Original Research Article

Evaluation of different varieties of Gladiolus (*Gladiolus grandifloras L.*) Cultivars under Agro-Climatic Conditions of Prayagraj .

ABSTRACT

An experiment was conducted during *rabi* season 2023 at Horticulture Research Farm, Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (Uttar Pradesh). The experiment has 20 different varieties laid out in Randomized Block Design (RBD) in three replications. The results showed that the all the cultivars had significant differences for vegetative, floral, corm and cormels characters when evaluated under Agro climatic conditions of Prayagraj. Twenty cultivars namely Pusa Sindhuri, Pusa Suhagin, Red Ginger, Red Majesty, Sancerre, Shahanoda, Shobha, Smoky Lady, Snow Princess, Solan shrinagar, Souvik Biscuits, Suyrakiran, Swarnima, Sweta, Tambri, Urmi, VickyLin, WeddingCreamby, White Prosperity, Yellow Stone were evaluated for their performance. Based on their performance, it is concluded that all the cultivars can be grown under Prayagraj Agro climatic conditions, but cultivar yellow stone, white property, wedding creamby, Vickylin has found to be promising in respect of all parameters under Agro climatic conditions of Prayagraj.

Keywords: Varieties, Vegetative, Floral, Corm, Cormels.

Introduction:

Floriculture is getting importance as a good source of income apart from giving pleasure and happiness. More than 150 countries are involved in floriculture trade worldwide. Approximately covered area by bulbous ornamentals in the world is 50,000 ha out of which gladiolus is cultivated in 9500 ha. In India approximately 3500 ha area is covered by bulbous ornamentals in which gladiolus is cultivated more than 1200 ha with an annual production of 707 million spikes (NHB, 2013), followed by tuberose (800 ha). In this way, gladiolus, or sword lily (***Gladiolus spp***.) is the most popular ornamental bulbous plants commercially grown in our country for its excellent spikes with array of colours [1,2]. The name gladiolus was coined from Latin word *gladiolus,* meaning a sword because of shape of its foliage. Its common name is “corn flag" in Europe because *Gladiolus illyricusis* found wild as weed in corn fields. It is also known as "water fall gladiolus" as it was found growing near the Victoria Falls in the tropical forests of Africa. Its commercial production for spikes in the last two decade has grown and became a very popular flowering plant in India. It has been found that commercial floriculture has higher potential per unit area than most of the field crops and is therefore a lucrative business for farmers [3-5]. Government has taken various steps to develop the floriculture sector through the Agriculture and Processed Food Product Export Development Authority (APEDA). Gladiolus cultivation under Northern Indian plains that includes whole U.P., coastal areas of Tamil Nadu and Pondicherry has a potential to change the economic scenario of farmers of these areas. It provides both money as well as employment in rural areas. Gladiolus is such a crop which is suitable for establishing floriculture industry by progressive farmers and entrepreneurs and it is one of the best bulbous flowers in India [6,7]. Genetic variability refers to the presence of difference among the individuals of plant population. Variability results due to differences either in the genetic constitution of the individuals of a population or in the environment in which they are grown. Genetic variability is an essential component of any breeding programme, design to improve the characteristics of crop. The available variability in a population can be partitioned into heritable and non-heritable variation with the aid of genetic parameters such as variance genotypic coefficient of variation, heritability and stability which serve as a basis for selection of some outstanding genotypes.

Objectives:

1. To evaluate the performance of different varieties of gladiolus in terms of growth, yield, flower yield , corm yield and quality under Agro climatic conditions.

2. To estimate the economics of different varieties of Gladiolus.

Review of literature

Mishra et al. (2014) reported that Gladiolus (*Gladiolus floribundas L*.) is a bulbous ornamental plant belonging to the family Iridaceous. It is an elegant cut flower grown for its, magnificent spikes. The estimates of heritability varied from 99.5% to 61.1%. The highest heritability estimates in broad sense were observed for the characters vase life (99.5%) and lowest height at 30 days after planting.

Kumar et al (2019) examined 10 genotypes of gladiolus and reported GCV and PCV of 10.60 and 11. 06 respectively for number of Height of plant(cm) and Heritability (Broad Sense %), Genetic Advance (Ga) and Genetic Advance as percentage of to be 91.9, 12.28 and 20.94 respectively.

