RESEARCH PAPER International Journal of Agricultural Sciences, Vol. 7 Issue 1 (January, 2011) : 141-143

Effect of plant growth regulators on growth and yield of gladiolus cv. AMERICAN-BEAUTY

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ABSTRACT

The experiment was conducted at College Horticulture Nursery, Department of Horticulture, B.A. College of Agriculture, Anand Agricultural University, Anand during November, 2008 to March, 2009. The treatments comprised of four growth regulators with their two levels of each *viz.*, GA_3 (25 and 50 mg/l), NAA (50 and 100 mg/l), Ethrel (100 and 200 mg/l) and CCC (250 and 500 mg/l) including control (only water). The experiment was laid out in Randomized Block Design with nine treatments and three replications. The results revealed that treatment of GA_3@50 mg/l took minimum days for corm sprouting as compared to control and rest of the treatments. Significantly the maximum plant height, leaf length and number of leaves per plant width were registered with the same treatment GA_3@50 mg/l as compared to control. Where as CCC @250 mg/l gave maximum yield of corms and cormels by increasing the number and weight of corms and cormels per plant as compared to control.

Patel, Jinesh M., Patel, H.C., Chavda, J.C. and Saiyad, M.Y. (2011). Effect of plant growth regulators on growth and yield of gladiolus cv. AMERICAN-BEAUTY. *Internat. J. agric. Sci.*, **7**(1): 141-143.

Key words : Gladiolus, Gibberellic acid, NAA, Ethrel, CCC, Plant, Regulators

INTRODUCTION

Gladiolus (*Gladislus grandiflorus* L.)is a flower of glamour and perfection and commercially (internationally next to tulip) cultivated as a bulbous plant. It is known as the queen of bulbous flowers with majestic flower spikes having florets of massive form, brilliant colours, attractive shapes, varying sizes and excellent keeping quality. It is ideal both for garden and floral decoration. Gladiolus is highly priced for bright, beautiful and differently coloured flowers which make it attractive for use in herbaceous borders, beddings, rockeries, pots and for cut flowers. Gladiolus can be cultivated on all types of soils having good structure and drainage. The soil pH range of 6.0-7.0 is ideal for good growth and spike production. It is a winter season crop but can be grown during rainy season in low rainfall areas with mild climate. For maximization of yield and quality of any flower crop various cultural and management practices like optimum dose of manures and fertilizers, spacing, irrigation, plant protection etc. are to be properly followed. Besides these practices, the increase in flower production and improvement of quality of spike can be achieved by following advanced techniques like use of plant growth regulators. The majority of growth regulators are classified in various groups *viz.*, auxins, gibberellins, cytokinins and inhibitors etc. These growth regulators are commercially available in the market.

MATERIALS AND METHODS

The experiment was carried out during November, 2008 to March, 2009 at the Department of Horticulture, B.A. College of Agriculture, Anand Agricultural University, Anand in Randomized Block Design (RBD) with three replications. In the experiment, the treatment comprised of four growth regulators with their two levels of each *viz.,* GA_3 (25 and 50 mg/l), NAA (50 and 100 mg/l), Ethrel (100 and 200 mg/l), CCC (250 and 500 mg/l) and compared with control (only water).

The soil was sandy loam in texture, locally known as '*Goradu*' and reasonably suitable for gladiolus cultivation. The corms were dipped for overnight (12 hrs) as treatment and than planted on raised beds one per hill at a distance of 45 x 30 cm with 6 cm depth in the month of November, 2008. Uniform basal dose of well rotten FYM was applied @ 4 kg/m^2 at the time of soil preparation. The fertilizer dose given to the crop was 300:200:200 kg NPK/ha. One third dose of nitrogen and potash as well as full dose of phosphorus was applied at the time of corm planting. Out of 2/3rd dose of nitrogen and potash, half dose of each was applied at 4 leaf stage *i.e.* 30 days after planting. Remaining dose of nitrogen and potash was applied at 6 leaf stage *i.e.* 45 days after planting.

