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Effects of Plant Spacing and Indole-3-Acetic Acid on Vegetative Growth, Flowering and Yield Features of Gladiolus (*Gladiolus palustris*)

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Abstract: The experiment was carried out at the Horticulture Farm of Bangladesh Agricultural University (BAU), Mymensingh during the epoch from November, 2020 to April, 2021 with the aim to observe the outcomes of plant spacing and indole-3 acetic acid (IAA) concentrations on the vegetative growth, flowering and yield features of gladiolus. The research was two factors, Factor A: three plant spacing viz. S_1 = 15 cm x 25 cm, S_2 = 20 cm x 25 cm, S_3 = 25 cm x 25 cm and Factor B: different concentrations of indole-3-acetic acid (IAA) viz. I_1= IAA 0 ppm, I_2=100 ppm and I_3=150 ppm. It was Randomized Complete Block Design with three replications. The 25 cm × 25 cm spacing showed best performance in respect to plant height (69.88 cm), yield of flower (162.22 t ha^{-1}), yield of corm (15.65 t ha^{-1}), and yield of cormel (14.32 t ha^{-1}) than the other spacing. Application of IAA at a rate of 150 ppm was initiated to be excellent for plant height (68.51 cm), yield of flower (162.67 t ha^{-1}), yield of corm (15.57 t ha^{-1}) and yield of cormel (13.93 t ha^{-1}). Regarding the combined effect of treatments, 150 ppm IAA with wider plant spacing was found to be best for plant height (70.73cm), yield of flower (166.67 t ha^{-1}), diameter of corm (7 cm) and weight of cormel per plant (81.87gm). Considering the above findings, it was apparent that the combination of 25 cm × 25 cm spacing with 150 ppm IAA application was suitable for better growth, flowering and yield/production of gladiolus.

Keywords: Indole-3-Acetic Acid (IAA), Corm and Cormel, AEZ, Spacing, Gladiolus

1. Introduction

Gladiolus (*Gladiolus grandiflorus)* is a cut flowers which is one of the mass monumental in the flower industry. It holds four space in universal cut flower commerce. It belongs to the family Iridaceae. Gladiolus is known as the queen of bulbous cut flowers due to its flower spikes with florets of large form, good colours because of its flower of glamour and perfection and smell.

Gladiolus is adult as flower bed in gardens and conducted in floral treatment for common ornament as well as making good characteristic bouquets [1]. The area of flower occurrence arrives to be increment significantly, also the annual commerce in the gross equality to be value between 500-1000 million and the calculated field of circa 10,000 ha taka in Bangladesh [2]. Gladiolus have widely fulfill in medicines for concern, diarrhea, rheumatism, lumbago and allied pains., Afterwards ornamental fountain,

The gladiolous productivity, of quality spikes, yeild produced are known to influence by few factors such as plant spacing, cultivar, plant density, corm size, etc.

So, it's obligatory to take measures over intelligence to the plant for higher quality and productivity. Gladiolus size of

the mother corm and spacing, play an significant role which as well as yield quality of flower spikes and daughter corms builds on few factors. Though, no of corms, cormels, and spikes produced per plot is influenced by plant spacing. which execution of these crops is greatly influenced by it [3]. Gladiolus has been being found to influence growth, flowering and yield of crom by Spacing [4, 5]. A spacing of 30 x 40 cm for the diversity of American blossom was suggested [6]. A spacing 25 ×10 cm and massive cormel (7.0 ± 0.2 g) was Visible for occurrence of virtue flowers and corm of gladiolus [31]. The corm size was based that spike length, flower diameter, floret number, weight and size of corms were tumid with the grown. It was increased that wide spacing (25 x 20 cm) was connected with best flowering, corm and cormel production [5].

In few factors impressing growth, quality and yield of flowers the appeal of plant accrual controller is the most important [7]) which needs further rating for their acting under local agro climatic state as well as under controlled situation in green houses. The effect of IAA and BA on growth, flowering and corm production of cut flower gladiolus was observed by Sweety, R. et al., (2019) [8]. The various concentration of IAA (0, 100, 150 and 200 mg/l) and BA (0, 100, 150 and 200 mg/l) were medicated by Initial bulbs. The outcomes reported that IAA and BA grown germination defeat of gladiolus. Also onset lag flower, blub wing and diameter of floret affected by IAA and BA. The outcomes tested that maximum amount of sugar were in petal and leaves which were treated with IAA 100 and 200 mg/l. The role of plant spacing and indole-3-acetic acid on various morphological and floral attributes of gladiolus, present research was started the effect of different condensation of indole-3-acetic acid and plant spacing on growth, flowering, corm and cormel production of gladiolus, Keeping in sight the above mentioned.

