International Journal of Chemical Studies

P-ISSN: 2349–8528 E-ISSN: 2321–4902 www.chemijournal.com IJCS 2020; 8(5): 205-207 © 2020 IJCS Received: 02-06-2020 Accepted: 25-07-2020

Zeenat Parveen

Department of Plant Physiology, Agricultural Biochemistry, Medicinal and Aromatic plants Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

Pratibha Katiyar

Department of Plant Physiology, Agricultural Biochemistry, Medicinal and Aromatic plants Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

Corresponding Author:

Zeenat Parveen Department of Plant Physiology, Agricultural Biochemistry, Medicinal and Aromatic plants Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

Impact of plant growth substances on corm and cormel yield of different cultivars of gladiolus (Gladiolus grandiflorus L.)

Zeenat Parveen and Pratibha Katiyar

DOI: https://doi.org/10.22271/chemi.2020.v8.i5c.10300

Abstract

Gladiolus is a flower of glamour and perfection which is known as the queen of bulbous flowers and grown as flower bed in garden. Plant growth substances promote more number of quality corm production in gladiolus. Hence, the present study was conducted to study the impact of plant growth substances in gladiolus at Research cum Instructional Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). The five gladiolus cultivars i.e., Saffron, Summer shine yellow, American beauty, Candyman and White prosperity were tested with plant growth substances viz., GA₃ @ 100 ppm + Vermicompost @ 80 g/pot, CCC @ 500 ppm, Humic acid @ 0.1% + Chicken manure @ 10 g/ pot, Salicylic acid @ 150 ppm and control (distilled water) in Factorial Completely Randomized Design with three replications during Rabi season 2016-17. The plant growth substances were sprayed with the help of a sprayer and the organic manures (Vermicompost, Chicken manure) was given by soil application at two, four, six leaves and flowering stage. It was observed that the experimental cultivars were exhibited genotypic variation regarding corm and cormel number, size, weight and diameters. The cultivar American beauty having maximum number of cormels whereas, cultivar White prosperity having significantly highest corm weight, corm diameter and cormel diameter and cultivar Saffron recorded minimum corm weight and corm diameter in all the tested cultivars. The treatment CCC @ 500 ppm was significantly improved the yield parameters and treatment GA₃ @ 100 ppm along with Vermicompost @ 80 g/ pot was found inferior among all the treatments.

Keywords: Gladiolus (Gladiolus grandiflorus L.) CCC, GA3, vermicompost, corm and cormel

1. Introduction

Gladiolus (*Gladiolus grandiflorus*) is a high revenue generator and is a native of South Africa and Asia Minor and occupies prime position in floriculture industry. Gladiolus occupies fourth place in International cut flower trade after rose, carnation and chrysanthemum (Farhat, 2004)^[5]. It has a high demand in global cut flowers trade; which requires development of new, promising, high yield cultivars and their evaluation for their suitability for commercial production (Ahmed *et al.*, 2008)^[1]. In India, the estimated area under gladiolus cultivation is about 11.67 thousand hectares, with a production of 50.70 thousand metric tonnes loose flowers and 92.89 lakh number cut flowers (Anonymous, 2014)^[2]. In Chhattisgarh state, the area under floriculture crops in Chhattisgarh is 10115 ha. out of which gladiolus occupies an area of 1665 ha with production of 5.77 metric tonnes (Anonymous, 2014)^[2].

Gladiolus is a flower of glamour and perfection which is known as the queen of bulbous flowers due to its majestic spikes, beautiful colours, attractive shapes and excellent keeping quality or vase life. Its magnificent inflorescence with variety of colors and number of pretty florets has made it attractive for diversified use in the garden. It is an important cut-flower in both domestic and international market (Chanda *et al.*, 2000)^[4]. Gladiolus is grown as flower bed in gardens and used in floral arrangements for interior decoration as well as making high quality bouquets (Lepcha *et al.*, 2007)^[6]. Gladiolus is grown primarily for cut flowers and to a limited extent for landscaping and exhibition purpose.

