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Performance of Some Gladiolus Hybrid Varieties under Tropical Conditions of Tirupati

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ABSTRACT

An experiment was carried out during winter season of 2015-17 at the Citrus Research Station, AICRP, Tirupati to evaluate the performance of 12 gladiolus hybrid cultivars for cut flower and corm production. The vegetative and flowering characters as well as corm and cormel characters showed significant differences amongst the studied cultivars. The minimum number of days required for corm sprouting (7.4 days) and days to slipping (59.2) were recorded in A. Aarthi. The highest plant height (154.3 cm) and spike length (96.4 cm) were recorded in A .Tilak. The cultivar A. Darshan produced longest length of leaf (54.8 cm), while the maximum leaf width (3.75 cm), spike diameter (1.0 cm), and floret diameter (8.2cm) were noted in A Kesar. The maximum leaf area (155.9 cm2), rachis length (66.8 cm), florets per spike (18.4) and number of florets remaining open at time (8.6) were recorded in A.Amar. The maximum number of spikes (2.7) and corms (3.2) per plant were produced in American Beauty. Performance of A.Aarthi was found to be the best under tropical conditions of Tirupati on the basis of yield and economic parameters.

Key words : *Cut-flower, Corm, Gladiolus, Varietal performance.*

Gladiolus (*Gladiolus x hybridus* Hort.) is an important cut-flower crop in domestic as well as international markets. It belongs to family *Irridaceae* and and is attributed as "Queen of bulbous ornamentals" due to its high popularity amongst the bulbous ornamentals cultivated in the world. It is also called as 'sword lily' due to its sword shaped leaves. Gladiolus cuts pikes are in great demand for bouquets and flower arrangements because of long spike length, variety of colors and forms of florets. Besides, it is also grown in the beds for garden display and in pots for its magnificent inflorescence.

In North Indian plains, the winter season climatic conditions are ideal for its cultivation which also provides comparative advantage for export to European countries where it can't be raised successfully in open in the winters. To tap the ample opportunities of gladiolus cultivation for its vast demand and higher returns per unit cultivated area, it is necessary to assess performance of gladiolus cultivars under specific climatic conditions for getting the maximum output out of the genotypes available. Therefore, the present investigation was conducted to evaluate the relative performance of gladiolus varieties for their growth, yield and flower quality parameters under tropical conditions of Tirupati because there is huge demand for flowers in this region for proximity to famous temples in and around Tirupati where the requirement of flowers is perennial and during marriage season the gladiolus flowers are in huge demand used mainly for bouquets and decoration purpose

MATERIALS AND METHODS

The experiment was conducted at Citrus Research Station, Tirupati in November 2015-16 and 2016-17. The soil of the experimental field is red loamy with pH 6.4. The region lies in Seshachalam hill ranges dominated by sedimentary rocky-hilly terrain.It receives an average rainfall of 900- 1000 mm with sub-humid conditions and remains almost free from frost. During summers the temperature touches the mark of 42-45 degrees centigrade, whereas during winters it falls to 18- 20 ^{0}C. The source of planting material is from Indian Institute of Horticultural Research, and Lalbagh, Bangalore. The cultivars included for study were Arka Gold, Arka Amar, Arka Ayush, Arka Kesar, Arka Naveen, American Beauty, Summer Sunset, Arka Darshan, Arka Sanjeevini, Arka Kum Kum, Arka Tilak and Arka Aarthi.

The corms of these 12 varieties were planted in randomized block design at a spacing of 30 x 30 cm in beds of 2x2 mt size at a depth of 6-8 cm on November 2015, and November 2016 in three replications. All the fertilizer and protection measures was carried out as per the recommendations. The observations were recorded for different characters viz., days to sprouting of corm, corm sprouting percentage, number of leaves per plant, plant height, leaf length, leaf width, leaf area, days to slipping, spike length, spike diameter, floret diameter, rachis length, number of florets per spike, number of florets remaining open at a time, number of spikes produced per plant, number of corms produced per plant. The data were recorded on five randomly

selected plants per plot and the mean values of the recorded data were statistically analyzed.