Bharti et al. (2022) examined 12 genotypes of gladiolus to work out the genetic variability, heritability, genetic advance and genetic divergence effects of their various attributes on spike yield and reported that the magnitude of phenotypic coefficient of variation was higher than corresponding genotypic coefficient of variation for all the characters and the highest of genetic advance was recorded for number of cormels per plant (38.63%) and lowest for number of spikes per plant and number of spikes per hectare (4.90%) whereas high genetic advance coupled with high heritability was recorded for the characters of number of cormels per plant, number of sprouts per corm, number of leaves per plant, vase life (days), plant height (cm), days taken for complete sprouting, number of spikes per plant, length of spike (cm), number of spikes per ha (lac), duration of flowering (days) and corms yield per ha (q). Phenotypic and genotypic coefficient variations were highest for number of cormels per plant (26.95 and 22.48) and lowest for duration of flowering (days) (11.01 and 9.99).

MATERIALS AND METHODS

The present investigation was carried out to study the **"Evaluation of different varieties of Gladiolus Cultivars under Agro-Climatic Conditions of Prayagraj".** The experiment was carried out during *Rabi* season 2023 at the Research farm in Department of Horticulture, Naini Agriculture Institute, Sam Higginbottom University of Agriculture, Technology and sciences, Prayagraj (U.P). Allahabad is situated at an elevation of 78 meters above sea level at 25.87 ^{0}North latitude and 81.15^{0}E longitude. This region has a sub-tropical climate prevailing in the South-East part of U.P. with both the extremes in temperature, i.e., the winter and the summer. In cold winters, the temperature sometimes is as low as 32°F in December–January and very hot summer with temperature reaching up to 115°F in the months of May and June. During winter,

frosts and during summer, hot scorching winds are also not uncommon. The experiment was laid out in Randomized Block Design with Twenty treatments, each replicated three times. Three plants were randomly selected for recording observations on growth parameters, yield parameters , quality parameters and attributing parameters. The data collected during course of investigation were subjected to statistical analysis by adopting appropriate methods of analysis of variance as described by Fisher (1950).

RESUALT AND DISCUSSION

Plant height (cm): Maximum plant height of gladiolus at 30, 60 and 90 days was observed in V20: Yellow Stone (39.68, 70.53cm, 110.27cm respectively) whereas the minimum plant height was recorded in V2: Pusa Suhagin (30.53cm, 60.66cm, 103.12cm at 30, 60 and 90 days respectively).

Plant height is a genetic character of every species and cultivar variation in plant height of different varieties may be attributed to the fact that this genetic character varied from variety to variety. Similar findings in variation in plant height were obtained by **Mohanty *et al.* (2011)** in rose and **Hussain and Khan (2004)** in variety of gladiolus.

Number of leaves: Maximum number of leaves of gladiolus at 30, 60 and 90 days was observed in V20: Yellow Stone (4.35, 6.35, 9.35 respectively) whereas minimum number of leaves was recorded in V1: Pusa Sindhuri (2.15, 4.15, 7.15 respectively).

The difference in number of leaves in different varieties might be due to the different genetic makeup of the varieties and their adaptability to the existing environmental conditions. The findings of the present investigation are in conformity with the reports of **Treder (2008)** in Oriental lily; **Lalmuanpuii *et al.*, (2021)** in gerbera; **Balan *et al.*, (2020)** in tuberose; **Khan *etal.*, (2020)** in Chrysanthemum**.**

Number of sprouts/plants : Maximum number of sprouts of gladiolus was observed in V20: Yellow Stone (2.75 respectively) whereas minimum number of sprouts was recorded in V1: Pusa Sindhuri (1.12 respectively).

Days for 50 % sprouting : Minimum days for 50 % sprouting of gladiolus was observed in V20: Yellow Stone (82.8 respectively) whereas maximum days for 50 % sprouting was recorded in V1: Pusa Sindhuri (90.2 respectively).

The differences in days to first sprouting in different cultivars of gladiolus due to geneticnature of cultivars. Similar reports were also investigated in different varieties of tuberose by **Singh et. al., (2013), Kumar et. al. (2014).**

Number of days for emergence of flower spike : Minimum Number of days for emergence of flower spike of gladiolus was observed in V20: Yellow Stone (74.57 respectively) whereas maximum Number of days for emergence of flower spike was recorded in V14: Sweta (91.0 respectively).

This variation among cultivars might be due to genetic traits and prevailing climatic conditions. These findings are in accordance with **Singh and Singh (2013),**

Patil *et al.*, (2009) and **Rachana *et al.*, (2013).**

Number of days to show colour of basal floret : Maximum Number of days to show colour of basal floret of gladiolus was observed in V14: Sweta (95.15 respectively) whereas minimum Number of days to show colour of basal floret was recorded in V20: Yellow Stone (79.86 respectively).

