E-ISSN: 2618-0618
P-ISSN: 2618-060X

NAAS Rating (2025): 5.20
www.agronomyjournals.com
2025; 8(9): 1003-1011
Received: 19-06-2025
Accepted: 22-07-2025

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Effect of plant growth regulators on growth and yield of bhendi (*Abelmoschus esculentus*)

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DOI: https://www.doi.org/10.33545/2618060X.2025.v8.i9n.3891

Abstract
A field experiment was conducted during May–August 2025 at Kumaraguru Institute of Agriculture, Erode for evaluating the effect of plant growth regulators on the growth and yield of bhendi (*Abelmoschus esculentus* L. Moench). The study comprised thirteen treatments, including different concentrations of gibberellic acid (GA3), naphthalene acetic acid (NAA), their combinations, and a control, laid out in a Randomized Block Design with three replications. Foliar sprays were applied at 30, 45, 60 and 75 DAS. Significant variation was observed among treatments for all vegetative and yield attributes. T_4 (GA3 @ 200 ppm) recorded the maximum plant height, leaf length, fruit weight per plant, and overall yield, emerging as the best performer. T_6 (NAA @ 100 ppm) ranked second, excelling in fruit number and fruit length. In contrast, T_8 (NAA @ 200 ppm) consistently produced the lowest values for most parameters. The results indicates, that GA3 at 200 ppm and NAA at 100 ppm can substantially enhance both vegetative growth and reproductive performance, whereas excessive NAA concentration may negatively affect yield potential in bhendi under field conditions.

Keywords: Bhendi, plant growth regulators, fruit yield, growth, yield attributes

Introduction
According to Kumar and Yadav (2016) [1], bhendi *(Abelmoschus esculentus L. Moench)*, commonly known as okra or Ladies finger, which is an important warm-season vegetable crop cultivated extensively in tropical and subtropical regions. It is rich in vitamins A, B, and C, calcium, potassium, iodine and dietary fiber, and its mucilage is valued for both medicinal and industrial uses (Nath *et al*., 2021) [2]. The productivity of bhendi is often constrained by poor fruit set, flower drop, and low yield, which are mainly caused by environmental stress and hormonal imbalances, as reported by Das *et al*., (2016) [3].

Choudhary *et al.*, (2018) [4] described plant growth regulators (PGRs) as organic substances, other than nutrients, that influence physiological processes at very low concentrations. These regulators play a vital role in manipulating growth, enhancing flowering, and increasing yield in vegetable crops. According to Patel *et al.*, (2017) [4] gibberellic acid (GA3) promotes cell elongation, shoot growth, and early flowering, resulting in increased plant height and biomass. Naphthalene acetic acid (NAA), a synthetic auxin, is effective in improving fruit set, reducing premature fruit drop, and enhancing pod yield in okra. The efficiency of PGRs depends on crop variety, concentration, timing, and local agro-climatic conditions, as emphasized by Raut *et al*., (2021) [31].

Bhowmick and Banerjee (2021) [6] found that the combined application of GA3 and NAA is more effective than individual treatments in improving both vegetative and reproductive parameters of okra. Such combinations increase plant height, leaf number, branching, fruit length, fruit weight, and total yield while promoting early maturity and synchronized flowering (Lakshmi *et al*., 2018) [7]. According to Kale *et al*. (2020) [8], repeated foliar sprays of PGRs enhance pod length and reduce the time to first harvest, making the crop more profitable. Therefore, the present investigation was undertaken to evaluate the effect of different concentrations and combinations of GA3 and NAA on the growth and yield performance of bhendi under the field conditions of Erode district, Tamil Nadu.

Materials and Methods

The study was laid out in a randomized block design with three replications, whereas each treatment plot measured 3m x 2m with spacing of 45 cm between rows and 30 cm between plants (Gomez & Gomez, 1984) [10]. The okra variety used was (*Abelmoschus esculentus* L. cv.) with healthy seeds sown directly in the field (Gopalakrishnan, 2007) [11]. The experiment consisted of a series of foliar spray treatments using various Plant Growth Regulators (PGRs) at different concentrations, applied at 30, 45, and 60 days after sowing. All recommended agronomic practices like land preparation, irrigation, weeding, and pest control were followed uniformly (Gopalakrishnan, 2007) [11].

