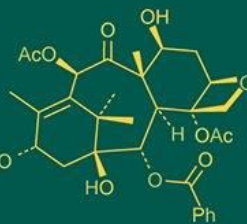
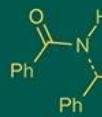
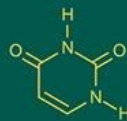
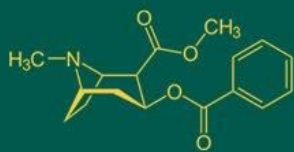


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693

ISSN Online: 2617-4707

NAAS Rating (2025): 5.29

IJABR 2025; 9(9): 396-402

www.biochemjournal.com

Received: 11-07-2025

Accepted: 14-08-2025

SR Bachkar

M.Sc. Student, Department of Horticulture, College of Agriculture, Pune, Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri, Maharashtra, India

SG Bhalekar

Professor and Head, Department of Horticulture, College of Agriculture, Pune, Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri, Maharashtra, India

SD Gaikwad

Assistant Professor of Horticulture, Zonal Agricultural Research Station (ZARS), Ganeshkhind, Pune, Mahatma Phule Krishi Vidyapeeth (MPKV), Maharashtra, India

AA Bhagat

Assistant Professor of Statistics, Division of Agricultural Economics, College of Agriculture, Pune, Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri, Maharashtra, India

BV Gondhali

Assistant Professor of Horticulture, Zonal Agricultural Research Station (ZARS), Ganeshkhind, Pune, Mahatma Phule Krishi Vidyapeeth (MPKV), Maharashtra, India

MB Shete

Ex-Floriculturist, Zonal Agricultural Research Station (ZARS), Ganeshkhind, Pune, Mahatma Phule Krishi Vidyapeeth (MPKV), Maharashtra, India

Corresponding Author:**SR Bachkar**

M.Sc. Student, Department of Horticulture, College of Agriculture, Pune, Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri, Maharashtra, India

Evaluation of gladiolus hybrids and varieties for growth and yield characters

SR Bachkar, SG Bhalekar, SD Gaikwad, AA Bhagat, BV Gondhali and MB Shete

DOI: <https://www.doi.org/10.33545/26174693.2025.v9.i9f.5649>

Abstract

Floriculture is an important branch of horticulture having aesthetic, social, economic and environmental importance which provides beauty, employment and raw material to various industries and also presents rich ancient culture of India. The experiment was conducted in *rabi* season at AICRP on Floriculture, ZARS, Ganeshkhind Pune during 2023-24 in Randomized Block Design with three replications for the evaluation of 16 hybrids, 10 varieties and one exotic variety.

The results revealed that the vegetative growth, floral, corms and cormels production of gladiolus the hybrids *viz.* GK-GL-07-04, GK-GL-07-08, GK-GL-07-14 and GK-GL-07-22 were found promising in respect of days required for spike emergence, days required for first floret to open, spike length, girth of spike, number of spikes per plant, vase life, number of corms per plant, number of florets per spike, diameter of floret, number of florets remained open at a time.

Keywords: Gladiolus, hybrids, varieties, growth and yield characters

Introduction

Gladiolus (*Gladiolus (Tourn.) L.*) belongs to family Iridaceae and originated from South Africa. Gladiolus belongs to monocotyledons group with basic chromosomal number $n=15$, although most to 120 and commercially propagated through underground storage organs known as corms (Javaid *et.al.* 2025) [2]. The global floriculture industry has significantly contributed to the world's agricultural economy and reached to \$ 57.5 billion USD of global export revenue in 2024.

According to the report of Future Market Insights, the floriculture sector is projected to grow at a compound annual growth rate (CAGR) of 6.2% from 2024 to 2032 reaching an estimated \$109.10 billion USD by 2032. (Javaid *et.al.* 2025) [2]. This growing trend highlights the increasing global demand for floricultural products and expanding economic impact of floriculture. The floriculture industry generates employment, increase the standard of livelihood, growth and development of farmers and increasing the export potentiality and profitability of agriculture. (Javaid *et.al.* 2025) [2].

In India, commercially gladiolus cultivating states Tamilnadu (21%), Karnataka (16%), Madhya Pradesh (14%) and West Bengal (12%). (Source- Ministry of Agriculture and Finance welfare 2nd advance estimates 2023-24 APEDA) This crop has covered 11660 ha area with the production of 106 crore flower spikes and 2,60,000 tonnes of cut flower in India 2023-24 (kadam *et.al.*) [17]. Total export of floriculture from India is USD 86.63 million in 2023-24 (APEDA). Gladiolus is perfect for garden displays and floral arrangements and most important bulbous crops grown for it attractive coloured and long-lasting flowers. It occupies high demand in both domestic and international market it ranks first in the world for the trade of bulbous flowers and eighth for the production of cut flowers. (Safia, N. E. *et al.* 2024) [56]. Gladiolus spikes are admired for its long and fascinating styles, trumpet shaped varying sized flowers and flowers bloom in various vibrant and bold colours and commonly known as the 'queen of bulbous flowers', sword lily, and corn flag (Javaid *et al.* (2025) [2]. Gladiolus spikes give varying size and form of florets with smooth, ruffled, deeply crinkled of lancing tepals which are blotched or possess distinct patches or markings of various colours and colour combinations. Now a days, there is a huge availability of market for flowers and floriculture industry product. Due to rise in socio-economic status, change in

life style of people and want for novelty every year large number of gladiolus varieties are being added in public domain (Kadam *et al.* (2014b) ^[17]. The addition of new varieties every year necessitates varietal evaluation to find out suitable variety for specific region. (Pandey, 2012) ^[34]. By considering the increasing demand of gladiolus in domestic and international market new varieties with desirable growth and yield characters should be selected and released for cultivation. Selection of suitable cultivar is an important factor that determines successful cultivation of gladiolus under different agro-climatic conditions Therefore, it is necessary to study the performance of developed varieties with existing ones with superior growth and yield characters for different agroclimatic conditions.

