



Performance of gladiolus (*Gladiolus hybridus* L.) genotypes for growth, flowering and quality characters

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Abstract: The performance of different genotypes for growth, flowering and quality characters showed significant differences. Among the twenty genotypes studied, Arka Gold recorded maximum plant height (79.40cm) whereas minimum plant height was observed in Green Star (53.80cm). Poonam produced more number of leaves (8.60), whereas Pinklady (7.40) produced less number of leaves. Early emergence of spike was recorded in genotype Liemonocello (48.80 days) while, it was late in genotype Tilak (69.40 days). First floret opening was recorded in genotype Shobha (62.40 days), while it was delayed in genotype Charms Flow (78.07 days). The longest spike length was recorded in genotype Sagar (90.73 cm) it was on par with cultivar Arka Naveen (81.47 cm) and shortest spike length was in observed in the genotype Algarve (48.60 cm). Number of florets per spike was maximum in genotype Arka Kesar (19.13) whereas, minimum in genotype minimum in Algarve (9.27). Number of spikes was maximum in genotype Arka Amar (2.93) followed by Tilak and Sagar (2.13) while minimum in Greenstar, King Lynn, Magma, Liemonocello, Algarve, Cheops, Pinklady, Bangladesh, Anjali and Charms Flow. Genotype Tilak recorded maximum diameter of floret (11.19 cm) and it was minimum in genotype Aarti (7.67 cm). Among the genotypes studied, vase life was maximum in genotypes Arka Naveen, Tilak, Arka Kesar and Sagar (9.00 days) whereas minimum in genotype Algarve (6.60days).

Key words : Gladiolus, Genotypes, Performance, Flowering, Quality parameters

Introduction

Gladiolus (*Gladiolus hybridus* L.) is a bulbous ornamental plant belongs to family Iridaceae. It is an elegant cut flower grown for its magnificent spikes. With changing life style and increased urban affluence, floriculture has assumed a definite commercial status in recent times and it has emerged as an important agri-business venture. In this regard gladiolus has gained much importance as it is the 'Queen of bulbous flowers'. The latin word 'Gladius' means sword and hence, it is often called as 'sword lily' because of the shape of its leaves (Lewis *et al.*, 1972). Gladiolus is an ornamental bulbous plant native to South Africa (Sharma and Sharma, 1984). Popularity of this crop as a cut flower is increasing day by day because of its attractive flower spikes and availability in wide range of colors of the florets, varying number of florets and their size, wide range of keeping quality and adaptability to different seasons. These characters have made it very attractive for use as a cut flower, vase and bouquet preparation, growing in herbaceous borders, beddings, rockeries and pot cultivation. Gladiolus is very rich in varietal wealth and every year there is an addition of new varieties (Kumar and Yadav, 2005). It is now grown as a cut flower very widely in the continent of Europe, particularly in Holland, Italy and Southern France (Butt, 2005). The performance of any crop or variety largely depends on genotypic and environmental interaction. As a result, cultivars, which perform well in one region, may not perform same in other regions of varying climatic conditions. Hence, it becomes very much necessary to study the morphological variation, development of high yielding varieties with better quality spikes and to find out

suitable variety for a particular region. Thus, the present investigation was conducted to study the relative preformance of twenty gladiolus genotypes for their growth, flowering and quality characters.

Materials and Methods

The experimental material of the present study comprised of 20 gladiolus genotypes. The present experiment was conducted at Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, UAHS Shivamogga, India. The experiment was laid out in randomized block design with three replications. Healthy and uniform corms were planted at 5-6cm depth, with a spacing of 30 × 20 cm. All recommended agronomic package and practices were followed to grow a successful crop. Observations were recorded on five selected plants from each genotype in each replication. The experimental observations were taken on growth, flowering and quality characters. The mean values of five randomly selected plants from each genotypes in each replication were used for data analysis. The analysis of variance was carried out according to the standard procedure suggested by Panse and Sukhatme (1967).

Results and Discussion

Significant differences were observed for all the characters studied among all the genotypes. The data pertaining to growth, flowering and quality characters are presented in table-1, 2, 3 and 4. Among the genotypes under study, Arka Gold recorded maximum plant height (79.40cm) followed by Arka Kesar (78.80 cm) whereas minimum plant height was observed in Green Star (53.80cm). Poonam produced more number of leaves (8.60), Poonam

