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## Germplasm evaluation for growth, flowering and corm yield in gladiolus (*Gladiolus grandiflorus* L.)

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**Abstract**

An experiment was conducted to find out the variability among ten varieties of gladiolus for cultivation at Rajasthan College of Agriculture Udaipur. The experiment was laid out in Randomized Block Design with three replications. There were significant difference among the varieties with respect to vegetative, floral and yield characters. Maximum plant height (60.22 cm) was recorded in Candiman Rose. Priscilla produced maximum number of leaves per plant (11.39). Psittacinous Hybrid recorded with earliest sprouting (12.61 days), earliest flowering (70.27 days), minimum days to 50% flowering and maximum number of spikes per plant (1.88). Candiman Rose was recorded the maximum spike length (83.28 cm), number of florets per spike (14.78), number of corms per plant (2.94) and number of cormels per plants (32.50).

**Keywords:** variability, gladiolus, germplasm evaluation

**Introduction**

Gladiolus is a member of the Iridaceae family and one of the most popular ornamental bulbous plants grown commercially for its fascinating flowers in many parts of the world. Gladiolus is known as queen of the bulbous plants is very popular as a cut flower. In the cut flower industry, gladiolus occupies the fourth place in international cut-flower trade. The key for any success of any genetic breeding programme for crop improvement depends on the availability of genetic variability for desired traits (Heller 1996) [5]. The most common method of improving gladiolus is through hybridization. Since gladiolus is highly heterozygous (Misra and Saini, 1990) [8], it is essential to evaluate the wide germplasm available before adopting any breeding programme to exploit the diversity in growth, flowering and corm traits. Considering the importance of popularity of the gladiolus both in domestic market and international market, it is important to study the performance of existing varieties and hybrids and also to test the new lines or hybrids for their superiority of performance and also identify new colours and colour combinations along with desirable floral characteristics like spike length, more number and better size of floret, increase vase life etc. The present study furnishes the results on assessment of gladiolus cultivars for growth, flowering, and corm yield.

**Materials and Methods**

This experiment was conducted at Horticultural Instructional Farm, Dept. of Horticulture, Rajasthan College of Agriculture, Udaipur during 2012-2013 in Randomized Block Design with three replication. Gladiolus cultivars viz., Candiman Rose, American Beauty, Chandni, Red Beauty, Punjab Dawn, White Prosperity, Jester, Srijana, Psittacinous Hybrid and Priscilla were selected for this study. The recommended agronomic packages and practice were followed to grow a crop. A basal does of 1.5 kg of FYM per square meter was incorporated in the soil at the time of field preparation, in addition to this 300kg N, 150kg P<sub>2</sub>O<sub>5</sub> and 150kg K<sub>2</sub>O per hectare were applied accordingly. The entire dose of phosphorus and potash in form of single super phosphate (SSP), muriate of potash (MoP), respectively were applied just before planting of corms. The balance amount of nitrogen was applied through two top dressings of urea in equal amounts at 40 days after planting and 60 days after planting. Planting of corms, two shallow furrows at 40 cm distance and of 6-8cm depth were prepared in each plot with help of kudali and treated corms (with Bavistin 0.2%) were planted at a distance of 20 cm in furrows. The observations were recorded from randomly selected five plants in each treatment the data were analyzed statistically on 15 parameters viz., vegetative, flowering, spike yield and corm yield.