Plant growth substances such as CCC, GA₃, Salicylic acid, Humic acid play an important role in breaking dormancy and promote more number of quality corm production in gladiolus (Bhattacharjee, 1984)^[3].

2. Materials and methods

An investigation was carried out at Research cum Instructional Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) during Rabi 2016-17. The experiment was laid out Factorial Completely Randomized Design with three replications and five treatments viz., GA₃ @ 100 ppm + Vermicompost @ 80 g/ pot, CCC @ 500 ppm, Humic acid @ 0.1% + Chicken manure @ 10 g/ pot, Salicylic acid @ 150 ppm were applied along with control (distilled water) were adopted in five different cultivars of gladiolus *i.e.*, Saffron, Summer shine yellow, American beauty, Candyman and White prosperity. The plant growth substances were sprayed with the help of a sprayer and the organic manures (Vermicompost, Chicken manure) was given by soil application at two, four, six leaves and flowering stage. The growth substances were sprayed in the afternoon on the plants. The usual method of propagation of gladiolus is through corms. The healthy uniform sized corms ranged between 3 cm to 5cm were planted after treating with 1% Bavistin by dipping the corms for 10-15 minutes.

3. Results and discussion

3.1 Corm and cormel size (cm)

The effect of plant growth substances on corm (cm) and cormel size (cm) of gladiolus (*Gladiolus grandiflorus*) presented in Table.1.

The gladiolus varieties were significantly different in relation to the diameter of corms. The maximum diameter of corm was observed in the *cv*. White prosperity (14.68 cm) followed by Candyman (12.83 cm) and Summer shine yellow (12.79 cm). However, the minimum diameter of corm was recorded in the *cv*. Saffron (12.06 cm) among all the varieties. The maximum impact of treatment was found in CCC @ 500 ppm (15.07 cm) followed by Humic acid @ 0.1% + Chicken manures @10 g (13.92 cm) and salicylic acid @ 150 ppm (13.40 cm) and the minimum diameter of corm was recorded in control (10.05 cm) as compared to other treatments.

The cultivar White prosperity (0.88 cm) was recorded the highest and the *cv*. Candyman (0.80 cm) was found the lowest among all the varieties. The overall maximum diameter of cormels were found in treatment CCC @ 500 ppm (1.12 cm) followed by humic acid @ 0.1% + chicken manures (@10 g (0.98 cm). However, the minimum diameter of cormels was found in control (0.56 cm) as compared to other treatments.

The impact of plant growth substances to enhance the size and number of cormels *via* translocating the photoassimilate towards second sinks (tuber/bulb). The Cormels size plays a significant role in yield and contributes for propagating it for the development of future progeny.

3.2 Weight of Corm and cormel (g)

The effect of plant growth substances on weight of Corm and

cormel (g) of gladiolus (*Gladiolus grandiflorus*) result have shown in Table.2.

The gladiolus varieties as well as treatments were significantly different in relation to the corm weight. The maximum corm weight was recorded in *cv*. White prosperity (30.71 g) followed by Candyman (21.93 g) and *cv*. Summer shine yellow (20.67 g) whereas, the minimum corm weight was found in *cv*. Saffron (15.79 g) as compared to other varieties. The treatment of CCC @ 500 ppm (30.48 g) was found significantly better, followed by Humic acid @0.1% + Chicken manure @ 10g/ pot (26.06 g) and Salicylic acid @ 150 ppm (22.09 g) over other treatments. The minimum weight of corm was found in Control (11.48 g). The CCC is a growth retardant and improved the corm and cormel yield in Gladiolus and it is supported by Patel *et al.*, (2010) ^[7] and Sudhakar and Kumar (2012)^[9] in Gladiolus.