Table-1: Performance of different gladiolus genotypes for growth parameters

Genotypes	Plant height (cm)	Number of leaves	Leaf length (cm)	Leaf width (cm)	Leaf area (cm ²)
Greenstar	64.00	8.13	48.93	3.87	115.33
King Lynn	73.00	7.67	58.07	4.21	132.67
Magma	70.73	7.80	55.07	3.98	115.00
Limonocello	67.93	7.87	55.27	3.84	125.33
Algarve	65.73	8.20	52.27	3.97	116.33
Cheops	67.73	7.87	53.47	4.13	127.00
Pinklady	68.93	7.60	56.60	3.67	115.90
Bangladesh	73.73	7.73	62.33	3.96	100.67
Poonam	68.80	8.60	54.87	3.94	136.50
ArkaNaveen	76.53	8.27	65.67	4.15	118.67
Shobha	73.53	8.20	60.13	4.17	132.67
Tilak	67.93	8.53	55.13	4.04	123.33
ArkaAmar	76.33	8.47	64.87	4.16	140.33
Arka Gold	79.40	7.93	63.13	4.42	135.33
Aarti	71.73	8.13	59.33	3.85	108.00
ArkaKesar	78.80	8.53	66.73	4.57	149.00
KumKum	66.13	8.53	50.80	4.11	115.00
Sagar	70.00	8.27	57.53	4.37	134.00
Anjali	68.40	8.13	58.07	4.31	133.17
Charms Flow	66.33	8.20	55.60	3.91	111.67
Sem ±	2.50	0.1	3.18	0.11	4.89
CD @ 5%	7.15	0.29	9.10	0.35	14.01

Table-2: Performance of different gladiolus genotypes for flowering parameters

Genotypes	Days taken for		Duration of flowering (days)
	Spike initiation	First floret opening	
Greenstar	66.53	73.93	20.27
Meridiane	66.27	73.93	19.20
Magma	53.13	63.33	26.60
Limonocello	48.80	63.13	22.60
Algarve	64.80	72.93	17.60
Cheops	63.80	72.00	20.73
Pinklady	57.20	64.93	19.67
Bangladesh	67.60	75.53	20.20
Poonam	59.47	69.00	22.60
ArkaNaveen	53.80	64.07	26.47
Shobha	51.13	62.40	25.93
Tilak	69.40	76.53	23.27
ArkaAmar	64.40	71.80	22.00
Arka Gold	61.27	69.93	19.87
Aarti	68.13	77.20	20.20
ArkaKesar	55.00	64.00	27.13
Kumkum	68.27	77.53	23.07
Sagar	61.13	68.80	26.60
Anjali	61.93	70.40	22.13
Charmsflow	67.00	78.07	21.80
S.Em±	1.54	1.41	0.84
CD @ 5%	4.40	4.03	2.41

(8.60) was on par with Arka Kesar, Tilak and Kum Kum (8.53), followed by Arka Amar (8.47), whereas Pinklady (7.40) produced less number of leaves. The leaf length varied from 48.93 cm in 'Greenstar' to 66.73 cm in 'Arka Kesar' with a grand mean of 57.69 cm. Leaf width ranged from 3.67 cm in Pinklady to 4.57 cm in 'Arka Kesar'. Leaf area at 90

Table-3: Performance of different gladiolus genotypes for spike characters

Genotypes	Spike length (cm)	Rachis length (cm)	Spike girth (mm)	Weight of the spike (g)	Number of spikes per plant
Greenstar	62.93	41.47	7.17	73.53	1.00
Meridiane	70.07	50.07	7.78	77.00	1.00
Magma	74.27	57.00	8.21	99.80	1.00
Limonocello	66.00	45.40	8.09	67.67	1.00
Algarve	48.60	36.67	6.91	62.73	1.00
Cheops	68.80	45.40	8.71	81.07	1.00
Pinklady	54.87	38.83	7.35	57.93	1.00
Bangladesh	63.73	41.93	7.35	73.80	1.00
Poonam	73.00	49.67	7.25	72.47	1.00
ArkaNaveen	81.47	56.67	8.97	77.43	2.00
Shobha	75.47	56.13	7.21	76.80	1.80
Tilak	77.20	57.27	9.99	120.13	2.13
ArkaAmar	66.07	50.53	7.05	65.60	2.93
Arka Gold	73.33	50.27	7.08	63.60	1.87
Aarti	54.27	37.40	7.16	42.87	2.07
ArkaKesar	77.87	58.67	8.09	105.60	2.00
Kumkum	68.07	51.00	7.40	71.87	2.00
Sagar	90.73	69.73	7.45	117.60	2.13
Anjali	71.93	57.40	7.35	73.73	1.00
Charmsflow	73.40	40.47	7.13	82.67	1.00
S.Em±	1.59	1.76	0.16	2.94	0.09
CD @ 5%	4.54	5.04	0.46	8.41	0.27

Table-4: Performance of different gladiolus genotypes for floret characters and vase life

Genotypes	No. of florets per spike	Length of the floret (cm)	Diameter of the floret (cm)	Vase life (days)
Greenstar	12.60	9.65	9.12	8.00
Meridiane	11.40	10.21	10.83	8.00
Magma	17.00	10.55	10.87	8.27
Limonocello	12.27	9.53	9.01	7.67
Algarve	9.27	9.83	10.13	6.60
Cheops	13.27	9.95	10.03	8.07
Pinklady	11.87	8.61	8.87	7.47
Bangladesh	12.60	10.01	9.58	8.13
Poonam	13.60	8.36	8.65	8.00
ArkaNaveen	17.33	10.77	10.54	9.00
Shobha	16.20	9.41	8.99	8.00
Tilak	15.93	10.82	11.19	9.00
ArkaAmar	14.67	10.01	8.93	8.00
Arka Gold	11.53	8.42	8.14	7.07
Aarti	10.87	8.13	7.67	7.00
ArkaKesar	19.13	10.68	10.76	9.00
Kumkum	14.00	10.25	10.05	8.00
Sagar	18.60	10.34	10.26	9.00
Anjali	13.53	9.90	9.18	7.87
Charmsflow	12.93	9.65	9.04	8.07
S.Em±	0.47	0.20	0.29	0.16
CD @ 5%	1.35	0.57	0.83	0.46

days after planting ranged from maximum of 108.00 cm² in Aarti to minimum of 149.00 cm² in Arka Kesar. Variations in vegetative characters may be due to their genetic make up as well as varietal differences. Similar, results were observed by Pragya et al. (2010), Neha et al. (2012) and Geeta et al. (2014) in gladiolus.

