

Varietal Performance on Growth and Corm Yield Attributes in Gladiolus

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ABSTRACT

An experiment was conducted at Horticulture Research Farm, Banaras Hindu University, Varanasi, UP to study the performance of gladiolus varieties on growth and corm yielding attributes. The experiment was laid out in Randomized Block Design with three replications. Healthy, uniform and disease free corms of 27 gladiolus varieties (American Beauty, Arka Amar, Arka Ayush, Arka Darshan, Arka Kesar, Arka Manorama, Arka Nazrana, Arka Poonam, Arka Pratham, Arka Shobha, Arka Tilak, Arti, Chandni, Dhanvantri, Hunting Song, IIHR, Malaviya Kiran, Malaviya Kundan, Malaviya Shatabdi, Mohini, Plum Tart, Pusa Manmohak, Pusa Shubham, Pusa

Swarnima, Regency, Sunayana and Tiger Flame) were planted during the month of December, 2021. Various growth and corm parameters were significantly influenced by the performance of all gladiolus varieties. Among these varieties, Dhanvantri was observed maximum plant height and leaf blade length. However, maximum number of sprouts/hill was recorded with cv Arka Amar and cv Arka Ayush was noted for both maximum leaf width and scape width. Cultivar Pusa Swarnima was observed for maximum number of leaves/plant. Corm diameter and weight are important parameters for producing quality spikes with more number of cormels. The maximum number and weight of corm/hill was observed by cv Arka Amar and maximum number of cormels/hill was observed by cv Malaviya Kundan. The maximum weight of cormel/hill was recorded with cv Arka Pratham and maximum diameter of corm was exhibited by cv American Beauty.

Keywords Corm, Growth, Gladiolus, Varieties, Yield.

INTRODUCTION

As India has such a diverse climate, it is ideal for cultivating a variety of flowers in gladiolus including both exotic as well as Indian origin varieties. Floral ornaments and bouquets are esteemed during social gatherings where spikes of gladiolus in several attrac-

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tive colors are used to honour dignitaries, welcome guests and wish the sick a swift recovery and among several other things (Ravinath 2007). Gladiolus is an important bulbous crop though it is also popular with the name queen of bulbous flowers belongs to the family Iridaceae. It has a pivotal place as cut flower both in the domestic as well as international market (Pandey *et al.* 2012). Modern gladiolus is an important cut flower considered to have been bred originally from only six species. There are about 260 species of gladiolus (Singh and Sisodia 2017) till 2017. Many more number of new species are added under genus Gladiolus. The performance of any crop or cultivar largely depends on genotypic and environmental interactions. As a result cultivars which perform well in one region may not perform the same in other regions of varying climatic conditions. Gladiolus is very rich in varietal wealth and every year there is an addition of many new varieties hence, varietal evaluation becomes necessary to find out suitable variety for the specific region (Kumar and Yadav 2005). So, an experiment was conducted to study the performance of different gladiolus varieties on growth and corm yield parameters.

MATERIALS AND METHODS

The experiment was carried out at Horticulture Research Farm, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh during the year 2021-2022, geographically situated at 25° 02' north latitude, 83° 03' east longitudes and at an altitude of the location is 128.93 meters above the sea level. Uniform, healthy and disease free corms of 27 gladiolus varieties (American Beauty, Arka Amar, Arka Ayush, Arka Darshan, Arka Kesar, Arka Manorama, Arka Nazrana, Arka Poonam, Arka Pratham, Arka Shobha, Arka Tilak, Arti, Chandni, Dhanvantri, Hunting Song, IIHR, Malaviya Kiran, Malaviya Kundan, Malaviya Shatabdi, Mohini, Plum Tart, Pusa Manmohak, Pusa Shubham, Pusa Swarnima, Regency, Sunayana and Tiger Flame) were planted at a row to row spacing of 30 cm and plant to plant spacing of 20 cm during December 2021. The experiment was laid out in Randomized Block Design and replicated thrice. All cultural operations were timely followed for all the varieties. Observations were recorded on

various growth, corms and cormels attributes and data were analyzed statistically.

