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# Impact of plant growth regulators on growth and flowering of gladiolus CV. Candyman

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### Abstract

An experiment was conducted to study the Impact of plant growth regulators on growth and flowering of gladiolus cv. Candyman during 2015-16 at Department of Floriculture and Landscape Architecture, IGKV, Raipur. Three growth regulators with three concentration viz., NAA (25 ppm, 50 ppm and 100 ppm) GA<sub>3</sub> (200 ppm, 250 ppm and 300 ppm) CCC (150 ppm, 200 ppm and 250 ppm) each at three concentrations in addition to distilled water spray as control comprised ten treatments of this experiment. The experiment was laid out in a Randomized Block Design (RBD) with three replication. All the growth and flowering parameters were periodically observed. The results revealed that the treatment of GA<sub>3</sub> 200 ppm (T<sub>4</sub>) attributed to superior results regarding the plant height, number of leaves, length of leaves, length of spike, length of rachis, number of floret per spike, diameter of florets, and vase life over all other treatments.

**Keywords:** Gladiolus, gibberellic acid, NAA, CCC, growth regulator

### Introduction

Gladiolus is a flower of glamour and perfection which is known as the queen of bulbous flowers due to its flower spikes with florets of massive form, brilliant colours, attractive shapes, varying size and excellent shelf life. 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) [3]. Gladiolus is grown on all types of soils having good structure and drainage. It is a winter season crop but can be grown during rainy season in low rainfall areas with mild climate. To enhance of yield and quality of any flower crop various cultural management practices like good planting material, spacing, irrigation, plant protection etc., are required. The planting material i.e. corm is the important factor which governs the growth and development of gladiolus. The physiological functions inside the corms are controlled by plant growth regulators. Plant growth regulators are the organic chemical compounds which modify or regulate physiological processes in an appreciable measure in plants when used in small concentrations. They are readily absorbed and move rapidly through tissues when applied to different parts of the plant. It has generally been accepted that many plant processes including senescence are controlled through a balance between plant hormones interacting with each other and with other internal factors (Mayak and Halevy, 1980) [4]. Although growth retarding chemicals did not increase the number of flowers, they produced flowers with compact shape, developed short stalk, flowers remained fresh for a longer period and they suppressed the height of the plant. It is known fact that application of growth regulators such as CCC, NAA, and GA<sub>3</sub> had positive effects on growth and development of gladiolus plants at different concentrations. The reports indicate that the growth and flowering of gladiolus was enhanced by application of GA<sub>3</sub> (Umrao Vijai *et al.*, 2007 and Rana *et al.*, 2005) [12, 7] NAA (Kumar *et al.*, 2008) [10], CCC by (Patel *et al.*, 2010 and Ravidas *et al.*, 1992) [1, 2]. Hence the present study was conducted to find the Impact of plant growth regulators on growth and flowering of gladiolus cv. Candyman.

### Materials and methods

This experiment was conducted in Floriculture and Landscape Architecture Research cum Instructional Farm, College of Agriculture, IGKV, Raipur (C.G.). Soil of the experimental plot was sandy loamy, uniform in texture and well drained. The experimental design was R.B.D. with 3 replications and the plot size was 1.5 x 1.0m. In total ten treatments comprised of three growth regulators at three levels of each viz., NAA @25, 50 and 100 ppm, GA<sub>3</sub>

@200, 250 and 300 ppm and CCC @150, 200 and 250 ppm with control (distilled water) were applied. The gladiolus variety Candyman was planted on ridges and furrow at 30 x 20 cm on 21 October, 2015. Uniform basal dose of well rotten FYM was applied @ 5 kg/m<sup>2</sup> at the time of soil preparation. The fertilizer dose given to the crop was 300:200:200 kg N: P: K / ha as per recommendation. One third dose of nitrogen

and potash as well as full dose of Phosphorus was applied at the time of corm planting. The growth and yield parameters for each treatment were observed in five plants selected by random sampling method. The data were statistically analysed and critical differences were worked out at five percent level to draw statistical conclusions as suggested by Panse and Sakhatme (1978).

