SHORT COMMUNICATION

MORPHOLOGICAL CHARACTARIZATION OF GLADIOLUS (*GLADIOLUS HYBRIDUS* HORT.) GERMPLASM

Mukesh Kumar*

Department of Horticulture, SVPUAT, Meerut, UP, India 250110

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Abstract: An experiment was conducted with 15 gladiolus cultivars at Horticultural Research Centre, SVPUAT, Meerut, UP, India during the year 2013-14. Results on different characteristics showed that cultivar Prabha gave the maximum plant height while cultivar Sylbia exhibited maximum number of leaves per plant, leaf length and leaf width. Maximum number of suckers per corm was noted with cultivar Aldebaran. Cultivar American Beauty showed maximum length of rachis and spike while cultivar Arka Gold produced maximum number of florets, flower diameter and weight of corm. However, minimum days required for visibility of spike and minimum days for opening of first flower noted in Punjab Glance and it was maximum observed with cultivar Prabha. Orange Ginger gave maximum number of spike and Aldebaran showed maximum diameter of corm and cormlets per plant whereas, highest number of corm was recorded in Pacific.

Kewwords: Gladiolus, Evaluation, Genotypes, Performance, Morphological characterization

INTRODUCTION

Gladiolus is one of the most important boulbous flowering plant of Iridaceae family. This flowering crop has gained popularity in India as well as world due to majestic flower spike with massive florets of brilliant color, attractive shapes, varying sizes of flowers and excellent keeping quality. Therefore, it is necessary to study the performance of existing cultivars for their desirable characters. Moreover, exotic varieties are known for their better quality spike and multiplication rate of corms and cormlets. However, their suitability under local conditions needs to be tested before their recommendation. The varieties with more number of florets, bigger floret size and more number of florets open at a time are well suited for exhibition purpose. The success of improvement depends mainly on the morphological variability. The morphological character of gladiolus varies due to its genotypes. In order to make further improvement for the economic traits efforts are needed on the part of breeders and floriculturist to bring about variations in the gladiolus cultivars for the traits attributing to economic characters.

MATERIAL AND METHOD

The experiment was carried out during 2013-14 at Horticultural Research Centre (HRC) of SVPUAT, Meerut, UP, India. Before planting of corms, well decomposed farm yard manure @ 50 t ha-1 was applied for the experimental plots uniformly as basal application. The application of nitrogen @ 200 kg ha-1 in the form of urea was applied in three equal split doses, one as basal application and the other two split doses 30 and 60 days after planting. Phosphorus @ 200 kg ha-1 in the form of single super phosphate and potassium @ 150 kg ha-1 in the form of Muriate of Potash was applied as basal dose. The beds of 1 m × 1 m size were prepared. Healthy and uniform sized corms (3.0-5.0 cm) were planted at 5-6 cm depth at a spacing of 30 cm × 20 cm in a randomized block design with three replications in Oct., 2013. Standard cultural practices were followed during the cropping season. Harvesting of corms and cormels were performed only when leaves turned into brown (Mukhopadhyay, 1995). The data were recorded on five randomly selected plants from each genotype in each replication on 17 characters i.e. Plant height (PH), number of leaves per plant (NLPP), leaf length (LL), leaf width (LW), number of suckers per plant (NSPC), length of spike (LS), length of rachis (RS), spikes per corm (SPC), diameter of spike (DS), number of florets per spike (NFPS), flower diameter (FD), visibility of spike in days (VSD), opening of first flower in days (OFFD), longevity of spike in days (LSD), diameter of corm (DC), weight of corm (WC), number of corms per plant (NCPP) and cormels per plant (CPP) . The experimental data were analyzed statistically as proposed by (Gomez and Gomez, 1984) using MSTAT–C software to find the significance.

RESULT AND DISCUSSION

The observations recorded at the successive stage of the plant development were analysed statistically and presented in the Table 1. The experimental findings of the present investigation and discussion had been discussed with appropriate reference by different authors as co-authors with the different parameters. It is clear from the Table 1 that all the characters under present investigation were significantly differed from each other in terms of growth, flowering and corm characters, indicating more variation in plant growth, flowering and corm characters. Since plant height is one of the most important character as it contributes towards higher spike length with more number of florets and thereby enhances spike quality. Cultivar