Early emergence of spike was recorded in genotype Liemonocello (48.80 days) and it was on par with genotypes Shobha, Magma and Arka Naveen (51.13 days), (53.13) days and (53.80) days, respectively whereas, it was late in genotype Tilak (69.40 days). Number of days taken for first floret opening in genotype Shobha (62.40 days) and it was on par with Liemonocello and Magma (63.13 days and 63.33 days, respectively) and it was late in genotype Charms Flow (78.07 days). Duration of flowering was maximum in Magma (26.60) while minimum duration of flowering was observed in Algarve (17.60). Identification of such characters would be useful in prolonging the flowering duration. Judicious planting of early and late cultivars could be useful in sustainable marketing of gladiolus cultivars for a longer period. These variations may be attributed to the inherent genetic characters of cultivars. Similar, results were observed earlier by Kamble *et al.* (2004), Kumar (2009), Balaram *et al.* (2009), Pragya *et al.* (2010), Neha *et al.* (2012) and Geeta *et al.* (2014) in gladiolus.

Significant differences were observed among the genotype with respect to spike length, which ranged from 48.60 cm to 90.73 cm. Genotype Sagar recorded the longest spike length (90.73 cm), however, it was on par with cultivar Arka Naveen (81.47 cm) and shortest spike length was in observed in the genotype Algarve (48.60 cm). However, the Maximum rachis length was observed in Sagar (69.73 cm) followed by Anjali (57.40) while minimum rachis length was found in the genotype Algarve (36.67). This variation in spike length and rachis length might be attributed to the inherent genetic characters associated with the genotypes. Similar, observations were reported earlier by Kishan *et al.*, (2005); Manjunath and Jankiram (2006) and Neha *et al.* (2012). Maximum number of spikes per plant was recorded in the genotype Arka Amar (2.93) followed by Tilak and Sagar (2.13) while minimum in Greenstar, King Lynn, Magma, Liemonocello, Algarve, Cheops, Pinklady, Bangladesh, Anjali and Charms Flow. Genotype Arka Kesar (19.13) recorded maximum number of florets per spike however it was on par with the genotypes Sagar (18.60) and Magma (17.00) whereas, minimum in Algarve (9.27). Weight of the spike was observed maximum in Tilak (120.13g) and Sagar (117.60 g) followed by Arka Kesar (105.60 g) whereas, minimum spike weight was observed in Algarve (62.73g). Similar results were previously observed by Kamble *et al.* (2004) and Punam *et al.* (2009) in gladiolus.

Diameter of the floret was recorded at the time of peak flowering stage differed significantly among the genotypes and it was ranged from 7.67cm to 11.19 cm. The Diameter of the floret was observed largest in Tilak (11.19) and it was on par with genotypes Magma (10.87), King Lynn (10.83), Arka Kesar (10.76) and Arka Naveen (10.54) While, genotype Aarti (7.67 cm) was recorded minimum diameter of floret. The length of floret was recorded maximum in Tilak (10.82 cm) followed by Arka Naveen (10.77) and minimum floret length was observed in Aarti (8.13 cm). The differences observed in these flower characters can be attributed mainly due to genetic characters. These findings confirm the earlier reports of Kamble *et al.* (2004) and Mandal *et al.* (2004) in gladiolus.

Maximum spike girth was observed in Tilak (9.99mm) and it was on far with genotype Arka Naveen (8.97mm) while minimum spike girth was observed in Algarve (6.91mm). This might be due to inherent genetic character associated with the cultivars. Similar, trend of spike girth variation was reported by Geeta *et al.* (2014).

Genotypes varied significantly with respect to vase life of spikes, which ranged from 6.60 days to 9.00 days. The maximum vase life period was recorded in genotypes Arka Naveen, Tilak, Arka Kesar and Sagar (9.00 days) and but it was on par with genotype Magma (8.27 days) and it was minimum in genotype Algarve (6.60days). Similar results are in conformity (Sheikh and Jhon, 2005), Pratap and Manohar (2006), Kumar and Roy (2012) and Geeta *et al.* (2014). On the basis of the investigation, it is evident that genotypes Liemonocello and Shobha were found earliest for spike initiation and first floret opening. Tilak, Sagar, Arka Naveen, Arka Kesar and Magma were found promising for production of quality spikes, longest spike and rachis length with a good durability, thus can be recommended for commercial cut flower production. Arka Amar, Tilak and Sagar for more number of spike production.

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