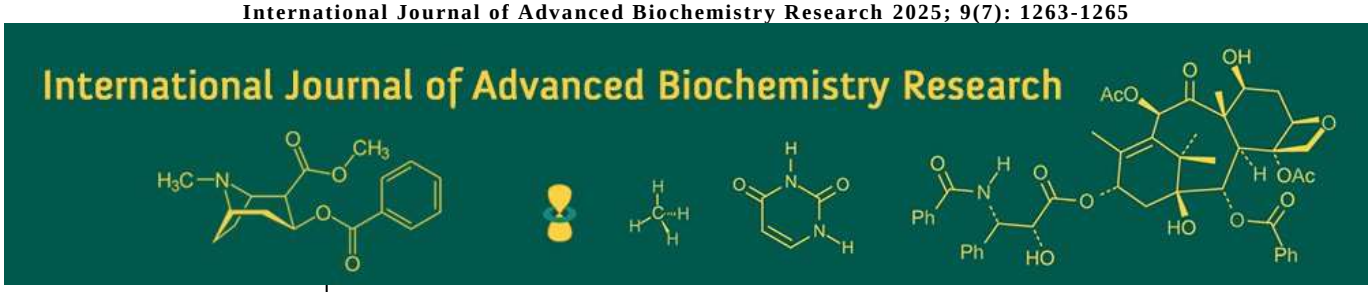

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Evaluation of varieties and genotypes for growth and yield of gladiolus

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Abstract
A field experiment was undertaken during rabi season of 2024-25 at Satpuda Botanic Garden, College of Agriculture, Nagpur (M. S.) to evaluate thirteen varieties and genotypes of gladiolus for their growth, flowering and yield. The experiment was laid out in a Randomized Block Design with two replications. The results revealed that, in respect of growth parameters, significantly the earliest sprouting was recorded in the genotype NG-2 and sprouting percentage of corms was observed maximum with the genotype NG-1 and variety American Beauty. Significantly maximum vegetative growth of the plant *viz*., height of plant and leaves plant^{-1} was noted with the genotype NG-1 and variety PDKV Satpuda Purple, respectively. However, minimum period for the first spike emergence was exhibited with the genotype NG2 and spikes plant^{-1} was counted significantly highest with the variety PDKV Satpuda Purple. In respect of spike quality parameters of gladiolus such as length of spike, florets spike^{-1} and vase life of spike were found to be maximum with the genotype NG-1. However, significantly highest corm yield in respect of corms plant^{-1} was recorded with Pusa Suhagin and genotype NG- 2 noted highest weight of a corm.

Keywords: Gladiolus, genotypes, varieties, growth, flower (yield), corm (yield)

Introduction
Gladiolus (*Gladiolus grandiflorus L.*), a member of the Iridaceae family, is one of the most commercially important cut flowers grown globally. With its tall, colourful spikes and wide adaptability, it is known as the "Queen of Bulbous Flowers". Originally native to South Africa, gladiolus is now cultivated extensively across India and major producing states include Himachal Pradesh, Punjab, Maharashtra, West Bengal, Karnataka and Uttar Pradesh. It thrives particularly well in subtropical and temperate zones.

In Maharashtra state, floriculture is mainly concentrated in the districts like Pune, Nasik, Sangli, Kolhapur, Thane, Nagpur, Akola, Amravati and Satara having total area of about 11.06 thousand ha. With the production of 99.18 thousand MT of cut flowers and 61.56 thousand MT of loose flowers (Anon, 2025) [1]. In Vidarbha region of Maharashtra State, gladiolus cultivation is gaining momentum due to high demand during festivals and weddings. However, productivity and quality remain inconsistent due to limited region-specific varietal recommendations. Hence, the present study aimed to evaluate different varieties and genotypes of gladiolus for their adaptability and performance in the Vidarbha region, focusing on growth, flowering and corm yield.

Materials and Methods
The field experiment was conducted at Satpuda Botanic Garden, College of Agriculture, and Nagpur (M.S.) during rabi season of 2024-25. Thirteen gladiolus varieties and genotypes *viz.*, PDKV Satpuda Purple, NG- 3, NG- 1, NG- 2, NG- 8, American Beauty, Arka Pratham, Phule Tejas, Dhanvantari, Phule Neelrekha, Phule Ganesh, Pusa Suhagin and PDKV Gold were planted. The experiment was laid out in Randomized Block Design with two replications and thirteen varieties and genotypes as treatments. Uniform sized corms with 4-5 cm diameter were pre-treated with 0.3% Captan fungicide planted in ridges and furrow during October 2024. Recommended fertilizer dose (300:200:200 kg NPK per ha) was applied. Cultural operations like irrigation, weeding, earthing-up and staking were carried out

as and when required. Five plants were selected at random in each plot for recording the observations. The data on various observations during the course of investigation *viz.*, growth (days required for sprouting of corms, sprouting percentage of corms, plant height, leaves plant^{-1}), flowering (days to first spike emergence), spike yield (spikes plant^{-1}), quality (length of spike, florets spike^{-1} and vase life of spike) and corm yield (corms plant^{-1} and weight of a corm) were recorded.

