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INFLUENCE OF GA_3 ON QUALITY GLADIOLUS (*GLADIOLUS GRANDIFLORUS* L.) PRODUCTION

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ABSTRACT

A field experiment was conducted at Horticulture Section, College of Agriculture, Nagpur during *rabi* season of the year 2015-16 to study the influence of GA_3 on quality gladiolus production. Treatments includes five varieties (Snow Princess, Princess Morgarate Rose, Yellow Stone, Novalux and American Beauty) and three GA_3 concentrations (0, 100 and 200 ppm) sprayed at 30th, 45th and 60th day after planting. The results revealed that, the maximum length of spike and rachis, florets spike^{-1} was registerd with the variety American Beauty whereas, Novalux has recorded minimum length of spike and rachis. However, variety Yellow stone has recorded maximum spike diameter, longevity of flower, vase life of flower and minimum florets spike^{-1} whereas, variety American Beauty has recorded minimum spike diameter, longevity of flower and vase life of flower. Among corm parameters, maximum corm diameter was registered with the variety Snow Princess whereas, minimum was recorded with Novalux. However maximum and minimum weight of corms plant^{-1} and weight of cormels plant^{-1} was recorded in the variety American Beauty and Snow Princess respectively. Results on GA_3 application found that GA_3 200 ppm has superior over other treatment and control treatment registerd with the minimum values. Variety American Beauty and Yellow Stone were superior in respect of quality spikes production however, quality corms were produced in the variety American Beauty and Snow Princess under the treatment 200 ppm GA_3.

(Key words: Corm, flower, gladiolus, growth regulators, quality)

INTRODUCTION

Gladiolus is very popular and important bulbous ornamental flowering plant of the world. It is known as queen of bulbous flowers. It belongs to the family Iridaceae and is a native of South Africa. It is excellent for cut flowers as it lasts long in flower vase and has magnificent inflorescence with variety of colours.

Suitable variety for the region is one of the important factors influencing the yield and quality of gladiolus spikes and corms. The growth and development of plant is governed by internal factors namely hormonal and nutritional balance. The balanced development of plant is governed by the growth regulators, which are being increasingly used to manipulate the growth and flowering of ornamental plants. Therefore, the present study was undertaken to find out the suitable variety of gladiolus for the region and concentration of the growth regulator like gibberellic acid and for the better quality spikes and corms production.

Sharma *et al.* (2006) conducted an experiment to study the effect of gibberellic acid (100, 200 and 300 ppm) on different cultivars (Red Beauty, Jester and Summer France) and concluded that maximum length of spike and rachis, florets spike^{-1}, vase life and florets length were recorded with GA_3 200 ppm and variety Red Beauty.

Swain (2006) studied the effect of four growth regulators GA_3, Cycocel, Ethrel and 2, 4 – D on three cultivars *viz*., American Beauty, Friendship and Cherry Blossom under Orissa conditions. Cultivar Friendship proved superior to other varieties at 100 ppm GA_3 and 200 ppm Cycocel.

Chopde *et al.* (2011) conducted an experiment to study the effect of growth regulators (GA_3 and NAA) on three gladiolus varieties (Phule Neelrekha, Phule Thejas and Phule Ganesh). Results revealed that variety Phule Ganesh recorded maximum spike length, rachis length and longevity of flower under GA_3 150 ppm.

Sunitha and Kumar (2013) studied the effect of GA_3 (250 and 500 ppm) on gladiolus varieties (Archana, Friendship, Mukta, White Goddesse, Decise, Green Wood Pecker, American Beauty, Bright Eye and Tropic Seas) under Kanpur conditions and concluded that GA_3 500 ppm produced maximum spike length in cv. Tropic Seas.