Materials and Methods

The experiment was conducted at AICRP on Floriculture, ZARS, Ganeshkhind Pune in rabi season during 2023-24 for the evaluation of 16 hybrids developed by AICRP on Floriculture, ZARS, Ganeshkhind, Pune and 10 varieties developed by various AICRP on Floriculture centers in India and one exotic variety. The experiment was laid down in Randomized Block Design with three replications. The corms of 27 treatments (30 corms of each treatment) cleaned properly by removing dried husk and treated with captain (0.2%) solution for 20 minutes to avoid fungal infestations. These corms were planted at the spacing of 45x15 cm along the sides of the ridges at the depth of 5-6 cm. Light irrigation was given immediately after planting. Half of the recommended fertilizer dose of N was given as a basal dose and full dose of the P and K was given at the time of planting and remaining half of N was given in splits at second, fourth and sixth leaf stage. The data on days taken to days to spike emergence (days), number of leaves, plant height (cm), number of days to first floret emergence, spike length (cm), Rachis length (cm), number of florets per spike, number of spikes per plant, inter- floret length (cm), diameter of floret (cm), girth of spike (cm), average fresh weight of spike (g), diameter of floret (cm), vase life (days), number of corms per plant, weight of corms per plant (g), diameter of corms (mm), number of cormels, weight of cormels per plant etc. The data was recorded on five randomly selected plants per replication and the mean values of the recorded data was statistically analyzed.

Results and discussion

The results on growth and flowering characters are presented in table 1 and it revealed that maximum plant height was observed in cultivar Pratap Glad -I (106.08 cm) which was statistically at par with hybrid GK-GL-07-14 (101.67 cm) and cultivar Sancerre (98.50 cm). Significantly minimum plant height was recorded by hybrid GK-GL-07-11 (44.35 cm). Difference in plant height due to genetic constitution of hybrids and varieties. These results are similar with findings of Hossain *et al.* (2011) ^[13], Pandey *et al.* (2012) ^[34], Srinivas and Mukunda Laxmi (2018) ^[33, 63]. The significantly greater number of leaves per plant was recorded by the hybrid GK-GL-07-04 (10.57) while the minimum number of leaves was recorded by cultivar Punjab Dawn (5.97) which was at par with hybrid GK-GL-07-26 (6.23). The variation in number of leaves may be due to difference in the amount of food material stored in mother corm and may be due to environmental conditions of growing location. Similar findings also have been reported

by Singh *et al.* (2017), Mushtaq *et al.* (2018) and Naithani M. *et al.* (2024) ^[28, 32, 39, 43, 61].

It was observed that hybrid GK-GL-07-14 was early in spike emergence (54.23 days) which was at par with GK-GL-07-19 (55.03 days), GK-GL-07-22 (55.57 days), Arka Ranjini (55.57 days), GK-GL-07-04 (56.30 days) and GK-GL-07-08 (58.93 days). Maximum days required to spike emergence by the cultivar Sancerre was (68.63 days) which was at par with DHN-86-1 (66.50 days) and Suryakiran (65.90 days). Spike emergence may have been based on food reserves which results in growth rate of the plants which regulates the accumulation of required level of carbohydrates for spike emergence. Similar results have been reported by Naithani M. *et al.* (2024). It is also genetically controlled as reported by Kadam *et al.* (2014) ^[17, 32, 43].

Minimum days required for first floret opening was recorded by the hybrid GK-GL-07-14 (70.67 days) which was at par with GK-GL-07-18 (72.23 days), GK-GL-07-22 (72.47 days) GK-GL-07-04 (73.20 days), GK-GL-07-13 (73.83 days) and GK-GL-07-08 (75.10 days) and variety Pusa Manmohak (75.67 days). Maximum days for first floret opening recorded by the cultivar DFR-GH-1. (86.60 days) which was at par with variety Aarti (84.37 days), Sancerre (84.47 days) and hybrid GK-GL-07-11 (83.53 days) and GK-GL-07-16 (83.00 days). Number of days required for first floret opening are genetically controlled this was reported by Kadam *et al.* (2014) ^[17].

Table 2 summarized the results of flowering characters and it was observed that the significant influence among 27 gladiolus hybrids and varieties. The maximum spike length recorded by GK-GL-07-14 (90.17 cm) which was statistically at par with Pratap Glad -I (87.84 cm), Sancerre (84.07 cm) and Phule Neelrekha (83.62 cm) and GK-GL-07-08 (81.82 cm). Significantly lowest spike length was recorded by GK-GL-07-11 (38.79 cm). The hybrid GK-GL-07-14 recorded maximum rachis length (52.77 cm) which was statistically at par with GK-GL-07-13 (52.60 cm), Phule Neelrekha (50.70 cm), GK-GL-07-05 (50.55 cm) GK-GL-07-08 (47.38), and GK-GL-07-04 (44.70 cm). However significantly minimum rachis length was recorded by the hybrid GK-GL-07-11 (25.17 cm). The difference in spike length and rachis length might be due to inherent characters associated with hybrids with varieties as well as environmental conditions prevailed during growth stage of spike. Similar results were reported by Naithani M. *et al.* (2024) ^[32].