2. Materials and Methods

2.1. Soil and Climate of the Experimental Site

The experiment was audited at the Laboratory of the Department of Horticulture and Horticulture Farm, BAU. The average high land belonging to the Old Brahmaputra Floodplain beneath the AEZ 9 having non-calcareous dark gray floodplain soil was sited. [32] The soil of the pilot plot was salty loam in neutral (pH 6.8) and texture in reaction, which is compatible for gladiolus production.

2.2. Treatments of the Investigation and Experimental Design

There were two factors with three balance in this experiment such as Factor A: Plant spacing (cm) S_1= 15 cm x 25 cm, S_2=20 cm× 25 cm, S_3=25 cm× 25 cm. Factor B: Different condensation of IAA: I_0:0 ppm IAA, I_1: 100 ppm IAA, I_2: 150 ppm IAA. There were altogether 9 treatment combinations in this trial. The two-factor experiment was laid out in RCBD with 3 replications. The treatments were estimated at random where each block was separated into 9 plots. There were 27 (9 x 3) unit plots in the research. The size of a unit portion was 1 m x 1 m. The distance between the blocks was 50 cm and between the adjoining plot was 25 cm.

2.3. Land Preparation and Planting Materials Used for the Experiment

The land is prepared few ploughing power tiller followed by laddering to attain a good tilth. The weeds were dispelled. All are approximately uniform sized corms were collected from Landscape Section, Department of Horticulture, BAU.

2.4. Collection of Data

The width of the plant from bottom level up to the apex of the leaf was measured by plant tallness. Height of five randomly selected plants of each plot. Days required 80% emergence / spike initiation was observed by calculation the days from planting to first direct emergence of plants from each unit plot. Length of the spike was surveyed from bottom to the apex of the spike before harvesting time [4]. Numbers of florets per spike and per portion were numbered severally from ten randomly specific spike of each portion. All florets of the portion were calculated individually. All tillers of the hole were numbered severally from ten randomly elected hills. A glide calipers was habituated to dimension the space of the florets. Number of spike per plot and converted to per hectare per hectare was received by calculating yield of flower [9]. Corms divided from the plants and weight of corm was made by electrical scale. Weight of corms per hectare was counted by moving the yield of corms per portion to per hectare. [5] Number of cormels per plant/per portion. Cormels were detached from the corms of ten sample plants and all data moderate was counted. Cormels were divided from corms and the weight of cormels was taken by electrical scale. Weight of cormels per hectare and yield of cormels, was counted by converting the yield of cormels per plot to per hectare.

2.5. Statistical Analysis

The collected data were statistically analyzed by using MSTAT-C computer package program in various characters. The mean for all the treatments was counted and the analysis of variance for each of the characters was edited by F test. The differences between the treatment means were appreciated by least significant difference (LSD) test at 1% or 5% probability wherever applicable [10].

3. Results and Discussion

3.1. Main Effect of Plant Spacing and IAA on Plant Height

The tallest gladiolus plant 41.42 cm, 66.49 cm and 69.88 cm) at 20 DAP, 40 DAP and 60 DAP were filed in wider. The shortest gladiolus plant and plant spacing (38.09 cm, 64.93 cm and 65.67 cm) at 20 DAP, 40 DAP and 60 DAP

were filed at 15×25 cm plant spacing. The greatest plant height (68.51 cm) was filed from 150 ppm IAA, while it was the least (39.22 cm) at control (Figure 1). These results are in agreement [4].

