Journal of AgriSearch, 11 (1): 18-21
An Open Access International Peer Reviewed Quarterly

ISSN : 2348-8808 (Print), 2348-8867 (Online)
https://doi.org/10.21921/jas.v11i01.14767

Performance Evaluation of Gladiolus Cultivars in Eastern Uttar Pradesh

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ABSTRACT

The experiment was conducted at the Experimental Unit Department of Horticulture, Tilak Dhari Post Graduate College, Jaunpur (U.P.) India During the year 2019-2020. The experiment was laid down in Randomized Block Design (RBD) with ten cultivars (treatments) and three replications, with a net plot size of 2 m x 1.50 m and a spacing of 30 cm x 20 cm. Tiger Flame, Arka Gold, Red Majesty, Pink City, American Beauty, Nova Lux, Red Beauty, Jyotsana, Pusa Manmohak, and Punjab Morning were among the varieties tested. The cultivar Arka Gold sprouted in least time (8.75 days), followed by the cultivar American Beauty (9.40 days). The cultivar Tiger Flame, on the other hand, took the longest number of days (13.38) to reach 50% sprouting. The cultivar Jyotsana (77.55 cm) had the largest spike length, which was much longer than cultivars Pusa Manmohak (75.42 cm) and Nova Lux (75.42 cm). At room temperature, the cultivar Pusa Manmohak (7.32 days) had the longest vase life (days), followed by Nova Lux (7.20) and Pink City (7.10) days, while cultivar American Beauty (7.10) had the shortest vase life (5.82 days). The cultivars Nova Lux, Pink City, and Pusa Manmohak produced a lot of corms. The cultivars Pusa Manmohak, Nova Lux, Pink City, and Red Majesty, on the other hand, were shown to be ideal for extended vase life.

Keywords: Gladiolus cultivars, Evaluation, Yield, Flower spike, Corm

ARTICLE INFO

Received on	:	30.12.2023
Accepted on	:	31.02.2024
Published online	:	31.03.2024

INTRODUCTION

Gladiolus (*Gladiolus grandiflorus* L.) belongs to the family Iridaceae and subfamily Ixioideae (Ranjan *et al.*, 2010). It is recognised for its magnificent spikes as well as long vase life. Centuries of hybridization and selection have produced various varieties that exhibit a broad diversity of floral forms, bloom hues, growth and flowering behaviours. Targeted breeding efforts have also achieved tremendous gains in the quality of these plants with reference to their blooming duration, vase life and resilience to diseases. They are commonly used in floral arrangements, making of bouquets and for indoor decorations. It is also suitable for flower beddings in gardens, pot cultures; rockeries etc (Abbasi *et al.*, 2005). The biggest producing nations include United States (Florida and California), Holland, Italy, France, Bulgaria, India, and Israel. It has a key place among commercial cut flowers which are in high demand in both the local and international market.

The production of good quality flowers is crucial, it is as critical to manage the vase life of cut flowers which in general are very perishable and sensitive to post harvest losses. Thus, post-harvest management in order to keep freshness and original colour of flower for longer duration after cutting is one of the major factors taken into account in cut flower industry. *Gladiolus* is highly rich in its varietal wealth and every year there is an addition of new variations, so varietal evaluation becomes vital to figure out acceptable variety for a given region. The success of every crop or cultivar primarily depends on genotypic and environmental interactions. As a result, cultivars which perform well in one place may not do the same in other regions of diverse climatic circumstances. It comes in bloom from December to March in the plains and from June to September in the hills of India.

A number of gladiolus varieties are being cultivated by the farmers or scientist but top performing varieties having acceptable quantitative and qualitative character such as adoptability to unfavourable environment and resistance to biotic and abiotic stresses result into superior monetary worth. The present study has been carried out with following objectives to select superior cultivars of gladiolus for growth and flowering parameters, to select superior cultivars of gladiolus for yield features and to find out varieties with good vase life of spike.

MATERIALS AND METHODS

The experiment was laid down in Randomized Block Design (RBD) with ten cultivars (treatments) and three replications, with a net plot size of 2 m x 1.50 m and a spacing of 30 cm x 20 cm. Field was prepared by ploughing once with a mould board plough, then harrowing, labelling, and collecting crop waste. Well-rotten FYM was incorporated into soil at a rate of 15 tonnes per acre during harrowing. The field was then divided into three replications, each one metre apart.

