J. Hort. Sci.
Vol. 2 (2): 112-114, 2007

Effect of spacing and corm size on growth, flowering and corm production in gladiolus cv. White Prosperity under Kashmir conditions

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Abstract

A study was carried out during 2005 - 2006 at the Division of Floriculture, Medicinal and Aromatic Plants, SKUAST-K, Shalimar, to determine the effect of corm size (4.1-4.5, 4.6-5.0 and 5.1-5.5 cm) and spacing (10 x 20, 15 x 20 and 20 x 20 cm) on growth, flowering and corm production in gladiolus cv. White Prosperity. Larger-sized corms (5.1-5.5 cm) with wider plant spacing (20 x 20 cm) gave the best performance. Number of days taken to spike emergence, plant height, number of leaves plant^{-1}, spike length, number of florets spike^{-1} and diameter of floret were observed to be significantly better with larger-sized corms. Minimum days taken to slipping were also found to be due to larger size of the corms. Number of corms plant^{-1}, corm weight, diameter of corm, number of cormel plant^{-1} and cormels weight plant^{-1}, in terms of both quality and quantity, showed increasing trend with an increasing corm-size and spacing. Therefore, wider spacing and larger corm size may be recommended for realising better quality and higher production in gladiolus cv. White Prosperity under Kashmir conditions.

Key words: Gladiolus, corm size, spacing, vegetative growth, flower quality

INTRODUCTION

Gladiolus is considered as an easy to grow bulbous ornamental because of its wide adaptability to varying agro-climatic regions. It is grown extensively in the tropical, sub-tropical and temperate regions of the world. Yield as well as quality of flower spikes and daughter corms depends on several factors, of which size of the mother corm and spacing, play an important role. Therefore, the present study was undertaken to work out the optimum size for the mother corm in gladiolus cv. White Prosperity and ideal spacing for the sowing corms under Kashmir conditions.

MATERIAL AND METHODS

Experiments were conducted for two consecutive years (2005 and 2006). Nine treatments were imposed with three corm sizes (dia in cm), viz., 4.1-4.5, 4.6-5.0 and 5.1-5.5 and three plant spacings (cm), viz., 10 x 20, 15 x 20 and 20 x 20 between plants and rows. Corms were planted at a depth of 5 cm in the first week of March during both years. Experiments were laid out in randomised block design with three replications. Observations were recorded on vegetative growth, floral and corm production parameters. Spikes were harvested when the lowermost florets developed colour. Corms were lifted from the soil two months after harvest of spikes. Two years data collected from 5 plants/plot each year were analysed statistically (Chandel, 1975).

RESULTS AND DISCUSSION

Vegetative characters

The results clearly indicate a significant influence of corm size on growth, flowering in gladiolus (Table 1). Bigger corms took significantly less number of days (20.16 and 18.77) to corm emergence, but, per cent corm emergence did not show any significant effect during 2005 and 2006. Bigger sized corms also produced taller plants (71.22 and 73.45 cm) and more number of leaves (7.78 and 8.71) plant^{-1}, as also observed by Mukhopadhyay and Yadav (1984) and Islam *et al.* (2000). This could be due to higher amounts of stored food reserves in large corms.

Out of the three spacings, viz., 10 x 20, 15 x 20 and 20 x 20 cm, the spacing of 20 x 20 cm showed early

Table 1. Effect of corm size and spacing on growth and flowering in gladiolus cv. White Prosperity

Treatment	Days taken to sprouting		% corm sprouting		Plant height (cm)		No. of leaves plant^{-1}		No. of days taken to spike emergence		Spike length (cm)		No. of florets spike^{-1}		Floret diameter (cm)	
	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006
Corm size (cm)																
4.1-4.5	21.38	19.87	98.14	99.10	68.94	71.28	7.06	8.15	81.75	83.33	88.33	90.83	16.50	17.82	9.71	10.52
4.6-5.0	20.66	19.18	99.32	98.15	70.77	73.05	7.43	8.47	80.83	82.33	95.27	98.30	17.00	18.37	10.55	11.30
5.1-5.6	20.16	18.77	98.45	99.25	71.22	73.45	7.78	8.71	79.17	80.83	99.11	101.66	17.83	19.36	10.72	11.62
CD *(P=0.05)*	0.69	0.72	NS	NS	2.01	1.87	0.18	0.18	0.15	0.20	1.96	2.03	0.78	0.79	0.58	0.60
Spacing (cm)																
10 x 20	21.38	19.97	98.17	98.25	69.01	71.75	7.28	8.24	81.15	82.72	87.22	89.72	16.66	18.03	9.55	10.49
15 x 20	20.44	19.00	98.09	97.14	71.05	72.65	7.47	8.30	80.64	82.22	97.27	99.87	16.88	18.33	10.48	11.27
20 x 20	20.38	18.86	99.00	99.12	71.37	73.38	7.51	8.79	79.96	81.55	98.72	101.20	17.77	19.19	10.95	11.78
CD *(P=0.05)*	0.69	0.72	NS	NS	2.01	1.87	0.18	0.18	0.15	0.20	1.96	2.03	0.78	0.79	0.58	0.60

emergence of corms as compared to closer spacings (10 x 20 cm) also corroborated by Langhlans and Smith, 1966. However, the per cent corm emergence was found to the non-significant in different spacings. Number of leaves plant^{-1} (7.51 and 8.79) and plant height (71.37 and 73.31) significantly increased with wider spacing i.e. 20 x 20 cm (Table 1). Maximum plant height resulted from corms planted at a spacing of 20 x 20 cm during both the years. Wider spacing gives more space to the plant to derive nutrients from the soil and reduces competition between plants for nutrients and light (Sujatha and Singh, 1991; Yadav and Singh, 1996). Reduction in plant height under higher densities may be due to greater competition between plants for various factors.