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## Results and Discussion

The results obtained from present experiment on various parameters exhibited significant difference among cultivars are presented in Table.1 and Table 2. There were highly significant differences among the varieties for days to sprouting of corm. Earliest sprouting was observed in Psittacinous Hybrid (12.61 days) whereas maximum number of days taken for sprouting of corm was recorded in jester (19.61 days). The variation in days to sprouting of corm amongst various varieties might be due the genotypic differences that could have contributed to different hormonal levels, especially of gibberellins and abscisic acid accumulation in the corms, controlling the extent of dormancy and ultimately time required for sprouting. Variation in days to corm sprouting in different genotypes have also been reported by Safiullah and Ahmed (2001) <sup>[13]</sup> and Nair and Shiva (2003) <sup>[10]</sup>. Another probable reason for variation among the varieties might be due to the environmental conditions prevailed during sprouting period of corms that could have contributed to different genotype- environment interactions. Significantly maximum number of leaves per plant (11.39) was recorded in cultivar Priscilla whereas the minimum number of leaves per plant (6.39) was recorded in cv. Chandni. Similar findings amongst gladiolus varieties have also been reported by Kumar and Yadav (2005) <sup>[7]</sup>, Ram *et al.* (2005) <sup>[11]</sup> and Swain *et al.* (2008) <sup>[14]</sup>. Significant differences were observed in plant height at all the stages of growth. The maximum plant height (60.22 cm) recorded in Candiman Rose and the minimum plant height (36.11 cm) in Psittacinous Hybrid. Plant height is attributed to be an important varietal character that depends upon the genetic constitution. The variation in plant height among the different varieties might be due to genotypic differences in phenotypic expression of plant height and variations in different genotype-environmental interaction effects on plant height. It could have also been influenced by other plant characters viz., corm size, planting distance, etc. The results find support from reports of Saifullah and Ahmed (2001) <sup>[13]</sup>, Nagaraju and Parthasarthy (2001) <sup>[9]</sup>, Nair and Shiva (2003) <sup>[10]</sup>, Kumar and Yadav (2005) <sup>[6]</sup> and Swain *et al.* (2008) <sup>[14]</sup>. The variation in number of leaves per plant among the varieties might be due to variation amount of stored food material in mother corms expressed by their sizes. It could also be due to variation in rate of vegetative growth among the genotypes that could be attributed to their genetic makeup and could have been further influenced by the agro-climatic conditions. Floral characters results revealed that there were highly significant differences among varieties. The number of days to spike emergence were observed among the varieties that ranged from a maximum of 97.50 days in 'Red Beauty' to the minimum 64.66 days in 'Candiman Rose'. Time required for spike emergence is an important varietal character in gladiolus that might be primarily governed by the genetic makeup of the varieties. Spike emergence might have been primarily dependent on food reserves in plant that could be related to growth rate of plants regulating accumulation of the requisite level of carbohydrates for slipping. Similar results on varietal differences in spike emergence have reported by Nagaraju and Parthasarthy (2001) <sup>[9]</sup> and Kumar and Yadav (2005) <sup>[7]</sup>. Earliest flowering was observed in Candiman Rose (70.33 days) whereas, late flowering was observed in Red Beauty (103.05 days). Maximum spike length (83.28 cm) was recorded in 'Candiman Rose' and the minimum (64.22 cm) in 'American Beauty'. The results observed were in line with earlier findings of Kumar and yadav (2005) <sup>[7]</sup> and Swain *et al.*