Removal of corms and cormels was done when the leaves turned yellow. After complete drying of the leaves, corms were lifted by digging of soil. The cormels were

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Table 1 : Effect of plant growth regulators on growth and corm yield of gladiolus (*Gladiolus grandiflorus* L.) cv. AMERICAN BEAUTY

Treatments	No. of days required for corm sprouting	Plant height (cm)	No. of Leaves/ plant	Leaf length (cm)	No. of corms/plant	No. of cormels /plant	Corm yield	
							Corms wt. / plant (g)	Cormels wt. /plant (g)
T_1: GA_3 25 mg/l	7.43	80.37	12.57	61.03	2.80	22.27	42.95	4.19
T_2: GA_3 50 mg/l	7.40	80.65	12.80	61.34	3.00	24.87	43.47	4.51
T_3: NAA 50 mg/l	9.67	72.35	12.30	54.92	2.37	18.93	35.67	3.48
T_4: NAA 100 mg/l	9.93	71.83	12.47	55.12	2.63	19.47	37.63	3.89
T_5: Ethrel 100 mg/l	8.03	76.09	11.33	56.36	2.97	31.57	42.07	5.27
T_6: Ethrel 200 mg/l	8.43	78.37	11.23	58.69	3.13	30.27	44.15	5.15
T_7: CCC 250 mg/l	10.13	72.20	11.27	50.70	3.67	41.30	56.68	7.01
T_8: CCC 500 mg/l	10.27	71.30	11.10	49.71	3.27	36.37	52.01	6.56
T_9: Control	9.27	73.78	12.00	54.00	3.03	30.13	49.68	5.10
S.E. $\pm$	0.47	2.28	0.41	2.05	0.21	1.66	2.59	0.29
C.D. (P=0.05)	1.41	6.84	1.24	6.14	0.64	4.97	7.76	0.86
C.V. %	9.13	5.26	6.02	6.36	12.35	10.13	9.98	9.91

separated from the mother corm and observations on yield parameters were recorded.

RESULTS AND DISCUSSION

The experimental results revealed that the growth and yield attributes of gladiolus were significantly influenced due to the application of growth regulators (Table 1). The application of gibberellic acid 25 and 50 mg/l significantly reduced the days required for sprouting as compared to control and rest of the treatments, except Ethrel (100 and 200 mg/l0).

Similarly, the treatment of GA_3 50 mg/l recorded maximum plant height (80.65 cm), number of leaves per plant (12.80) and leaf length (61.34 cm) over control and it was at par with treatment GA_3 25 mg/l (Table 1). This might be due to its effect on stem elongation by increasing cell division and cell elongation in sub-apical meristem. The results of present investigation are in accordance with the result of Ravidas *et al*. (1992), Mahesh and Misra (1993), Mohanty *et al*. (1994), Maurya and Nagda (2002), Barman and Rajni (2004), Kumar and Singh (2005) and Sharma *et al*.(2006) in gladiolus.

On the contrary, CCC (250 and 500 mg/l) decreased the plant height, number of leaves per plant and leaf length as compared to control and rest of the treatments. The reduction may be due to retardation of stem elongation by preventing cell division in sub-apical meristem and suppression of apical dominance (Weaver, 1972).

Number of corms per plant is one of the most important yield attribute characters, which ultimately affect the total yield per plant. The significantly increased in number of corms (3.67), number of cormels (41.30), weight of corms (56.68 g) and weight of cormels (7.01 g) were noted under the treatment CCC 250 mg/l (T_7) as compared to control. This might be due to dipping of corms in the CCC solution which breaks the dormancy of lateral bud and promotes the sprouting of lateral buds resulting in splitting (division into two or more daughter corms) of corms and thus increasing in the number of corms and cormels per plant and there by corm yield. The corm yield was significantly incrsead due to the treatment of lower dose of CCC (250 mg/l) as compaired to rest of the treatments and control, exept the tretment of higher dose of CCC (500 mg/l). These results are in accordance with the findings of Dataram *et al.* (2001), Maurya and Nagda (2002) and Ravidas *et al.* (1992) in gladiolus.

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Received : August, 2010; Accepted : October, 2010