The maximum girth of spike (3.1 cm) was recorded by hybrid GK-GL-07-04, GK-GL-07-08, GK-GL-07-14 which was statistically at par with the hybrid GK-GL-07-07 (3.00 cm) and variety Pusa Manmohak (3.00 cm) and Pratap Glad -I (3.00 cm). Minimum girth of spike was recorded by Punjab Dawn (2.3 cm) which was statistically at par with GK-GL-07-10 (2.6 cm), Suryakiran (2.6 cm) and GK-GL-07-18 (2.5 cm). The variation in this character might be due to genetic makeup of hybrids and environmental effects. Similar results were found by Swaroop K. (2022) ^[65]. Significantly highest weight of spike was found by hybrid GK-GL-07-14 (84.82 g). Minimum average weight of the spike was found by hybrid GK-GL-07-10 (37.47 g). The variation in weight of spike was cumulative effect of the variation in characters like length of spike, girth of spike. Similar results were reported by Roni *et al.* (2015) ^[52] and Khutwad (2021) ^[21] in gladiolus,

The maximum number of florets per spike was recorded by the hybrid GK-GL-07-08 (16.53) which is statistically at par with GK-GL-07-14(16.38), GK-GL-07-04 (16.27). Significantly minimum number of florets was recorded by the cultivar Arka Ranjini (7.07). The variability in number of florets per spike among the hybrids and varieties may be due to genotypic differences which results in phenotypic expressions as reported by Naithani M *et al.* (2024) and Safeena and Thangam M (2019) [32, 43, 55].

The diameter of the flower is the parameter determining the market value and breeding efficiency of the variety. The largest and showy floret was recorded by the hybrid GK-GL-07-22 (11.77 cm), GK-GL-07-14 (11.63 cm) and GK-GL-07-04 (11.45 cm) while smallest florets with less diameter was recorded by cultivar Punjab Dawn (6.56 cm) which is at par with cultivar Arka Ranjini (6.63 cm). Similar results are reported by Srinivas and Mukunda Laxmi (2018) [33, 63] and Safeena and Thangam M (2019) [55]. The appropriate inter floret length exhibited by hybrids GK-GL-07-04 (4.64 cm), GK-GL-07-08(5.44 cm) GK-GL-07-14 (5.60) and GK-GL-07-22 (4.84). Significantly highest inter floret length exhibited by GK-GL-07-16 (6.32 cm) while minimum inter floret length was observed by cultivar Punjab Dawn (3.26 cm) which is at par with GK-GL-07-26 (3.39 cm). The greater number of florets remained open at a time (7.47) was recorded by hybrid GK-GL-07-22 and GK-GL-07-08 which is at par with GK-GL-07-14 (7.37) while a smaller number of florets remained open at a time was recorded by hybrid GK-GL-07-18 (3.53). Similar variations reported by Kumar *et al.* (2020) and Priyanka Kumari *et al.* (2023) [47].

The significantly maximum number of spikes per plant was recorded by GK-GL-07-08 (3.33). Significantly minimum number of spikes per plant was recorded by the hybrid GK-GL-07-18 (1.37). The variation in number of spikes per plant observed may be due to genetic variability and prevailing field conditions. Similar results were earlier recorded by Srinivas and Mukunda Lakshmi (2018) [33, 63], Safeena S.A and Thangam M. (2019) and Ghadge (2020) [11, 55]. The maximum vase life was recorded by hybrid GK-GL-07-08 (8.81 days) which was statistically at par with GK-GL-07-14 (8.49), Gk-GL-07-04(8.44), GK-GL-07-10 (8.37) and GK-GL-07-22 (8.33 days). However, the minimum vase life was recorded by cultivar Aarti (5.30 days) which was at par with DHN-86-1(5.41 days), Punjab Dawn (5.58 days) and Suryakiran (5.60 days). Significant variation for cut spike's vase life in tap water among gladiolus hybrids and varieties may be due to genetic makeup with prevailing environmental conditions which finally affects physiological processes like cell turgidity, water uptake through xylem tissue, water loss through transpiration, respiration and breakdown of reserved food and senescence responsible

enzyme which reduces vase life as reported by Safeena and Thangam M (2019), Naithani M. *et al.* (2024) [32, 43, 55].

Table 3 indicated that the results of corms and cormels production of gladiolus hybrids and varieties. The significant variation noticed in corms and cormels production. Maximum number of corms per plant was recorded by GK-GL-07-04 (1.67), GK-GL-07-14 (1.67), GK-GL-07-22 (1.67) which was statistically at par with GK-GL-07-08 (1.65) However, the minimum number of corms was recorded by Pusa Manmohak (1.45), GK-GL-07-16 (1.45) and GK-GL-07-11 (1.45) Variation in number of corms also recorded by Srinivas and Mukunda Lakshmi (2018) [33, 63], Priyanka Kumari *et al.* (2023) [47]. Highest average weight of corm per plant was observed by hybrid GK-GL-07-08 (52.78 g.) which was statistically at par GK-GL-07-04 (49.87g.) and GK-GL-07-01 (41.07g). The minimum weight of the corm per plant was observed by hybrid GK-GL-07-18 (18.30 g.) Which was at par with hybrid GK-GL-07-11 (21.60 g). Variation in weight of corms may be due to genetic makeup of the hybrids and varieties. These findings are similar to results obtained by Safeena S.A. and Thangam M (2019), Priyanka Kumari *et al.* (2023) [47, 55].

Maximum diameter of the corm was recorded in hybrid GK-GL-07-04 (54.60 mm) which is statistically at par with GK-GL-07-08 (54.51 mm) and GK-GL-07-14 (50.96 mm). Significantly minimum diameter of the corm was recorded by hybrid GK-GL-07-26 (31.53 mm). Higher diameter of corm is the result of good vegetative growth of the plants in initial stages which supplies good amount of photosynthates for storage in corm which are the storage organs. Similar results are obtained by Safeena and Thangam (2019) and Srinivas and Mukunda Lakshmi (2018), Priyanka Kumari *et al.* (2023) [33, 47, 55, 63].