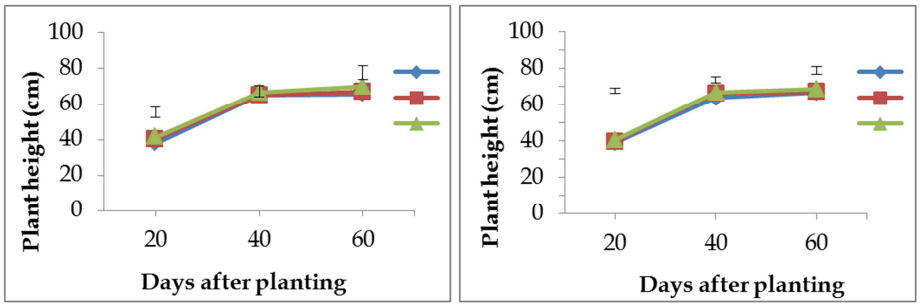

Figure 1. *Main effect of plant spacing and IAA on plant height Vertical bars represent the LSD at 1% level of probability.** = Significant at 1% level of probability I_0 = 0 ppm, I_1 = 100 ppm, I_2 = 150 ppm.*

3.2. Main Effect of Plant Spacing on Growth of Gladiolus

The effect of different plant spacing of gladiolus was Statistically momentous distinction were filed days required for 80% emergence. S_3 space took 27.48 days and 1st spike inclination of the least time (68.18 days) and the greatest time (72.04 days), 80% spike inclination greatest time (78.93 days) required for 80% spike inclination harvest was filed for S_1 spacing. The greatest spike length (79.63 cm) was reported. Plants from S_3 spacing portion created the longest rachis (44.71) and shortest rachis (41.17 cm). Plants from longer plant to plant spacing grown the highest number (13.86) of florets and lowest number (13.29) of florets per spike. (Table 1). These findings are in coordinate with the reports of gladiolus by Pandey et al., (2012) and Afrin, (2007) [11, 12].

Table 1. *Main effect of plant spacing on growth of gladiolus.*

Plant spacing	Days required 80% emergence	Days required 1st spike initiation	Days required for 80% spike initiation	Spike length (cm)	Rachis length (cm)	No. of florets per spike
S_1	27.48	72.04	78.93	74.28	41.17	13.29
S_2	27.40	70.07	74.62	76.08	43.57	13.45
S_3	27.29	68.18	72.98	79.63	44.71	13.86
$LSD_{0.01}$	0.082	0.157	0.404	0.144	0.113	0.050
Level of significance	**	**	**	**	**	**

** = Significant at 1% level of probability. S_1 = 15 cm x 25 cm, S_2 = 20 cm x 25 cm, S_3 = 25 cm x 25 cm

3.3. Main Effect of IAA on Growth of Gladiolus

The maximum days for 80% emergence recorded (27.55) in I_0, The maximum period (75.93 days) and the minimum time (64.84 days) constituted for first spike initiation in the plot with 150 ppm IAA applications. The highest period (80.71 days) required for 80% spike inclination in I_0 whereas the lowest (70.40 days) in I_2. The spike length (79.58 cm) maximum was noted in I_2 whereas the (74.48 cm) minimum in the control. The maximum number of florets per spike (13.67) was obtained from the plant treated with 150 ppm IAA. (Table 2). The findings were also attained by Waskar et al., (2015) to reveal that plant growth regulators on growth and flower characteristic of gladiolus is significant by foliar application [7].

Table 2. *Main effect of IAA on growth of gladiolus.*

Indole-3-acetic acid	Days required 80% emergence	Days required 1st spike initiation	Days required for 80% spike initiation	Spike length (cm)	Rachis length (cm)	No. of florets per spike
I_0	27.55	75.93	80.71	74.48	42.26	13.40
I_1	27.43	69.51	75.42	75.94	42.31	13.53
I_2	27.18	64.84	70.40	79.58	44.88	13.67
$LSD_{0.01}$	0.082	0.157	0.404	0.144	0.113	0.050
Level of significance	**	**	**	**	**	**

** = Significant at 1% level of probabilityI_0 = 0 ppm, I_1 = 100 ppm, I_2 = 150 ppm

3.4. Main Effect of Plant Spacing on Flowering of Gladiolus

Plants from longer plant to plant spacing grown the greatest amount (69.23) of florets per plot. Elsewhere, plant nubile from shorter plant to plant spacing made the lowest number (2.11) of tillers per hill. The greatest number of tillers per hill (2.49) was acquired from the plant acted with 150 ppm IAA. The 25 cm × 25 cm spacing created the corm

of highest range between florets (6.51 cm) while it was lowest (6.08 cm) in 15 cm × 25 cm spacing (Table 3). This results were also observed by [13-15].