The following growth and yield parameters were recorded from three randomly selected plants in each plot (Reddy, 2012) [12]. The following growth and yield parameters were recorded from three randomly selected plants in each plot: Mean Plant Height (cm) was the average vertical length of the plant, measured from the soil surface to the tip of the main shoot (Panse & Sukhatme, 1985) [13]. The total count of lateral branches emerging from the main stem was recorded as the Number of Branches per Plant (Thamburaj& Singh, 2004) [14], while the total number of fully expanded leaves on a single plant was counted for the Number of Leaves per Plant (Singh & Singh, 2015) [15]. The Node to First Flowering, which indicates the early onset of reproductive growth, was the node where the first flower appeared (Hartmann *et al*., 2011) [16]. The Days to First Flowering was the number of days from sowing to the appearance of the first flower (Kumar & Singh, 2012) [17], and the Days to First Harvest was the number of days from sowing until the first marketable pod was harvested (Chadha, 2001) [18]. According to Singh (2014) [19], the Percentage of Fruit Set (%) was the proportion of flowers that successfully developed into fruits. The number of days for all plants in a plot to reach full bloom was recorded as Days to 100% Flowering (Rai & Yadav, 2005) [20], and the time taken for all flowers to convert into fruits across all plants was the Days to 100% Fruit Set (Sharma, 2009) [21]. For fruit observations, the Number of Fruits per Plant was the total number of marketable okra pods harvested from a single plant (Gopinath *et al.*, 2012) [22].

The Average Fruit Length (cm) was the mean length of individual pods (Kumar & Singh, 2017) [9], and the Average Fruit Weight (g) was the average weight of individual fruits (Gopinath *et al*., 2012) [22]. Fruit Diameter (cm) was the average thickness or girth of the fruit (Hazra & Som, 1999) [23]. Fruit Weight per Plant was the total weight of all fruits harvested from a single plant (Singh & Yadav, 2013) [24], and the Fruit Weight per Plot was the cumulative weight of fruits harvested from all plants in a treatment plot (Kumar & Gopalan, 2000) [25].

Treatments	Concentration(ppm)
T_1	GA3 50ppm
T_2	GA3 100ppm
T_3	GA3 150ppm
T_4	GA3 200ppm
T_5	NAA 50ppm
T_6	NAA 100ppm
T_7	NAA 150ppm
T_8	NAA 200ppm
T_9	GA3+NAA (50+50ppm)
T_{10}	GA3+NAA (100+100ppm)
T_{11}	GA3+NAA (150+150ppm)
T_{12}	GA3+NAA (200+200ppm)
T_{13}	Control

Results and Discussion

Results of the field experiment entitled "Effect of Plant Growth regulators on growth and yield of Bhendi *(Abelmoschus esculentus*)" conducted during May- August, 2025 at Kumaraguru Institute of Agriculture, Erode with statistical inferences are presented.

Growth Parameter

At 30 DAS

At 30 days after sowing (DAS), the vegetative growth of okra showed significant variation among treatments. Plant height ranged from 14.08 cm in T_6 to 28.17 cm in T_{10}. The tallest plants were recorded in T_{10} (28.17 cm), followed by T_4 (26.67 cm), both statistically superior to all other treatments. The shortest plants were found in T_6 (14.08 cm), significantly lower than all others. The superior height in T_{10} and T_4 suggests optimal conditions for cell elongation and biomass accumulation, likely due to enhanced nutrient uptake and photosynthetic efficiency during early growth stages. Similar observations were reported by Sarkar and Pal (2016) [26], who noted that optimal nutrient and growth regulator combinations significantly increase okra height in the vegetative phase. The number of leaves per plant varied between 5.33 in T_8 and 9.33 in T_9. T_9 produced the maximum number of leaves, significantly higher than all other treatment indicating more active leaf initiation and expansion. Treatments T_1, T_4, and T_{13} recorded 7.67, 7.67, and 7.50 leaves respectively, forming the next superior group.

Higher leaf count in T_9 would contribute to greater photosynthetic surface area and better carbohydrate assimilation, which can enhance yield potential. Kumar *et al.*, (2017) [9] linked such increases in leaf production to higher nitrogen availability and favourable soil moisture conditions supporting canopy development. Leaf diameter ranged from 7.42 cm in T_8 to 10.92 cm in T_1. T_1 recorded the widest leaves, significantly superior to all other treatments, followed by T_9 (9.92 cm) and T_6/T_7. Wider leaves enhance light interception, boosting photosynthetic activity and vegetative vigour. This finding aligns with Patel *et al.*, (2018) [4], who reported that improved water and nutrient uptake in okra promotes leaf blade expansion. Overall, T_{10} was superior in plant height, T_9 in leaf number, and T_1 in leaf diameter, indicating that no single treatment dominated all vegetative traits. A combination of the beneficial factors from these treatments could potentially maximize overall vegetative growth and yield in okra cultivation.