Number of florets/spikes : Maximum Number of florets/spikes of gladiolus was observed in V20: Yellow Stone (12.23 respectively) whereas minimum Number of florets/spikes was recorded in V1: Pusa Sindhuri (8.91 respectively).

This variation in florets per spike may be due to genetic variability among the different cultivars of gladiolus and prevailing environmental conditions. Variation in number of floretsamong the varieties was also reported **Ramachandrudu and Thangam (2004) and Singh and Singh (2013**).

Number of spikes : Maximum Number of spikes of gladiolus was observed in V20: Yellow Stone (1.97 respectively) whereas minimum Number of spikes was recorded in V1: Pusa Sindhuri (1.12 respectively).

Length of spike (cm) : Maximum length of spike of gladiolus was observed in V20: Yellow Stone (111.89 cm respectively) whereas minimum length of spike was recorded in V1: Pusa Sindhuri (95.13 cm respectively).

Floret diameter (cm) : Maximum floret diameter (cm) of gladiolus was observed in V20: Yellow Stone (14.57 cm respectively) whereas minimum floret diameter (cm) was recorded in V14: Sweta (11.14 cm respectively).

The differences in floret diameter varieties may be attributed to the fact that this geneticcharacter varied from variety to variety. The variation in floret diameter might be due to the retarded growth of the plants, low temperature and low light intensity in winter as reported earlier by **Gill** and **Atwal (1976), Gill *et al.*, (1988)** and **Terfa *et al.*, (2014).**

Rachis length (cm) : Maximum rachis length (cm) of gladiolus was observed in V20: Yellow Stone (50.26 cm respectively) whereas minimum rachis length (cm) was recorded in V1: Pusa Sindhuri (39.14 cm respectively).

Number of cormels produced : Maximum Number of cormels produced of gladiolus was observed in V20: Yellow Stone (2.68 respectively) whereas minimum Number of cormels produced was recorded in V14: Sweta (1.16 respectively).

Corm diameter (cm): Maximum corm diameter (cm) of gladiolus was observed in V18: wedding creamby (7.26 cm respectively) whereas minimum corm diameter (cm) was recorded in V1: Pusa Suhagin (4.25 cm respectively).

The differences in corm diameter varieties may be attributed to the fact that this geneticcharacter varied from variety to variety. Similar findings of **Murugesan *et al.*, (1991), Bhattacharjee *et al.*, (1993)** and **Sundram *et al.*, (1996**).

Weight of corm (g) : Maximum weight of corm (g) of gladiolus was observed in V20: Yellow Stone (42.33 g respectively) whereas minimum weight of corm (g) was recorded in V1: Pusa Sindhuri (31.16 g respectively).

Weight of corm/plant (g) : Maximum weight of corm/plant (g) of gladiolus was

observed in V20: Yellow Stone (103.15 g respectively) whereas minimum weight of corm/plant (g) was recorded in V1: Pusa Sindhuri (76.84 g respectively).

Cormels weight/plant: Maximum cormels weight/plant (g) of gladiolus was observed in V20: Yellow Stone (11.16 g respectively) whereas minimum cormels weight/plant (g) was recorded in V2: Pusa Suhagin (7.03 g respectively).

Number of corms/plants: Maximum Number of corms/plants of gladiolus was observed in V20: Yellow Stone (3.16 respectively) whereas minimum number of corms/plants was recorded in V1: Pusa Sindhuri (2.07 respectively).

Number of cormels/plant: Maximum Number of cormels/plant of gladiolus was observed in V20: Yellow Stone (25.57 respectively) whereas minimum number of cormels/plant was recorded in V14: Sweta (16.54 respectively).

Yield of corms/ha: Maximum yield of corms/ha of gladiolus was observed in V20: Yellow Stone (280886.08 respectively) whereas minimum yield of corms/ha was recorded in V1: Pusa Sindhuri (183998.16 respectively).

Yield of cormels/ha: Maximum yield of cormels/ha of gladiolus was observed in V20: Yellow Stone (222866.16 respectively) whereas minimum yield of cormels/ha was recorded in V1: Pusa Sindhuri (1508429.36 respectively).

Number of spikes/plots : Maximum Number of spikes/plots of gladiolus was observed in V20: Yellow Stone (20.58 respectively) whereas minimum Number of spikes/plots was recorded in V1: Pusa Sindhuri (13.14 respectively).

Number of spikes/ha : Maximum Number of spikes/plots of gladiolus was observed in V20: Yellow Stone (1829315 respectively) whereas minimum Number of spikes/plots was recorded in V1: Pusa Sindhuri (1167988 respectively).