Table 3. *Main effect of plant spacing on flowering of gladiolus.*

Plant spacing	No. of florets per plot	No. of tillers per hill	Distance between florets (cm)
S_1	66.72	2.11	6.08
S_2	67.89	2.22	6.21
S_3	69.23	2.51	6.51
$LSD_{0.01}$	0.155	0.045	0.069
Level of significance	**	**	**

** = Significant at 1% level of probability, S_1 = 15 cm x 25 cm, S_2 = 20 cm x 25 cm, S_3 = 25 cm x 25 cm.

3.5. Main Effect of IAA on Flowering of Gladiolus

The greatest number of florets per plot (68.89) and least number (66.94) was gained from the plant medicated with 150 ppm IAA and control plots. The highest difference between florets (6.36 cm) was observed from insertion of 150 ppm indole-3-acetic acid while it was the lowest (6.15) at control. (Table 4).

Table 4. *Main effect of IAA on flowering of gladiolus.*

Indole-3-acetic acid	No. of florets per plot	No. of tillers per hill	Distance between florets (cm)
I_0	66.94	2.07	6.15
I_1	68.00	2.29	6.29
I_2	68.89	2.49	6.36
$LSD_{0.01}$	0.155	0.045	0.069
Level of significance	**	**	**

** = Significant at 1% level of probability. I_0 = 0 ppm, I_1 = 100 ppm, I_2 = 150 ppm.

3.6. Main Effect of Plant Spacing and IAA on Yield of Corm Gladiolus

The maximum (72.38 g) weight in S_3 and minimum (41.84 g) in S_1 of corm per plant was recorded. The maximum weight (1.46 kg) of corm/plant was recorded in S_1 spacing. The S_3 spacing produced the corm of highest diameter (7 cm) while it was lowest (5.33 cm) in S_1 cm spacing. The maximum (66.40 g) minimum (54.69 g) weight of corm per plant was filed with 150 ppm IAA. The lowest (1.07 kg) weight of corm/plot was filed in the portion with control and highest (1.28 kg) weight with 150 ppm IAA application (Table 5). These results are approximately similar with the observation [16, 14], where they explained that, IAA flourish vegetative swelling and raises the metabolic operation and photosynthetic making more transit and utilization of photosynthetic products turning quickly flowering in gladiolus.

Table 5. *Main effect of plant spacing and IAA yield of corm of gladiolus.*

Plant spacing	Weight of corm (g)/plant (g)	Weight of corm/plot (kg)	Indole-3-acetic acid	Weight of corm (g)/plant (g)	Weight of corm/plot (kg)
S_1	41.84	0.87	I_0	54.69	1.07
S_2	65.60	1.20	I_1	58.73	1.18
S_3	72.38	1.46	I_2	66.40	1.28
$LSD_{0.01}$	0.675	0.031	$LSD_{0.01}$	0.675	0.031
Level of significance	**	**	Level of significance	**	**

** = Significant at 1% level of probability. S_1 = 15 cm x 25 cm, S_2 = 20 cm x 25 cm, S_3 = 25 cm x 25 cm

3.7. Main Effect of Plant Spacing and IAA Yield of Cormel of Gladiolous

The lowest number of cormel (43.27 g) and highest (58.38 g) was obtained from S_3 spacing. Besides, number of cormel per plant (55.36 g) was found in 150 ppm concentrations of IAA while lower (49.38 g) at control. The highest average weight (75.95 g) was obtained from S_3 spacing. Besides, weight of cormel per plant (71.87 g) was observed in 150 ppm concentrations of IAA while lower (59.27 g) at control. The maximum cormel yield (14.32 t/ha) was filed from 25 cm × 25 cm spacing and the minimum (13.04 t/ha) was filed for S_1 spacing. The greatest cormel yield (13.93 t/ha) was realized with 150 ppm IAA application (Table 6). Similar results were also gained by Afrin, S. (2007) and Baskaran & Misra, 2007) [12, 17].