(2008) <sup>[14]</sup>. The variation in spike length could be due to differences among the varieties for number of nodes and internodal length. The maximum floret diameter (9.22 cm) recorded in 'Candiman Rose' and the minimum (8.28 cm) noted in 'Srijana'. The variation in floret diameter might be due to hereditary traits of different varieties. The results also find support from findings of Baweja and Brahma (2003) <sup>[2]</sup> and Kumar and Yadav (2005) <sup>[7]</sup>. The maximum rachis length was recorded in White Prosperity (53.22 cm), whereas the minimum was recorded in 'Red Beauty' (33.66 cm). The results indicated that, rachis length was closely associated with other morphological characters like number of florets per spike, spike length and plant height in the varieties. Baweja and Brahma (2003) <sup>[2]</sup>, Kumar and Yadav (2005) <sup>[7]</sup> and Swain *et al.* (2008) <sup>[14]</sup> also reported similar results. The maximum number of florets (14.78) per spike was recorded in 'Candiman Rose' while the minimum number of florets (10.00) was recorded in Chandni. The variation in number of florets per spike might be due to hereditary traits of the varieties. Similar results on floret number have been reported by Rani and Singh (2005) <sup>[12]</sup> and Ram *et al.* (2005) <sup>[11]</sup>. There were significant differences in yield characters among the varieties. The maximum number of spikes per plant (1.88) was recorded in Psittacinous Hybrid while the minimum number of spikes per plant (1.5) was observed in Candiman Rose and Red Beauty. The variation in number of spikes per plant might be due to variability in genetic constitution of the varieties controlling the apical dominance and intensity of dormancy due to endogenous hormone level, governing the number of sprouts per planted corm. Similar results have also been reported by Safiullah and Ahmed (2001) <sup>[13]</sup>. The maximum number of corms per plant (3.11) was recorded in Punjab Dawn while the minimum number of corms (2.11) was observed in Red Beauty. It is general physiological property of gladiolus that every sprout emerging from the mother corm develops a new daughter corm at its base just above the mother corm. Similar results were reported by Safiullah and Ahmed (2001) <sup>[13]</sup>, Balamurugan *et al.* (2002) <sup>[1]</sup> and Kem *et al.* (2003). The number of corms produced per plot and per hectare might have direct correlation with per plant production, as has been indicated by the results. The results showed highly significant differences in corm characters among the varieties. The maximum diameter of corm (5.46 cm) was recorded in Srijana and the minimum (4.68 cm) in Red Beauty. Size of corm might be mainly governed by the genotypic makeup of the varieties determining the number of corms produced per plant, as the number of corms produced per plant appeared to be negatively correlated to corm diameter. It might be due to partitioning of the food material and its less availability for accumulation into individual corm. Similar, results on corm diameter have been reported by Kumar and Yadav (2005) <sup>[7]</sup>. The maximum weight of corm (61.39 g) was noted in Punjab Dawn whereas the minimum (37.22 g) was recorded in Candiman Rose. Whereas, the maximum number of cormels per plant (31) was recorded in White Prosperity while the minimum number of cormels per plant (13.94) was observed in Chandni. The weight of corm and cormels per plants appeared to be associated with diameter of corm as evident from the results. It could be due to the fact that larger corms might have deposited more food resulting into their correspondingly heavier weight and vice versa. The results are in accordance with the finding of Kumar and Yadav (2005) <sup>[7]</sup>, Ram *et al.* (2005) <sup>[11]</sup> and Bhujbal *et al.* (2013) <sup>[1]</sup>. The weight of cormels produced per plant in various varieties

was closely associated with the number of cormels produced per plant. Variation in size of cormels of different varieties of

gladiolus has also been reported by Kumar and Yadav (2005)<sup>[7]</sup>.

**Table 1:** Mean value of different characters in various varieties of gladiolus.

Varieties	Days to sprouting	Plant height (cm)	No. of leaves per plant	Rachis length (cm)	Days taken to spike emergence	Days taken to flowering	Days taken to 50% flowering	Spike length (cm)
Candiman Rose	17.890	60.223	8.167	40.890	64.667	70.333	77.833	83.280
American Beauty	13.500	49.333	10.167	42.553	65.553	74.277	82.053	64.220
Chandni	14.610	42.337	6.390	34.997	72.110	77.280	86.167	73.387
Red Beauty	19.557	49.777	9.667	33.667	97.500	103.057	110.997	82.277
Punjab Dawn	15.887	37.390	6.890	38.777	71.113	75.943	84.000	72.333
White Prosperity	13.390	51.557	7.053	53.223	82.390	89.223	96.447	83.057
Jester	19.610	51.833	10.890	45.333	86.280	91.890	98.943	79.000
Srijana	14.833	43.057	11.167	43.220	71.557	77.947	86.390	69.720
Psittacinous Hybrid	12.610	36.113	10.053	42.777	64.833	70.277	77.667	74.223
Priscilla	15.390	48.500	11.390	34.000	87.113	91.447	99.500	74.723
C.D.	0.472	1.441	0.879	1.336	2.425	1.281	2.211	1.859
SE(m)	0.158	0.481	0.294	0.446	0.810	0.428	0.739	0.621
SE(d)	0.223	0.681	0.415	0.631	1.146	0.605	1.045	0.878
C.V.	1.737	1.774	5.539	1.887	1.839	0.902	1.421	1.422

