***Original Research Article***

# Growth and Yield of Chilli as Influenced by Plant Growth Regulators and Its Method of Application

## ABSTRACT

The experiment was conducted in the Horticultural Farm of Sher-e-Bangla Agricultural University, Dhaka, Bangladesh during Rabi season to find out the growth, yield and economic benefit of chilli as influenced by plant growth regulators. The experiment consisted of two factors. Factor A: Plant growth regulators (three levels) as G0: Control, G1: NAA (40 ppm), G2: Cytokinin (10 ppm) and Factor B: Application method (three levels) as M1: Seed soaking with plant growth regulators for 6 hours, M2: Foliar spray of plant growth regulators at vegetative stage, M3: Foliar spray of plant growth regulators at flower bud initiation stage. The experiment was laid out in a Randomized Complete Block Design with three replications. In the case of plant growth regulators, the highest yield (33.56 t/ha) was found from G1 treatment, whereas the lowest (13.85 t/ha) from G0 treatment. For the application method, maximum yield (27.12 t/ha) was recorded from M3 treatment, while the minimum yield (19.92 t/ha) from M1 treatment. Due to combined effect, the highest yield (38.10 t/ha) with net income (1075498) and BCR (3.39) was observed from G1M3 treatment combination, while the lowest yield (11.22 t/ha) with net income (147131) and BCR (1.49) from G0M1 treatment combination. So, the economic analysis revealed that the G1M3 treatment combination appeared to be the best for achieving the higher growth, yield and economic benefit of Chilli.

*Keywords: Application Method, Chilli, Growth Regulators and Yield*

## 1. INTRODUCTION

Chilli (*Capsicum frutescens*) is one of the important spices which belong to the family Solanaceae. It is the second most important Solanaceous crop after tomato throughout the world [1]. Green chillies are rich in vitamin A and C and the seed contains traces of starch [2], [3]. Also, peppers are a good source of vitamin-B and vitamin B6, carbohydrate, carotene, thiamine, riboflavin and niacin [4]. The production of chilli is governed not only by the inherent genetic yield potential but also it is greatly influenced by several environmental factors and cultivation practices. But the production of chilli is reduced due to flower and fruit drop, which is caused by physiological and hormonal imbalance in the plants, particularly under unfavorable environments. There is a huge potential to increase the yield of chilli by reducing flower drops and by increasing fruit set. Studies revealed that the application of NAA has been found effective in reducing the flower and fruit drops thereby enhancing the production of chilli per unit area and per unit time. It also plays an important role in stimulating cellular elongation in the shoot, apical bud dominance and root initiation [5]. Another plant growth regulator, cytokinin stimulates cell-division, induce cell-enlargement, break dormancy, shoot initiation and rejuvenation of mature shoots. Although plant growth regulators have great potential for growth improvement their application has to be planned sensibly in terms of optimal concentration, stage of the application and proper application method. Plant growth regulators can be used through different application methods such as foliar spray, seed soaking, drenching, etc. Foliar spray and seed soaking methods are very useful for using these chemicals. But specific information based on research work on many aspects of chilli crop more particularly the application method is still lacking in the literature. The present study was undertaken to evaluate the performance of plant growth regulators and its application method on growth, yield and economic return of chili in Bangladesh.

## 2. MATERIAL AND METHODS

### 2.1. Experimental site

The experiment was conducted at the experimental farm of Sher-e-Bangla Agricultural University, Dhaka-1207 during the period of rabi season from October 2017 to March 2018. The experimental site is situated between 23°75′ N latitude and 90°34′ E longitude and at an elevation of 8.4 m from sea level [6]. The soil was shallow red brown and high land in texture. Soil was having the texture of sandy loam with $p^H$ 5.6.

### 2.2 Experimental frame work

Hybrid seed of chilli (Variety-Anmol) was used as planting materials in the experiment. The experiment was laid out in factorial design in Randomized Complete Block with three replications. Factor-A had three levels of plant growth regulators viz. $G_0$- control, $G_1$- NAA (40 ppm), $G_2$ – Cytokinin (10 ppm) and Factor-B had three different levels of application method viz.$M_1$- Seed soaking with plant growth regulators for 6 hours, $M_2$- Foliar spray with plant growth regulators at vegetative stage, $M_3$- Foliar spray with plant growth regulators at flower bud initiation stage. There were 27 units of plot in the experiment. The size of each plot was 1.6 m x 1.2 m, whichaccommodated 12 plants at a spacing 40 cm x 40 cm.

