

Impact of Growth regulators on vegetative and flowering parameters of White Prosperity (*Gladiolus dalenii*)

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Abstract

The present investigation entitled "Impact of Growth regulators on vegetative and flowering parameters of White Prosperity (*Gladiolus dalenii*)" was carried out at Department of Horticulture, Chaudhary Chhotu Ram Degree (C.C.R.D.) College, Muzaffarnagar affiliated with CCSU, Meerut (U.P.) October 2017-February 2018. White Prosperity (V_1) was used as a cultivar and the bulbs of this species were soaked for 24 hours with foliar application 40 days after sowing with the growth regulators i.e. Gibberellic acid (GA3), (G_1) @ 200 ppm, Cycocoeel (CCC) @ 500 ppm (G_2) and Maleic Hydrazide (MH) @ 500 ppm (G_3). The result showed in the vegetative parameters, the maximum plant height, number of leaves per plant, width of leaf was recorded under $T_1(V_1A_1G_1)$ treatment and in the flowering parameter number of spike per plant, Spike length, number of florets per spike, spike longevity and Rachis length were recorded highest under T_1 treatment while all growth parameters of vegetative and flowering growth were found minimum under reference.

Keywords: White Prosperity, Gibberellic acid, Cycocoeel, Growth Regulators

I. Introduction

Gladiolus (*Gladiolus dalenii*) is an herbaceous and one of the most cultivated, economically important and common flowering plants worldwide. The genus *gladiolus* is classified in the family Iridaceae and many species of this genus are found in South Africa, Tropical Africa, Madagascar and Eurasia. The current number of species in the genus is 255 (Goldblatt and Manning 1998). *Gladiolus* is known as queen of the bulbous plants is very popular as a cut flower, both with the consumer and the florist alike because of its many spike forms, colors and color combinations, an advantage in every floral arrangement (Bushman 1990). During Roman times, the *gladiolus* was associated with the gladiators. The soldiers would wear the flowers around their neck as a protection while fighting in battle. Originating in Africa and Asia, the flower only became more well-known in Europe and the U.S. during the 1700's. Trade routes were expanded during that time, which led to the discovery of many exotic and new products to Western Europeans and North Americans. There are also medicinal uses of the flower, such as mashing the seeds to draw out splinters and thorns, or to treat colic by mixing with milk.

The *Gladiolus* has 2nd rank in the world and just next to china under cultivation in floriculture having an area of 309 thousand hectares with a production of 1653 thousand tonnes of loose flowers and 593 thousand tonnes of cut flowers (NHB, 2017). Keeping the fact of the economic values of *gladiolus* in mind, this study was designed to know the exact impact of the growth regulators on the selected species of *Gladiolus*. After the study we would be able to know the various dimensions of the farming of the selected flowers and simultaneously the farmers can use the growth regulators in the field to gain more economy from the farming.

II. Materials and Methods

The present study entitled "Effect of growth regulators on growth, flowering and corm yield in *Gladiolus* (*Gladiolus dalenii*)" was carried out during the winter season in 2017–18 with the aim to assess the impact of growth regulators on the selected species of *Gladiolus*. During this study the selected species White Prosperity (V_1) was used as a cultivar and the bulbs of this species were soaked for 24 hours with foliar application 40 days after sowing with the growth regulators i.e. Gibberellic acid (GA3), (G_1) @ 200 ppm, Cycocoeel (CCC) @ 500 ppm (G_2) and Maleic Hydrazide (MH) @ 500 ppm (G_3). This study was carried out to study the vegetative parameters (Days to corm sprouting, percent of Corm sprouting, No. of buds sprouted per corm, Plant height (cm), No. of leaves per plant and Width of leaf) and flowering parameters (Days to appearance of initial spike, Number of spikes per plant, Spike length (cm.), Rachis length (cm.), Days to flowering (open florets), Number of florets per spike, Days to flowering (open florets), Spike longevity (Spike field life) in days).

III. Results and Discussion

A. Vegetative Parameters: During the present study the vegetative parameters i.e. days of corm sprouting, percent corm sprouting, no. of buds sprouted per corm, plant height, no. of leaves per plant and width leaf of White Prosperity were studied and observed that all the value shown tremendous effects of growth regulators on selected parameters. In case of days to corm sprouting, it was recorded that the minimum and maximum days 6.187 days and 8.743 days taken under T₄ and T₇ treatment, respectively. Percent of corm sprout was recorded highest 96.667 under T₆ treatment, while the lowest value was recorded 89.753 under T₇ treatment and number of buds sprouted per corm was found highest 1.417 under T₁ treatment and lowest value was recorded 1.033 under T₇ treatment. The plant height is the important vegetative parameter and this parameter has directly shown the effect of growth regulators on selected species of Gladiolus as the maximum plant height was recorded 90.12 cm under T₁ treatment and lowest was recorded 85.043 cm under T₇ treatment. Number of leaves per plant is the parameter, which shows the vegetative growth of the plant, in the present study the number of leaves per plant were recorded highest 5.957 under T₇ treatment and the lowest number of leaves were recorded 5.067 under T₇ treatment. In the vegetative parameters, width of leaves was also measured and found that the given treatment was very effective in growth of leaf as the highest width of leaf was recorded 2.91 under T₁ treatment (Table 1). Various researcher has studied the impact of nutrients, growth regulators on the overall growth of the flowering plants in general and gladiolus species in particular. Kaushik, *et.al.* (2016) have made a study on impact of gibberellin on the vegetative growth and flowering growth parameters of Gladiolus and found the similar results. His investigation clearly indicates that sprouting of corms (50% sprouting) was non-significantly affected by the applications of GA3 because the applications of GA3 were applied after sprouting of corms i.e. at 30 DAP. Similar results were obtained by Barman *et al.* (2003) and Barman *et al.* (2006) in gladiolus and Srivastava *et al.* (2006) in tuberose.

