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Evaluation of gladiolus cultivars for plant growth and corm production

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Abstract
The experiment conducted to study the "Evaluation of varieties and post-harvest studies in gladiolus" at Horticulture Research Farm, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh. Experiment was laid out in Randomized Block Design with five replications. Healthy corms of 25 gladiolus varieties were planted during November, 2016. Among cultivars Punjab Dawn produce maximum number of sprouts/hill. Maximum width of longest leaf was observed in cv. Sunayna, whereas, minimum was found in cv. Arti. Maximum plant height at 30 and 60 days was recorded in cv. Dhanvantri, while, minimum height was observed in cv. Darshan. Maximum diameter and weight of corms/hill was exhibited with cv. American Beauty, however, no. of corms/hill was found maximum in cv. Chandani. Number and weight of cormels/hill was observed maximum in cv. Anjali and Arti, respectively.

Keywords: Gladiolus, cultivars, growth, corms, cormels

Introduction
Flower is a greatest gift given by god. Flower, name represents the beauty and love. Flower gives the pleasure and peace to the soul. Gladiolus or sword lily (*Gladiolus* spp.) has gained much importance as a cut flower as it is valued for its majestic spikes which contain attractive, elegant and delicate floret of different attractive colours and shapes. Gladiolus is one of the largest genera in the Iridaceae family contains about 260 species (Singh, 2014) [14]. Gladiolus is an important commercial flower and is very popular as cut flower both in domestic and international market (Singh and Sisodia, 2017) [10]. Gladiolus propagated through rounded, symmetrical corms that enveloped in several layers of brownish, fibrous tunics, from one corm 2-3 plants immerged. The performance of any crop or cultivar largely depends on genotypic constituent and effect of environmental condition. As a result, cultivars which perform well in one region may not perform the same in other regions of varying climatic conditions (Panday, 2012) [4]. Hence, the present experiment was conducted to evaluation of gladiolus varieties suitable for growth, corm and cormel production.

Materials and Methods
The experiment was carried out at Horticulture Research Farm, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India. The geographical situation is about 28 18" North latitude, 83 03" East longitudes and at altitude of the location is 76 meter above the mean sea level. Healthy corms of 25 varieties (Anjali, Arti, Chandani, Darshan, Dhanvantari, Punjab Dawn, Pusa Kiran, Pusa Manmohak, Pusa Srijan, Shabnam, Shubhangini, Sunayna, Surya Kiran, Aldebaran, American Beauty, Flavour Souvenir, Green, Green Star, Invitatie, Mascagni, Nova Lux, Plum Tart, Princess Margaret Rose, Priscilla and Purple Flora) were planted at 30 × 20 cm spacing in November, 2016. The experiment was laid out in Randomized Block Design and replicated five times. All cultural operations were uniformly done for all the cultivars. Observations were recorded on various growth, corm and cormel attributes and data were analyzed statistically.

Results and Discussion
Growth characters
Various growth parameters were influenced significantly due to response of varieties (Table 1). Maximum number of sprouts/hill was recorded with cv. Punjab Dawn which was statistically at par with cvs. Sunayna, Surya Kiran and Pusa Kiran and significant to all other varieties. Cultivar Sunayna exhibited maximum width of leaf which was at par with cvs. Mascagni and American Beauty and significant to other varieties. Maximum plant height was attended by cv. Dhanvantri at 30 and 60 days after planting of corms, whereas, cv. Green

resulted in shortest plant height. It is clearly indicated from the data that there is wide variation in different growth characters, which is probably due to genetic nature of the varieties which phenotypically appear. Morphological variations on number of sprouts/hill and size of leaf were observed due to gladiolus varieties (Sisodia and Singh, 2015). Significant difference on growth characters also observed in hybrids of Snapdragon (Singh *et al*., 2013a) [11]. Similar finding have been reported by.

Table 1: Performance of gladiolus varieties for growth characters.