### 2.3 Application of manure and fertilizers

Fertilizers were applied at 210, 330, 200 kg and 10 ton per ha for urea, TSP, MP and cow dung, respectively (Table 1).

**Table 1. Manure and fertilizer dose in the main field**

| Fertilizer | Quantity | Application method |
|---|---|---|
| Cow dung | 10 t/ha | Basal dose |
| Urea | 210 kg/ha | 15, 25 and 35 DAT |
| TSP | 330 kg/ha | Basal dose |
| MP | 200 kg/ha | ½ basal dose + rest ½ (15 and 25 DAT) |

**Source:** Razzaket. al., 2011 [7]

### 2.4. Economic analysis

The cost of production was calculated to find out the most economic combination of growth regulator and application method. All input cost like the cost for land lease and interests on runningcapital were computed in the calculation. The interests were calculated @ 13% in simple rate. The marketprice of chilli was considered for estimating the return. The benefit cost ratio (BCR) was calculated as follows:

BCR = Gross return per hectare (Tk.) ÷ Cost of production per hectare (Tk.)

### 2.5. Statistical analysis

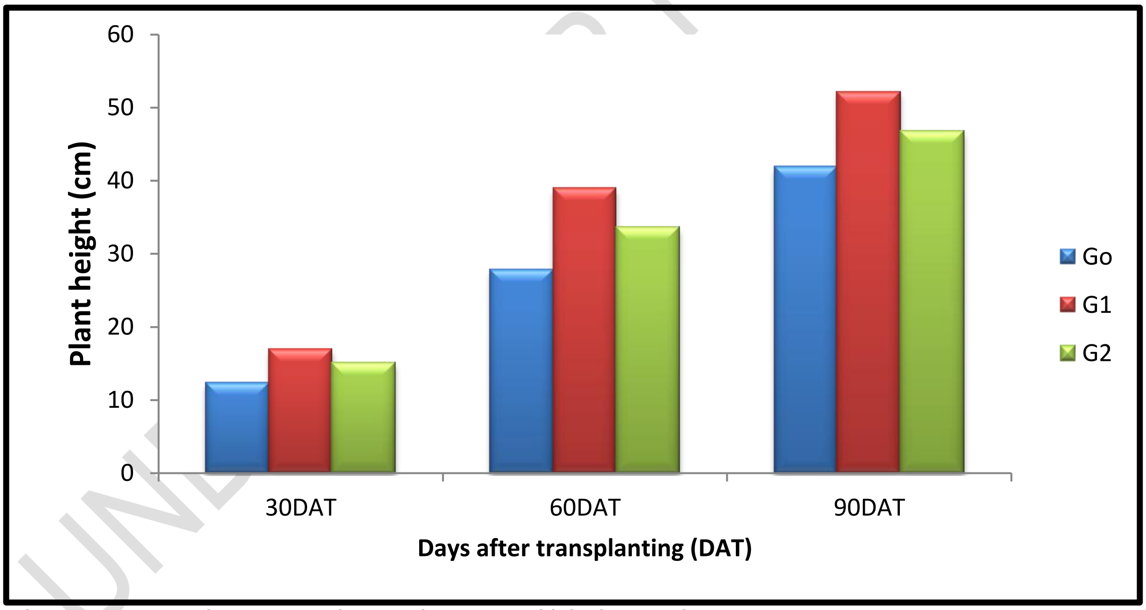
The data collected on different characters were statistically analyzed using MSTAT-C software. The mean values of all the characters were evaluated and analysis of variance was performed by ‘F’ test. The significance of the difference among the treatments means was estimated by Duncan’s Multiple Range Test (DMRT) at 5% level of probability**.**

## 3. RESULTS AND DISCUSSION

### 3.1. Plant height (cm)

Plant height was significantly influenced by plant growth regulators. At 90 DAT, the tallest plant (52.18 cm) was obtained from G1 treatment, while the shortest plant (41.83 cm) was found from G0 treatment (Fig 1 and Table 2). It revealed that plant growth hormone increased plant height, which might be due to regulating effect of exogenous application of PGRs. [8] studied with tomato plants were treated with NAA and supported the results. At 90 DAT, the tallest plant (49.14 cm) was obtained from M2 treatment, while the shortest plant (44.97 cm) was found from M3 treatment (Fig 2 and Table 3).