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Healthy and uniform sized corms of 4-5 cm were used as propagating materialafter treatment with Carbendazim @ 2gm/litter of water. During the experiment, recommended fertilizers viz. nitrogen (40g/m^2), phosphorous (20g/m^2), and potassium (20g/m^2) were administered. The source of nitrogen, phosphorus and potassium was Urea, SSP and muriate of potash respectively. *Gladiolus* spikes were picked after the 1-2 florets had turned colour. Spikes were harvested every two to three days. About 60 days after the spikes were cut; the corms and cormels dug out. After that, the corms were dried in the shade for about a week.

The number of days for 50% corm sprouting was noted in the observations. At 20, 40 and 60 days following planting, the height of the five tagged plants was measured using a metre scale from the soil surface to the tip of the tallest leaves in each treatment, and the average was calculated.

Days to spike emergence, days to first floret colour show, days to first opening of floret, length of spikes (cm), inter nodal length of floret (cm), number of florets per spikes, diameter of floret (cm), number of corms per plant, weight of corms per plant (g), diameter of corms (cm), number and weight of cormels per plant were recoded. The time between the opening of the first basal floret and the wilting of the 6th floret from the base of the spike was regarded as real vase life and shown in days.

The statistical analysis for Randomized Block Design was carried out using Panse and Sukhatme (1985). At a 5% level of significance, the estimated 'F' value was compared to table F values. The difference was noted to be significant if the estimated 'F' value was more than the table value, and a critical difference was calculated for further comparison.

RESULTS AND DISCUSSION

During the course of the investigation, data was collected on different elements, which showed several fascinating findings, which are briefly mentioned below. Table 1. shows the data on 50 percent sprouting, plant height (cm) and days taken to spike emergence for several gladiolus cultivars.

Days taken to 50% sprouting

Cultivar Arka Gold took the least time to reach 50% sprouting (8.78 days), followed by cultivar American Beauty (9.40 days), and cultivar Tiger Flame took the most time (13.36) to reach 50 percent sprouting. It may be due to varying dormancy durations. Early cultivars had a short dormancy period, whereas late cultivars had a longer one. The length of the dormancy phase can be regulated by environmental conditions as well as soil temperature.

Plant height (cm)

The cultivar Pusa Manmohak had the highest plant height (95.16 cm). This cultivar outperformed the others by a wide margin. The cultivar Red Beauty had the shortest plant height (53.84 cm), which was much lower than the other varieties. Variation in ultimate plant height across all cultivars may be attributed to hereditary features or current environmental circumstances of the growing region, according to Kumari and Kumar (2015). The variance in plant height might be attributed to the cultivar's genetic composition, which varies from variety to variety.

Days taken to spike emergence

The cultivar Nova Lux took the shortest time to spike emergence (60.56 days), followed by cultivar American Beauty (60.76). It was, nevertheless, much sooner than others. Pink City (66.75) had the longest time to reach maximal emergence. In gladiolus, the time it takes for spikes to develop is an essential varietal characteristic that may be predominantly influenced by the genetic makeup of the varieties.

Table 1: Performance of gladiolus cultivars to 50% sprouting, plant height (cm) and days taken to spike emergence

Treatments		Days to 50% Sprouting	Plant Height (cm)	Days taken to spike emergence
T_1	Arka Gold	8.75	85.45	61.48
T_2	Nova Lux	10.00	87.47	60.56
T_3	Pink City	11.12	87.35	66.75
T_4	Red Beauty	10.36	53.84	61.74
T_5	American Beauty	9.40	69.67	60.76
T_6	Pusa Manmohak	11.47	95.16	60.84
T_7	Punjab Morning	9.54	84.83	65.54
T_8	Red Majesty	11.22	90.13	65.88
T_9	Jyotsana	9.62	72.22	67.12
T_{10}	Tiger Flame	13.38	85.21	64.76
C.D. at 5%		**0.117**	**0.288**	**0.012**
SEm±		**0.039**	**0.094**	**0.040**

Table 2 shows the measurements of spike length (cm), rachis length (cm), and inter-nodal length (cm).

Spike length (cm)

The cultivar Jyotsana (77.55 cm) had the longest spike length, followed by Pusa Manmohak (75.42 cm), Nova Lux (74.45 cm), and Punjab Morning (72.66 cm). However, it differed significantly from other cultivars. Under cultivar Tiger Flame, the spike length was found to be the shortest (52.80 cm). Differences in genotypes might explain the variance in spike length. Rani *et al.* (2007) and Sindhu *et al.* (2014) found similar findings.

Rachis length (cm)

The longest rachis was found in cultivar Nova Lux (66.36 cm), followed by cultivar Arka Gold (65.42 cm), and Red Majesty (65.02), with other cultivars being much longer. The cultivar Red Beauty was found to have the shortest rachis (45.57 cm). The findings revealed that rachis length was linked to other morphological characteristics such as the number of florets per spike, floret inter-nodal length, spike length, and plant height. Baweja and Brahma (2003) and Swain *et al.* (2008) all observed similar findings.