RESULTS AND DISCUSSION

Growth characters

Various growth parameters were influenced significantly due to the performances of gladiolus varieties and presented in Table 1. Cultivar Arka Amar reported maximum number of sprouts/hill (2.66) which was statistically at par with cvs Malaviya Kiran (2.43), IIHR (2.40), Chandni (2.20) and Sunayana (2.13) and significant to rest of the cultivars, whereas, minimum number of sprouts/hill was exhibited with cv Arka Shobha (1.00). Similarly, the maximum plant height (83.62 cm) and leaf blade length (76.78 cm) was recorded by cv Dhanvantri which was statistically significant to all other cultivars. Whereas, cv Arka Tilak exhibited minimum plant height (36.54 cm) and minimum leaf blade length (31.00 cm) was observed by cv. Arka Poonam. Cultivar Pusa Swarnima exhibited maximum number of leaves/plant (7.13) which was statistically significant to all other cultivars except cvs. American Beauty (6.63), Hunting Song (6.58) and Plum Tart (6.52). Minimum number of leaves/plant was reported by cv Arka Poonam (4.16). The cultivar Arka Ayush was reported maximum leaf width (4.30 cm) and scape width (2.65 cm), whereas, minimum leaf width (1.90 cm) was recorded with cv Malaviya Kiran and cultivar IIHR reported minimum scape width (1.46 cm). Different cultivars showed variable responses for vegetative characteristics. Varieties under study were grown under same soil and climatic condition but variations were reported. This might be due to their genetic composition, which interact differently to the soil and climatic conditions of the area (Ahmed *et al.* 2002). Plants may vary in height in order to compete for light, space, moisture, nutrition and ventilation (Azimi 2020). The variation in leaf width might be due to differences in the genetic makeup of the cultivars or it could be due to trigger on higher rates of photosynthesis activities that may have encouraged cell division, cell proliferation and enlargement resulting increase in the size of the leaves. Plant height is an important character as it contributes towards better spike length with more

Table 1. Varietal performance on various growth attributes in gladiolus.

Treatment	No. of sprouts/hill	Plant height (cm)	Leaf blade length (cm)	Leaf width (cm)	No. of leaves/plant	Scape width (cm)
American Beauty	1.20	61.42	56.79	3.67	6.63	2.23
Arka Amar	2.66	55.44	51.70	3.32	5.60	2.45
Arka Ayush	1.22	53.54	48.29	4.30	6.24	2.65
Arka Darshan	1.94	43.50	37.77	2.73	5.08	1.65
Arka Kesar	1.44	57.80	54.68	3.72	5.05	2.18
Arka Manorama	1.38	50.62	46.46	2.78	4.97	2.14
Arka Nazrana	1.33	44.94	38.28	2.05	5.83	2.17
Arka Poonam	1.33	37.46	31.00	2.60	4.16	1.73
Arka Pratham	1.25	51.11	45.90	3.21	5.54	2.35
Arka Shobha	1.00	54.47	52.05	2.79	5.50	1.97
Arka Tilak	1.83	36.54	32.21	3.08	5.36	1.87
Arti	1.80	70.75	65.77	2.28	5.50	1.95
Chandni	2.20	58.85	53.76	2.58	6.10	1.76
Dhanvantri	2.06	83.62	76.78	3.04	6.11	1.81
Hunting Song	2.00	62.86	56.78	3.02	6.58	1.82
IIHR	2.40	55.94	50.86	2.45	5.53	1.46
Malaviya Kiran	2.43	59.23	53.77	1.90	5.00	1.62
Malaviya Kundan	1.93	57.56	51.67	3.22	5.83	2.15
Malaviya Shatabdi	1.26	57.25	52.46	2.13	5.27	1.91
Mohini	1.46	69.66	63.96	2.93	6.18	2.39
Plum Tart	1.53	67.28	62.23	2.46	6.52	1.77
Pusa Manmohak	2.06	74.02	67.44	3.11	5.83	1.75
Pusa Shubham	1.60	56.90	52.62	2.76	6.33	2.03
Pusa Swarnima	1.60	75.42	70.65	2.98	7.13	1.65
Regency	1.26	64.79	60.08	3.35	5.95	2.06
Sunayana	2.13	69.82	63.68	4.15	6.24	1.93
Tiger Flame	1.60	60.66	56.27	2.46	5.69	1.79
CD at 5%	0.59	8.15	8.17	0.60	0.77	0.44

number of florets and thereby enhances spike quality. The similar findings was also reported by Swaroop *et al.* (2005), Kadam *et al.* (2014), Bhat and Sheikh (2016), Kujur *et al.* (2016) and Nagar *et al.* (2018) in gladiolus.