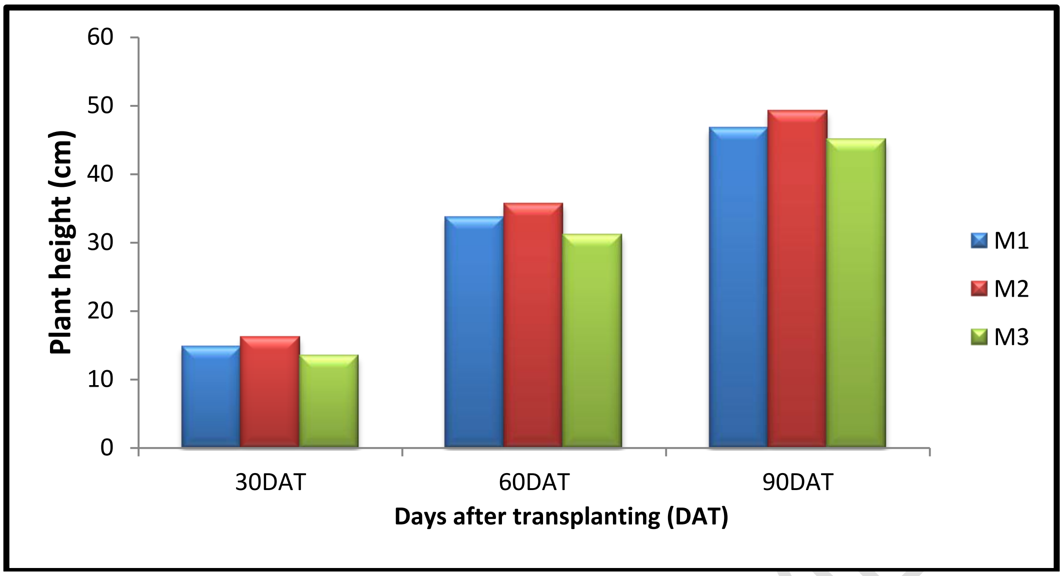
Combined effect showed that the tallest plant (54.50 cm) was observed from G1M2 treatment combination and the shortest plant (40.00 cm) was recorded from G0M3 treatment combination (Table 4). Increasing plant height was observed with application of different concentration of auxin as foliar sprays (NAA 50 ppm) in capsicum under




Where, $G_0$= Control, $G_1$ = NAA (40 ppm) $G_2$ = Cytokinin (10 ppm)

**Fig.1. Effect of plant growth regulators on plant height at different days after transplanting of chilli**

protected condition in Garhwal region, Himachal Pradesh [9].




Where,$M_1$: Seed soaking with plant growth regulators for 6 hours, $M_2$: Foliar spray of plant growth regulators at vegetative, $M_3$: Foliar spray of plant growth regulators at flower bud initiation stage

**Fig.2. Effect of application method on plant height at different days after transplantingof chilli.**

### 3.2. Number of branches per plant

At 90 DAT, the maximum number of branches per plant (17.33 cm) was recorded from G1 treatment, while the minimum number (14.11 cm) was found from G0 treatment which was statistically identitcal to G2 (15.44 cm) (Table 2). Tiwari and Singh, [10] reported that number of branches increased by NAA 40 ppm. At 90 DAT, the maximum number of branches per plant (16.00 cm ) was obtained from M2 treatment, while the shortest plant (15.44 cm) was found from M1 and M3 (Table 3). The maximum number of branches per plant (18.33 cm) was recorded from G1M2 treatment combination which was statistically similar with G1M1 (17.00 cm), G1M3 (16.67 cm), G2M1 (15.33 cm) and G2M3 (16.00 cm) treatment combinations. On the other hand, the minimum number of branches per plant (13.67 cm) was observed from G0M3 treatment combination (Table 4) which was statistically similar to G0M1 (14.00 cm), G0M2 (14.67 cm) and G2M2 (15.00 cm) treatment combination. It was found in present study that plant growth regulators increase number of branches perplant.