At 45th DAS

At 45 days after sowing (DAS), okra growth and yield parameters exhibited highly significant variation among the treatments. Plant height ranged from 90.33 cm in T_5 to 157.50 cm in T_4, with T_4 being statistically superior to all other treatments. This pronounced vertical growth in T_4 suggests optimal nutrient and growth regulator synergy, as also noted by Sarkar and Pal (2016) [26]. In contrast, the reduced height in T_5 may be attributed to nutrient limitations or growth restrictions. Branch number per plant varied significantly, with T_{13} (3.33) producing the highest, followed by T_6 (2.83) and T_9 (2.50). The lowest was in T_{11} (1.00). The prolific branching in T_{13} may be due to hormonal stimulation of auxillary bud outgrowth, supported by Kumar *et al.*, (2017) [9], who linked higher nitrogen and potassium levels to increased branching. Leaf diameter differed significantly, with T_4 (15.75 cm) achieving the largest leaves. This may indicate enhanced mesophyll expansion and turgidity, improving light interception, consistent with Patel *et al.*, (2018) [4]. The smallest leaves occurred in T_1 (12.17 cm).

The number of leaves per plant was highest in T_4, T_8, and T_{10} (28.67), all of which were significantly superior to T_1 (24.33) and T_{11} (23.83).

Higher leaf counts generally indicate sustained leaf initiation and retention, which contribute to a greater photosynthetic surface area and enhanced assimilate production, ultimately improving plant vigour and yield potential. Similar trends have been reported by Ayyub *et al.,* (2013) [24], who found that foliar application of GA3 markedly increased leaf number in okra compared to untreated controls, and by Rajput *et al.,* (2018) [27], who observed that GA3 at 200 ppm significantly improved leaf production alongside other vegetative parameters. These findings confirm that PGR application. The highest fruit count was recorded in T_6 and T_{13} (5.17), both significantly exceeding T_5 (2.50). This indicates improved flowering and fruit set efficiency under these treatments. Similar results were reported by Thirupathi *et al.,* (2012) [28] and Meitei *et al.,* (2014) [30], where PGR application enhanced fruit retention and increased the number of fruits per plant.Fruit length showed significant variation among treatments, with the maximum recorded in T_9 (14.30 cm) and the minimum in T_5 (7.50 cm). Fruit breadth also differed significantly, being highest in T_8 (5.90 cm) and lowest in T_1 (3.37 cm). Such differences in fruit size are attributed to variations in assimilate partitioning and source–sink dynamics.

Similar results were reported by Thirupathi *et al.,* (2012) [28] and Meitei *et al.,* (2014) [30], who found that application of PGRs such as GA3 and NAA in okra enhanced fruit length and breadth by promoting efficient translocation of photosynthates to developing fruits. Fruit weight varied significantly, with T_4 (434.67 g) being the highest and T_8 (124.67 g) the lowest. T_4's superiority in height, leaf area, and fruit weight indicates efficient assimilate production and partitioning, aligning with findings by Thirupathi *et al.,* (2012) [28] and Meitei *et al.,* (2014) [30]. Overall, T_4 demonstrated exceptional performance in both vegetative and reproductive traits, suggesting its suitability for maximizing okra yield. While T_{13} and T_6 excelled in branching and fruit number, and T_9 and T_8 in fruit size, T_4 combined advantages position it as the most effective treatment for enhancing growth and productivity.

Yield Parameter

At 60th day DAS

At 60 days after sowing (DAS), significant differences were observed among treatments for all measured growth and yield parameters. Plant height varied from 62.00 cm in T_5 to 150.33 cm in T_4, with T_4 being significantly superior to all other treatments, followed by T_{10} (110.92 cm) and T_8 (99.97 cm). The pronounced height in T_4 suggests sustained vegetative vigour due to enhanced nutrient uptake and prolonged cell elongation, consistent with Sarkar and Pal (2016) [26]. The minimal height in T_5 likely reflects suboptimal nutrient or moisture availability. Number of branches per plant showed highly significant variation T_{13} (3.33) produced the highest number, followed by T_{10} (3.00), both significantly higher than T_2 (1.33). This enhanced branching may be due to improved auxillary bud activation under favourable nutrient regimes, as reported by Kumar *et al*., (2017) [9].

Leaf diameter differed significantly, with T_4 (22.90 cm) recording the largest leaves and T_{11} (14.62 cm) the smallest. Broad leaves in T_4 likely enhanced light interception and photosynthetic efficiency, thereby increasing assimilate production for fruit development. Similar observations were reported by Ayyub *et al.*, (2013) [24] and Rajput *et al.*, (2018) [27], who found that treatments promoting larger leaf area in okra improved photosynthate accumulation, resulting in better growth and yield performance. The number of leaves per plant was highest in T_4 (35.67) and T_6 (35.00), both significantly exceeding T_{11} (15.50) and T_{13} (20.83). Increased leaf production in these treatments suggests prolonged vegetative activity and greater photosynthetic capacity during fruiting. Similar findings were reported by Ayyub *et al.,* (2013) [24] and Rajput *et al*., (2018) [27], who observed that treatments enhancing leaf number in okra improved assimilate production, thereby supporting higher yield potential.

