and earliness was may be due to foliar application of plant growth regulators.

#### 3.2.3 Number of flowers per plant

The present data revealed the treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS) exhibited significantly higher number of flowers per plant was found in (34.03). Whereas, lower number of flowers per plants (24.06) was recorded in treatment $T_{13}$ (control).

$GA_3$ helps to increase a greater number of flowers due to acceleration of auxiliary buds into new shoots providing extra sites for more flowers.

**Table 4:** Effect of plant growth regulators and micronutrients on days to initiation of flowering, nodal position of first flower and number of flowers per plant.

| Tr. No. | Treatments | Days for initiation of flower | Nodes at 1st flowering | Number of flowers per plant |
|---|---|---|---|---|
| $T_1$ | $GA_3$ 100 ppm foliar application at 45 DAS | 48.33 | 5.66 | 28.06 |
| $T_2$ | NAA 100 ppm foliar application at 45 DAS | 43.66 | 5.00 | 28.60 |
| $T_3$ | $GA_3$ 100 ppm foliar application at 30 DAS | 42.66 | 3.33 | 34.03 |
| $T_4$ | NAA 100 ppm + CCC 750 ppm foliar application at 45 DAS | 46.00 | 5.00 | 30.00 |
| $T_5$ | $GA_3$ 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS | 46.00 | 4.66 | 27.93 |
| $T_6$ | NAA 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS | 46.33 | 4.00 | 27.73 |
| $T_7$ | $GA_3$ 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS | 43.33 | 4.00 | 27.50 |
| $T_8$ | NAA 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS | 45.00 | 5.00 | 28.56 |
| $T_9$ | $GA_3$ 100 ppm at 30 DAS + $M_2$ 100 ppm at 45 DAS | 46.66 | 5.33 | 27.56 |
| $T_{10}$ | NAA 100 ppm at 30 DAS + CCC 750 ppm + $M_2$ 100 ppm at 45 DAS | 47.00 | 4.00 | 30.10 |
| $T_{11}$ | NAA 100 ppm + CCC 750 ppm + $M_1$ 100 ppm at 30 DAS | 43.66 | 3.66 | 28.00 |
| $T_{12}$ | NAA 100 ppm + CCC 750 ppm + $M_2$ 100 ppm at 30 and 45 DAS | 45.00 | 4.66 | 27.30 |
| $T_{13}$ | Control | 50.00 | 6.00 | 24.06 |
| | SEm ± | 1.128 | 0.516 | 0.886 |
| | CD at 5% level | 3.311 | 1.515 | 2.603 |

### 3.3 Fruit Parameters
### 3.3.1 Fruit Length (cm)
The treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS) exhibited significantly highest fruit length. Whereas, lowest fruit length (10.16 cm) was found in treatment $T_{13}$ (control).
The increase in fruit length is attributed to the fact that $GA_3$ and NAA encourage cell division and cell elongation.

### 3.3.2 Fruit Diameter (mm)
The fruit diameter significantly showed maximum diameter of fruit (15.00 mm) was recorded in treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS) followed by $T_2$ (13.44 mm) and $T_8$ (13.30 mm) while, minimum diameter of fruit (12.00 mm) was exhibited in treatment $T_{13}$ (control).
$GA_3$ and NAA helps to promote cell division and cell elongation which may lead to increase in fruit development.

### 3.3.3 Number of fruits per plant
The foliar application of treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS) exhibited significantly highest fruit weight (15.66 g) of okra. Whereas, lowest fruit weight (10.96 g) was recorded in treatment $T_{13}$ (control).
$GA_3$ helps for better translocation of photosynthates. NAA affect stimulation of fruit growth, CCC might have led to increase the number of branches resulting in diversion of flow of food materials for increasing the fruiting character.

