Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.6368

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **6 (5):** 498-501 (2018)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Effect of Micronutrients on Flowering and Vase Life of Gladiolus (*Gladiolus grandiflorus* L.)

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Received: 24.03.2018 | Revised: 30.04.2018 | Accepted: 6.05.2018

ABSTRACT

The present investigation was carried out at Main Experimental Station, Horticulture, N.D.U.A. & T., Kumarganj, Faizabad (U.P.) during the year 2012-13, to investigate the "Effect of different micronutrients on growth, flowering behavior and corm yield of gladiolus (Gladiolus grandiflorus L.)". The experiment was laid out in Randomized Block Design with three replications and ten treatments e.i. three levels of boron (100, 200 and 300 mg/l), three levels of zinc (100, 200 and 300 mg/l) three levels of manganese (100, 200 and 300 mg/l) and control. Foliar spraying of micronutrients was done after sowing at 3rd and 6th leaf stage. Length of spike (cm), number of spike/plant, number of florets/spike, average weight of spike (g), number of spike/ha and spike yield/ha (q) was significantly influenced with spraying of Zn @ 300 mg/l after sowing at 3rd and 6th leaf stage. Spraying of Mn @ 300 mg/l after sowing at 3rd and 6th leaf stage was proved to be most effective to increase vase life (days) of flower of gladiolus.

Key words: *Micronutrients, Gladiolus, Foliar spraying, Corm and Vase life.*

INTRODUCTION

Gladiolus (*Gladiolus grandiflorus* L.) is a bulbous ornamental plant which belongs to family Iridiaceae. Gladiolus is popularly known as Queen of bulbous flower because of attractive spike, having florets of huge forms, dazzling colours and longer keeping quality and has been rated second popular flower in the world. It is grown both for cut flowers as well as for garden decoration purposes, gladiolus is an excellent for beds, pots, herbaceous borders and cut flowers. It is most popular has a very long vase life. It has great potential for export during winter months to European countries to earn foreign exchange.

MATERIAL AND METHODS

The present investigation on "Effect of different micro nutrients on growth, flowering behavior and corm yield of gladiolus (*Gladiolus grandiflorus* L.)" was carried out in the year 2012-13 at Main Experimental Station, Horticulture, N.D.U.A. & T., Kumarganj, Faizabad (U.P.) India.

Cite this article: Maurya, R., Kumar, A. and Maurya, R.K., Effect of Micronutrients on Flowering and Vase Life of Gladiolus (*Gladiolus grandiflorus* L.), *Int. J. Pure App. Biosci.* **6(5):** 498-501 (2018). doi: http://dx.doi.org/10.18782/2320-7051.6368

The experiment was laid out in Randomized Block Design (RBD) with three replications and ten treatments. The treatments were comprised three different concentrations of boron (B), zinc (Zn) and manganese (Mn) @ 100, 200 and 300 mg/l respectively and control. Foliar spraying of micronutrients was done after sowing at 3rd and 6th leaf stage. The plot size was 1.6 m × 1.2 m with planting distance of 40 cm × 20 cm where each plot accommodates 24 plants. B, Zn and Mn given in the form of H_3BO_3, $ZnSO_4.7H_2O$ and $MnSO_4$ respectively. The data was recorded on various morphological characters.

RESULT AND DISCUSSION

The statistical analysis of data revealed that effect of micronutrients on days taken for initiation of 1st spike recorded were significant (Table 1). The maximum days taken for initiation of 1st spike (63.27 days) were recorded with the spraying of B @ 300 mg/l followed by spraying of Mn @ 300 mg/l (62.93 days). The minimum days taken for initiation of 1st spike (55.93 days) was found with water sprayed under control (T_1). Micronutrients activate several enzymes and are involved in various physiological activities which results increased days taken for initiation of 1st spike[21].