MATERIALS AND METHODS

An experiment was carried out at Horticulture unit, Department of Horticulture, College of Agriculture, Nagpur (M.S.) during *rabi* season of the year 2015-16. The experiment was laid out in factorial randomized block design with three replications and fifteen treatment combinations. The first factor comprised of five gladiolus varieties *viz.,* Snow Princess (V_1), Princess Morgarate Rose (V_2), Yellow Stone

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(V_3), Novalux (V_4) and American Beauty (V_5) and second factor comprised of three foliar spraying treatments of GA_3 *viz.,* G_1 – Control (water spray), G_2 – GA_3 100 ppm and G_3- GA_3 200 ppm. After preparing the land, the field was laid out with the raised beds of size 0.75 m length and 1.8 m width. The rested, cold stored, uniform and bigger size gladiolus corms of five varieties were selected and placed at room temperature for 15 days and treated with 0.3% copper fungicide for 15 minutes before planting. After drying in shade, the corms were planted 15 cm apart. Solution of plant growth regulators was sprayed as per the treatment along with control (water spray) at 30th, 45th and 60th day after planting. All the intercultural operations were followed as and when required. The various observations on flower quality like length of spike and rachis, spike diameter, florets spike^{-1}, vase life of flower (once after harvesting), flowering span (days from first harvest to last harvest), longevity of flower on plant (first floret opening to drying of last floret) and corm and cormel quality like corm diameter, weight of corm and cormels (after harvesting) were recorded and the data was statistically analyzed by the method suggested by Panse and Sukhatme (1967)..

RESULTS AND DISCUSSION

Flower quality

Influence of varieties: The data presented in table 1 exhibited that, an influence of gladiolus varieties on flower quality in respect of length of spike and rachis, spike diameter, florets spike^{-1}, flowering span, longevity of flower on plant and vase life of flower were found to be significant. Significantly the maximum length of spike and rachis (87.63 cm and 41.53 cm respectively) and florets spike^{-1} (15.51) was recorded in the variety American Beauty whereas, Novalux had recorded minimum spike and rachis length (62.90 cm and 34.20 cm respectively). However, variety Yellow Stone had recorded maximum spike diameter (1.35 cm), longevity of flower (15.68 days), vase life of flower (11.36 days) and minimum number of florets spike^{-1} (12.51) whereas, American Beauty recorded minimum flowering span (18.87 days), longevity of flower (12.92 days) and spike diameter (0.97 cm). The variation in the flower characters of varieties might be due to the genetic differences of the varieties used, as the most of the characters are governed by the genetic makeup of the plant. Rani *et al*. (2015) also reported variation among gladiolus cultivars with respect to spike length and spike diameter which was maximum in yellow cultivars. Similarly Chourasia *et al*. (2015) also recorded maximum florets spike^{-1} and vase life of flower in Candiman variety and Chopde *et al*. (2011) recorded maximum rachis length, flowering span and longevity of flower in the variety Phule Ganesh in gladiolus.

Effect of growth regulators: The data presented in table 1 revealed that, the effect of treatment of GA_3 on flower quality parameters was found to be significant. Spraying of GA_3 200 ppm has recorded the maximum length of spike and rachis (82.85 cm and 39.78 cm respectively), spike diameter (1.25 cm), flowering span (24.52 days), longevity of flower (14.99 days), florets spike^{-1} (15.31) and vase life (11.36 days) of flower followed by GA_3 100 ppm. However, treatment control has recorded minimum length of spike and rachis (70.22 cm and 35.47 cm respectively), spike diameter (0.94), flowering span (20.75 days), longevity of flower (13.71 days), florets spike^{-1} (12.8) and vase life of flower (9.41 days).

The foliar treatment of GA_3 enhances cell elongation and cell division, increased photosynthesis and respiration with enhanced carbon-di-oxide fixation in the treated plants. Similarly, gibberellic acid treatment might have resulted into production and accumulation of more photosynthates which would have diverted to the sink resulting more quality spike production in gladiolus. The results obtained are in close agreement with the findings of Padaganur *et al*. (2005). They recorded maximum flowering span and spike length in tuberose cv. Single under 150 ppm GA_3. Umrao *et al*. (2007) reported maximum rachis length and spike diameter in gladiolus cv. Novalux under 150 ppm GA_3 and Dogra *et al*. (2012) recorded maximum longevity of flower in gladiolus cv. Novalux under 300 pmm GA_3 and Ajmeera *et al*. (2015) recorded maximum vase life under 200 ppm GA_3 in tuberose.