Table 6. *Main effect of plant spacing and IAA yield of cormel of gladiolus.*

Plant spacing	No. of cormel per plant	Average weight of cormel per plant (g)	Average weight. of cormel per plot (kg)	Yield of cormel (t/ha)	Indole-3-acetic acid	No. of cormel per plant	Average weight of cormel per plant (g)	Average weight. of cormel per plot (kg)	Yield of cormel (t/ha)
S_1	43.27	50.40	0.94	13.04	I_0	49.38	59.27	1.05	13.36
S_2	55.16	71.89	1.20	13.49	I_1	52.07	67.11	1.15	13.56
S_3	58.38	75.95	1.34	14.32	I_2	55.36	71.87	1.27	13.93
$LSD_{0.01}$	0.397	1.040	0.020	0.071	$LSD_{0.01}$	0.397	1.040	0.020	0.071
Level of sig.	**	**	**	**	Level of sig.	**	**	**	**

** = Significant at 1% level of probability. S_1 = 15 cm x 25 cm, S_2 = 20 cm x 25 cm, S_3 = 25 cm, 25 cm, I_0 = 0 ppm, I_1 = 100 ppm, I_2 = 150 ppm

3.8. Combined Effects of IAA and Plant Spacing on Plant Height at Different Days After Planting of Gladiolus

The Combined effects of IAA and spacing showed cabalistic distinction in reverence of plant height. The tallest gladiolus plant (70.73 cm) at 60 DAP was filed in I_3S_3 combination and the lowest gladiolus plant (64.60 cm) was filed in I_0S_1 convention (Table 7). These findings are in coordinate with the response [18], in gladiolus. In gladiolus the early emergence of spike in wider spacing has been indicated earlier [19]. Similar results were also observed by Sudhakar & Kumar, (2012). and Kamal, N., et al, (2013) [14, 15].

Table 7. *Combined effects of IAA and plant spacing on plant height at different days after planting of gladiolus.*

Treatment combination	Plant height (cm) at different days after planting (DAP)		
	20	40	60
I_0S_1	37.93	63.07	64.60
I_0S_2	40.33	65.07	66.93
I_0S_3	39.40	63.40	68.80
I_1S_1	38.13	66.13	65.00
I_1S_2	39.67	65.53	66.47
I_1S_3	42.27	67.00	70.10
I_2S_1	38.20	65.60	67.40
I_2S_2	40.60	65.53	67.40
I_3S_3	42.60	69.07	70.73
$LSD_{0.01}$	0.198	0.242	0.280
Level of significance	**	**	**

** = Significant at 1% level of probability I_0 = 0 ppm, I_1= 100 ppm, I_2 = 150 ppm, S_1 = 15 cm x 25 cm, S_2 = 20 cm x 25 cm, S_3 = 25 cm x 25 cm.

3.9. Combined Effects of IAA and Plant Spacing on Growth of Gladiolus

The I_2S_3 summation hold the least time (27 days) for 80% inflorescence origin while 27.60 days was requisited by I_0S_1 summation. The maximum length of spike (82.13 cm) in I_2S_3 and minimum (71.87 cm) was grown from I_0S_1 combination. The Number of florets per spike plant was greatest number (14.17) I_2S_3 combination. (Table 8). These results are in agreement with the findings of gladiolus by Methela, N. J. et al., (2019) and Sudhakar, M., & Kumar, S. R. (2012) [4, 14]. IAA stipulated the include moving unto the inflorescence at the charge of corm which produced in the best quality spike [18, 20, 21, 26, 8].

Table 8. *Combined effects of IAA and plant spacing on growth of gladiolus.*

Treatment combination	Days required 80% emergence	Days required 1st spike initiation	Days required for 80% spike initiation	Spike length (cm)	Rachis length (cm)	No. of florets per spike
I_0S_1	27.60	79.67	85.07	71.87	40.47	13.13
I_0S_2	27.53	75.20	78.67	73.57	42.13	13.40
I_0S_3	27.53	72.93	78.40	78.00	44.17	13.67
I_1S_1	27.57	72.60	80.67	73.67	41.37	13.33
I_1S_2	27.40	69.33	74.27	75.37	42.27	13.53
I_1S_3	27.33	66.60	71.33	78.77	43.30	13.73
I_2S_1	27.27	63.87	71.07	77.30	41.67	13.40
I_2S_2	27.27	65.67	70.93	79.30	46.30	13.43
I_2S_3	27.00	65.00	69.20	82.13	46.67	14.17
$LSD_{0.01}$	0.142	0.272	0.699	0.249	0.195	0.087
Level of significance	**	**	**	**	**	**