The higher yield might be due to increased morphological characters viz. plant height,a greater number of leaves which help in the production of more photosynthesis resulting in greater accumulation of dry matter which related to the production of a greater number of spikes per hectare. Similar results were also found by **Nagaraj (1996)**

Table :1 Plant height at 30,60- and 90-Days interval.

Treatments Symbol	**Varieties**	**Plant height**		
		30 DAYS	**60DAYS**	**90 DAYS**
V_1	Pusa Sindhuri	30.92	61.16	101.51
V_2	Pusa Suhagin	30.53	60.66	103.12
V_3	Red Ginger	32.85	62.13	103.30
V_4	Red Majesty	33.08	62.88	103.66
V_5	Sancerre	32.90	62.63	104.12
V_6	Shahanoda	33.34	63.15	104.88
V_7	Shobha	33.58	63.75	105.20

V_8	Smoky Lady	33.69	64.03	105.07
V_9	Snow Princess	34.07	64.58	105.89
V_{10}	Solan shrinagar	35.27	65.49	106.85
V_{11}	Souvik Biscuits	35.54	65.86	106.95
V_{12}	Suyrakiran	34.15	64.12	105.82
V_{13}	Swarnima	34.24	64.26	106.12
V_{14}	Sweta	30.31	60.61	101.41
V_{15}	Tambri	31.43	61.55	102.23
V_{16}	Urmi	30.97	61.21	102.53
V_{17}	VickyLin	39.33	68.86	109.86
V_{18}	WeddingCreamby	39.46	69.36	110.07
V_{19}	White Prosperity	39.46	69.57	110.22
V_{20}	Yellow Stone	39.68	70.53	110.27
	F-test	**S**	**S**	**S**
	S.E(d). (±)	1.371	2.545	0.144
	C.D.at 0.05	2.786	5.172	0.292
	CV	4.903	4.846	0.167

Table :2 Length of spike, Floret diameter, Rachis length, no of corms/plant of Gladiolus

Treatments Symbol	Varieties	Length of spike(cm)	Floret diameter(cm)	Rachis length(cm)	No of corms/plant
V_1	Pusa Sindhuri	95.13	11.37	39.14	20.7
V_2	Pusa Suhagin	97.55	11.43	41.67	2.12
V_3	Red Ginger	99.15	11.93	28.92	2.20
V_4	Red Majesty	98.84	12.17	42.87	2.23
V_5	Sancerre	105.63	12.77	46.82	1.10
V_6	Shahanoda	103.23	12.57	46.24	1.14
V_7	Shobha	100.16	12.34	45.42	2.15
V_8	Smoky Lady	99.85	12.32	45.23	2.13
V_9	Snow Princess	108.93	13.15	48.13	2.10

V_{10}	Solan shrinagar	105.13	13.65	47.84	2.45
V_{11}	Souvik Biscuits	109.54	13.44	48.55	2.38
V_{12}	Suyrakiran	71.24	12.53	46.12	2.24
V_{13}	Swarnima	108.45	12.88	47.13	2.23
V_{14}	Sweta	96.14	11.14	40.45	2.10
V_{15}	Tambri	95.58	11.54	40.14	2.19
V_{16}	Urmi	96.98	11.25	41.26	2.24
V_{17}	VickyLin	111.45	14.29	50.13	2.65
V_{18}	WeddingCream by	110.69	14.02	49.98	2.84
V_{19}	White Prosperity	110.89	14.12	49.86	2.95
V_{20}	Yellow Stone	111.89	14.57	50.26	3.16
	F-test	**S**	**S**	**S**	**S**
	S.E(d). (+)	0.076	0.021	4.211	0.013
	C.D.at 0.05	0.154	0.043	8.558	0.027
	CV	0.122	0.206	11.510	0.734

CONCLUSION

From the present investigation, it is evident from the results that all the cultivars had significant differences for vegetative, floral, corm and cormels characters when evaluated under Agro climatic conditions of Prayagraj. Twenty cultivars namely Pusa Sindhuri, Pusa Suhagin, Red Ginger, Red Majesty, Sancerre, Shahanoda, Shobha, Smoky Lady, Snow Princess, Solan shrinagar, Souvik Biscuits, Suyrakiran, Swarnima, Sweta, Tambri, Urmi, VickyLin, WeddingCreamby, White Prosperity, Yellow Stone were evaluated for their performance. Based on their performance, it is concluded that all the cultivars can be grown under Prayagraj Agro climatic conditions but cultivar yellow stone, white property, wedding creamby, Vickylin has found to be promising in respect of all parameters under Agro climatic conditions of Prayagraj.

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