Number of fruits per plant peaked in T_6 (4.67), followed by T_{10} (3.83), while the lowest was in T_7 (1.33). This suggests more efficient reproductive development in T_6, aligning with Patel *et al.,* (2018) [4], who noted that optimal nutrient allocation improves fruit retention. Fruit length was highest in T_6 (14.00 cm), followed by T_{10} (12.33 cm) and T_8 (12.00 cm). Fruit breadth was widest in T_{10} (5.83 cm), significantly exceeding T_7 (3.35 cm) and T_1 (3.37 cm). These differences indicate that T_6 was most effective in promoting longitudinal fruit growth, whereas T_{10} favoured lateral expansion. Similar trends were noted by Thirupathi *et al.*, (2012) [28] and Meitei *et al.*, (2014) [30], who reported that PGR application.

Overall, T_4 consistently dominated vegetative traits (plant height, leaf size, leaf number), T_6 excelled in reproductive output (fruit number and length), and T_{10} achieved superiority in fruit breadth. This indicates that different treatments optimized distinct aspects of growth and yield, suggesting that integrating the beneficial elements of these treatments could maximize both yield quantity and quality in okra production.

At 75th day DAS

Plant height varied significantly among treatments, ranging from 91.83 cm in T_{13} to 162.67 cm in T_4. T_4 was significantly superior, followed by T_{12} (143.00 cm) and T_2 (141.17 cm). The taller stature in T_4 suggests enhanced nutrient assimilation and vigorous stem elongation, aligning with reports by Ayyub *et al.*, (2013) [24] and Rajput *et al.,* (2018) [27]. Leaf diameter varied significantly, with maximum values in T_1 and T_{11} (17.17 cm) and minimum in T_4 (14.50 cm) and T_7 (14.00 cm). Wider leaves, as observed by Ayyub *et al.,* (2013) [24] and Rajput *et al.*, (2018), enhance light interception, while narrower leaves may indicate greater resource allocation to stem or fruit growth. Highly significant differences were observed, with T_8 (79.67) recording the highest leaf number, followed by T_{10} (35.50) and T_6 (34.00). The lowest counts were in T_{11} (23.17) and T_3 (24.00). The exceptional leaf production in T_8 suggests a greater photosynthetic surface area, potentially enhancing assimilate supply for reproductive growth, while low leaf counts in T_{11} and T_3 could limit carbohydrate production and yield potential.

Similar findings were reported by Alam *et al.*, and Sadiq *et al.*, (2017) [29], who noted that higher leaf. Fruit count varied significantly, with T_6 (6.17) producing the highest, followed by T_7 (5.83) and T_5 (5.50). The lowest counts were recorded in T_3 (3.83) and T_4/T_{12} (4.00 each). Higher fruit set in T_6 indicates favourable reproductive conditions, while lower counts in T_3 and T_4 may be due to competition between vegetative and reproductive growth. Similar trends were reported by Islam *et al.*, and Meitei *et al.*, (2014) [30], who found that optimal nutrient balance and hormonal regulation enhance fruit set in okra. Significant variation was observed, with the longest fruits in T_5 (17.87 cm), followed by T_6 (17.23 cm) and T_8 (16.42 cm). The shortest were in T_{12} and T_{11} (12.31 cm each). Longer fruits in T_5 may be attributed to enhanced cell elongation, while shorter fruits in T_{12} and T_{11} could be due to limited assimilate availability. Similar results were reported by Prakash *et al.*, (2017) and Singh *et al.*, (2020) [8], who noted that adequate nutrient supply and hormonal activity promote longitudinal fruit growth in okra. Significant differences were recorded, with T_5 (1.92 cm) producing the widest fruits, followed by T_{13} (1.85 cm) and T_2 (1.77 cm). The narrowest fruits were in T_{12} (1.46 cm) and T_7/T_8 (1.58 cm each). Wider fruits in T_5 suggest enhanced radial cell expansion, whereas narrower fruits may indicate reduced sink strength. Similar observations were made by Patel *et al*, (2018) [4] and Kumar *et al.*, who reported that fruit girth in okra is influenced by assimilate distribution and varietal sink capacity.Highly significant differences were observed among treatments.