** = Significant at 1% level of probability. I_0 = 0 ppm, I_1 = 100 ppm, I_2 = 150 ppm, S_1 = 15 cm x 25 cm, S_2 = 20 cm x 25 cm, S_3 = 25 cm x 25 cm

3.10. Combined Effects of IAA and Plant Spacing on Flowering of Gladiolus

The highest appraisal of florets per portion was (70.67) in I_2S_3 combination and lowest was (64.50) in I_0S_1 combination. The highest distance between florets (6.60 cm) was filed from the longer spacing of plant to plant and the lowest (5.93 cm) in I_0S_3 combination at shorter plant spacing. The greatest (80.13 g) heft of corm per plant was filed in I_2S_3 combination. Weight of corm per plot was found that the highest (1.65 kg) heft of corm per portion was filed in I_2S_3 combination and the lowest (0.82 kg) weight of individual corm was recorded in I_0S_1 combination. (Table 9). This is inconformity with the work by Bhat, Z. A., et al., (2010); Bhat, Z. A., et al., (2009); Bhat, Z. A., & Khan, F. U. (2007) [23, 24, 19]. Similar results were also reported by the findings of Jinesh, P. M., et al., (2011); Sajid, M., et al., (2015); and FAO, (1998) [9, 25, 32].

Table 9. *Combined effects of IAA and plant spacing on flowering of gladiolus.*

Treatment combination	No. of florets per plot	No. of tillers per hill	Distance between florets (cm)	Diameter of corm (cm)	Weight of corm (g)/plant (g)	Weight of corm/plot (kg)
I_0S_1	64.50	1.80	5.93	5.00	39.80	0.82
I_0S_2	68.00	1.87	6.09	6.00	60.00	1.09
I_0S_3	68.33	2.53	6.43	7.00	64.27	1.31
I_1S_1	67.67	2.20	6.13	5.00	41.53	0.86
I_1S_2	67.67	2.33	6.23	6.00	61.93	1.25
I_1S_3	68.67	2.33	6.50	7.00	72.73	1.42
I_2S_1	68.00	2.33	6.17	6.00	44.20	0.94
I_2S_2	68.00	2.47	6.30	7.00	74.87	1.25
I_2S_3	70.67	2.67	6.60	7.00	80.13	1.65
$LSD_{0.01}$	0.269	0.078	0.119	0.307	1.168	0.054
Level of significance	**	**	**	**	**	**

** = Significant at 1% level of probability,
I_0 = 0 ppm, I_1= 100 ppm, I_2= 150 ppm S_1 = 15 cm x 25 cm, S_2 = 20 cm x 25 cm, S_3 = 25 cm x 25 cm

3.11. Combined Effects of IAA and Plant Spacing on Yield of Gladiolus

It was found as the highest yield of flower (166.67 t/ha) was observed in I_2S_3 combination and the least yield of flower (136.67 t/ha) was executed in I_0S_1 combination. These results are in agreement with the findings of [8, 14] in gladiolus. The highest corm yield (16.65 t/ha) and cormel yield (14.38 t/ha) were filed in I_2S_3 combination and the least corm yield (14.29 t/ha) and cormel yield (12.57 kg/ha) were recorded in I_0S_1 combination. (Figure 2). This is inconformity with the work [27, 28].