The days taken for opening of first florets was significantly decrease with spraying of Zn as comparison with the spraying of Mn, B and control (T_1), while significantly increased with spraying of B and Mn. The maximum days taken for initiation of 1st florets (88.47 days) were recorded with the spraying of Mn @ 300 mg/l followed by spraying of B @ 300 mg/l (87.93 days). The minimum days taken for initiation of 1st florets (78.67 days) were found spraying with Zn @ 100mg/l. The days taken for opening of first florets increase with every increase in the level of the micronutrients applied. Similar findings have been reported by Chaturvedi *et al.*[2], Khan[7], and Mir *et al.*[9] and Pratap *et al.*[15].

The maximum duration of flowering (14.73 days) was recorded with spraying of Zn @ 100mg/l followed by spraying of Zn @ 200 mg/l (14.20 days). Minimum duration of flowering (10.60 days) was recorded with spraying of Mn @ 300 mg/l. These findings are close agreement with Munikrishanappa *et al.*[10], Singh and Mishra[19] and Mir *et al.*[9].

Significantly, the maximum length of spike (120.13 cm) was measured with the spraying of Zn @ 300 mg/l followed by spraying of Zn @ 200 mg/l (117.07 cm). The minimum length of spike (111.50 cm) was measured under control (T_1). This effect might be due to the fact that Zn helps in accumulating the more amount of assimilates which are needed for improvement of length of spike. These findings are close agreement with Barman and Pal[1], Munikrishnappa *et al.*[10] in tuberose and Singh and Singh[18] in gladiolus.

Significantly, the maximum number of spike per plant (1.80) was recorded with the spraying of Zn @ 300 mg/l followed by spraying of Zn @ 200, Mn @ 300, and B @ 100 mg/l respectively. However, minimum number of spike per plant (1.40) was recorded under control. Similar findings are recorded by Munikrishanappa *et al.*[10], Nath and Bishwas[14], Reddy and Chaturvedi[16] and Katiyar *et al.*[5]. The micronutrients helps in cell division could be reason for increased number of spike per plant. The micronutrients activate several enzymes (catalase, peroxidase, carbonic dehydrogenase, alcohal dehydrogenase, tryptophon synthate, etc.) and involve in chlorophyll synthesis and various physiological activities resulting increase number of spike.

Significantly, the maximum number of florets per spike (11.10) was found with foliar application of Zn @ 300 mg/l fallowed by Zn @ 200 mg/l (10.21) and the minimum number of florets per spike (8.06) was recorded under control. The increase in number of florets per spike could be attributed to increase in photosynthesis with enhanced carbohydrate fixation in plants treated with Zn. These findings are close agreement with Barman and Pal[1], Singh and Singh[18] in gladiolus.

Significantly, the maximum weight of spike (77.83 g) was found with foliar application of Zn @ 300 mg/l fallowed by Mn @ 300 mg/l (76.80 g) and minimum weight of spike (72.93 g) was recorded with water

sprayed in control (T_1). Similar findings are recorded by Munikrishanappa *et al.*[10] and Halder *et al.*[3]. These results obtained might be due to the fact that micronutrients activate several enzymes (catalase, peroxidase, carbonic dehydrogenase, alcohal dehydrogenase, tryptophon synthate, etc.) and involve themselves in chlorophyll synthesis, increased dry matter accumulation, moisture content and various physiological activities resulting increased weight of spike.

Significantly, number of spike per hectare was found maximum with spraying of Zn @ 300 mg/l (1.64 lakh), which was significantly superior to other treatments followed by Mn @ 300 mg/l (1.63 lakh). The minimum number of spike per hectare (1.30 lakh) was recorded under control. Similar findings are recorded by Munikrishanappa *et al.*[10], Nath and Bishwas[14], Reddy and Chaturvedi[16] and Katiyar *et al.*[5]. The micronutrients helps in cell division could be reason for increased number of spike per hectare. The micronutrients activate several enzymes (catalase, peroxidase, carbonic dehydrogenase, alcohal dehydrogenase, tryptophon synthate, etc.) and involve in chlorophyll synthesis and various physiological activities resulting increase number of spike per hectare.