The maximum fruit weight was recorded in T_4 (434.67 g), which was statistically superior to T_{13} (162.67 g) and T_5 (160.00 g). The minimum fruit weight was observed in T_8 (124.67 g) and T_{10} (134.00 g). The higher fruit weight in T_4 may be attributed to its greater plant height and enhanced assimilate production and translocation efficiency. Similar findings were reported by Singh *et al.*, (2017) [9] and Meena *et al.*, who noted that vigorous vegetative growth and efficient source–sink dynamics significantly increase fruit weight in okra. Significant variation was observed among treatments. The maximum number of branches was recorded in T_5 (3.17), followed by T_2 and T_8 (3.00 each), while the minimum was in T_{11} (1.67) and T_3 (1.83). Increased branching in T_5 and T_2 enhances the number of potential flowering and fruiting sites, contributing to higher yield potential. These results are in agreement with Kumar *et al.*, and Patel *et al.*, (2018) [4], who reported that higher branch numbers in okra correlate positively with fruit yield due to increased reproductive sites.

Overall, T_4 excelled in plant height and fruit weight, indicating strong vegetative growth and resource allocation to fruit development. T_8 stood out for leaf production, potentially boosting photosynthetic capacity. T_6 was superior in fruit number, while T_5 produced the longest and widest fruits. These results suggest that different treatments favoured distinct growth and yield parameters, highlighting the potential of integrating the most effective traits to maximize both yield quantity and quality in okra cultivation.

Growth Parameters

Table 1: Plant Height (cm)

Treatment	30 DAS	45 DAS	60 DAS	75 DAS
T_1	21.50	101.50	95.50	95.50
T_2	15.83	115.67	82.33	82.33
T_3	22.08	101.67	86.83	86.83
T_4	26.67	157.5	150.33	150.33
T_5	17.50	90.33	62.00	62.00
T_6	14.08	112.5	80.33	80.33
T_7	17.25	102.5	77.83	77.83
T_8	20.83	109.67	99.97	99.97
T_9	18.17	96.83	83.00	83.00
T_{10}	28.17	113.5	110.92	110.92
T_{11}	18.67	109.33	86.20	86.20
T_{12}	15.17	98.67	90.17	90.17
T_{13}	15.67	106.83	71.67	71.67
SEd	0.31	2.1822	2.1286	3.19
CD(5%)	0.64	4.508	4.3933	6.59

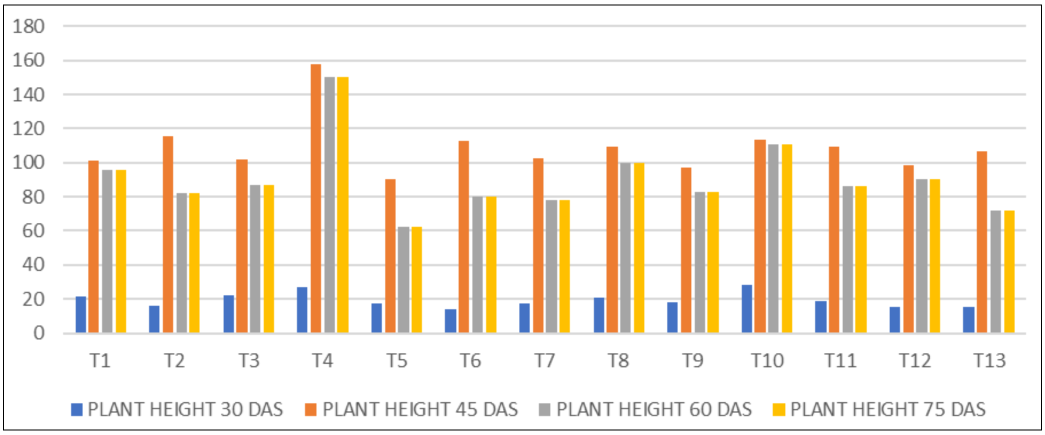

Fig 1: Plant Height

Table 2: No. of Leaves

Treatment	30 DAS	45 DAS	60 DAS	75 DAS
T_1	7.67	24.33	23.33	33.50
T_2	6.67	26.83	28.50	30.67
T_3	7.00	26.33	27.50	24.00
T_4	7.67	28.67	35.67	28.83
T_5	6.67	26.67	27.50	31.17
T_6	6.50	26.33	35.00	34.00
T_7	6.33	27.83	24.00	32.33
T_8	5.33	28.67	30.00	79.67
T_9	9.33	25.67	26.50	33.50
T_{10}	7.50	28.67	31.83	35.50
T_{11}	7.33	23.83	15.50	23.17
T_{12}	6.50	24.00	24.67	23.83
T_{13}	7.50	26.17	20.83	26.33
SEd	0.11	0.56	0.24	0.64
CD(5%)	0.23	1.16	0.51	1.33