Significantly maximum number of cormels were recorded by hybrid GK-GL-07-14 (70.67). Significantly minimum number of cormels recorded in variety Aarti (9.00). Variation in the number of cormels may be due to distinguished genetic makeup of the hybrids and varieties. Variation in cormel production also reported by Safeena and Thangam (2019), Priyanka Kumari *et al.* (2023) [47, 55].

The varieties with more leaves improve photosynthetic activity, source sink relationship accumulates carbohydrates and improves weight of cormels under prevailing environmental conditions. The Maximum weight of cormels (64.00 g) was recorded by hybrid GK-GL-07-22 which is statistically at par with hybrid GK-GL-07-14 (60.30g) and GK-GL-07-08 (59.23g). The minimum weight of cormels (6.99 g) was recorded by cultivar Aarti which is at par with GK-GL-07-18 (11.29g). Vide variation in weight of cormels also recorded by Kamble *et al.* (2004) and Safeena and Thangam (2019) [18, 55].

Table 1: Mean performance of vegetative growth characters of different gladiolus hybrids and varieties

	Treatments	Plant height (cm)	Number of leaves Per plant	Days required for spike emergence (days)	Days required for first floret to open (days)
T ₁	GK-GL-07-01	76.60	8.30 (3.05)	65.13	81.73
T ₂	GK-GL-07-02	75.65	9.00 (3.16)	59.70	75.80
T ₃	GK-GL-07-04	89.66	10.57 (3.40)	56.30	73.20
T ₄	GK-GL-07-05	96.20	9.17 (3.18)	63.90	80.00
T ₅	GK-GL-07-07	73.30	7.23 (2.87)	61.37	77.10
T ₆	GK-GL-07-08	94.12	10.18 (3.34)	58.93	75.10
T ₇	GK-GL-07-09	86.49	10.03 (3.32)	59.73	80.50
T ₈	GK-GL-07-10	71.28	8.23 (3.04)	62.77	82.13
T ₉	GK-GL-07-11	44.35	7.50 (2.92)	61.73	83.53

T ₁₀	GK-GL-07-13	79.17	7.40 (2.90)	65.33	73.83
T ₁₁	GK-GL-07-14	101.67	9.13 (3.18)	54.23	70.67
T ₁₂	GK-GL-07-16	71.30	8.50 (3.08)	62.80	83.00
T ₁₃	GK-GL-07-18	74.80	8.23 (3.04)	63.47	72.23
T ₁₄	GK-GL-07-19	88.73	9.50 (3.24)	55.03	74.30
T ₁₅	GK-GL-07-22	91.15	9.50 (3.24)	55.57	72.47
T ₁₆	GK-GL-07-26	74.61	6.23(2.69)	65.97	76.67
T ₁₇	Phule Neelrekha	97.56	9.07(3.17)	60.27	80.87
T ₁₈	Pusa Manmohak	94.97	7.80 (2.97)	63.60	75.67
T ₁₉	Arka Ranjini	83.33	8.60 (3.10)	55.57	79.37
T ₂₀	DFR-GH-1	77.49	7.50 (2.92)	61.83	86.60
T ₂₁	Sancerre	98.50	7.37 (2.89)	68.63	84.47
T ₂₂	DHN-86-1	84.58	7.43 (2.90)	66.50	77.50
T ₂₃	Aarti	73.45	7.47 (2.91)	57.73	84.37
T ₂₄	Surya- Kiran	79.88	7.83 (2.97)	65.90	78.60
T ₂₅	Punjab Down	71.72	5.97 (2.64)	61.43	79.37
T ₂₆	Pratap Glad -1	106.08	7.60 (2.93)	61.77	77.97
T ₂₇	Punjab Glad -3	96.27	8.30 (3.05)	60.00	78.28
	SE(m)±	2.78	0.042	2.31	2.58
	C.D. @ 5%	7.92	0.12	6.57	7.35

Note: Figures in parenthesis indicates square root transformed values.

Table 2: Mean performance of flowering characters of gladiolus hybrids and varieties.