**Table 5:** Effect of plant growth regulators and micronutrients on fruiting parameters of okra.

| Tr. No. | Treatments | Fruit length (cm) | Fruit diameter (mm) | Number of fruits per plant |
|---|---|---|---|---|
| $T_1$ | $GA_3$ 100 ppm foliar application at 45 DAS | 11.03 | 12.76 | 27.10 |
| $T_2$ | NAA 100 ppm foliar application at 45 DAS | 11.76 | 13.44 | 26.60 |
| $T_3$ | $GA_3$ 100 ppm foliar application at 30 DAS | 14.50 | 15.00 | 28.83 |
| $T_4$ | NAA 100 ppm + CCC 750 ppm foliar application at 45 DAS | 10.76 | 13.26 | 27.73 |
| $T_5$ | $GA_3$ 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS | 10.51 | 12.40 | 26.73 |
| $T_6$ | NAA 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS | 10.69 | 12.96 | 26.90 |
| $T_7$ | $GA_3$ 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS | 10.69 | 12.56 | 26.80 |
| $T_8$ | NAA 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS | 10.67 | 13.30 | 26.56 |
| $T_9$ | $GA_3$ 100 ppm at 30 DAS + $M_2$ 100 ppm at 45 DAS | 10.56 | 12.80 | 25.33 |
| $T_{10}$ | NAA 100 ppm at 30 DAS + CCC 750 ppm + $M_2$ 100 ppm at 45 DAS | 10.68 | 12.93 | 27.76 |
| $T_{11}$ | NAA 100 ppm + CCC 750 ppm + $M_1$ 100 ppm at 30 DAS | 11.47 | 13.20 | 26.90 |
| $T_{12}$ | NAA 100 ppm + CCC 750 ppm + $M_2$ 100 ppm at 30 and 45 DAS | 11.17 | 12.96 | 25.86 |
| $T_{13}$ | Control | 10.16 | 12.00 | 23.26 |
| | SEm ± | 0.340 | 0.410 | 0.826 |
| | CD at 5% level | 0.998 | 1.204 | 2.425 |

### 3.4 Yield parameters
### 3.4.1 Yield per plant (g)
The present investigation of data revealed that the treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS) appeared highest fruit yield per plant (444.30 g) which was significantly at par with treatments $T_1$ (395.60 g) and $T_6$ (387.36 g). Whereas, lowest fruit yield per plant (256.46 g) was recorded in treatment $T_{13}$ (control).
$GA_3$ due to the consequence on cell elongation, stimulate RNA and protein synthesis and better diversion of food material might towards fruit yield character might increase fruit yield. CCC helps to increase branching which results in diversion of food material for improvement of fruit yielding attributes i.e., fruit yield per plant.

**Table 6:** Effect of plant growth regulators on yield parameters of okra

| Tr. No. | Treatments | Fruit yield/plant (g) |
|---|---|---|
| $T_1$ | $GA_3$ 100 ppm foliar application at 45 DAS | 395.60 |
| $T_2$ | NAA 100 ppm foliar application at 45 DAS | 305.76 |
| $T_3$ | $GA_3$ 100 ppm foliar application at 30 DAS | 444.30 |
| $T_4$ | NAA 100 ppm + CCC 750 ppm foliar application at 45 DAS | 295.63 |
| $T_5$ | $GA_3$ 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS | 376.36 |
| $T_6$ | NAA 100 ppm + $M_1$ 100 ppm (micronutrient mixtures) at 30 DAS | 387.36 |
| $T_7$ | $GA_3$ 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS | 312.90 |
| $T_8$ | NAA 100 ppm + $M_2$ 100 ppm (micronutrient mixtures) at 45 DAS | 310.86 |
| $T_9$ | $GA_3$ 100 ppm at 30 DAS + $M_2$ 100 ppm at 45 DAS | 298.43 |
| $T_{10}$ | NAA 100 ppm at 30 DAS + CCC 750 ppm + $M_2$ 100 ppm at 45 DAS | 317.63 |
| $T_{11}$ | NAA 100 ppm + CCC 750 ppm + $M_1$ 100 ppm at 30 DAS | 313.40 |
| $T_{12}$ | NAA 100 ppm + CCC 750 ppm + $M_2$ 100 ppm at 30 and 45 DAS | 351.80 |
| $T_{13}$ | Control | 256.46 |
| | SEm ± | 21.859 |
| | CD at 5% level | 64.183 |

## 4. Conclusion
The present results showed that the significantly highest plant height of okra at 30 DAS (15.04 cm), 45 DAS (40.16 cm), 60 DAS (78.34 cm), 75 DAS (122.68 cm) and 90 DAS (152.65 cm) was found in treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS). The significantly higher total number of fruits per plant (28.83), fruit yield per plant (444.30 g) was observed in the treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS).
However, among the various treatment combinations, overall performance of treatment $T_3$ ($GA_3$ 100 ppm at 30 DAS) was

superior over all other treatments. This was further followed by $T_6$ (NAA 100 ppm + $M_1$ 100 ppm at 30 DAS), $T_{11}$ (NAA 100 ppm + CCC 750 ppm + $M_1$ 100 ppm at 30 DAS). From the present investigation it revealed that, foliar application of plant growth regulators is an instant and effective way of application which significantly influenced vegetative characters and fruiting characters in okra.

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