RESULTS AND DISCUSSION

Out of the 12 cultivars evaluated for their vegetative growth and flower yield parameters(Tables1 and 2) corm sprouting was earliest in A. Aarthi (7.4 days), whereas A. Ayush took the maximum time to sprout (10.5 days). Among the varieties, A. Aarthi, A. Gold, A. Sanjeevini, A. Tilak, A. Amar and A. Kesar recorded cent per cent sprouting of corms, while Arka Kum Kum had the minimum 90.0% corm sprouting. The variety A.Amar produced the maximum number of leaves per plant at slipping stage (9.2) being at par to Summer Sunset (9.1) and A. Darshan (9.0), while minimum number of leaves per plant was produced by American Beauty (6.3). The number of leaves per plant might be more due to the higher stored food reserve in mother corm (Sharma and Gupta, 2003). The variety A. Tilak produced the tallest plants (154.3 cm) followed by A. Amar (131.0 cm), whereas American Beauty produced the dwarfest plant (106.2 cm). The differences in plant height amongst the varieties could be attributed to the genetic factors as reported by Lal *et al.* (1985) and Nagaraju and Parathasarthy (2001). The longest leaves were recorded in A.Darshan (54.8 cm), while the shortest length of leaves (42.9 cm) was in A.Gold. The broadest leaves (4.7 cm) and largest leaf area (155.9 cm2) were recorded by A Amar, whereas the narrowest leaves (2.6 cm) and smallest leaf area (84.0 cm2) were noted in A.Tilak and A.Gold, respectively. Differences in vegetative growth characters of different cultivars might be due to varied growth rates because of their genetic make-up; as a result, variation in phenotypic expression could be expected. Similar results on vegetative characters have also been reported by Mishra (1997) and Swain *et al.* (2008) in gladiolus.

Table 1: Comparative performance of gladiolus varieties for vegetative growth parameters

Name of variety	Days to sprouting of corm	Corm sprouting %	No of leaves per plant	Plant height (cm)	Leaf length (cm)	Leaf width (cm)	Leaf area (cm2)
Arka Amar	8.6	100	9.2	131.1	51.6	4.7	155.9
Summer Sunset	8.9	96.6	9.1	113	45.6	3.4	102.1
Arka Kesar	9.6	100	7.9	107.0	44.3	3.7	109.4
Arka Ayush	10.5	96.6	7.6	112.9	54.0	3.4	120.1
Arka Gold	8.4	100	7.6	108.1	42.9	3.0	84
Arka KumKum	9.0	90	7.9	108.1	47.1	3.0	95.5
Arka Sanjeevini	9.1	100	6.6	115.6	50.3	3.5	115.0
American Beauty	7.9	96.6	6.3	106.2	51.3	2.7	86.2
Arka Tilak	9.8	100	7.2	154.3	47.7	2.6	84.6
Arka Aarthi	7.4	100	6.5	118.8	51.6	2.9	96.9
Arka Darshan	9.3	96.6	9	120.2	54.8	3.4	121.5
Arka Naveen	9.1	96.6	7.4	118.2	47.6	3.0	94.6
Mean	9.0	97.7	7.7	117.8	49.0	3.3	105.5
S. Em±	0.4	2.82	0.37	3.49	1.71	0.1	3.15
C.D.(P=0.05)	1.399	NS	1.08	10.25	5.03	0.31	9.25

Data presented in Table 2 reveals that floral characters and flower and corm yield had significant differences amongst the genotypes. The variety A Aarthi was earliest in slipping (59.2 days) being at par with American Beauty (60.5 days), A. Kesar (61.9 days), Summer Sunset (62.4 days), A Amar (64.2 days) and A Ayush (64.5 days), while A.Darshan was most late (75.5 days to slipping). The current findings found support from Arora and Khanna (1985), who reported significantly varied time taken for spike emergence amongst the cultivars.

In gladiolus, spike length is one of the most important characters and in the present investigation A.Tilak and A.Amar produced significantly longer spikes (96.4 and 90.3 cm, which are considered of special and standard grades, respectively), whereas the shortest spikes were produced in A.Aarthi (69.9 cm). The variety A. Aarthi recorded the thinnest spikes of 0.7 cm diameter, while the thickest spikes were produced by A. Kesar (1.0 cm diameter). Lesser spike diameter is an undesirable trait due to less strength for remaining in straight position and more vulnerability to bending.