### 3.3. Days from transplanting to 1st flowering

The minimum days from transplanting to 1st flowering (50.83 days) was found from G1 treatment, while the maximum (63.00 days) from G0 treatment (Table 2).It is recorded that when NAA has been applied @ 20 ppm the initiation of flowering was earlier by almost one week. Similar finding was recorded by Desai, [11]. The minimum days from transplanting to 1st flowering (55.41 days) was recorded from M2 treatment, while the maximum (59.33 days) was attained from M3 treatment **(**Table 3**)**. The present result indicated that different application method affect in 1st flowering. The minimum days from transplanting to 1st flowering (48.50 days) was found from G1M2 treatment combination, while the maximum (64.00 days) was observed from G0M3 treatment combination (Table 4). From presented data it can be observed that NAA has positive effect on early flower initiation.

### 3.4. Days from transplanting to 50% flowering

The minimum days from transplanting to 50% flowering (90.17 days) was found from $G_1$ treatment, while the maximum days (103.67 days) was attained from $G_0$ (Table 5) treatment. Data recorded on days from transplanting to 50% flowering was in agreed with the findings of [12]. The minimum days from transplanting to 50% flowering (94.50 days) was observed from $M_3$ treatment, while the maximum days (98.83 days) was recorded from $M_1$ treatment, which was statistically identical to $M_2$ (Table 6). The minimum days from transplanting to50%flowering (87.50 days) was showed in $G_1M_3$ treatment combination, while the maximum days (105.50 days) was found from $G_0M_1$ treatment combination which was statistically identical to $G_0M_2$ (Table 7).

**Table 2. Effect of plant growth regulators on growth parameters at different growth stages of chilli**

| Treatments | Plant height (cm) | | | No. of branches per plant | | | Days from transplanting to 1st flowering |
|---|---|---|---|---|---|---|---|
| | 30 DAT | 60 DAT | 90DAT | 30 DAT | 60 DAT | 90DAT | |
| $G_0$ | 12.3c | 27.8c | 41.83c | 3.56c | 8.78c | 14.11b | 63.0a |
| $G_1$ | 16.9a | 38.9a | 52.18a | 6.11a | 12.56a | 17.33a | 50.8c |
| $G_2$ | 15.0b | 33.5b | 46.76b | 5.00b | 11.00b | 15.44b | 58.1b |
| CV % | 6.42 | 8.67 | 8.25 | 12.68 | 11.58 | 8.45 | 12.84 |
| LSD (0.05) | 0.55 | 2.98 | 0.99 | 0.69 | 1.03 | 1.76 | 0.41 |

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly at 0.05 level of probability

**Table 3. Effect of application method on growth parameters at different growth stages of chilli**

| Treatments | Plant height (cm) | | | No. of branches per plant | | | Days from transplanting to 1st flowering |
|---|---|---|---|---|---|---|---|
| | 30 DAT | 60 DAT | 90DAT | 30DAT | 60 DAT | 90DAT | |
| $M_1$ | 14.76b | 33.68ab | 46.66b | 5.00 | 10.78ab | 15.44b | 57.33b |
| $M_2$ | 16.17a | 35.57a | 49.14a | 5.55 | 11.44a | 16.00a | 55.41c |
| $M_3$ | 13.40c | 31.13b | 44.97c | 4.11 | 10.11b | 15.44b | 59.33a |
| CV % | 6.42 | 8.67 | 8.25 | 12.68 | 11.58 | 8.45 | 12.84 |
| LSD (0.05) | 0.49 | 2.76 | 0.77 | NS | 0.98 | 0.48 | 0.73 |

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly at 0.05 level of probability