Floral characters

Flower quality was also significantly influenced by corm size. Larger corms produced significantly longer spikes (99.11 and 101.66cm) and maximum number of florets (17.83 and 19.36) spike^{-1} during the years, viz., 2005 and 2006, respectively (Table 1). Spike emergence, number of florets spike^{-1} and diameter of the floret were also reported to increase with increase in size of mother corms, by Mukhopadhyay and Yadav (1984), Yadav and Singh (1996), and, Islam *et al* (2000).

The widest spacing (20 x 20 cm) resulted in maximum spike length (98.72 and101.20 cm), floret diameter (10.95 and 11.78 cm) and number of florets (17.77 and 19.19) spike^{-1} (Table 1). Similar findings have also reported by other workers earlier (Banker and Mukhopadhyay, 1980; Sujatha and Singh, 1991).

Corm and cormel production

Corm and cormel production was significantly affected by different corm grades used in planting. Significantly higher number of corms (2.28 and 2.62) and cormels (36.11 and 43.38) plant^{-1} were produced in a corm size of 5.1-5.5 cm (Table 2). Similarly, weight and size of the corm significantly increased with increase in size of corm at planting. This may also be due to availability of more food material stored in bigger sized mother corms that helped in better plant growth, corm and cormel production. These results are in agreement with earlier

Table 2. Effect of corm size and spacing on corm and cormel production in gladiolus cv. White Prosperity

Treatment	No. of corms plant^{-1}		No. of cormels plant^{-1}		Weight of 10 corms (g)		Weight of cormels plant^{-1} (g)		Diameter of corm (cm)	
	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006
Corm size (cm)										
4.1-4.5	1.91	2.08	28.42	34.88	402.86	400.07	24.73	30.00	5.30	5.70
4.6-5.0	2.08	2.32	31.71	36.77	442.25	447.32	27.70	33.83	5.43	5.83
5.1-5.6	2.28	2.62	36.11	43.38	464.43	480.55	31.05	35.55	5.50	5.90
CD *(P=0.05)*	0.19	NS	2.45	1.43	20.65	29.10	2.05	1.04	0.07	0.13
Spacing (cm)										
10 x 20	1.85	2.26	27.21	30.94	412.66	420.50	24.18	31.11	5.22	5.62
15 x 20	2.03	2.33	32.04	40.38	420.81	442.12	28.22	32.88	5.47	5.87
20 x 20	2.38	2.43	36.98	43.72	476.07	465.42	31.07	34.38	5.53	5.93
CD *(P=0.05)*	0.19	NS	2.45	1.43	20.65	29.10	2.05	1.04	0.07	0.13

findings of Mukhopadhyay and Yadav (1984), Patil *et al* (1995) and Islam *et al* (2000). Widest plant spacing (20 x 20 cm) significantly increased the number of corms (2.38 and 2.43) and cormels (36.98 and 43.72) plant^{-1}, and weight of cormels (31.07 and 34.38 g) plant^{-1} and size of corm (5.53 and 5.93 cm) plant^{-1} during both years of experimentation. Present findings are, thus, in agreement with many earlier workers (Mukhopadhyay and Yadav, 1984; Arora and Khanna, 1987, and, Sujatha and Singh, 1991). The availability of more light for synthesis of photosynthates and more area for better root growth and nutrient absorption in widest spacing may have enhanced the production of bigger corms and cormels. The positive response of wider spacing on corm and cormel production has also been reported by Mukhopadhyay and Yadav (1984) and Patil *et al* (1995).

REFERENCES

Arora, J. S. and Khanna, K. 1987. Spacing effects on flower and corm production of gladiolus cv. Sylvia. *Ind. J. Hort.*, **44**:96-99

Bankar, G. J. and Mukhopadhyay, A. 1980. Effect of corm size, depth of plating and spacing on the production of flowers and corms in gladiolus. *Ind. J. Hort.*, **37**: 403-408

Chandel, S. R. S. 1975. Handbook of Agricultural Statistics, Achal Prakashan, Parmat, Kanpur

Islam, M. S., Chowdhury, S. S., Hafiz, A. S. M. G. and Malik, M. A. 2000. The effect of corm size on the production of flower, corm and cormel in gladiolus. *Bangladesh J. Agril. Res.*, **25**:33-37

Mukhopadhyay, T. P. and Yadav, L. P. 1984. Effect of corm size and spacing on growth, flowering and corm production in gladiolus. *Haryana J. Hortl. Sci.*, **15**:18-24

Patil, S . S. D., Katwate, S. M. and Patil, M. T. 1995. Effect of different spacing and corm size on the flower and corm production of gladiolus. *J. Maharashtra Agri. Univ.*, **20**:122-123

Sujatha, K. and Singh, K. P. 1991. Effect of different planting densities on growth, flowering and corm production in gladiolus. *Ind. J. Hort.*, **48**:273-276

Yadav, M. P. and Singh, H. K. 1996. Influence of corm size and their spacing on growth and flowering of gladiolus cv. Sylvia. *Prog. Hort.*, **28**:96-100

Langhans, R. W. and Smith, D. R. 1966. Lily bulb size. *Bull. N.Y.St. flower Grs.*, **242**:8

(MS Received 12 March 2007, Revised 7 November 2007)