Results and Discussion

Data presented in table 1 noted a great amount of variability in respect to growth, flowering and spike and corm yield of gladiolus.

Growth

On perusal of the data, it is revealed that, significant differences were observed among the gladiolus varieties and genotypes for the days required for sprouting of corms, sprouting percentage of corms, height of plant and leaves plant^{-1}. Significantly the earliest sprouting of gladiolus corms (6.90 days) was recorded with the genotype NG-2 which was found to be at par with the genotype NG-1, NG-3, varieties Phule Ganesh, Phule Tejas, PDKV Satpuda Purple, Phule Neelrekha, Arka Pratham, American Beauty and Dhanvantari (7.00, 9.10, 7.20, 7.40, 7.90, 8.00, 8.40, 8.70 and 9.00 days, respectively), whereas, maximum days required for sprouting of corms was recorded with the variety Pusa Suhagin (14.90 days). This might be attributed due to the permeability of water in the tissues of corms which might have resulted into the faster activation of meristematic tissues and finally an early sprouting of corms might have been resulted. The present findings are in conformity with findings of Gawali *et al.* (2012) [4] and Kadam *et al.* (2020) [6]. Significantly maximum sprouting of corms (100%) was observed in the genotype NG-1 and variety American Beauty, which was found to be at par with PDKV Satpuda Purple, NG-3, NG-8, Pusa Suhagin, NG-2, Arka Pratham, Phule Ganesh, Phule Neelrekha and Dhanvantari (98.30, 98.30, 96.65, 96.65, 94.95, 93.30, 89.85, 85.00 and 83.30%, respectively) which might be attributed due to the genetic differences of the varieties.

Similar variation in sprouting of the corms was observed by Ghadage (2020) [5] in gladiolus.

Significantly the maximum height of plant at 60 days after planting was recorded in the variety NG-1 (98.65 cm) which was found to be statistically at par with the genotype NG-8, varieties Dhanvantari and PDKV Gold (82.60, 88.70 and 87.12 cm, respectively), however, the minimum height of plant was recorded in the variety Pusa Suhagin (62.64 cm). However, the variety PDKV Satpuda Purple had produced significantly the maximum leaves plant^{-1} (15.00) which was found statistically at par with the genotype NG-8, variety American Beauty, Pusa Suhagin and NG-3 (14.30, 13.20, 12.80 and 12.60, respectively), whereas, significantly minimum leaves plant^{-1} (10.30) were counted with the variety Dhanvantari. The variations in height of plant and leaves plant^{-1} of the different genotypes and varieties of gladiolus might be due to the varied growth rate and differential genetic makeup. The present study confirms the results of Prithvi *et al.* (2023) [7] in gladiolus.

Flowering and yield

The data indicated that, genotype NG-2 took significantly minimum period for first spike emergence (52.00 days) and it was followed by Phule Tejas (58.80 days), however, significantly maximum days were required for first spike emergence in the variety Pusa Suhagin (70.80 days). While, the variety PDKV Satpuda Purple had produced significantly the maximum spikes plant^{-1} (2.20) and it was statistically at par with the genotype NG-1, NG-8 and NG-3 (2.00, 2.00 and 1.90, respectively), whereas, significantly minimum spikes plant^{-1} were recorded with the genotype NG-2, variety American Beauty and Arka Pratham (1.30 each). Similar variation in flowering and spike yield was also noticed by Prithvi *et al.* (2023) [7] and Gaikwad *et al.* (2023) [3] in gladiolus.

Table 1: Effect of genotypes and varieties on growth, flower and corm yield of gladiolus plant