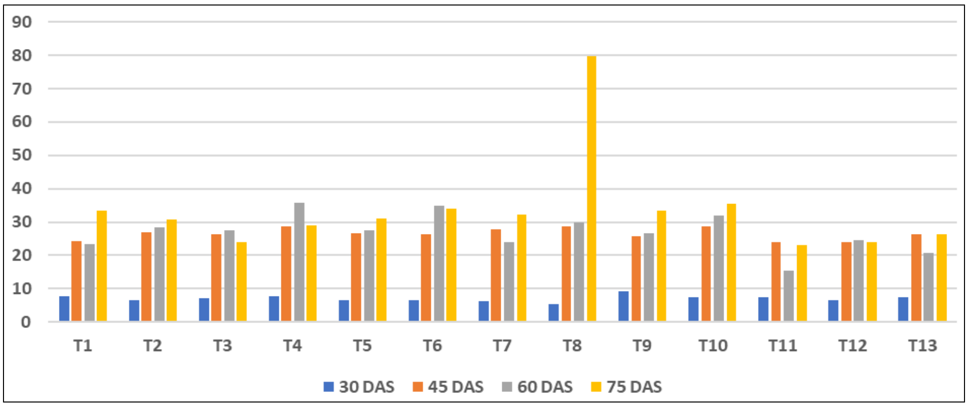

Fig 2: No. of Leaves

Table 3: Leaf Diameter

Treatment	30 DAS	45 DAS	60 DAS	75 DAS
T_1	0.92	12.17	19.00	14.50
T_2	8.83	14.42	18.25	17.00
T_3	9.25	14.00	15.92	16.90
T_4	8.50	15.75	22.90	14.50
T_5	8.17	14.25	15.98	14.67
T_6	9.50	13.25	16.82	16.75
T_7	9.50	13.10	15.28	14.00
T_8	7.42	14.25	17.30	16.00
T_9	9.92	13.00	18.48	17.00
T_{10}	9.33	14.43	18.50	16.92
T_{11}	8.50	12.92	14.62	17.17
T_{12}	9.17	14.25	19.92	15.33
T_{13}	8.00	13.83	15.00	16.75
SEd	0.19	0.29	0.49	0.38
CD(5%)	0.39	0.61	1.02	0.79

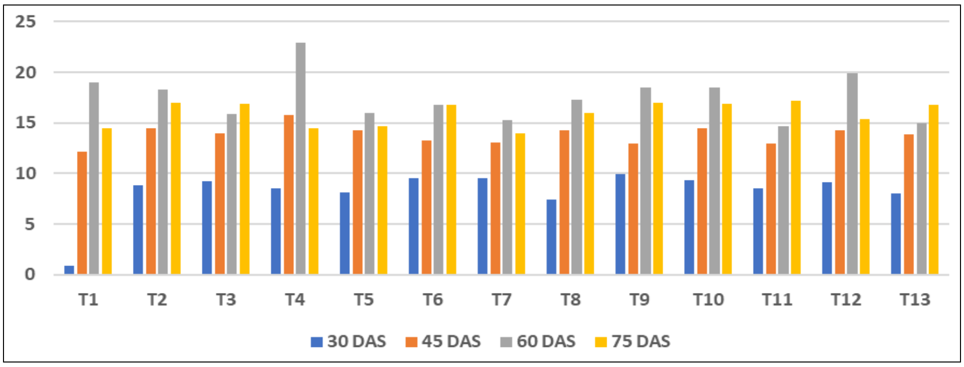

Fig 3: Leaf Diameter

Table 4: No of Branches

Treatment	45 DAS	60 DAS	75 DAS
T_1	2.17	2.33	2.83
T_2	1.17	1.33	3.00
T_3	1.33	1.83	1.83
T_4	2.00	2.67	2.67
T_5	2.33	2.50	3.17
T_6	2.83	2.67	2.33
T_7	1.50	2.00	2.33
T_8	1.50	2.33	3.00
T_9	2.50	2.33	2.50
T_{10}	1.33	3.00	2.17
T_{11}	1.00	1.83	1.67
T_{12}	1.17	1.67	2.67
T_{13}	3.33	3.33	2.67
SEd	0.04	0.04	0.05
CD(5%)	0.09	0.10	0.11