Sr. No.	Treatments	Spike length (cm)	Girth of the spike (cm)	Average weight of the spike (g)	Rachis length (cm)	Number of florets per spike	Diameter of floret (cm)	Number of florets remained open at a time	Inter floret length (cm)	Number of spikes per plant	Vase life of spike (days)
T ₁	GK-GL-07-01	58.86	2.7	51.93	38.92	13.80 (3.85)	9.50	4.50 (2.34)	4.28	2.47 (1.86)	6.13
T ₂	GK-GL-07-02	61.61	2.8	63.10	37.03	11.93 (3.60)	10.11	5.17 (2.48)	4.35	2.40(1.84)	7.00
T ₃	GK-GL-07-04	75.53	3.1	62.22	44.39	16.27 (4.17)	11.45	6.93 (2.82)	4.64	2.82 (1.95)	8.44
T ₄	GK-GL-07-05	82.85	2.7	48.31	50.55	14.27 (3.91)	9.35	5.73 (2.59)	4.73	2.52 (1.87)	6.33
T ₅	GK-GL-07-07	57.09	3.0	48.90	42.60	13.73 (3.84)	8.43	5.23 (2.49)	4.73	2.48 (1.86)	7.65
T ₆	GK-GL-07-08	81.82	3.1	54.15	47.38	16.53 (4.19)	9.89	7.47 (2.91)	5.44	3.33(2.08)	8.81
T ₇	GK-GL-07-09	72.81	2.8	45.47	41.05	14.41 (3.92)	9.82	5.13 (2.48)	4.77	1.80(1.67)	7.42
T ₈	GK-GL-07-10	58.93	2.6	37.47	41.28	12.28 (3.64)	9.58	4.50 (2.34)	4.03	1.43 (1.56)	8.37
T ₉	GK-GL-07-11	38.79	2.8	38.24	25.17	8.70 (3.11)	9.67	3.80 (2.19)	5.15	1.58 (1.61)	7.93
T ₁₀	GK-GL-07-13	74.74	2.7	38.14	52.60	12.43 (3.67)	9.51	4.57 (2.36)	5.58	1.52 (1.58)	7.13
T ₁₁	GK-GL-07-14	90.17	3.1	84.82	52.78	16.38 (4.14)	11.63	7.37 (2.89)	5.60	3.02 (2.00)	8.49
T ₁₂	GK-GL-07-16	61.87	2.7	40.09	47.67	14.13 (3.89)	9.57	5.60 (2.57)	6.32	1.57 (1.60)	7.63
T ₁₃	GK-GL-07-18	68.01	2.5	37.88	42.09	15.09 (4.01)	8.65	3.53 (2.13)	4.57	1.37 (1.54)	7.97
T ₁₄	GK-GL-07-19	70.14	2.7	39.28	45.05	14.70 (3.96)	8.78	4.70 (2.39)	4.01	1.48 (1.57)	7.81
T ₁₅	GK-GL-07-22	78.61	2.9	70.56	42.16	16.23 (4.15)	11.77	7.47 (2.91)	4.84	3.03 (2.01)	8.33
T ₁₆	GK-GL-07-26	65.11	2.9	38.43	43.48	12.23 (3.64)	8.67	3.70 (2.17)	3.39	1.50 (1.58)	7.40
T ₁₇	Phule Neelrekha	83.62	2.8	56.57	50.70	16.17 (4.15)	8.57	7.03 (2.83)	4.45	2.40(1.84)	7.15
T ₁₈	Pusa Manmohak	74.76	3.0	61.45	48.60	15.70 (4.09)	10.50	7.07 (2.84)	4.05	1.82 (1.68)	7.70
T ₁₉	Arka Ranjini	70.75	2.7	37.92	31.66	7.07 (2.84)	6.63	4.47 (2.34)	4.73	1.63(1.62)	7.20
T ₂₀	DFR-GH-1	67.62	2.9	57.48	35.77	13.73 (3.84)	10.49	5.50 (2.55)	4.03	2.20 (1.79)	7.62
T ₂₁	Sancerre	84.07	2.8	61.11	46.15	15.43	8.53	6.50	5.17	2.62 (1.90)	6.90

						(4.05)		(2.74)			
T ₂₂	DHN-86-1	70.61	2.9	45.47	38.40	12.40 (3.66)	9.50	4.80 (2.41)	4.85	1.53 (1.59)	5.41
T ₂₃	Aarti	64.37	2.7	38.56	40.18	12.47 (3.67)	9.44	4.23 (2.28)	4.75	1.80 (1.67)	5.30
T ₂₄	Surya- Kiran	65.70	2.6	39.13	41.82	12.20 (3.63)	9.63	4.20 (2.28)	4.68	1.64 (1.62)	5.60