**Table 4. Combined effect of plant growth regulators and application method on growth parameters at different growth stages of chilli**

| Treatments | Plant height (cm) | | | No of branches per plant | | | Days from transplanting to 1st |
|---|---|---|---|---|---|---|---|
| | 30 DAT | 60DAT | 90DAT | 30 DAT | 60 DAT | 90DAT | |

| | | | | | | | flowering |
|---|---|---|---|---|---|---|---|
| $G_0M_1$ | 12.33e | 28.53de | 41.90f | 3.67 | 9.00de | 14.00bc | 63.00b |
| $G_0M_2$ | 13.93d | 30.40cd | 43.60e | 4.00 | 9.67cd | 14.67bc | 62.00c |
| $G_0M_3$ | 10.67f | 24.67e | 40.00g | 3.00 | 7.67e | 13.67c | 64.00a |
| $G_1M_1$ | 16.77b | 38.73ab | 51.90b | 6.00 | 12.33ab | 17.00ab | 51.00h |
| $G_1M_2$ | 18.60a | 40.80a | 54.50a | 7.00 | 13.33a | 18.33a | 48.50i |
| $G_1M_3$ | 15.47c | 37.33ab | 50.13c | 5.33 | 12.00ab | 16.67abc | 53.00g |
| $G_2M_1$ | 15.20c | 33.80bc | 46.20d | 5.33 | 11.00bc | 15.33abc | 58.00e |
| $G_2M_2$ | 16.00bc | 35.53c | 49.33c | 5.67 | 11.33bc | 15.00bc | 55.50f |
| $G_2M_3$ | 14.07d | 31.40cd | 44.77e | 4.00 | 10.67bcd | 16.00abc | 61.00d |
| CV % | 6.42 | 8.67 | 8.25 | 12.68 | 11.58 | 8.45 | 12.34 |
| LSD (0.05) | 0.96 | 5.20 | 1.42 | NS | 1.79 | 3.06 | 0.71 |

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly at 0.05 level of probability

### 3.5. Number of flowers per plant

The maximum number of flowers per plant (434.12) was recorded from $G_1$ treatment, whereas the minimum number (136.62) was obtained from $G_0$ treatment (Table 5). It was noticed that application of NAA enhanced flower production, reduced flower abscission that contributed the maximum number of flowers per plant compared to plants that treated with others hormone and control. Plant growth regulators play an essential role in flower development [13]. The maximum number of flowers per plant (322.75) was attained from $M_3$ treatment, while the minimum number (234.44) was found from $M_1$ treatment (Table 6). The highest number of flowers per plant (500.29) was recorded from $G_1M_3$ treatment combination, while the lowest number (106.69) was found from $G_0M_1$ treatment combination (Table 7). It can be said that plant growth regulators modify plant physiological process using in small amount and plays an essential role in plant growth, elongation and flower development.

### 3.6. Number of fruits per plant

The highest number of fruits per plant (410.60) was attained from $G_1$ treatment, while the lowest number (83.05) was recorded from $G_0$ treatment (Table 5). Maximum number of fruit was found in plant growth regulators (NAA) treated plants compared to control. Deb et al., [14] found significant response of NAA with respect to number of fruits per plant. The maximum number of fruits per plant (283.31) was obtained from $M_3$ treatment, while the minimum number (193.06) was obtained from $M_1$ treatment (Table 6). The highest number of fruits per plant (480.32) was recorded from $G_1M_3$ treatment combination, while the minimum number (49.35) was found from $G_0M_1$ treatment combination (Table 7).

### 3.7. Individual fruit weight (g)

The maximum weight (6.03 g) of individual fruit was recorded from $G_1$ treatment, while the minimum weight (4.63 g) was observed from $G_0$ treatment (Table 5). The maximum weight (5.67 g) was found from $M_3$ treatment while the minimum (4.93 g) was recorded from $M_1$ treatment which was statistically identical with $M_2$ treatment (Table 6). The maximum weight (6.86 g) of individual fruit was attained from $G_1M_3$ treatment combination, while the minimum weight (4.40 g) was found from $G_0M_1$ treatment combination (Table 7) and it was statistically similar to $G_0M_2$ and $G_0M_3$ treatment combination. From the results of the present study indicated that combined effect of NAA 40 ppm with foliar spray at flower bud initiation stage might have induced better growth condition and ultimately led to increase individual fruit weight per plant. Similar results were noticed by Revanappa, [15].