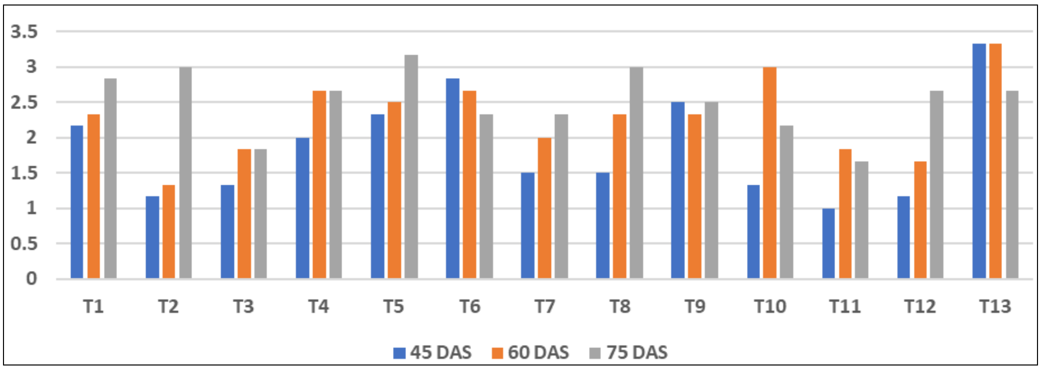

Fig 4: No of Branches

Yield Parameters

Table 5: No of Fruits

Treatment	45DAS	60 DAS	75 DAS
T_1	5.00	3.50	4.83
T_2	4.33	2.67	4.83
T_3	4.17	2.50	3.83
T_4	4.17	2.00	4.00
T_5	2.50	2.00	5.50
T_6	5.17	4.67	6.17
T_7	3.33	1.33	5.83
T_8	3.50	2.50	5.83
T_9	2.83	2.33	5.33
T_{10}	2.67	3.83	4.67
T_{11}	3.50	1.67	4.17
T_{12}	2.67	2.17	4.00
T_{13}	5.17	3.00	4.50
SEd	0.06	0.05	0.09
CD(5%)	0.14	0.11	0.19

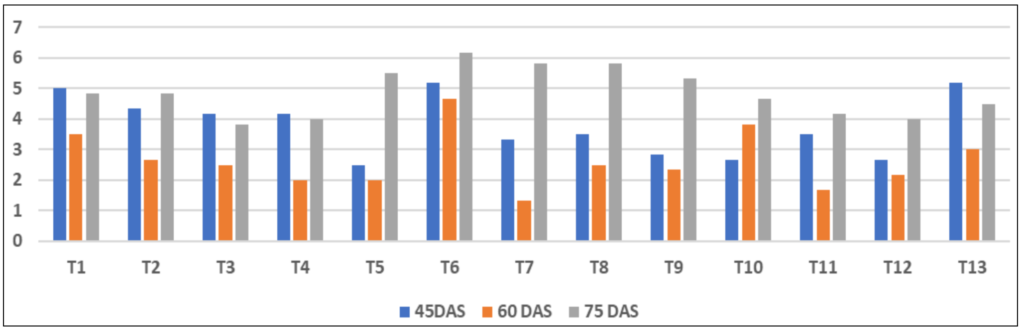

Fig 5: No of Fruits

Table 6: Fruit length

Treatment	45DAS	60 DAS	75 DAS
T_1	7.95	3.50	14.75
T_2	12.22	2.67	13.04
T_3	13.67	2.50	12.89
T_4	13.40	2.00	13.77
T_5	7.50	2.00	17.87
T_6	14.00	4.67	17.23
T_7	11.50	1.33	15.00
T_8	13.83	2.50	16.42
T_9	14.30	2.33	12.36
T_{10}	11.17	3.83	14.34
T_{11}	13.67	1.67	12.31
T_{12}	14.17	2.17	12.31
T_{13}	11.00	3.00	14.64
SEd	0.27	0.24	0.26
CD(5%)	0.56	0.51	0.54

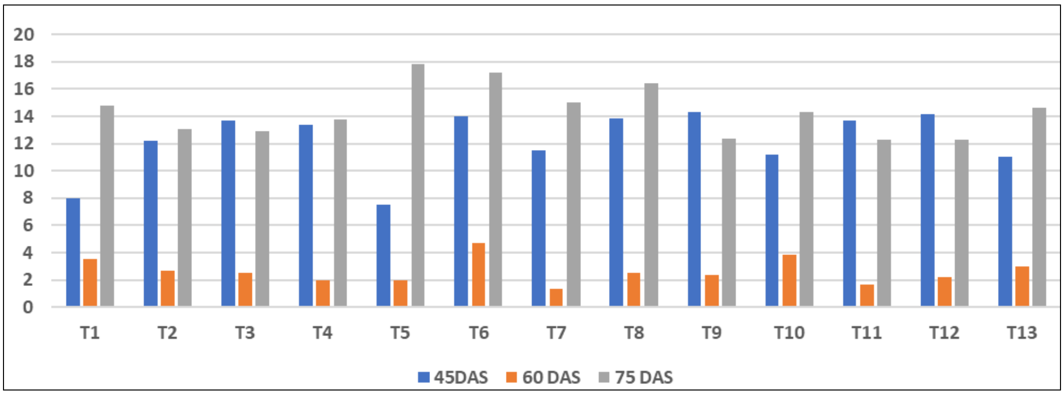

Fig 6: Fruit length

Table 7: Fruit breadth

Treatment	45DAS	60 DAS	75 DAS
T_1	3.37	3.37	3.37
T_2	5.55	3.80	3.80
T_3	5.37	4.67	4.67
T_4	5.40	3.57	3.57
T_5	3.87	4.65	4.65
T_6	5.40	5.40	5.40
T_7	4.25	3.35	3.35
T_8	5.90	5.23	5.23
T_9	5.52	4.52	4.52
T_{10}	5.03	5.83	5.83
T_{11}	5.88	4.05	4.05
T_{12}	5.23	4.53	4.53
T_{13}	4.73	3.78	3.78
SEd	0.14	0.07	0.03
CD(5%)	0.30	0.15	0.07