T ₂₅	Punjab Down	63.29	2.3	38.47	36.80	7.73 (2.95)	6.56	3.93 (2.22)	3.26	1.55 (1.60)	5.58
T ₂₆	Pratap Glad -1	84.87	3.0	61.89	44.07	12.54 (3.64)	9.73	5.40 (2.53)	5.46	2.53 (1.88)	6.72
T ₂₇	Punjab Glad -3	82.42	2.9	58.11	43.50	15.03 (4.00)	10.41	5.83 (2.61)	5.41	2.63 (1.90)	6.53
	SE(m)±	3.00	0.1	2.36	2.01	0.10	0.18	0.048	0.14	0.032	0.40
	C.D.@ 5%	8.54	0.3	6.71	5.72	0.28	0.50	0.137	0.40	0.091	1.12

Note: Figures in parenthesis indicates square root transformed values.

Table 3: Mean performance of corms and cormels production of different gladiolus hybrids and varieties

	Treatments	Number of corms per plant	Average weight of corms (g)	Diameter of the corms (mm)	Number of cormels per plant	Weight of cormels (g)
T ₁	GK-GL-07-01	1.54 (1.59)	36.00	49.19	46.67 (6.90)	38.36
T ₂	GK-GL-07-02	1.58 (1.61)	25.83	41.38	37.33 (6.19)	28.68
T ₃	GK-GL-07-04	1.67 (1.63)	49.87	54.60	64.33 (6.65)	39.96
T ₄	GK-GL-07-05	1.52 (1.59)	29.70	47.01	57.67(8.46)	49.18
T ₅	GK-GL-07-07	1.59 (1.61)	41.07	48.25	43.33 (8.14)	39.96
T ₆	GK-GL-07-08	1.65 (1.63)	52.78	54.51	65.33 (8.14)	59.23
T ₇	GK-GL-07-09	1.52 (1.59)	26.50	48.25	29.33 (5.50)	26.73
T ₈	GK-GL-07-10	1.52(1.59)	29.23	47.81	46.00 (6.85)	39.24
T ₉	GK-GL-07-11	1.45(1.57)	21.60	37.66	39.33 (6.35)	30.51
T ₁₀	GK-GL-07-13	1.52 (1.59)	25.60	44.55	46.00 (6.85)	39.24
T ₁₁	GK-GL-07-14	1.67 (1.63)	35.92	50.96	70.67 (7.65)	60.30
T ₁₂	GK-GL-07-16	1.45 (1.57)	29.07	46.46	42.33 (6.58)	39.65
T ₁₃	GK-GL-07-18	1.52 (1.59)	18.30	35.77	13.33(3.77)	11.29
T ₁₄	GK-GL-07-19	1.45 (1.56)	32.60	47.36	60.00 (7.81)	56.34
T ₁₅	GK-GL-07-22	1.67 (1.63)	30.27	47.81	69.33(8.38)	64.00
T ₁₆	GK-GL-07-26	1.51 (1.59)	18.27	31.53	13.67(3.83)	11.64
T ₁₇	Phule Neelrekha	1.59 (1.61)	38.42	47.25	37.67(6.22)	34.94
T ₁₈	Pusa Manmohak	1.45 (1.57)	37.47	48.59	37.67(6.22)	32.16
T ₁₉	Arka Ranjini	1.48 (1.58)	35.40	48.81	47.67(6.97)	41.70
T ₂₀	DFR-GH-1	1.48 (1.58)	25.97	44.25	66.33(8.20)	53.28
T ₂₁	Sancerre	1.55 (1.60)	26.10	45.35	52.67 (7.32)	45.11
T ₂₂	DHN-86-1	1.51 (1.58)	29.34	46.18	51.33 (7.22)	46.84
T ₂₃	Aarti	1.51 (1.58)	24.73	38.89	9.00 (3.15)	6.99
T ₂₄	Surya- Kiran	1.54 (1.59)	24.80	38.75	17.67 (4.31)	15.27
T ₂₅	Punjab Down	1.48 (1.58)	27.02	50.74	21.00 (4.68)	18.79
T ₂₆	Pratap Glad -1	1.55 (1.60)	28.20	48.37	16.67(4.20)	14.26
T ₂₇	Punjab Glad -3	1.58(1.60)	26.35	45.72	18.00 (4.35)	15.54
	SE(m)±	0.005	1.68	1.40	0.2	1.99
	C.D.@ 5%	0.014	4.79	3.98	0.6	5.66