Treatment	Number of sprouts per hill	Width of longest leaf (cm)	Height of plant at 30 days (cm)	Height of plant at 60 days (cm)
Anjali	1.40	3.14	46.65	59.27
Arti	1.20	1.76	41.94	51.96
Chandani	1.80	2.84	42.03	55.35
Darshan	1.20	2.64	37.59	50.05
Dhanvantari	1.20	3.22	59.14	73.62
Punjab Dawn	2.60	2.14	47.23	60.64
PusaKiran	2.20	2.68	51.15	70.53
PusaManmohak	1.60	2.66	54.44	68.19
PusaSrijan	1.40	2.28	38.47	50.44
Shabnam	1.00	3.36	45.63	60.47
Shubhangini	1.60	2.96	49.58	69.60
Sunayna	2.40	3.98	43.49	55.03
Surya Kiran	2.20	2.18	39.86	51.69
Aldebaran	1.40	2.30	42.00	52.85
American Beauty	1.40	3.60	53.59	68.14
Flavour Souvenir	1.00	2.02	39.05	56.89
Green	1.20	2.14	38.66	50.89
Green Star	1.20	1.82	44.43	60.23
Invitatie	1.40	2.38	46.23	60.00
Mascagni	1.00	3.70	45.07	59.25
Nova Lux	1.40	2.92	44.73	58.36
Plum Tart	1.60	2.40	54.20	69.11
Princess Margaret Rose	1.40	3.36	41.05	53.48
Priscilla	1.20	2.86	44.43	57.05
Purple Flora	1.40	2.44	44.85	57.73
C.D. at 5%	0.67	0.56	6.86	7.32

Table 2: Performance of gladiolus varieties for corms and cormels production.

Treatment	Number of corms/hill	Diameter of corm (mm)	Weight of corms/hill (g)	Number of cormels/hill	Weight of cormels/hill (g)
Anjali	2.60	67.16	152.20	78.60	12.88
Arti	2.00	45.06	86.65	17.80	19.61
Chandani	3.00	43.04	79.21	75.20	9.85
Darshan	2.20	45.97	57.11	8.00	2.74
Dhanvantari	2.20	61.49	141.42	19.40	5.13
Punjab Dawn	2.60	55.55	136.46	6.20	2.92
Pusa Kiran	2.20	50.55	71.85	15.40	5.41
Pusa Manmohak	1.60	49.45	77.80	12.80	3.56
Pusa Srijan	2.40	52.93	96.40	25.60	9.76
Shabnam	1.00	56.45	66.43	12.80	3.83
Shubhangini	1.60	59.39	96.80	43.40	8.15
Sunayna	2.20	64.56	150.02	26.40	11.87
Surya Kiran	2.60	49.62	101.81	28.80	8.61
Aldebaran	2.20	55.14	83.88	27.20	8.12
American Beauty	1.20	85.97	162.25	19.80	6.74
Flavour Souvenir	1.20	44.86	68.80	21.60	7.28
Green	1.60	47.39	49.84	21.20	4.24
Green Star	1.40	60.60	72.49	32.20	5.29
Invitatie	1.40	46.71	67.82	17.00	4.91
Mascagni	1.00	55.03	57.41	17.60	6.02
Nova Lux	1.20	63.66	97.82	28.60	11.04
Plum Tart	1.60	58.07	92.91	31.00	6.92
Princess Margaret Rose	1.40	69.00	91.13	12.20	4.96
Priscilla	1.80	61.74	112.74	30.40	11.76
Purple Flora	2.20	50.02	73.38	61.40	8.18
C.D. at 5%	0.82	10.08	38.80	23.27	6.01

earlier worker Ranjan *et al*. (2010) [7], Shaukat *et al*. (2012) [9], Negi *et al*. (2014) [3] and Chourasia *et al*. (2015) [2].

Corm and cormel attributes

All the corm and cormel characters were influenced significantly in various gladiolus cultivars. Maximum number of corms/hill was recorded with cv. Chandani which was at par with Punjab Dawn, Anjali, Darshan, Dhanvantri, Pusa Srijan, Surya Kiran, Sunayna and Aldebaran and significant to other varieties. Cultivar American Beauty produced bigger size of corm (85.97 mm diameter) which was significant to all other the varieties. Minimum diameter of corm was recorded with cv. Chandani (43.04 mm) followed by cvs. Flavour Souviner, Arti and Invitatie. Maximum weight of corms/hill was exhibited with cv. American Beauty which was at par with cvs. Anjali, Sunayna, Dhanvantri and Punjab Dawn (Table 2). Cormel parameters were also influenced significantly and maximum number of corms/hill was recorded with cv. Anjali followed by cvs. Chandani, Purple Flora and Subhangini, however, cv. Punjab Dawn produce minimum no. of corms/hill. Maximum weight of cormels/hill were recorded with cv. Arti followed by cvs. Anjali, Sunayna, Priscilla and Nova Lux, although, it was statistically significant to all the varieties. It is well documented by several earlier workers that production of corms and cormels largely dependent on genetic constitution of a genotype/variety. Varietal influence on corm and cormel production was noticed by Sisodia and Singh (2015) [15] in gladiolus. Significant difference on production of tuberose bulb was also observed by Singh *et al*. (2013b) [12]. These finding are also in close conformity with the observation made by Patil (2001) [5], Ahmed *et al*. (2002) [1], Poon *et al*. (2010) [6], Sankari *et al*. (2012) [8] and Singh *et al*. (2013c) [13].

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