Treatments	Days required for sprouting of corms (days)	Sprouting of corms (%)	Height of plant at 60 DAP (cm)	Leaves plant^{-1} at 60 DAP	Days to first spike emerge nce (days)	Spikes plant^{-1}	Length of spike (cm)	Florets spike^{-1}	Vase life (days)	Corms plant^{-1}	Weight of a corm (g)
T_1 - PDKV Satpuda Purple	7.90	98.30 (84.67)	75.52	15.00	62.50	2.20	103.85	15.30	9.10	2.40	40.10
T_2 - NG-3	9.10	98.30 (84.67)	67.74	12.60	68.80	1.90	104.15	17.30	9.60	2.30	40.80
T_3 - NG-1	7.00	100.00 (90.00)	98.65	12.20	60.80	2.00	109.90	17.50	10.60	2.50	43.60
T_4 - NG-2	6.90	94.95 (77.15)	75.89	10.50	52.00	1.30	100.50	13.50	7.40	2.00	51.80
T_5 - NG-8	10.00	96.65 (82.48)	96.38	14.30	64.60	2.00	109.12	12.00	6.50	2.10	32.80
T_6 - American Beauty	8.70	100.00 (90.00)	68.41	13.20	64.00	1.30	68.00	8.70	7.00	2.00	36.80
T_7 - Arka Pratham	8.40	93.30 (75.43)	76.07	12.00	60.00	1.30	81.95	8.90	7.10	1.70	37.10
T_8 - Phule Tejas	7.40	70.35 (57.54)	70.15	11.20	58.80	1.80	87.45	12.50	7.50	2.30	42.40
T_9 - Dhanvantari	9.00	83.30 (72.33)	88.70	10.30	66.60	1.50	81.30	12.78	9.90	2.00	34.70
T_{10} - Phule Neelrekha	8.00	85.00 (67.47)	72.00	12.40	70.50	1.70	106.40	15.20	9.30	2.30	35.00
T_{11} - Phule Ganesh	7.20	89.85 (71.40)	69.84	11.40	63.10	1.80	103.50	16.60	9.10	2.10	42.00
T_{12} - Pusa Suhagin	14.90	96.65 (82.48)	62.64	12.80	70.80	1.50	72.66	12.20	9.40	2.70	26.40
T_{13} - PDKV Gold	10.00	58.30 (49.76)	87.12	10.80	68.20	1.80	93.26	14.50	9.40	2.00	40.90
'F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE (m)	0.76	6.97	4.24	0.82	2.04	0.10	2.00	0.30	0.14	0.10	1.13
CD @ 5%	2.34	21.76	13.07	2.55	6.29	0.31	6.18	0.94	0.45	0.32	3.50

In respect of spike quality parameters, significantly maximum length of spike (109.90 cm) was recorded with the genotype NG-1 which was found statistically at par with the genotype NG8, Phue Neelrekha, NG-3 and PDKV Satpuda Purple (109.12, 106.40, 104.15 and 103.85 cm, respectively), whereas, minimum length of spike was observed with the variety American Beauty (68.00 cm). Similarly, significantly the highest number of florets spike^{-1}

(17.50) were noted under the genotype NG-1 which was found statistically at par with the genotype NG-3 (17.30), whereas, significantly minimum florets spike^{-1} were counted with the variety American Beauty (8.70). The differences might be due to the variation in genetical make up of different varieties and genotypes. Similar variation in spike length and florets spike^{-1} was earlier noted by Kadam *et al.* (2020) [6] and Thakur *et al.* (2017) [8].

Significantly the maximum vase life of cut spike (10.60 days) was recorded with the genotype NG-1 followed by the variety Dhanvantari (9.90 days), however, the minimum vase life of cut spike was recorded with the genotype NG-8 (6.50 days). This might be due to differences in their quality and uptake of vase solution. The increased vase life of cut flower in the gladiolus genotype NG-1, variety Dhanvantari and Phule Ganesh might be due to an increased uptake of solution that might have been enhanced due to the better-quality spikes which maintained the stem turgidity even under the high rate of respiration. Gawali *et al.* (2012) [4] also observed similar variations in the vase life of gladiolus spike.

Corm yield

The variety Pusa Suhagin produced significantly the maximum corms plant^{-1} (2.70) which was found statistically at par with the genotype NG-1 (2.50) and variety PDKV Satpuda Purple (2.40). However, the minimum number of corms plant^{-1} was recorded with the variety Arka Pratham (1.70). Similar variation in production of corms plant^{-1} in gladiolus cultivars was also observed by Chopde *et al.* (2013) [2] and Ghadage (2020) [5] in gladiolus.

The genotype NG-2 was found significant superior over all the treatments and it had recorded the maximum weight of a corm (51.80 g) and it was closely followed by the genotype NG-1, Phule Tejas and Phule Ganesh (43.60, 42.40 and 42.00 g, respectively), however, minimum weight of a corm (26.40 g) was noted with the variety Pusa Suhagin. Number of corms produced influence the weight of a corm. Thakur *et al.* (2017) [8] also reported similar variations in weight of a corm in gladiolus.

Conclusion

In can be inferred from the results that, the gladiolus variety PDKV Satpuda Purple and genotype NG-1 were found superior in respect of spike yield and quality, respectively, however, the variety Pusa Suhagin and genotype NG-2 were superior in respect of corm yield and quality, respectively.

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