Interaction effect: The interaction effect due to the gladiolus varieties and GA_3 treatments in respect of quality parameters of spikes was found to be non-significant during the experimentation.

Corm and cormel quality

Effect of varieties: The data presented in table 2 revealed that, the effect of gladiolus varieties and GA_3 treatments on quality prameters of corm and cormels was found to be significant. The maximum weight of corms plant^{-1} (51.52 g) and weight of cormels plant^{-1} (6.01 g) was registered with significantly the variety American Beauty whereas, Snow Princess registered with minimum weight of corms plant^{-1} (23.83 g) and weight of cormels plant^{-1} (3.08 g). However, variety Snow Princess recorded maximum diameter of corm (5.42 cm) which was found to be at par with Princess Morgarate Rose, whereas, minimum corm diameter (4.8 cm) was recorded in the variety Novalux. This might be attributed due to more vegetative growth and ultimately its genetic make up. Shaukat *et al*. (2013) also recorded maximum corm diameter and maximum weight of corm and cormels in gladiolus cv. Fidelio.

Effect of growth regulators: Among the different concentrations of GA_3, significantly the maximum diameter of corm (5.61 cm) was registered under the treatment GA_3 200 ppm followed by GA_3 100 ppm, whereas, minimum corm diameter (4.72 cm) was registered with the control treatment. However, the effect of GA_3 on weight of corms plant^{-1} and weight of cormels plant^{-1} in gladiolus was found to be non significant. These results are in agreement with the findings of Rani *et al.* (2015). They recorded maximum corm diameter, weight of corm and cormel in gladiolus cv. White Prospority under 150 ppm GA_3.

Table 1. Influence of different gladiolus varieties and GA_3 on quality flower production

Treatments	Spike length	Rachis length	Florets spike^{-1}	Diameter of spike	Flowering span	Longevity of flower	Vase life of flower
First factor- Varieties (V)							
V_1 – Snow Princess	75.71	37.22	14.24	1.09	26.12	15.10	09.96
V_2 - Princess Morgarate Rose	79.28	38.76	13.00	1.11	23.61	14.32	10.16
V_3 - Yellow Stone	76.32	30.85	12.51	1.35	20.43	15.68	11.36
V_4 – Novalux	62.90	34.20	14.58	0.94	23.07	14.22	09.27
V_5 – American Beauty	87.63	41.53	15.51	0.97	18.87	12.92	09.77
SE(m) ±	1.28	0.95	0.58	0.06	1.05	0.30	0.33
CD at 5 %	3.71	2.76	1.67	0.17	3.05	0.88	0.94
Second factor – Gibberellic acid (G)							
G_1 – Control (water spray)	70.22	35.47	13.80	0.94	20.75	13.71	09.41
G_2 – GA_3 100 ppm	76.03	34.29	12.80	1.10	21.99	14.64	10.16
G_3 – GA_3 200 ppm	82.85	39.78	15.31	1.25	24.52	14.99	11.36
SE(m) ±	0.99	0.74	0.45	0.04	0.81	0.23	0.25
CD at 5 %	2.87	2.14	1.29	0.13	2.36	0.68	0.73
Interaction effect V X G							
SE(m) ±	2.72	0.22	1.22	0.12	2.23	0.64	0.69
CD at 5 %	--	--	--	--	--	--	--

Interaction effect: The interaction effect due to the gladiolus varieties and GA_3 treatments in respect of corm quality parameters of was found to be non-significant.

From the results, it can be inferred that, the variety American Beauty and Yellow Stone were superior in respect of quality spikes production however, quality corms were produced in the variety American Beauty and Snow Princess under 200 ppm GA_3.