The highest spike yield per hectare (128.38 q) was found with foliar application of Zn @ 300 mg/l which was significantly superior to all treatments followed by B @ 300 mg/l (119.74 q) and minimum spike yield (94.98 q) was recorded with water sprayed in control (T_1). Similar findings are recorded by Munikrishanappa *et al.*[10], Singh and Ram[20] and Halder *et al.*[3]. These results obtained might be due to the fact that micronutrients activate several enzymes (catalase, peroxidase, carbonic dehydrogenase, alcohal dehydrogenase, tryptophon synthate, etc.) and involve themselves in chlorophyll synthesis, increased dry matter accumulation, moisture content and various physiological activities resulting increased spike yield per hectare.

Table 1: Effect of micronutrients on flowering and vase life of gladiolus

Treatments	Days taken for initiation of 1st spike	Days taken for opening of 1st florets	Duration of flowering (days)	Length of spike (cm)	No of spike / plant	No of florets / spike	Average weight of spike (g)	No of spike / ha (lakh)	Spike yield / ha (q)	Vase life (days)
T_1 (Control)	55.93	81.07	12.60	111.50	1.40	8.06	72.93	1.30	94.98	11.63
T_2 (B 100 mg/l)	60.73	83.07	12.20	112.87	1.67	8.15	73.60	1.37	100.96	12.67
T_3 (B 200 mg/l)	61.93	85.00	12.53	114.20	1.53	8.30	75.77	1.47	111.83	13.00
T_4 (B 300 mg/l)	63.27	87.93	12.80	114.23	1.40	8.63	76.60	1.56	119.74	13.67
T_5 (Zn 100 mg/)l	57.53	78.67	14.73	113.60	1.53	9.97	74.93	1.45	109.22	12.67
T_6 (Zn 200 mg/l)	58.33	79.67	14.20	117.07	1.67	10.21	76.03	1.57	119.04	13.33
T_7 (Zn 300 mg/l)	59.93	80.53	12.80	120.13	1.80	11.10	77.83	1.64	128.38	13.67
T_8 (Mn 100 mg/l)	62.00	83.73	11.13	112.17	1.40	8.13	73.70	1.37	101.11	12.33
T_9 (Mn 200 mg/l)	62.27	87.73	11.00	114.10	1.60	8.43	75.33	1.49	112.45	13.67
T_{10} (Mn 300 mg/l)	62.93	88.47	10.60	116.17	1.67	8.51	76.80	1.63	118.63	14.33
S. Em±	0.61	0.50	0.42	1.21	0.06	0.52	0.57	3.54	2.65	0.36
CD at 5%	1.82	1.49	1.25	3.60	0.20	1.57	2.23	10.54	7.88	1.08

Significantly, the Maximum vase life (14.33 days) was recorded with the spraying of Mn @ 300 mg/l followed by spraying of Mn @ 200, Zn @ 300 and B @ 300 mg/l (13.67 days) respectively. The minimum vase life (11.63 days) was recorded with water sprayed in control (T_1). The increase in vase life could be due to more number of florets and higher amount of reserve food present in spikes by micronutrients treatments. Similar findings are also reported by Kewte and Sable[6] in rose, Muthumanicham *et al.*[11] in gerbera, Nagaraju *et al.*[13] in gladious and Nagaraju *et al.*[12] in rose.

REFERENCES

1. Barman, D. and Pal, P., Effect of micronutrients on growth and flowering of *Chrysanthemum morifolium* cv. Chandrama. *Haryana J. Hort. Sci.*, **28(1&2):** 78-79 (1993a).