*Corresponding Author

Prabha showed maximum plant height followed by, variety Sylvia (62.77 cm) and minimum height of the plant (40.45 cm) was observed with the cultivar Arka Kesar. The variation observed in plant height among the genotypes might be due to difference in genetically constituents as well as environmental effects. Wide variation in plant height amongst some genotypes of gladiolus was observed by Hossain et al., (2011), Swaroop, K., (2010). Sylvia had maximum number of leaves per plant (6.72 leaves) and Punjab Glance was found minimum number of leaves per plant .Maximum leaf length was recorded in Sylvia (55.04) followed by, Prabha (54.65 cm) and minimum leaf length (35.76 cm) recorded in Punjab Glance. Similarly maximum leaf width (3.89 cm) was recorded in Sylvia and minimum leaf width (2.19 cm) showed in Aldebaran. Significant variations were observed among the cultivars in terms of number of suckers per corm and it was maximum (2.68) noted in Aldebaran followed by, Gold Field (2.63 suckers) and minimum number of suckers (0.86) was observed in Punjab Pink. This variation in leaf characters might be due to genotype as well as some known and/or unknown environmental factors. It has been reported that plant produces food materials through the process of photosynthesis. With the increasing number of leaves, photosynthesis generally increases, and plant can produce more food that influences the growth and development of the plant. So, genotypes that can produce more leaves have more plant growth leading to higher yield. Similar findings have been reported (Hossain et al., 2011). The wide variation was observed in flowering characters among the cultivars. American Beauty had maximum length of spike followed by Arka Kesar (79.24 cm) and minimum length of spike (48.53 cm) was found in Arka Kesar. The highest spike length is one of the important characters for commercial value of gladiolus. Length of spike is governed by the genotypic constitution of the plant that differs from cultivar to cultivar. Mishra (1997) reported that PG-8 germplasm was found to have the highest spike length among 10 gladiolus germplasm in calcarious soil of North Bihar. Ramachandruru and Thangam (2008) reported the highest rachis length in variety Mascagni. Pandey *et al.* (2009) also reported 'Advance Red' variety which was found to have the highest rachis length among 12 cultivars taken for investigation. Kumar *et al.* (2007) reported that the cultivar 'Jester Gold' to have the highest rachis length among twenty six gladiolus cultivars. Different cultivars showed significant variation in number of spikes per corm and cultivar Arka Gold produced maximum number of spikes per corm followed by, Punjab Glance (1.01 spikes) and minimum number of spikes per corm (0.86) was recorded in Punjab Pink. The maximum diameter of spike (1.11 cm) was recorded in Pricilla followed by Gold Field (1.07 cm) whereas, minimum diameter of spike (.72 cm) observed in Aldebaran.. Cultivar Arka Gold produced maximum number of florets (21.26) and minimum number of florets (10.15) was observed in Pacific. Baweja and Brahma (2003) reported that 'Ben Venuto' variety had the highest number of florets per spike among 15 cultivars of gladiolus. Patil (2003) reported that 'Sancerre' variety had the highest number of florets per spike among 9 cultivars of gladiolus. Nagaraju and Parthasarathy (2001) reported that 'Apollo' variety gave the highest floret number among 10 cultivars. Singh *et al.* (1998) also reported the highest number of florets in the variety 'Oscar' in Nagaland region. All the cultivars showed significant variation in flower diameter and it was maximum (10.45 cm) observed in Arka Gold followed by, (9.29 cm) in Pricilla while it was minimum (7.17 cm) noted in Arka Kesar. Baweja and Brahma (2003) reported that cultivar Oscar was found to have the highest diameter of floret among 15 gladiolus cultivars. Patil (2003) also reported Sancerre, which was found to have largest floret size among 9 gladiolus cultivars. Prabha had late spike initiation (88.33 days) and took more days for first floret opening (99.64 days). Planting of early and late blooming varieties in judicious manner will prolong flowering duration. Variation in days to spike initiation and 1st floret opening seem to be genetically controlled as reported by Pragya *et al*. (2010) in gladiolus. Rama Chandraru and Thangam (2008) also reported that Darshan was found to have the highest number of days for flowering whereas Peter Pears was found to have the lowest number of days to flowering both in shade and open field conditions. The variation in these parameters might be attributed to differences in genetic constitution of genotypes. The present findings are in conformity with the earlier findings of Pandey *et al*. (2012) in gladiolus, Wankhede and Gajbhiye (2012) in gerbera and Kumar *et al.* (2011) in snapdragon. Longevity of spike in days also differed each other among the cultivars and it was maximum (20.00 days) observed in Orange Ginger followed by, (16.13 days) in American Beauty and minimum longevity of spike (11.65 days) recorded in Prabha. The variation in different characters among varieties may be due to genetic traits and the effect of prevailing environmental conditions. The present findings are in conformity with the findings of Swaroop (2010) and Pandey *et al*. (2012) in gladiolus. Different genotypes exhibited significant variation for corm characters (Tables 1). Maximum diameter of corm (7.27 cm) was recorded in Aldebaran followed by, Arka Gold (7.10 cm) and minimum diameter of corm (4.07 cm) was recorded in Kuk-Kum. Weight of corm also varied significantly among different cultivars with minimum weight of corm being in Arka Gold (28.33) and maximum in Arka Gold (86.00 gm). Maximum number of corms per plant was recorded in Pacific (2.00) followed by, (1.67 corms) in Punjab Pink and minimum number of corms (1.00) was recorded in

Arka Gold. The data presented in Table 1 exhibits significant variation for cormel characters among the cultivars evaluated. Maximum number of cormels per plant (17.33) was recorded in Aldebaran followed by, (15.67) in Punjab Pink whereas, minimum number of cormels (11.67) was recorded in Orange Ginger. Variation in number of corms and cormels per plant may be due to the differential genetic make-up of the varieties. The present findings are in conformity to the work of Negi *et al*., (1982) Sharma and Sharma (1984) , Anuradha and Gowda (1994) and Pandey *et al*. (2012), in gladiolus.