**Table 5. Effect of plant growth regulators on growth and yield contributing parameters at harvest stage of chilli**

| Treatments | Days from transplanting to 50% flowering | Number of flowers per plant | Number of fruits per plant | Individual fruit weight (g) |
|---|---|---|---|---|
| G0 | 103.67a | 136.62c | 83.05c | 4.63c |
| G1 | 90.17c | 434.12a | 410.60a | 6.03a |
| G2 | 96.67b | 258.81b | 217.86b | 5.09b |
| CV % | 10.75 | 8.32 | 9.56 | 9.56 |
| LSD (0.05) | 1.16 | 5.03 | 8.14 | 0.28 |

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly at 0.05 level of probability

**Table 6.Effect of application method on growth and yield contributing parameters at harvest stage of chilli**

| Treatments | Days from transplanting to 50% flowering | Number of flowers per plant | Number of fruits per plant | Individual fruit weight (g) |
|---|---|---|---|---|
| M1 | 98.83a | 234.44c | 193.06c | 4.93b |
| M2 | 97.17a | 272.35b | 235.14b | 5.16b |
| M3 | 94.50b | 322.75a | 283.31a | 5.67a |
| CV % | 10.75 | 8.32 | 9.56 | 9.56 |
| LSD (0.05) | 1.22 | 4.76 | 3.87 | 0.38 |

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly at 0.05 level of probability

**Table 7. Combined effect of plant growth regulators and application method on growth and yield contributing parameters at harvest stage of chilli**

| Treatments | Days from transplanting to 50%flowering | Number of flowers per plant | Number of fruits per plant | Individual fruit weight (g) |
|---|---|---|---|---|
| G0M1 | 105.50a | 106.69i | 49.35i | 4.40e |
| G0M2 | 104.50a | 134.36h | 90.35h | 4.68de |
| G0M3 | 101.00b | 168.80g | 109.45g | 4.82de |
| G1M1 | 92.50e | 381.71c | 356.48c | 5.42bc |
| G1M2 | 90.50e | 420.36b | 395.01b | 5.82b |
| G1M3 | 87.50f | 500.29a | 480.32a | 6.86a |
| G2M1 | 98.50c | 214.92f | 173.35f | 4.96cd |
| G2M2 | 96.50cd | 262.33e | 220.07e | 4.99cd |
| G2M3 | 95.00d | 299.17d | 260.16d | 5.33bc |
| CV % | 10.75 | 8.32 | 9.56 | 9.56 |

| | | | | |
|---|---|---|---|---|
| LSD (0.05) | 2.01 | 2.06 | 1.24 | 0.48 |

### 3.8. Length and diameter of fruit (cm)

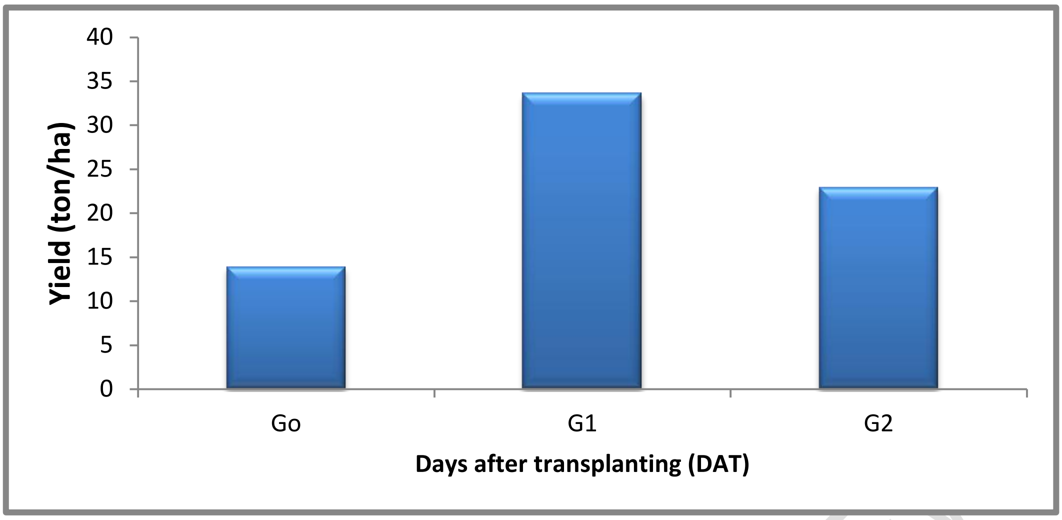
Application of different plant growth regulators varied significantly on length and diameter of fruit. Maximum fruit length (8.74 cm) and diameter (0.78 cm) of chilli were found in $G_1$ treatment, whereas minimum fruit length (7.86 cm) and diameter (0.61 cm) were recorded from $G_0$ treatment (Table 8). Plant growth regulators have possibility to increase length of fruit. The finding was also supported by Hasanuzzaman et al.,[16]. However, maximum (8.44 cm) fruit length was found in $M_3$ treatment which was statistically identical to $M_2$ treatment and maximum diameter (0.72 cm) was found in $M_3$ treatment, whereas minimum fruit length (8.06 cm) and diameter (0.66 cm) were recorded in $M_1$ treatment (Table 9). Maximum fruit length (8.98 cm) was recorded in $G_1M_3$ treatment combination which was statistically identical to $G_1M_2$ (8.85) and maximum diameter (0.81 cm) also found in $G_1M_3$ treatment combination, whereas minimum fruit length (7.70 cm) was recorded in $G_0M_1$ treatment combination which was statistically similar to $G_0M_2$ (7.86 cm) and $G_0M_3$ (8.02 cm) and $G_0M_1$ gave the minimum diameter (0.60 cm) of fruit which was statistically identical to the treatment combination of $G_0M_2$ (0.61) (Table10).