Internodal length (cm)

Pink City (2.61 cm), Punjab Morning (2.55 cm), and Nova Lux

(2.13 cm) were the cultivars with the most significant variances in inter-nodal length. It was much higher than the rest of the cultivars. Cultivar Red Beauty has the shortest inter-nodal length (1.54 cm). The genetic makeup of the cultivars, which is determined by the genotypic component of the plant, might explain the variance in internodal length.

Table 2: Performance of gladiolus cultivars in respect to length of spike (cm), rachis length (cm) and internodal length (cm)

Treatments		Length of spike (cm)	Rachis length (cm)	Internodal length (cm)
T_1	Arka Gold	69.21	65.42	1.76
T_2	Nova Lux	74.45	66.36	2.13
T_3	Pink City	72.28	58.02	2.61
T_4	Red Beauty	59.21	45.57	1.54
T_5	American Beauty	64.23	49.25	1.70
T_6	Pusa Manmohak	75.42	61.11	2.16
T_7	Punjab Morning	72.66	55.31	2.55
T_8	Red Majesty	72.13	65.02	1.54
T_9	Jyotsana	77.55	54.72	1.80
T_{10}	Tiger Flame	52.80	46.44	1.88
C.D. (5%)		**3.170**	**0.016**	**0.143**
SEm±		**1.060**	**0.057**	**0.046**

Significant variations were identified among the cultivars for quantity and weight (g) of corms per plant and vase life of gladiolus under ambient environment is provided in Table 3.

Number and weight of corms per plant

The maximum number of corms (4.35) per plant was reported in cultivar Pink City followed by Jyotsana (3.82), Pusa Manmohak (3.74) and Nova Lux (3.48). It was minimum (2.26) in Punjab Morning, Significant variations were noticed among the cultivars with respect to weight of corms per plant which varied from 57.46 g to 22.40 g. The maximum weight of corms per plant was observed in cultivar Punjab Morning (57.46 g) and least was reported in cultivar Red Beauty (22.40 g). Number of corms produced per plant may also impacted the weight of corms. It may also be attributable to greatest corm weight and corm size at the time of planting.

Vase life of gladiolus at room temperature

The flower spikes were maintained in laboratory at around 22 ± 2ºC (room temperature). The highest days to vase life of gladiolus in ambient environment was observed in the cultivar Pusa Manmohak (7.33) which was followed by cultivar Nova Lux (7.20) and Pink City (7.10). The least vase life (days) was reported in the cultivar American Beauty (5.66).Variation in vase-life may be ascribed to variable reserve of carbohydrates from diverse leaf production, susceptibility of cultivars to release of ethylene and genetic composition of the variety.

Table 3: Performance of gladiolus cultivars for number corms per plant, weight of corms per plant (g) and vase life of flower at room temperature

Treatments		Number of corms per plant	Weight of corms per plant (g)	Vase life of gladiolus at room temperature
T_1	Arka Gold	2.89	40.28	6.13
T_2	Nova Lux	3.48	32.38	7.20
T_3	Pink City	4.35	43.05	7.10
T_4	Red Beauty	3.43	22.40	6.21
T_5	American Beauty	2.27	33.62	5.66
T_6	Pusa Manmohak	3.74	50.14	7.33
T_7	Punjab Morning	2.26	57.46	6.68
T_8	Red Majesty	2.45	54.27	6.69
T_9	Jyotsana	3.82	33.58	6.55
T_{10}	Tiger Flame	2.51	31.88	6.48
C.D. at 5%		**0.076**	**0.135**	**0.140**
SEm±		**0.026**	**0.046**	**0.045**

CONCLUSIONS

The cultivars Pink City, Nova Lux, Arka Gold, and Punjab Morning were found ideal for commercial spike productionin eastern Uttar Pradesh. The cultivars Nova lux, Pink City, and Pusa Manmohak produced a lot of corms. Pusa Manmohak, Nova Lux, Pink City, and Red Majesty cultivars surfaced with good vase life.

CONFLICT OF INTEREST

All the author both individually and collectively, affirms that they do not possess any conflicts of interest either directly or indirectly related to the research being reported in the publication.

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Citation:

Baksh H, Srivastav A and Pandey R. 2024. Influence of Perennial Fodder Tree Species on Chemical Properties of Soil Under Fodder Trees Based Agroforestry System. *Journal of AgriSearch* **11**(1): 18-21