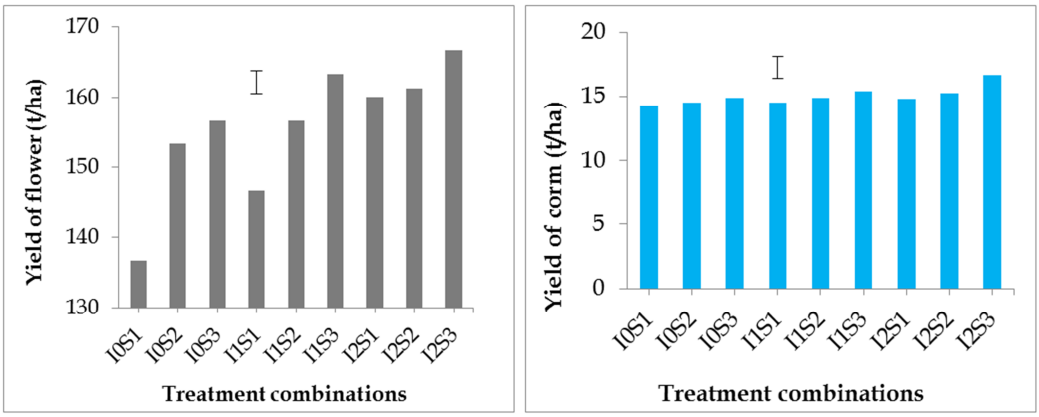

Figure 2. *Combined effects of IAA and plant spacing on yield of gladiolus. Vertical bars represent the LSD at 1% level of probability. I_0 = 0 ppm, I_1 = 100 ppm, I_2 = 150 ppm S_1 = 15 cm x 25 cm, S_2 = 20 cm x 25 cm, S_3 = 25 cm x 25 cm.*

3.12. Combined Effects of IAA Yield of Cormel of Gladiolus

The lowest number of cormel per plant (41.67 g) in the I_0S_1 and highest (62.80 g) was found from the I_2S_3 treatment combination. The maximum weight of cormel per plant (81.87 g) was found from I_2S_3 and the minimum (48.53 g) in I_0S_1 treatment combination. It was observed that the maximum cormel yield (14.38 t/ha) was recorded in I_2S_3 combination and the minimum cormel yield (12.54 t/ha) was recorded in I_0S_1 combination (Table 10). This observation is similar to the findings [3, 29, 22, 30] Response of plant spacing, GA_3, and planting thickness on flowering,

outgrowth and yield is impact role.

Table 10. *Combined effects of IAA yield of cormel of gladiolus.*

Treatment combination	No. of cormel per plant plant	Average weight of cormel per plant (g)	Average weight. of cormel per plot (kg)	Yield of cormel (t/ha)
I_0S_1	41.67	48.53	0.91	12.57
I_0S_2	53.13	64.00	0.97	13.27
I_0S_3	53.33	65.27	1.27	14.24
I_1S_1	42.73	50.00	0.94	12.87
I_1S_2	54.47	70.60	1.21	13.48
I_1S_3	59.00	80.73	1.30	14.33
I_2S_1	45.40	52.67	0.96	13.68
I_2S_2	57.87	81.07	1.42	13.73
I_2S_3	62.80	81.87	1.45	14.38
$LSD_{0.01}$	0.687	1.801	0.035	0.124
Level of significance	**	**	**	**

** = Significant at 1% level of probability

I_0 = 0 ppm, I_1 = 100 ppm, I_2 = 150 ppm, S_1 = 15 cm x 25 cm, S_2 = 20 cm x 25 cm, S_3 = 25 cm x 25 cm.

4. Conclusion

On the basis of above discussion it can be terminated that various plant spacing and application of different concentrations of IAA acted cabalistic character on the plant growth, flowering and yield assigning role of gladiolus. The spacing of 25 cm x 25 cm and application of 150 ppm IAA was observed to be the best for on growth, flowering and yield of gladiolus. In this test combination of 25 cm × 25 cm spacing and 150 ppm IAA was found with the best treatment for most of the parameters studied with maximum yields of corm (16.65 t ha^{-1}) and cormel (14.38 t ha^{-1}) of gladiolus.

5. Recommendations

Further studies may be suggested to conduct such experiment with GA_3, or other plant growth regulator, will be impacted role of other quality on gladiolus production. It also treated with different depth of ploughing.

Authors Contributions

Data collection, data analysis & report writing were done by Md. Imran Hossain. Md. Rezaul karim was the supervisor of this research work and also provided proper guideline. Md. Alamin & Md. Rashed sarker helped in data collection, data analysis & report writing. Fakhar Uddin Talukder participated in report writing & data management, revised & edited the manuscript and also did submission to the journal.

Conflict of Interest

All the authors do not have any possible conflicts of interest.

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