### 3.9. Yield per plant (g)

Yield is the main achievement for performing production of a crop. Highest and quality yield is the main target of producing crop. Under the present study, the highest yield per plant (516.66 g) was found from $G_1$ treatment, while the lowest yield per plant (177.25 g) was observed from $G_0$ treatment (Table 8). The highest yield per plant (401.05 g) was found from $M_3$ treatment, while the lowest yield per plant (289.33 g) was recorded from $M_1$ treatment (Table 9). Combined effect showed that the highest yield per plant (583.21 g) was attained from $G_1M_3$ treatment combination, while the lowest yield per plant (134.34 g) was found from $G_0M_1$ (Table 10) treatment combination. This result also is in agreement with the findings of Bhalekar et al., [17] where he revealed that NAA spray at flowering stage recorded higher fruit yield compared to control.

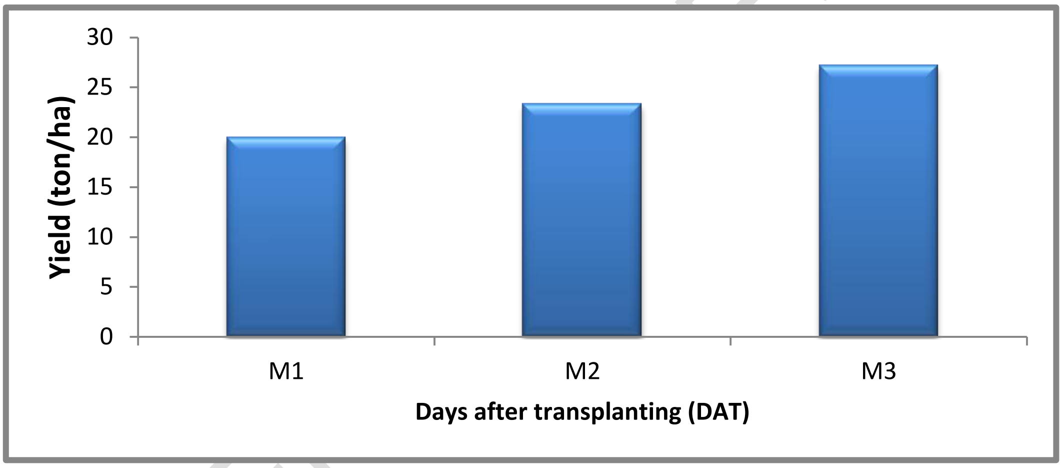
### 3.10. Yield per hectare (ton)

Application of different plant growth regulators significantly affects yield of chilli. The highest yield per hectare (33.56 ton) was observed from $G_1$ treatment, while the lowest yield per hectare (13.85 ton) was recorded from $G_0$ treatment (Fig 3 and Table 8). Pargi, [18] conducted a pot experiment on tomato and found maximum yield of tomato with NAA @ 40 ppm followed by NAA @ 30 ppm. These results proved that the maximum growth, yield and yield attributes were found with plant growth regulators than control. In case of application method, the highest yield per hectare (27.12 ton) was recorded from $M_3$ treatment, while the minimum yield per hectare (19.92 ton) was observed from $M_1$ treatment (Fig 4 and Table 9). The maximum yield per hectare (38.10 ton) was recorded from $G_1M_3$ treatment combination, while the minimum yield per hectare (11.21 ton) was found from $G_0M_1$ treatment combination (Table 10).