Note: Figures in parenthesis indicates square root transformed values.

Conclusions: Considering the vegetative growth, floral characters , corms and cormels production and disease

reaction it is concluded that hybrids GK-GL-07-04, GK-GL-07-08, GK-GL-07-14 and GK-GL-07-22 are promising in

respect of characters viz; days required for spike emergence, days required for first floret to open, spike length, girth of spike, weight of spike, number of florets, diameter of floret, number of spikes per plant, vase life, number of corms per plant, number of cormels per plant and weight of cormels.

Acknowledgements

The authors gratefully acknowledge the Associate Dean, College of Agriculture and Professor, Department of Horticulture, College of Agriculture, Pune and Associate Director of Research, ZARS Ganeshkhind for research support. The authors whose work formed basis for writing this paper and unknown reviewers' for critically reviewing and suggestions are also acknowledged.

References

- Anonymous. Area and Production of Gladiolus in India. Ministry of Agriculture and Farmers Welfare, 2nd advance estimates, 2023-24.
- Anonymous. Future Market Insights (FMI). 2025. Available from: <https://www.futuremarketinsights.com/reports/floriculture-market> [Accessed 11 Feb. 2025]. Quoted by Javaid Aqib, 2025.
- Ajnarkar AA, Khanvilkar MH, Kulkarni MM, Dalvi NV, Shinde BD, Mhatre MS. Evaluation of gladiolus (*Gladiolus* spp.) varieties for flowering characters and yield under Konkan agroclimatic conditions of Maharashtra. *Pharma Innovation J.* 2023;12(2):3159-3161.
- Singh AK, Kumar R, Tomar KS, Kumar H, Kumar S, Kumar A. Evaluation of *Gladiolus* (*Gladiolus* hybridus Hort.) varieties for vegetative and floral characters under Bundelkhand conditions. *Int J Curr Microbiol Appl Sci.* 2020;9(5):2612-2619.
- Asatkar KB, Panchbhair DB, Badge S, Gaidhani A. Growth and flowering performance of *Gladiolus* varieties. *J Soils Crop.* 2018;28(1):212-215.
- Azimi MH. Evaluation of yield and genetic factors in different cultivars of gladiolus. *Ornamental Hortic.* 2019;26(1):8-17.
- Bhaskar V, Reddy PS. Evaluation of gladiolus cultivars under the Northern Telangana Zone. *Asian J Hortic.* 2017;12(2):227-229.
- Bhujbal GB, Chavan NG, Mehete SS. Evaluation of genetic variability, heritability and genetic advances in gladiolus (*Gladiolus grandifloras* L.) genotypes. *An Int Quart J Life Sci.* 2013;8(4):1515-1520.
- Das R, Boro A, Medhi T, Medhi B. Performance studies of some gladiolus cultivars under rainfed conditions of Assam. *HortScience.* 2014;89:789-797.
- Geeta SV, Shirol AM, Kulkarni BS, Omen T, Parvati. Performance of gladiolus (*Gladiolus* hybridus) varieties for growth, yield and flower quality characters. *Plant Arch.* 2014;14(2):1147-1149.
- Ghadge PU. Evaluation of different *Gladiolus* varieties (*Gladiolus* hybridus Hort.) under Pune conditions of Maharashtra. *Indian J STEAM.* 2020;1(1):1-5.
- Hayat N, Singh S, Hayat S, Khan FU. Performance of different cultivars of gladiolus under Allahabad conditions. *Prog Hort.* 2004;41(2):196-199.
- Hossain MD, Talukder KH, Asaduzzaman M, Mahmud F, Amin N, Sayed MA. Study on morphological characteristics of different genotypes of gladiolus flower. *J Sci Foundation.* 2011;9(1&2):1-8.
- Ishwarraddy, Kandpal K, Hugar A, Ramesh G, Amare Gouda A. Genetic variability studies in gladiolus (*Gladiolus grandiflora* L.). *Int J Curr Microbiol Appl Sci.* 2018;7(11):2566-2573.
- Islam MK, Anwar M, Alam AU, Khatun US, Ara KA. Performance of different gladiolus varieties under the climatic condition of Tista Meander Floodplain in Bangladesh. *Progressive Agric.* 2017;28(3):198-203.
- Aqib J, Pandey RK, Shah AH, Bakshi P, Kaushal N, Chand G, Dogra S, Kumar R, Singh AK, Singh A. Response of *Gladiolus grandifloras* varieties to planting date: effects on growth, flowering and vase life. *BMC Plant Biol.* 2025;25:481.
- Kadam GB, Kumar G, Saha TN, Tiwari AK, Kumar R. Varietal evaluation and genetic variability studies on gladiolus. *Indian J Hortic.* 2014;71(3):379-384.
- Kamble BS, Reddy BS, Gangadharappa PM, Kulkarni BS. Haryana *J Hortic Sci.* 2004;33(1&2):74-75.
- Katwate SM, Patil MT, Singh BR, Kakade DS, Gurav SB, Nimbalkar CA. Phule Ganesh: A promising gladiolus genotype. *J Ornamental Hort.* 2005;8(4):299-302.
- Sahariya K, Kaushik RA, Khan R, Sarolia D. Evaluation of gladiolus cultivars for plant growth and corm production. *J Pharmacogn Phytochem.* 2018;7(40):1974-1976.
- Khutwad S. Evaluation of promising hybrids of gladiolus for quantitative and qualitative traits. MSc thesis. MPKV Rahuri; 2021.
- Kumar D, Singh AK, Sisodia A. Performance of gladiolus varieties for growth and corm yield under eastern Uttar Pradesh condition. *J Pharmacogn Phytochem.* 2018;7(4):751-754.
- Kumar R, Yadav DS. Evaluation of gladiolus cultivars under sub-tropical hills of Meghalaya. *J Ornamental Hortic.* 2005;8(2):86-90.
- Kumawat P, Sisodia A, Singh AK. Evaluation of gladiolus cultivars for plant growth and corm production. *J Pharmacogn Phytochem.* 2018;7(3):3083-3085.
- Kumari M, Swaroop K, Singh SK, Kamil D, Singh B, Bharadwaj C. Response of gladiolus genotypes to *in vivo* inoculation of *Fusarium oxysporum* f. sp. gladioli on growth, flowering and disease incidence. *Indian J Agric Sci.* 2019;89(2):268-278.
- Lepcha B, Nautiyal MC, Rao VK. Variability studies in gladiolus under mid hill conditions of Uttarakhand. *J Ornamental Hortic.* 2007;10(3):169-172.
- Azimi MH, Banijamali SM. Introducing superior cultivars of gladiolus by important quality and quantity indexes. *J Ornamental Plants.* 2019;9(1):33-40.
- Mushtaq S, Hafiz IA, Arif M, Anwar A. Performance evaluation of elite gladiolus cultivars under agro-climatic conditions of Rawalpindi. *Asian J Adv Agric Res.* 2018;5(3):1-6.
- Mukesh K. Morphological characterization of gladiolus (*Gladiolus* hybridus Hort.) germplasm. *J Plant Dev Sci.* 2015;7(4):359-362.
- Naresh S, Rao D, Bhaskar VV, Rao MP, Krishna KU. Genetic variability, heritability and genetic advance in gladiolus hybrids. *Plant Arch.* 2015;15(1):377-381.