**Table 2:** Mean value of different characters in various varieties of gladiolus.

Varieties	Diameter of floret (cm)	No of florets per spike	No of spikes per plant	No of corms per plant	Diameter of corms (cm)	Weight of corms per plant (g)	No of cormels per plant
Candiman Rose	9.220	14.780	1.500	2.943	5.200	37.223	32.503
American Beauty	9.000	14.000	1.720	2.500	5.170	40.277	24.830
Chandni	8.307	10.610	1.387	2.390	5.043	48.057	13.943
Red Beauty	9.000	13.277	1.500	2.110	4.683	53.333	28.610
Punjab Dawn	8.943	12.943	1.443	3.113	5.130	61.390	25.277
White Prosperity	8.497	13.113	1.557	2.613	5.277	40.280	31.000
Jester	9.250	14.000	1.667	2.997	5.363	43.333	23.663
Srijana	8.280	12.777	1.610	2.890	5.463	48.610	21.387
Psittacinous Hybrid	8.693	13.337	1.887	2.443	5.213	48.333	17.720
Priscilla	9.083	14.113	1.387	2.667	5.267	45.557	29.997
C.D.	0.205	0.618	0.256	1.53	0.289	1.754	1.706
SE(m)	0.069	0.206	0.086	0.208	0.096	0.586	0.570
SE(d)	0.097	0.292	0.121	0.294	0.136	0.829	0.806
C.V.	1.346	2.689	9.469	13.502	3.223	2.176	3.965

## References

- Balamurugan Rengaswamy P, Arumugam T. Variability studies in gladiolus. *J Orna. Hort.* 2002; 5(1):38-39.
- Baweja HS, Brahma B. Performance of some gladiolus cultivar under mid hill conditions of Himachal Pradesh. *Sci. Hort.* 2003; 8:191-197.
- Bhattacharjee SK, De LC. *Advanced Commercial Floriculture*. Aavishkar publishers, Jaipur. 2003; 1:309-310.
- BhujbaL GB, Chavan NG, Mehetre SS. Evaluation of genetic variability heritability and genetic advances in gladiolus (*Gladiolus grandiflorus* L.) genotypes. *The Bioscan.* 2013; 8(4):1515-1520.
- Heller J. Promoting the conservation and use of underutilized and neglected crops. Institute of Plant Genetic and Crop Plant Research, Gatersleben, International Plant Genetic Resource Institute, Rome, 1996.
- Kem JC, Yadav SK, Kumar S. Performance of gladiolus cultivars under valley conditions of Uttaranchal. *Progressive Hort.* 2003; 35(1):108-110.
- Kumar R, Yadav DS. Evaluation of gladiolus cultivars under subtropical hills of Meghalaya. *J Orna. Hort.* 2005; 8(2):86-90.
- Misra RL, Saini HC. Correlation and path coefficient studies in gladiolus. *Ind. J Hort.* 1990; 47:127-132.
- Nagaraju V, Parthasarthy VA. Evaluation of gladiolus germplasm at midhills of Meghalaya. *Indian J Hort.* 2001; 58(3):269-275.
- Nair SA, Shiva KN. Performance of selected gladiolus (*Gladiolus floribundas*) varieties under Bay island conditions. *Indian J Agric. Sci.* 2003; 73(7):397-398.
- Ram RB, Tomar KS, Datta SK. Performance of certain gladiolus varieties under sodic conditions. *J Orna. Hort.* 2005; 8(1):77-78.
- Rani R, Singh C. Evaluation of different gladiolus cultivars for quality flower production. *J Res. Birsa Agric. Uni.* 2005; 17(2):227-230.
- Safiullah, Ahmed MJ. Evaluation of exotic cultivar of gladiolus (*Gladiolus grandiflorus*) under Rawalkot conditions. *Sarhad J Agric.* 2001; 7(2):171-174.
- Swain SC, Rath S, Sethi BK. Evaluation of gladiolus cultivars under valley conditions of Uttaranchal, Orissa *J Hort.* 2008; 36(1):120-123.