Where, $G_0$= Control $G_1$ = NAA (40 ppm) $G_2$ = Cytokinin (10 ppm)

**Fig.3.Effect of plant growth regulators on yield per hectare (ton) at different days aftertransplanting**




Where, $M_1$: Seed soaking with plant growth regulators for 6 hours, $M_2$: Foliar spray of plant growth regulators at vegetative stage, $M_3$: Foliar spray of plant growth regulators at flower bud initiation stage

**Fig. 4.Effect of application method on yield per hectare (ton) at different days after transplanting**

**Table 8. Effect of plant growth regulators on growth and yield contributing parameters at harvest stage of chilli**

| Treatments | Length of fruit (cm) | Diameter of fruit (cm) | Yield per plant (g) | Yield per hectare (ton) |
|---|---|---|---|---|
| $G_0$ | 7.86c | 0.61c | 177.25c | 13.85c |
| $G_1$ | 8.74a | 0.78a | 516.66a | 33.56a |
| $G_2$ | 8.23b | 0.68b | 332.44b | 22.89b |
| CV % | 11.43 | 9.27 | 10.78 | 10.38 |
| LSD (0.05) | 0.21 | 0.05 | 9.06 | 2.02 |

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly at 0.05 level of probability

**Table 9. Effect of application method on growth and yield contributing parameters at harvest stage of chilli**

| Treatments | Length of fruit (cm) | Diameter of fruit (cm) | Yield per plant (g) | Yield per hectare (ton) |
|---|---|---|---|---|
| M1 | 8.06b | 0.66c | 289.33c | 19.92c |
| M2 | 8.32a | 0.70b | 335.97b | 23.26b |
| M3 | 8.44a | 0.72a | 401.05a | 27.12a |
| CV % | 11.43 | 9.27 | 10.78 | 10.38 |
| LSD (0.05) | 0.19 | 0.03 | 7.21 | 1.34 |

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly at 0.05 level of probability

**Table 10. Combined effect of plant growth regulators and application method on growth and yield contributing parameters at harvest stage of chilli**

| Treatments | Length of fruit (cm) | Diameter of fruit (cm) | Yield per plant (g) | Yield per hectare(ton) |
|---|---|---|---|---|
| G0M1 | 7.70d | 0.60e | 134.34i | 11.21i |
| G0M2 | 7.86cd | 0.61e | 168.03h | 13.85h |
| G0M3 | 8.02bcd | 0.63d | 229.38g | 16.50g |
| G1M1 | 8.39b | 0.73b | 456.48c | 29.22c |
| G1M2 | 8.85a | 0.79a | 510.30b | 33.36b |
| G1M3 | 8.98a | 0.81a | 583.21a | 38.10a |
| G2M1 | 8.11bc | 0.64d | 277.17f | 19.34f |
| G2M2 | 8.24bc | 0.70c | 329.59e | 22.57e |
| G2M3 | 8.33b | 0.71bc | 390.55d | 26.78d |
| CV % | 11.43 | 9.27 | 10.78 | 10.38 |
| LSD (0.05) | 0.37 | 0.02 | 2.10 | 0.14 |

In a column means having similar letter(s) are statistically similar and those having dissimilar letter(s) differ significantly at 0.05 level of probability

## 4. CONCLUSION

Considering the above result of this experiment it can be said that plant growth regulator (NAA 40 ppm) was superior to the others. The application method played a vital role in the growth and yield of chilli. In respect of all, foliar spray of plant growth regulators at flower bud initiation stage showed better performance than others. The combined application of NAA with foliar spray at flower bud initiation stage is more suitable for chilli crop production.

## COMPETING INTERESTS

The authors have declared that no competing interests exist.

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