The weight of cormels were significantly differed among all the cultivars of gladiolus cv. Summer shine yellow was found significantly highest (0.90 g) followed by White prosperity (0.70 g) and Candyman (0.68 g) whereas, the minimum cormel weight was recorded in cv. Saffron (0.59 cm) in all the tested cultivars. The maximum cormels weight was found in CCC @ 500 ppm (0.98 g) followed by Humic acid @ 0.1%+chicken manure @10 g/pot (0.81 g) and Salicylic acid@150 ppm (0.70 g) whereas, minimum cormels weight was found in control (0.43 g) among all the treatments. It may be due to influence of growth retardants in delaying flower initiation, which would have enhanced source and sink ratio by reducing the partition of carbohydrates to floral spike and reduced spike length.

The corm and cormels are significantly increased by the application of growth retardants like CCC and MH and the number of corms, number of cormels, weight of corms and weight of cormels significantly higher under CCC @ 500 ppm (Sudhakar and Kumar, 2012)^[9] in gladiolus cultivar White friendship. This is also supported by Raaga, (2012)^[8] in gladiolus.

3.3 Number of cormels per plot

The effect of plant growth substances on number of cormel per plot of gladiolus (*Gladiolus grandiflorus*) was presented in Table.3.

The maximum number of cormels were recorded in the cv. American beauty (21.66) followed by Candyman (19.33) and White prosperity (17.86) whereas, the minimum number of cormels was recorded in cv. Saffron (8.06) among all the tested varieties. The treatments CCC@ 500 ppm (19.26) was found significant better followed by Humic acid @ 0.1% (17.46) and Salicylic acid @ 150 ppm (15.73) and the minimum number of cormels was found in control (12.73) as compared to other treatments.

Table 1: Effect of plant growth substances on corm (cm) and cormel size (cm) of gladiolus (Gladiolus grandiflorus)

S. N.	Varieties	Corm size					Маан	Cormel size					Maan
		T ₁	T ₂	T 3	T4	T 5	Mean	T_1	T ₂	T 3	T 4	T 5	Mean
1.	Saffron	10.43	11.26	13.46	12.70	12.46	12.06	0.53	0.73	1.06	0.96	0.83	0.82
2.	Summer shine yellow	9.30	12.30	14.73	14.23	13.40	12.79	0.53	0.70	1.13	0.93	0.80	0.82
3.	American beauty	9.83	12.23	14.26	12.73	12.43	12.30	0.63	0.80	1.13	1.00	0.63	0.84
4.	Candyman	9.50	12.66	15.40	13.46	13.13	12.83	0.53	0.70	1.06	0.93	0.80	0.80
5.	White prosperity	11.20	12.60	17.50	16.50	15.60	14.68	0.56	0.73	1.23	1.06	0.80	0.88
	Mean	10.05	12.21	15.07	13.92	13.40		0.56	0.73	1.12	0.98	0.77	
	Treatments												
	C.D.	0.15						0.09					
	SE(m)	0.05						0.03					

Varieties							
C.D.	0.15			N/A			
SE(m)	0.05			0.03			

T₁: Control (distilled water), T₂: GA₃ @ 100 ppm + Vermicompost @ 80 g/pot T₃: CCC @ 500 ppm, T₄: Humic acid @ 0.1% + Chicken manure @ 10 g/pot, T₅: Salicylic acid @ 150 ppm

Table 2: Effect of plant growth substances on weight of corm (g) and cormels (g) in gladiolus (Gladiolus grandiflorus)

S. N.	Varieties	Corm weight					Maan	Cormel weight					Maan
		T ₁	T_2	T ₃	T ₄	T 5	wiean	T ₁	T_2	T ₃	T ₄	T 5	wiean
1.	Saffron	13.18	14.71	17.81	16.79	16.48	15.79	0.24	0.62	0.76	0.67	0.66	0.59
2.	Summer shine yellow	11.88	18.86	29.54	23.16	19.94	20.67	0.32	0.76	1.41	1.25	0.78	0.90
3.	American beauty	9.65	16.28	26.32	19.50	18.28	18.01	0.51	0.54	0.97	0.68	0.66	0.67
4.	Candyman	9.61	18.44	32.04	25.20	24.34	21.93	0.56	0.65	0.89	0.68	0.65	0.68
5.	White prosperity	13.10	16.70	46.70	45.64	31.40	30.71	0.52	0.57	0.87	0.78	0.75	0.70
	Mean	11.48	17.00	30.48	26.06	22.09		0.43	0.63	0.98	0.81	0.70	
	Treatment												
	C.D.	0.16						0.010					
	SE(m)	0.05						0.003					
	Varieties												
	C.D.	0.16						0.010					
	SE(m)	0.05						0.003					