Corm and cormel attributes

All the corm and cormel characters were significantly influenced by various gladiolus cultivars as shown in Table 2. Corm diameter and corm weight are important parameters for producing quality spikes with more flowers of larger size. The maximum number of corms/hill was observed by cv Arka Amar (2.88) which was statistically at par with cvs IIHR (2.58), Malaviya Kiran (2.48) and Arka Darshan (2.44), although, it was statistically significant to rest of the cultivars. Minimum number of corms/hill (1.00) was

recorded with both Arka Poonam and Arka Darshan cultivars. The maximum weight of corm/hill was observed with cv Arka Amar (59.34 g) which was significant to all other cultivars except cvs Sunayana (57.13 g) and Dhanvantri (47.65 g). Minimum weight of corm/hill was produced by cv Arka Manorama (18.02 g). The maximum diameter of corm was recorded with cv. American Beauty (49.40 mm). The minimum diameter was observed with cv Arka Darshan (26.40 mm). The maximum number of cormels/hill was noted with cv Malaviya Kundan (35.13) which was statistically at par with cvs. Sunayana (33.37), Tiger Flame (28.90), Chandni (26.86) and American Beauty (26.11) and significant to rest of the cultivars. Minimum number of cormels/hill was recorded with cv Arka Nazrana (3.88). The maximum weight of cormel/hill was exhibited by cv. Arka Pratham (13.18 g) which was statistically at par with cvs Malaviya Kundan (10.58 g) and Arti (8.84 g) and significant to

Table 2. Varietal performance on corm and cormel attributes in gladiolus.

Treatment	No. of corms/hill	Weight of corm/hill (g)	Diameter of corm (mm)	No. of cormels/hill	Weight of cormel/hill (g)
American Beauty	1.21	42.54	49.40	26.11	4.43
Arka Amar	2.88	59.34	35.75	13.77	4.27
Arka Ayush	1.22	38.75	47.23	8.22	6.37
Arka Darshan	2.44	20.59	26.40	5.10	3.18
Arka Kesar	1.11	23.16	43.28	18.16	6.83
Arka Manorama	1.33	18.02	32.75	7.00	1.30
Arka Nazrana	1.44	25.81	36.71	3.88	1.11
Arka Poonam	1.00	30.30	43.88	10.73	4.73
Arka Pratham	1.16	33.22	42.26	26.08	13.18
Arka Shobha	1.00	32.89	47.94	13.33	1.52
Arka Tilak	1.55	27.95	36.07	11.50	6.04
Arti	1.88	27.58	33.87	8.80	8.84
Chandni	2.00	34.76	36.02	26.86	2.98
Dhanvantri	1.98	47.65	42.58	21.65	4.86
Hunting Song	1.93	32.07	35.34	21.40	4.27
IIHR	2.58	27.88	28.92	6.36	2.10
Malaviya Kiran	2.48	27.71	29.67	12.42	1.07
Malaviya Kundan	1.73	23.51	31.64	35.13	10.58
Malaviya Shatabdi	1.18	21.43	35.96	6.20	1.46
Mohini	1.40	44.03	46.05	13.66	4.09
Plum Tart	1.63	44.50	46.05	9.33	2.25
Pusa Manmohak	1.83	34.95	37.13	14.16	3.16
Pusa Shubham	1.33	25.84	37.73	5.96	0.86
Pusa Swarnima	1.58	34.89	41.03	20.76	4.89
Regency	1.60	34.33	39.35	20.50	3.10
Sunayana	1.84	57.13	45.25	33.37	6.42
Tiger Flame	1.75	25.15	33.24	28.90	5.05
CD at 5%	0.52	13.44	6.42	12.24	5.73

all other cultivars. Minimum weight of cormels/hill was observed by cv Pusa Shubham (0.86 g). Varieties producing more corms/plant can be considered as good multipliers and may be used as parents in further breeding programs confirmed by Kadam *et al.* (2014). Different varieties responded or interact differently with given soil and climatic conditions depending upon their genetic composition. The availability of more food material stored in larger mother corms, which aided in greater plant growth could be linked to the more number of corm production influenced by corm size. Differences in vegetative features between cultivars may be influenced by growing conditions and genetic capabilities of variety resultant in diversity of phenotypic expression. These findings were in close conformity with the observation made by Lepcha *et al.* (2007), Sankari *et al.* (2012), Singh *et al.* (2013), Kadam *et al.* (2014) and Swaroop *et al.* (2019) in gladiolus.

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