The diameter of florets is an important parameter which could determine market desirability and breeding potentiality of the variety. The largest and showy florets were produced in A.Kesar (8.2 cm diameter), whereas in A. Gold the smallest florets of 5.1 cm diameter were recorded. Similarly, rachis length is also an equally important spike quality parameter which was found longest in A.Amar (66.8 cm) followed by A.Tilak (66.6 cm), while the shortest in A.Aarthi (39.0 cm). The number of florets per spike was found to be the maximum in A. Amar (18.4), while the minimum was recorded in A.Aarthi (13.3). Dimri (2002) and Swain *et al.* (2008) also noticed significant differences in floret number among different gladiolus varieties. Similarly Swaroop *et al.* (2005) reported that A. Aarthi , A. Darshan and A. Amar produced 13.3, 16.0 and 15.0 florets per spike, respectively. Amongst the varieties, A. Amar had the highest number of florets remained open at a time (8.6) followed by A. Sanjeevini (8.0), whereas A. Naveen had only 5.2 florets open at a time.

The studied varieties exhibited significant differences for spike and corm yield per plant (Table 2). The variety American Beauty produced the maximum number of spikes (2.7) per plant followed by A Aarthi (2.6) and A. Sanjeeevini (2.5), whereas A. Kesar had the minimum number (1.1). Nair and Shiva (2003) also recorded significant differences in varieties for spike production per plant. The varieties also varied significantly for corm multiplication with American Beauty recording the maximum number of corms produced per plant(3.2) followed by A.Sanjeevini, (3.0), A.Aarthi (3.0) and A.Gold (2.9), while A.Kesar produced only 1.5 corms per plant. Similar results were reported by Safiullah and Ahmed (2001) and Kem *et al.* (2003).

Table 2: Comparative performance of gladiolus varieties for flower yield and quality parameters

Name of variety	Days to slipping	Spike length (cm)	Spike diameter (cm)	Floret diameter (cm)	Rachis length	No of florets per spike	No of florets remain open at a time	No of spikes per plant	No of corms/ plant
Arka Amar	64.2	90.3	0.9	6.7	66.8	18.4	8.6	1.6	2.0
Summer Sunset	62.4	76.7	0.8	5.8	45.6	14.6	5.5	1.2	1.8
Arka Kesar	61.9	77.3	1.0	8.2	49.4	13.9	5.5	1.1	1.5
Arka Ayush	64.5	82.0	0.8	5.6	47.6	13.6	5.9	2.0	2.6
Arka Gold	65.4	84.4	0.8	5.1	47.4	14.4	6.4	2.4	2.9
Arka KumKum	71.8	77.5	0.8	5.7	45.0	14.2	7.1	1.4	2.0
Arka Sanjeevini	59.2	80.2	1.0	7.1	54.6	15.1	8.0	2.5	3.0
American Beauty	60.5	72.0	0.7	5.8	42.1	14.3	6.4	2.7	3.2
Arka Tilak	65.0	96.4	0.8	5.6	66.6	15.1	5.4	2.1	2.6
Arka Aarthi	59.2	69.9	0.7	6.0	39.0	13.3	5.3	2.6	3.0
Arka Darshan	75.5	73.1	0.8	5.7	48.3	14.4	5.3	1.4	1.6
Arka Naveen	65.8	83.6	0.7	5.8	47.3	14.3	5.2	2.0	2.2
Mean	64.6	80.3	0.8	6.1	50.0	14.6	6.2	1.9	2.3
S. Em±	1.96	2.38	0.02	0.25	1.69	0.46	0.25	0.1	0.13
C.D.(P=0.05)	5.77	6.99	0.07	0.76	4.97	1.35	0.74	0.3	0.38

CONCLUSION

Among the varieties tested in Tirupati conditions Arka Aarthi, Arka Tilak, American Beauty performend well in terms of spike length, number of florets and flower opening and corms development

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