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RESPONSE OF DIFFERENT SPACING AND SALICYLIC ACID LEVELS ON GROWTH AND FLOWERING OF GLADIOLUS (*Gladiolus grandiflora* L.)

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ABSTRACT: An experiment was conducted to assess the effect of spacing and salicylic acid levels on vegetative growth and flowering of gladiolus cv. White Properity at HRC, SVPUAT, Meerut. The three levels of spacing (20 x 10, 20 x 20, and 20 x 30 cm) and three levels of salicylic acid (0, 50 and 100 ppm) were used in randomized block design (RBD) with three replications. Out of these a optimum spacing 20 x 20 cm was found superior with 100 ppm salicylic acid concentration in respect of number of leaves, leaf length (cm), days to opening of 1st floret and visibility of first spike, spike length, and number of florets per spike.

Keywords : *Gladiolus, spacing, salicylic acid, spike yield.*

Gladiolus is a popular cut flower crop belonging to family Iridaceae which is originated from South Africa. The cut flower is popular for its attractive spikes having florets for huge form, dazzling colours, varying sizes and long keeping quality. Due to its longer vase life, it is used in various floral arrangements like vase-arrangement, bouquet, hall arrangement, dice arrangement etc. It is a most important flowering plant having fourth rank in international market in world cut flower trade. Now-a-days, it is gaining fast popularity in India because the use of its flowers for floral arrangements in metro cites. Therefore, the demand of gladiolus is increasing in international as well as domestic market due to it high value.

Quality flower production of gladiolus is a big challenge for our florist. To obtain good material of gladiolus spacing plays an important role for good growth, quality spikes and cormel production (Bijimol and Singh, 1). Keeping in view the present study was carried out to find out the optimum level of spacing and salicylic acid dose for vegetative growth and high quality cut spikes of gladiolus cv. White Prosperity.

MATERIALS AND METHODS

An experiment on the effect of spacing and salicylic acid levels on vegetative growth and flowering of gladilous (*Gladiolus grandiflora* L.) cv. White Prosperity was carried out at Horticulture Research Centre (HRC), Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (UP) during 2007-08. The experiment was laid out in a factorial randomized block design with 9 treatments and three replications Fully developed medium size corms were taken for planting purpose and treated with carbendazim @ 2.0 g per litre water and dried in shade. The treated corms were planted in well prepared field at the spacing *i.e.,* 20 x 10, 20 x 20 and 20 x 30 cm. The foliar application of salicylic acid was done according to doses *i.e.* 0, 50 and 100 ppm uniformly at 40 and 60 days after planting during cropping period. A recommended dose of nitrogen, phosphorus and potash was applied in field. The half dose of nitrogen and full dose of phosphorus and potash were applied as basal dose at the time of final preparation of field before planting of corms. Whereas, remaining half dose of nitrogen was applied at the time of first flower spike emergence. During the experimentations, data were recorded in terms of growth and flowering parameters by using standard methods. Statistical analyses were carried out as suggested by Gomez and Gomez (2).

RESULTS AND DISCUSSION

Data presented in Table 1 showed that the different levels of spacing and salicylic acid application significantly affected the growth parameters during the course of investigation.

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Maximum plant height (105.32 cm) was observed with 20 x 20 cm spacing whereas minimum plant height was recorded under the closer spacing i.e. 20 x 10 cm over the wider spacing i.e. 20 x 30 cm. Similar results were also recorded in respect of plant height. The maximum plant height (105.32cm) was noticed with a optimum spacing 20 x 20 cm and minimum (103.59 cm) under closer spacing i.e. 20 x 10 cm as compared to other wider spacing 20 x 30 cm. The number of leaves, length of leaf and width of leaf were also significantly affected by using various levels of spacing. The maximum of leaves per plant (12.63), length of leaf (67.28 cm) and width of leaf (3.01 cm) were recorded with optimum level of spacing i.e. 20 x 20 cm while minimum number of leaves (9.56), length of leaf (64.44 cm) and width of leaf (3.01 cm) were recorded under the closer spacing i.e. 20 x 10 cm after the second wider spacing 20 x 30 cm. It is might be due to the space providing between the plants. The optimum plant spacing is provide the optimal amount of nutrients, space, sun light etc. regarding the number of sprouts and plant height. Similarly maximum number of leaves per plant, length of leaf and width of leaf are due to the effect of sufficient space and maximum exposure to sun light which enhance the photosynthesis. These findings are closely related with the findings of (Sujatha and Singh, 3).

Similarly, the various doses of salicylic acid in the form of foliar application exhibited the significant effect on different growth parameters as compared to control and other treatments during the experimentation. The maximum plant height (104.83 cm) was recorded with an application of 50 ppm salicylic acid and minimum plant height (99.45 cm) was obtained under the control treatment after the higher level of salicylic acid *i.e*., 100 ppm. The other parameters like number of leaves per plant, leaves per plant, leaf length and width were also significantly increased upto zero to 100 ppm salicylic acid. The maximum number of leaves per plant (11.83), length of leaf (68.64 cm) and width of leaf (3.03 cm) were observed with higher level of salicylic acid (100 ppm), while minimum number of leaves (8.73), length of leaf (64.86 cm) and width of leaf (2.74 cm) were recorded in control treatment. The salicylic acid is gave the favourable effect on growth parameters, because it is a growth promoting chemical. It accelerates the cell divisions in the apical portion of the sprouts in gladiolus. The above findings are in close confirmity with the findings of Sakhabut-dinova *et al*. (4).