**Table 1:** Impact of plant growth regulators on growth and flowering of gladiolus cv. Candyman

Treatment	Plant height (cm)	Number of leaves per plant	Length of leaves per plant (cm)	Length of spike (cm)	Length of Rachis (cm)	Number of floret per spike	Diameter of florets (cm)	Vase life (days)
NAA 25 ppm (T <sub>1</sub> )	82.11	8.40	57.36	72.66	44.66	11.83	10.76	11.00
NAA 50 ppm (T <sub>2</sub> )	81.60	8.06	59.18	71.66	45.33	13.26	10.65	9.96
NAA 100 ppm (T <sub>3</sub> )	79.95	7.86	55.46	72.00	45.00	13.13	11.22	11.00
GA <sub>3</sub> 200 ppm (T <sub>4</sub> )	84.83	9.20	64.13	80.00	47.33	14.20	12.41	12.16
GA <sub>3</sub> 250 ppm (T <sub>5</sub> )	86.56	8.90	60.78	75.00	45.66	12.93	12.43	11.24
GA <sub>3</sub> 300 ppm (T <sub>6</sub> )	84.21	9.16	62.16	72.00	46.00	12.20	11.21	11.06
CCC 150 ppm (T <sub>7</sub> )	76.75	7.73	57.19	75.33	41.66	12.53	11.18	10.66
CCC 200 ppm (T <sub>8</sub> )	77.05	7.83	53.72	75.00	39.00	11.66	11.06	10.50
CCC 250 ppm (T <sub>9</sub> )	76.06	7.26	54.77	66.82	44.33	10.66	10.90	9.86
Control (T <sub>10</sub> )	78.43	7.93	55.56	73.00	42.00	11.00	11.17	10.26
SE(m)	2.33	0.24	1.91	2.15	1.58	0.65	0.36	0.43
C.D.	6.99	0.72	5.71	6.46	4.73	1.95	1.09	1.29

## Results and discussion

Result presented in table 1, revealed that the growth and flowering parameters of gladiolus plants were significantly altered due to the application of growth regulators. The plant height, number of leaves, length of leaves, length of spikes, length of spike, number of floret per spike, diameter of florets, and vase life were significantly increased due to GA<sub>3</sub> and NAA application. Whereas CCC application significantly reduced these parameters when compared with control. The maximum plant height (86.56 cm) was observed under the treatment of 250 ppm GA<sub>3</sub> (T<sub>5</sub>), while minimum plant height was recorded under treatment of CCC at 200 ppm (T<sub>9</sub>). The maximum number of leaves per plant (9.20) was recorded under the treatment T<sub>4</sub> (GA<sub>3</sub> 200 ppm foliar spray). The maximum length of leaves (64.13 cm) was observed under the treatment of 200 ppm GA<sub>3</sub> (T<sub>4</sub>), while minimum length of leaves was recorded under treatment of CCC at 200 ppm (T<sub>8</sub>). From results it is evident that height of the plant, number of leaves per plant and length of leaves per plant influenced by higher concentrations of GA<sub>3</sub> treatment and was superior over all other treatment. It clearly shows that the GA<sub>3</sub> elongate the cell and thereby increasing plant height. The CCC treatment reduce plant height because of its inhibitory action. The above findings are in close agreement with the findings of Sindhu and Verma (1998) [9].

Flower quality and parameters of gladiolus like length of spike, length of rachis, number of florets per spike, number of spike per meter square, diameter of florets, and vase life were significantly higher with the treatment GA<sub>3</sub> 200 ppm (T<sub>4</sub>) and exactly reverse trend was observed in treatment CCC 200 ppm (T<sub>8</sub>). GA<sub>3</sub> 200 ppm resulted in flower quality and yield parameters of gladiolus due to increased vigour of plants, which is essential for the production of sufficient carbohydrates in plants. Thus carbohydrates produced are translocated towards the development of reproductive part of plant. Similar results were reported by Mishra *et al.* (1999) [5], Reddy (1997) [8] and Tawar *et al.* (2002) [11]

## Conclusions

Application of GA<sub>3</sub> @ 200 ppm corm foliar spray found to be more effective for better performance of different attributes

namely plant height, number of leaves per plant, length of leaves, number of days taken to first spike emergence, length of spike, length of rachis, internodal length of floret, number of days taken to first floret open, number of florets per spike, diameter of floret, vase life of cut spike days, number of spike per square meter, diameter of corm per plant. While maximum number of corms per plant, number of cormel per plant, weight of corm per plant, weight of cormel per plant was recorded with the treatment CCC @ 200 ppm.

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