Table 2. Influence of different gladiolus varieties and GA_3 on quality corm production

Treatments	Corm diameter (cm)	Wt. of corms plant^{-1} (g)	Wt. of cormels plant^{-1} (g)
First factor- Varieties (V)			
V_1 – Snow Princess	5.42	23.83	3.08
V_2 - Princess Morgarate Rose	5.30	32.41	4.27
V_3 - Yellow Stone	5.27	35.03	3.44
V_4 – Novalux	4.80	34.36	4.11
V_5 – American Beauty	5.12	51.52	6.01
SE(m) ±	0.12	0.59	0.21
CD at 5 %	0.35	1.72	0.61
Second factor – Gibberellic acid (G)			
G_1 – Control (water spray)	4.72	34.67	3.93
G_2 – GA_3 100 ppm	5.21	35.31	4.17
G_3 – GA_3 200 ppm	5.61	36.29	4.44
SE(m) ±	0.09	0.46	0.16
CD at 5 %	0.27	--	--
Interaction effect V X G			
SE(m) ±	0.25	1.26	0.45
CD at 5 %	--	--	--

REFERENCES

Ajmeera Ravinder, S.S. Moon, C. N. R. Santhoshini and A. Shashank, 2015. Effect of foliar application of GA_3 and chemicals on growth, flowering and yield of tuberose. J.Soils and Crops. **25**(2):358-361.

Chopde Neha, V. S. Gonge and P. K. Nagre, 2011. Effect of growth regulators on growth and flowering of gladiolus. Asian J. Hort., **6**(2):398-401.

Chourasia Ankit, R. R. Viradia, H. Ansar and Shubham Madle, 2015. Evaluation of different gladiolus cultivars for growth, flowering, spike yield and corm yield under Saurashtra region of Gujarat. The Bioscan, **10**(1):131-134.

Dogra Sheetal, R. K. Pandey and Deep Ji Bhat, 2012. Influence of gibberellic acid and plant geometry on growth, flowering and corm production in gladiolus (*Gladiolus grandiflorus)* under Jammu agroclimate. Int. J. Pharm. Bio.Sci., **3**(4) : 1083-1090.

Padaganur, V. G., A. N. Mokashi and V. S. Patil, 2005. Effect of growth regulators on growth and yield of tuberose and yield of tuberose cv. Single. Karnataka J. Agric. Sci., **18** (2):469-473.

Panse, V. G. and P. V. Sukhatme, 1967. Statistical Method for Agricultural Workers. New Delhi, Publications and Information Division, ICAR.

Rani Pooja, Yadav Kuldeep, Kataria Nisha, Singh Narender, Hussain Muzafar Dar and Groach Rameshwar, 2015. Assesment of growth, floral and yield attributes of gladiolus in response of gibberellic acid treatment. Bot. Res. Intl., **8**(1):01-06.

Sharma, D. P., Chattar Yamini Krishna and Gupta Nishith, 2006. Effect of gibberellic acid on growth, flowering and corm yield in three cultivars of gladiolus. J. Ornament. Hort., **9**(2):106-109.

Shaukat Syed Atif, Syed Zulifiquar Ali Shabi, Syed Kashif Shaukat and Syed Waasif Shaukat, 2013. Performance of gladiolus (*Gladiolus grandiflora L.*) cultivars under the climatic conditions of Bagh Azad Jammu and Kashmir, Pakistan J. Central European Agriculture, **14**(2) : 636-645

Sunitha Arya and Kumar Dubey Rajesh, 2013. A research study of phytohormones on vegetative growth and flowering behavior in gladiolus (*Gladiolus grandiflorus*). Int. J. Inno. Res. Sci. Engg. And Tech., **2**(11):7060-7065.

Swain, S. C. 2006. Effect of plant growth regulators on emergence of shoots and yield of corms and cormels in gladiolus. Int. J. Agric. Sci., **2**(2):438-440.

Umrao, V. K., R. P. Singh and A. R. Singh, 2007. Effect of gibberellic acid and growing media on vegetative and floral attributes of gladiolus. Indian J. Hort. **61**(1):73-76.

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