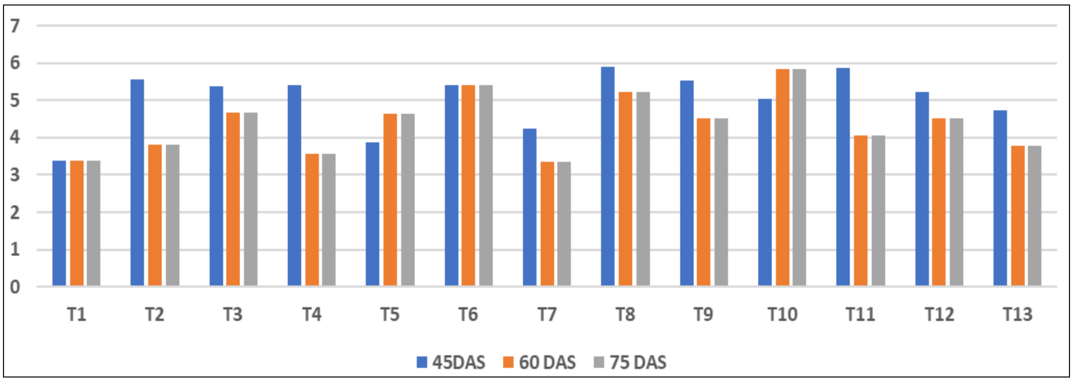

Fig 7: Fruit breadth

Table 8: Fruit weight

Treatment	45DAS	75 DAS
T_1	154.50	154.50
T_2	149.00	149.00
T_3	141.00	141.00
T_4	434.67	434.67
T_5	160.00	160.00
T_6	150.17	150.17
T_7	157.33	157.33
T_8	124.67	124.67
T_9	156.17	156.17
T_{10}	134.00	134.00
T_{11}	160.83	160.83
T_{12}	158.83	158.83
T_{13}	162.67	162.67
SEd	3.91	3.19
CD(5%)	8.07	6.59

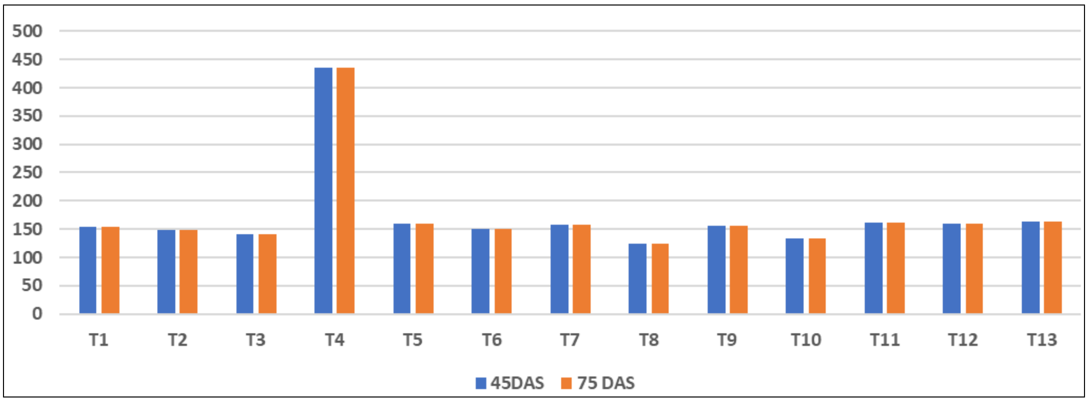

Fig 8: Fruit weight

Conclusion

The study showes that plant growth regulators have a significant impact on bhendi growth and yield. Among the treatments, T_4 (GA3 200ppm) emerged as the best performer, showing strong vegetative growth and heavier fruits. T_6 (NAA 100ppm) followed next, excelling in fruit number and length, while T_{13} (Control) was the least effective, showing lower performance across most traits. These results suggest that selecting the right growth regulator, especially T_4 (GA3 200ppm) or T_6 (NAA 100ppm), can greatly improve both yield and fruit quality, whereas T_{13} (Control) may not be ideal for maximizing productivity.

Acknowledgements

We thank Kumaraguru Institute of Agriculture, Erode, Tamil Nadu for provision of required place and financial support for successful conduction of this research.

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