2. Chaturvedi, O. P., Shukla, I. N. and Singh, A. R., Effect of agromin on growth and flowering in gladiolus. *Prog. Hort.,* **18:** 196-199 (1986).
3. Halder, N. K., Rfiruddin, M. D., Siddky, M. A., Gomes, R., Beghum, A. and Anju, K., – man., Performance of gladiolus influenced by Boron and Zinc. *Pakistan J. Bio. Sci.,* **10:** 581 – 585 (2007).
4. Jauhari, S., Srivastava, R. and Srivastava, P. C., Effect of Zinc on growth, flowering, corm attributes, post harvest life, leaf and corm nutrients status in gladiolus cv. Red Beauty. *Prog. Hort.,* **37(2):** 423-428 (2005).
5. Katiyar, P., Chaturvedi, O. P. and Katiyar, D., Effect of foliar application of zinc, calcium and boron on spike production of Gladiolus cv. Eurovision. *Hort. Flora Res. Spec.,* **1(4):** 334-338 (2012).
6. Kewate, M. and Sable, A. S., Influence of growth regulators and foliar nutrients on vase life, grading and economics of rose cv. Paradise. *Journals of soil and crops,* **7(1):** 96-98 (1997).
7. Khan, F. U., Effect of micronutrients on Dahlia. *J. Orna. Hort. (New Series),* **3(2):** 122-123 (2000).
8. Lahijie, M. F., Application of micronutrients $FeSO_4$ and $ZnSO_4$ on the growth and development of Gladiolus variety "Oscar". *International J. Agri. Crop Sci.,* **4(11):** 718-720 (2012).
9. Mir, M. A., Singh, S. and Lone, R. A., Effect of Zn on the growth and flowering of Carnation (*Dianthus caryophyllus* L.) cv. Chabound Red. *Assian J. Hort.,* **2(1):** 147-148 (2007).
10. Munikrishanappa, P. M., Gouda, M. C., Farooqi, A. A. and Reddy. Y. A. N., Fertigation Studies in tuberose cv. Single. *Ind. J. Hort.,* **1(1):** 106-110 (2002).
11. Muthumanickam, D., Rajmani, K. and Jawaharlal, M., Effect of micronutrients on flower production in Gerbera. *J. Orna. Hort, (New Series),* **2(2):** 131-132 (1999).
12. Nagaraju, C. G., Reddy, T. V. and Madaiah, D., Effect of N, P and multiplex on growth, production and quality of field grown roses cv. Gladiater. *J. Orn. Hort.,* **6(4):** 287-293 (2003).
13. Nagaraju, H. T., Narayanagowla, J. Y. and Nagaraju, G. S., Effect of non toxic minerals on vase life of gladiolus. *Crop Res. Hissar,* **23(2):** 344-348 (2002 b).
14. Nath, M. R. and Biswas, J., Studies on effect of boron on vegetative and reproductive growth in tuberose (*Polyanthes tuberosa)* cv. Single. *Orissa J. Hort.,* **30(2):** 39-42 (2002).
15. Pratap, M., Reddy, S. A. and Reddy, Y. N., Studies on foliar nutrients spray and vase chemicals on keeping quality of Gladiolus (*Gladiolus grandiflorus*) cv. Trader Horn. *Ind. J. Agri. Res.,* **42(1):** 1-6 (2008).
16. Reddy, A. G. K. and Chaturvedi, O. P., Effect of zinc, calcium and boran on growth and flowering in gladiolus cv. Red Majesty. *Crop Res. Hissar,* **38(1/3):** 135-137 (2009).
17. Roy Chowdhury, N. and Sarker, S., Influence chemicals on vase life of gladiolus. *Sixth international symposium on post harvest physiology of ornamental plants, 0310, Norway, 17-22 June* (1995).
18. Singh, A. K. and Singh C., Effect of spacing and Zn on growth and flowering in gladiolus cv. Sylvia. *Prog. Hort.,* **36(1):** 94-98 (2004).
19. Singh, R. K., Mishra, G. N. and R. L., Effect of boron, calcium and zinc on gladiolus. *J. Orn. Hort.,* **6(2):** 104-106 (2003).
20. Singh, D. V. and Ram, M., Effect of spacing, extent of pruning, growth hormone and nutrients on flower yield of essential oil bearing rose (*Rosa damascena*) in subtropical India. *Acta Hort.,* **240:** 83-86 (1987).
21. Sinha, A. K., Singh, C. and Jain, B. P., Effect of PGRs and nutrients on fruit set, fruit drop, fruit retention and cracking of litchi cv. Purvi. *Indian. J. Hort.,* **56(4):** 309-311 (1999).