Table 1. Mean performance of gladiolus (*Gladiolus hybridus* Hort.) genotypes for eighteen characters of gladiolus

S.No.	Genotypes	PH (cm)	NLPP	LL(cm)	LW (cm)	NSPC	LS (cm)	LR (cm)	SPC	DS (cm)	NFPS	FD (cm)	VSD	OFFD	LSD	DC (mm)	WC (gm)	NCPP	CPP
1	Punjab Pink	54.86	6.31	48.90	3.30	0.86	75.20	46.19	0.86	0.90	14.19	7.75	68.73	78.30	13.43	5.13	45.00	1.67	15.67
2	Punjab Glance	49.19	5.86	35.76	2.73	1.01	73.53	47.19	1.01	1.01	12.52	7.76	63.13	75.78	13.79	6.07	55.00	1.62	13.33
3	Pacific	50.01	5.91	41.93	2.21	2.27	60.25	35.00	0.87	0.76	10.15	8.13	68.53	79.75	13.13	5.37	46.33	2.00	15.33
4	Orange Ginger	50.39	5.91	41.73	2.21	2.27	60.25	35.00	0.89	0.80	11.36	8.13	73.18	79.24	20.00	5.23	50.00	1.64	11.67
5	Prabha	63.14	6.52	54.65	2.35	1.87	58.63	28.94	0.88	0.84	11.36	8.39	88.33	99.64	11.65	6.77	78.33	1.33	14.33
6	Sylvia	62.77	6.72	55.04	3.89	1.47	70.96	40.65	0.90	0.88	13.59	7.73	73.99	87.12	16.97	5.47	74.00	1.38	12.33
7	Aldebaran	45.30	6.11	37.32	2.19	2.68	55.81	36.61	1.06	0.72	11.77	7.73	70.75	84.69	17.98	7.27	76.67	1.00	17.33
8	Pricilla	50.04	6.46	43.33	3.19	2.22	65.65	42.42	1.21	1.11	13.33	9.29	73.93	85.04	14.27	5.23	33.33	1.33	12.67
9	Novalux	52.97	6.67	45.43	3.62	2.42	74.74	54.95	1.01	1.01	14.54	8.89	73.93	86.66	15.46	5.70	58.33	1.63	12.00
10	Gold Field	54.06	6.46	46.54	3.37	2.63	71.11	41.61	1.01	1.07	13.53	8.18	87.47	90.81	12.84	5.37	58.33	1.08	14.00
11	Ocilla	50.78	6.67	44.06	3.79	2.42	70.50	51.71	1.21	0.89	15.76	8.48	76.76	91.71	13.25	4.83	31.67	1.64	12.33
12	Kum-Kum	50.17	6.31	43.89	3.65	1.06	60.86	42.88	0.87	0.98	15.40	7.93	85.90	90.26	12.30	4.07	28.33	1.33	12.33
13	Arka Kesher	40.45	6.11	38.29	3.81	2.48	48.53	24.09	0.87	0.86	11.36	7.17	87.12	84.08	15.95	6.10	65.00	1.10	17.33
14	Arka Gold	49.87	6.11	41.69	3.49	1.47	79.24	56.61	1.67	0.87	21.26	10.45	80.25	93.58	14.31	7.10	86.67	1.00	12.67
15	American Beauty	51.06	5.91	44.35	2.88	2.07	86.71	60.45	0.90	0.96	15.20	7.63	82.67	95.40	16.13	5.37	52.67	1.67	15.00
16	Mean	51.67	6.27	44.19	3.13	1.95	67.46	42.95	1.00	0.91	13.69	8.24	76.98	89.60	15.96	5.67	61.31	1.42	13.89
17	Range	40.45	5.86	35.76	2.19	0.86	48.53	24.09	0.86	0.72	10.15	7.17	63.13	75.78	11.65	4.07	28.33	1.15	11.67
18	SE	63.14	6.72	55.04	3.89	2.68	86.71	60.45	1.67	1.11	21.26	10.45	88.33	99.64	20.00	7.27	86.67	2.00	17.33
19	C.V	5.72	0.30	5.53	0.65	0.62	10.06	10.24	0.22	0.11	2.70	0.81	7.91	9.38	3.52	0.86	8.41	0.32	1.88

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