Table 1: Vegetative parameters of White Prosperity during the study period

Treatment Combination	Treatments	Days to corm sprouting	Per cent corm sprouting	Number of buds sprouted per corm	Plant height (cm)	Number of leaves per plant	Width of leaf (cm)
V ₁ A ₁ G ₁	T ₁	5.747	98.557	1.417	90.12	5.957	2.91
V ₁ A ₁ G ₂	T ₂	6.49	95.707	1.1	87.277	5.157	2.493
V ₁ A ₁ G ₃	T ₃	6.437	94.483	1.137	87.57	4.993	2.47
V ₁ A ₂ G ₁	T ₄	6.187	95.37	1.083	87.867	4.85	2.483
V ₁ A ₂ G ₁	T ₅	6.363	95.037	1.18	86.907	5.467	2.553
V ₁ A ₂ G ₁	T ₆	6.883	96.667	1.1	87.83	5.517	2.737
V ₁	T ₇	8.743	89.753	1.033	85.043	5.067	2.4

B. Flowering Parameters:

Gladiolus is well known for its flower and the beauty of these flowers are depend on the nutrients and growth regulators, which plays a major role to beautify this flower. In the present study the selected parameters i.e. Days of appearance of initial spike, Number of spikes per plant, Spike length, Rachis length, Days to flowering, Number of florets per spike, Days to flowering, Spike longevity were studied under different treatment and it was found that all the parameters shown the positive response against the given treatment. During this study the appearance of initial spike was very earlier (69.510 days) was recorded under T₁ treatment and later appearance of initial spike was recorded (71.890 days) under T₇ treatment, this parameter is very significant and plays a key role in overall growth of the flower of this particular species and determine the future of the flower. Another parameter i.e. number of spikes per plant of Gladiolus was also studied and found that the highest value was observed 1.383 under T₁ treatment while the lowest value was recorded 1.033 under T₇ treatment followed by 1.083 under T₄ treatment (Table 2).

Table 2 Flowering Parameters of White Prosperity during the study period

Treatment Combination	Treatments	Days of appearance of initial spike	Number of spikes per plant	Spike length (cm.)	Rachis length (cm.)	Days to flowering (open florets)	Number of florets per spike	Days to 50% flowering	Spike longevity (Spike field life) (days)
V ₁ A ₁ G ₁	T ₁	69.510	1.383	72.713	51.693	82.573	11.487	73.823	4.220
V ₁ A ₁ G ₂	T ₂	71.223	1.100	70.437	50.370	83.693	11.063	76.523	3.920
V ₁ A ₁ G ₃	T ₃	70.623	1.137	70.447	50.293	83.693	10.887	77.377	3.917
V ₁ A ₂ G ₁	T ₄	70.733	1.083	70.340	50.107	83.793	10.963	77.670	3.640
V ₁ A ₂ G ₁	T ₅	70.790	1.180	70.217	49.337	83.947	10.647	76.660	3.990
V ₁ A ₂ G ₁	T ₆	70.533	1.100	69.627	49.870	83.887	10.720	77.120	3.923
V ₁	T ₇	71.890	1.033	68.523	47.640	91.230	9.860	81.780	3.117

Spike length was studied during this study and it was found that the highest value 72.713 cm was recorded under T₁ treatment and the lowest value was recorded 68.523 under T₇ treatment. Rachis length (cm.) is an important parameter and have a key importance in the beauty of flower especially in gladiolus, in the present study the maximum length of rachis was recorded 51.693 under T₁ treatment, while the minimum length 47.640 was recorded under T₇ treatment. On the other hand, maximum days 91.230 days to flowering were taken and flower was appeared very late in comparison of the value 82.573 days, which was recorded under T₁ treatment. Days to flowering is an important parameter and play a key role in the economic gain for the farmers. Number of florets per spike was studied and it was found that the highest number of florets per spike was recorded highest 11.487 under T₁ treatment and the lowest value was found 9.860 under T₇ treatment. Days to 50% flowering were also observed and recorded that the highest value of days to 50% flowering was recorded 81.780 under T₇ treatment which was 10.77% later than the value 73.823 days under T₁ treatment. Spike longevity is another a very important parameter of the gladiolus and directly linked with the field life of the flower and can be associated with the benefits of the white prosperity, if the spike longevity will be higher, the flower will exist for more time in the field. The highest and lowest value of spike longevity was recorded 4.220 and 3.117 under T₁ and T₇ treatment, respectively (Table 2). Similar findings are reported by Syamal, *et al.* (2006), Kumar Dhiraj *et al.* (2009), Davood Hashemabadi *et al.* (2012), Kaushik Himanshu *et al.* (2013), Ali Jabbar Abdulsada *et al.* (2013) and Manoj Kumar Rolaniya *et al.* (2017) in marigold.

During the present investigation it was observed that all the findings were positively influenced by the growth regulators, so the study has clearly shown that the recommended dose of growth regulators can accelerate the vegetative and flowering growth in positive manner with special reference to Gladiolus species i.e. White Prosperity.

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