 $\begin{array}{l} T_1: \mbox{ Control (distilled water), $T_2: GA_3 @ 100 ppm + Vermicompost @ 80 g/pot, $T_3: CCC @ 500 ppm, $T_4: Humic acid @ 0.1\% + Chicken manure @ 10 g/pot, $T_5: Salicylic acid @ 150 ppm \\ \end{array}$

Table 3: Effect of plant growth substances on number of cormels in gladiolus (Gladiolus grandiflorus)

S. N.	Varieties	T ₁	T ₂	T 3	T4	T 5	Mean
1.	Saffron	5.33	6.66	11.00	9.33	8.00	8.06
2.	Summer shine yellow	9.00	11.00	16.33	14.33	12.00	12.53
3.	American beauty	18.00	20.00	25.66	23.33	21.33	21.66
4.	Candyman	16.33	17.66	22.33	21.00	19.33	19.33
5.	White prosperity	15.00	16.00	21.00	19.33	18.00	17.86
	Mean	12.73	14.26	19.26	17.46	15.73	
	Treatment						
	C.D.	0.76					
	SE(m)	0.27					
	Varieties						
	C.D.	0.76					
	SE(m)	0.27					

T₁: Control (distilled water), T₂: GA₃ @ 100 ppm + Vermicompost @ 80 g/pot, T₃: CCC @ 500 ppm, T₄: Humic acid @ 0.1% + Chicken manure @ 10 g/pot, T₅: Salicylic acid @ 150 ppm

4. References

- Ahmad T, Ahmad I, Qasim M. Present status and future prospects of gladiolus cultivation in Punjab, Pakistan. Journal of Tekirdag Agriculture Faculty. 2008; 5:227-238.
- 2. Anonymous. Ministry of Agriculture, Govt. of India, 2014.
- 3. Bhattacharjee SK. The effects of growth regulating chemicals on Gladiolus. *Gartenbauwissens chaft.* 1984; 49(3):103-106.
- Chanda S, Barma G, Roy chowdhury N. Influence of different levels of nitrogen, phosphorus and potassium on growth and flowering of Gladiolus. Hort. J. 2000; 13(10):76-86.
- 5. Farhat T. Plant characteristics and vase life of gladiolus flowers as influenced by the pre harvest and NPK application and post harvest chemical treatment. M.Sc. (Hons). Thesis PMAS- AAUR, 2004, 2.
- 6. Lepcha R, Nautiyal MC, Rao VK. Variability studies in gladiolus under mid hill conditions of Uttarakhand. Journal of Ornamental Horticulture. 2007; 10(3):169-172.
- Patel J, Patel HC, Chavda JC, Saiyad MY. Effect of plant growth regulators on flowering and yield of gladiolus (*Gladiolus* L.) *cv*. American beauty. Asian Journal of Horticulture. 2010; 5(2):483-485.

- 8. Raaga AT. Effect of some growth regulators on growth, flowering, bulb productivity and chemical composition of Iris plant. Journal of Horticulture Science and Ornamental-Plants. 2012; 4(2):215-220.
- 9. Sudhakar M, Kumar SR. Effect of growth regulators on growth, flowering and corm production of Gladiolus (*Gladiolus grandiflorus* L.) *cv*. White friendship. Indian Journal of Plant Sciences. 2012. ISSN: 2319-3827.