The data pertaining to flowering parameters (Table 2) revealed that the various levels of spacing and salicylic acid significantly affected the flowering of gladiolus over the control. The minimum days taken in terms of visibility of spike and days to opening 1st floret *i.e.* 93.24 and 105.17 days were recorded under the wider spacing 20 x 30 cm, whereas maximum visibility days of first spike (104.04) and days to opening 1st floret (115.97 days) were taken with spacing *i.e.* 20 x 10 cm followed by optimum spacing 20 x 20 cm with values i.e. 97.88 and 110.64 days in terms of visibility of first spike and days to opening of 1st florets. Similar results were also obtained with different doses of salicylic acid. In this regard, the minimum visibility of 1st spike (90.77 days) and days to opening 1st floret (102.27 days) were noticed under the higher dose of salicylic acid i.e., 100 ppm. However, the maximum days taken to visibility of first spike and days to opening of 1st floret (108.09 and 119.38 days, respectively) were noticed in control.

In context of spike length, the maximum length of spike (96.53 cm) was observed with wider spacing 20 x 30 cm, whereas minimum length of spike was noted under closer spacing i.e. 20 x 10 cm followed by optimum spacing 20 x 20 cm. The salicylic acid concentration were also significantly affected the spike length upto 50 ppm salicylic acid then it was noted as detrimental factor. The maximum length of spike (101.54 cm) was recorded under 50 ppm salicylic acid whereas, minimum (86.14 cm) was obtained under control followed by higher concentration of salicylic acid. The another flowering character like rachis length

Table 1 : Effect of spacing and salicylic acid on vegetative growth characters of gladiolus.

Treatments	Plant height (cm)	No. of leaves / plant	Leaf length (cm)	Leaf width (cm)
Spacing				
S_1 (20 10 cm)	101.62	9.56	64.44	2.78
S_2 (20 20 cm)	105.32	10.64	66.91	2.90
S_3 (20 30 cm)	103.59	12.63	67.28	3.01
Salicylic acid				
H_0 (0 ppm)	99.45	8.73	64.86	2.74
H_1 (50 ppm)	104.83	9.06	65.03	2.93
H_2 (100 ppm)	101.24	11.83	68.64	3.03
C.D. (P = 0.05)	1.81	0.30	1.11	0.05

Table 2 : Effect of spacing and salicylic acid on flowering characters of gladiolus.

Treatments	Visibility of first spike (days)	Days to opening of 1st floret	Spike length (cm)	Rachis length (cm)	Floral diameter (cm)	No. of florets / spike
Spacing						
S_1 (20 10 cm)	104.04	115.97	90.61	95.07	10.68	11.08
S_2 (20 20 cm)	97.88	110.64	94.37	67.95	10.70	12.86
S_3 (20 30 cm)	93.24	105.17	96.53	66.45	40.90	14.45
Salicylic acid						
H_0 (0 ppm)	108.09	119.38	86.14	64.75	10.80	11.95
H_1 (50 ppm)	96.51	108.13	101.54	69.70	11.00	12.97
H_2 (100 ppm)	90.77	102.27	93.83	59.70	11.10	14.97
C.D. (P = 0.05)	2.16	1.75	2.11	0.70	NS	1.33

were also noted in favourable trend. The longest rachis length (95.07 cm) was recorded with closer spacing 20 x 10 cm and minimum (66.45 cm) was reported under 20 x 30 cm spacing followed by 20 x 20 cm. The rachis length significantly affected by salicylic doses also with increasing level upto zero to 50 ppm then it was declined with higher concentration i.e., 100 ppm salicylic acid. The maximum (69.70 cm) rachis length was recorded with a dose of 50 ppm salicylic acid, while minimum (59.70 cm) rachis length was observed with 100 ppm salicylic acid followed by control (64.75 cm).

The floral diameter was affected significantly with all the levels of spacing and salicylic acid. The various spacing and salicylic acid concentrations were significantly affected the number of florets per spike with increasing levels of both the treatments over control. The maximum number of florets (14.45) were found under wider spacing 20 x 30 cm whereas, minimum number of florets (11.08) were recorded under the closer spacing followed by 20 x 20 cm spacing. Similar results were also reported with various concentration of salicylic acid. The maximum number of florets per spike (14.97) were observed with 100 ppm salicylic acid and minimum number of florets (11.95) were under control followed by 50 ppm salicylic acid. The positive response of wider spacing provide sufficient space between the plants resulting plants absorbed optimum amount of nutrients with sufficient light, which ultimately favours photosynthesis and translocation of assimilates into the storage organs.

These changes in plant system are also responsible for improving flowering parameters i.e., visibility, days to open 1st floret, spike length, rachis length, floral diameter and number of florets. These findings are in close conformity with the earlier findings reported by Khurana and Cleland (5).

REFERENCES

1. Bijimol, G. and Singh A.K., (2001). Effect of spacing and nitrogen on gladiolus under Nagaland condition. *J. Orna. Hort.,* **4** (1) : 36-39.
2. Gomez, A and Gomez, A.A. (1996). *Statistical Procedure for Agricultural Research.* John Willey and Sons Inc, New York.
3. Sujatha, K. and Singh, K.P. (1991). Effect of different planting densities on growth, flowering and corn production in gladiolus. *Indian J. Hort.*, **48** (3) : 273-276.
4. Sakhabnt Dinova, A.R.; Fatkhat Kinova, D.R.; Bezrukova, M.V. and Shakiroga, F.M. (2003). Salicylic acid prevents and damaging action of stress factors on wheat plants Bulg. *J. Plant Physio.* period ISSU 314-319.
5. Khurana, J.P. and Cleland C.F. (1962). Role of salicylic acid and bezoic acid in flowering of a photoperiod insensitive strain, *Lemna paucicostala* LP 61. *Plant Physio.*, **100** :1541-1546.