31. Nalage NA, Haldankar PM, Gawankar MS, Rathod NG. Evaluation of different gladiolus varieties (*Gladiolus hybridus* Hort.) under Konkan conditions of Maharashtra. *Int J Chem Stud.* 2018;7(2):2018-2021.
32. Naithani M, Bohra M, Adhikari YS, Karki P, Negi S. Evaluation of gladiolus (*Gladiolus grandifloras* L.) germplasm for vegetative and corm yielding characters under temperate region of Uttarakhand, India. *Plant Arch.* 2024;24(2):770-776.
33. Srinivas PT, Mukunda Lakshmi L. Performance of some gladiolus varieties under tropical conditions of Tirupati. *Andhra Agric J.* 2018;65(3):640-643.
34. Pandey RK, Bhat DJI, Dogra S, Singh A, Laishram N, Jamwal S. Evaluation of gladiolus cultivars under subtropical conditions of Jammu. *Int J Agric Sci.* 2012;8(2):518-522.
35. Panse VG, Sukhatme PV. Statistical Methods for Agricultural Research Workers. Indian Council of Agricultural Research; 1985.
36. Kumari M, Swaroop K, Singh SK, Kamil D, Singh B, Bharadwaj C. Response of gladiolus genotypes to *in vivo* inoculation of *Fusarium oxysporum* f. sp. *gladioli* on growth, flowering and disease incidence. *Indian J Agric Sci.* 2019;89(2):268-278.
37. Lepcha B, Nautiyal MC, Rao VK. Variability studies in gladiolus under mid hill conditions of Uttarakhand. *J Ornamental Hortic.* 2007;10(3):169-172.
38. Azimi MH, Banijamali SM. Introducing superior cultivars of gladiolus by important quality and quantity indexes. *J Ornamental Plants.* 2019;9(1):33-40.
39. Mushtaq S, Hafiz IA, Arif M, Anwar A. Performance evaluation of elite gladiolus cultivars under agro-climatic conditions of Rawalpindi. *Asian J Adv Agric Res.* 2018;5(3):1-6.
40. Mukesh K. Morphological characterization of *Gladiolus* (*Gladiolus hybridus* Hort.) germplasm. *J Plant Dev Sci.* 2015;7(4):359-362.
41. Naresh S, Rao D, Bhaskar VV, Rao MP, Krishna KU. Genetic variability, heritability and genetic advance in gladiolus hybrids. *Plant Arch.* 2015;15(1):377-381.
42. Nalage NA, Haldankar PM, Gawankar MS, Rathod NG. Evaluation of different gladiolus varieties (*Gladiolus hybridus* Hort.) under Konkan conditions of Maharashtra. *Int J Chem Stud.* 2018;7(2):2018-2021.
43. Naithani M, Bohra M, Adhikari YS, Karki P, Negi S. Evaluation of gladiolus (*Gladiolus grandifloras* L.) germplasm for vegetative and corm yielding characters under temperate region of Uttarakhand, India. *Plant Arch.* 2024;24(2):770-776.
44. Srinivas PT, Mukunda Lakshmi L. Performance of some gladiolus varieties under tropical conditions of Tirupati. *Andhra Agric J.* 2018;65(3):640-643.
45. Pandey RK, Bhat DJI, Dogra S, Singh A, Laishram N, Jamwal S. Evaluation of gladiolus cultivars under subtropical conditions of Jammu. *Int J Agric Sci.* 2012;8(2):518-522.
46. Panse VG, Sukhatme PV. Statistical Methods for Agricultural Research Workers. New Delhi: Indian Council of Agricultural Research; 1985. p. 87-89.
47. Priyanka Kumari, Singh D, Meenu Kumari. Evaluation of gladiolus genotypes for horticultural traits. *Int J Agric Sci.* 2023;15(8):12599-12601.
48. Raimani H, Manjunatha Rao T, Sriram S, Kumar R, Venugopalan R, Dhananjaya MV. Evaluation of gladiolus genotypes for resistance to different isolates of *Fusarium oxysporum* f. sp. *gladioli*. *Ind J Curr Microbiol Appl Sci.* 2019;8(6):2811-2821.
49. Ram RB, Tomar KS, Datta SK. Performance of certain gladiolus varieties under sodic conditions. *J Ornamental Hortic.* 2005;8(1):77-78.
50. Rao KD, Sushma K. Performance of different new genotypes of gladiolus. *Agric Sci Digest.* 2015;35:134-137.
51. Rao TM, Janakiram T, Negi SS, Aswath C, Dhananjaya MV, Rajiv K, Ramchandran N. Development and evaluation of novel gladiolus hybrid selections IIHRG-7 (IC620379) and IIHRG-11 (IC620380) for flower quality and fusarium wilt resistance. *J Hortic Sci.* 2020;15(2):147-152.
52. Roni MZK, Sadia S, Sharin S, Rahman SKS. Phenotypical characteristics analysis of twelve gladiolus cultivars. *Bangladesh Res Publ J.* 2015;10(4):309-313.
53. Roy S, Ahmed QM, Rahaman MA, Rahaman MM, Hasan GN. Performance of BARI-released gladiolus varieties under the climatic conditions of Young Brahmaputra and Jamuna floodplain. *Bangladesh J Agri.* 2023;48(1):10-18.
54. Naresh S, Dorabjee AV, Bhaskar VV, Uma Krishna K, Paratpara Rao. Evaluation of gladiolus (*Gladiolus hybridus* L.) hybrids under coastal Andhra Pradesh conditions. *Plant Arch.* 2015;15(1):451-454.
55. Safeena SA, Thangam M. Field performance of gladiolus cultivars for growth, yield and quality cut flower production under humid conditions of Goa. *Int J Agric Sci.* 2019;11(3):7797-7800.
56. Safia NE, Manjusha MR, Alaka SB, Ashitha MR, Deepa Rani CV. Varietal assessment of gladiolus (*Gladiolus* spp.) for growth, flowering characteristics, yield and economics under highland agroclimatic conditions of Wayanad, Kerala, India. *J Exp Agric Int.* 2024;46(10):467-473.
57. Sarkar S, Chakraborty S. Varietal performance on important floral attributes of 15 indigenous and exotic varieties of gladiolus in north eastern Himalayan region. *J Agri Techno.* 2014;1(1):80-85.
58. Sankari A, Anand M, Arulmozhiyan R. Evaluation of gladiolus cultivars in Eastern Ghat of Tamil Nadu. *J Horti Sci.* 2012;7(20):206-208.
59. Shanmugam V, Ajit NS, Ram R, Dhyani D. Screening carnation and gladiolus cultivars for vascular wilt resistance. *Indian Phytopathol.* 2009;62(1):117-118.
60. Shelke SD, Lohate SR, Shete MB, Khadtare RM, Bhagat AA. Extensive varietal screening to find new sources of gladiolus wilt resistance. *J Agric Res Technol.* 2024;49(1):190-194.
61. Singh D, Mishra A, Singh J, Balram M. Evaluation of morphological characters of gladiolus (*Gladiolus hybridus* Hort.) genotypes under sub humid condition of Rajasthan. *Int J Agric Sci.* 2017;9(7):3846-3848.
62. Singh AK, Kumar R, Tomar KS, Kumar H, Kumar S, Kumar A. Evaluation of gladiolus (*Gladiolus hybridus* Hort.) varieties for vegetative and floral characters under Bundelkhand conditions. *Int J Curr Microbiol Appl Sci.* 2020;9(5):2612-2619.
63. Srinivas PT, Mukunda Lakshmi L. Performance of some gladiolus varieties under tropical conditions of Tirupati. *Andhra Agric J.* 2018;65(3):640-643.

64. Swaroop K, Kanwar P Singh, Prabhat K. Evaluation of gladiolus (*Gladiolus grandiflora*) genotypes for morphological diversity and corm yield. *Curr Hortic*. 2018;7(2):48-51.
65. Swaroop K. Comparative evaluation of gladiolus hybrids and genotypes for North Indian plains. *Int J Agric Innov Res*. 2020;8(6):1-7.
66. The Royal Horticultural Society. The Royal Horticultural Society Colour Chart. 6th ed. London: RHS Media; 2015. p. 80.