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Study on the Evaluation Genetic Variability of Gladiolus (*Gladiolus grandiflorus*) Cultivars Under Agro –Climatic Conditions of Prayagraj

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: A field experiment was carried out to "Study on Evaluating Genetic Variability of Gladiolus (*Gladiolus grandiflorus L.*) Cultivars under Agro –Climatic conditions of Prayagraj".
Place and Duration of Study: An experiment was carried out in the Department of Horticulture during the Rabi season of 2023-2024.

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Study Design: Randomized Block Design.
Methodology: The analysis of the data showed that phenotypic coefficient of variation (PCV) was higher than genotypic coefficient of variation (GCV) for all characters studied, indicating that environmental factors had a significant influence on these characters. In addition, positive and highly significant correlations were observed in between tuber yield per plant (gm) and various other traits including the No. of leaves at 30DAS, 60DAS and 90DAS and No. of shoots per plant, days for the first flowering, peduncle length, No. of florets per spike, No. of ears per plant, length of floret, diameter of floret, No. of corms per plant and diameter of corms, weight of corms and No. of corms per hectare and No. of corms per hectare.
Results: The mean sum of squares due to genotypes showed significant differences for all characters under study for except days taken for emergence of flower spike and days taken to show color of basal floret. High magnitude of GCV were recorded for No. of leaves (52.70), Corm yield/plant (46.40), No. of cormels/hectare(39.12), Cormel diameter(38.36), No. of corms/hectare(28.97), No. of corms per plant(28.97), No. of leaves at 60DAS(26.64), No. of shoot(26.64). The genotypic and phenotypic correlation coefficient of different characters with Corms yield/plant (g) and their relationship among themselves
Conclusion: Genotypic and Phenotypic correlation revealed that corms weight/plant (g) showed positive significant association with plant height, number of leavesper plant, number of shoots per plant, rachis length, no. of cormels per hectare and corm yield/ plant at both levels genotypic and phenotypic.

Keywords: Gladiolus; genotypes; genetic variability; growth; yield and quality.

1. 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 colors [1-12].

“The genus of gladiolus includes about 200 species with more than 10,000 cultivars of which about 20 are grown commercially for cut flower purpose and many others are used as seasonal flowering plants in gardens and exhibitions. The colour range in gladiolus is fantastic and almost any color from near black to white, pink, violet, lilac or mauve, greenish, “smoky” and combination of these colors. 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 Illyricum* is 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” [13-28].

1.1 Genetic Variability

The magnitude of variability present in a crop species are importance for the effective selection. The phenotypic variation in the population is due to a genotypic and environmental effect [19-25] Phenotypic variation is observable variation in population which includes both genotypic and environmental components which results that its magnitude differs due to environmental conditions whereas genotypic variation is the component of variation which is due to gene difference among the different individuals in a population [29-33,34-43]. Fisher (1918) divides genetic variance into three components as additive variance, dominance variance and epistatic variation. Genetic Variability is the term used in plant breeding programmed which is the presence of different gene actions in the individual.

1.2 Correlation Coefficient Analysis

Correlation coefficient is the mutual relationship between two or more variables that determine or estimate the component characters on which selection can be based for improvement.

1.3 Genetic Advance

Genetic Advance is the improvement in the mean genotypic value of selected plants over the parental population. The measure of genetic gain under selection is said to be Genetic advance. If the amount of genetic variability is high then genetic advance is also high.

2. MATERIALS AND METHODS

2.1 Location and Source of Experiment

The present investigation was carried out during Rabi season 2023 at Farm of Department of Horticulture at Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences Naini, Prayagraj Uttar Pradesh. The genetic materials were consisted of 22 varieties. The experiment was laid out in Randomized Block design (RBD) with three replications.

Fig. 1. Morphology of *Gladiolus grandiflorus*

2.2 Experimental Details

The trail was laid out in a randomized block design with twenty two varieties replicated thrice. Spacing 1m*1m. Twenty two different varieties used are Souvik Biscuits, Dhanvan Lari, Manhittan, P.B. Clown, Arka Naveen, Jester, Punjab Lemon Delight, Urmi, Arka Partham, Priscilla, Red Ginger, Arka Tilak, Phule Ganesh, Aly Anyque, Chandni, Yellow Stone, Punjab Flame, Pusa Suhagin, Arka Aayush, P.S Hybrid, Phule Neelrekha, Punab Bink Chalnu.

2.3 Statistical Analysis

The data was recorded on the above characters subjected to following statistical analysis.

2.4 Analysis of Variance

The data obtained from each environment will be subjected to analysis of variance as per the procedures outlined by Sukatme & Amble (1989). The pooled analysis of variance will be based on the following model of Sprague & Federar (1951).

a. Genotypic and Phenotypic:

Genotypic and phenotypic variance for individual environments was obtained with the help of following formula:

Genotypic Variance = Genotypic M.S – Error / No of M.S replication

Phenotypic Variance = Genotypic Variance + Error M.S

b. Coefficient of variance

The coefficient of variance will be cal. By Burton & Devane (1953) formula phenotypic coefficient of variance (PCV)

PCV% = Phenotypic S.d x 100 / General Mean

GCV % = Genotypic S,d x 100 / Grand Mean

c. Heritability in broad sense (%h^2)

Heritability will be calculated according to the formula suggested by Allard (1960).

$$H = \% \, h^2 \sigma^{2g} / \sigma^{2p}$$

Where,

H= Heritability Coefficient (in broad sense)

^{2g} = Genotypic Coefficient of variance

^{2p} = Phenotypic Coefficient of variance

d. Genetic advance

The expected genetic advance will be cal. by Allard's formula – 1960

$$GA = (k)\ (\sigma p)\ (H)$$

e. Genetic advance as percentage

The range of genetic advance as per cent of mean is classified as suggested by Johnson et al. (1955).

Genetic Adv. as % of mean = Genetic Advance / General Mean x 100

Table 1. Treatments details

S. No.	Notation	Genotypes	Source
1.	V1	SOUVIK BISCUITS	DFR, Pune
2.	V2	DHANVAN LARI	DFR, Pune
3.	V3	MANHITTAN	DFR, Pune
4.	V4	P.B. CLOWN	DFR, Pune
5.	V5	ARKA NAVEEN	DFR, Pune
6.	V6	JESTER	DFR, Pune
7.	V7	PUNJAB LEMON DELIGHT	DFR, Pune
8.	V8	URMI	DFR, Pune
9.	V9	ARKA PARTHAM	DFR, Pune
10.	V10	PRISCILLA	DFR, Pune
11.	V11	RED GINGER	DFR, Pune
12.	V12	ARKA TILAK	DFR, Pune
13.	V13	PHULE GANESH	DFR, Pune
14.	V14	ALY ANYQUE	DFR, Pune
15.	V15	CHANDNI	DFR, Pune
16.	V16	YELLOW STONE	DFR, Pune
17.	V17	PUNJAB FLAME	DFR, Pune
18.	V18	PUSA SUHAGIN	DFR, Pune
19.	V19	ARKA AAYUSH	DFR, Pune
20.	V20	P.S HYBRID	DFR, Pune
21.	V21	PHULE NEELREKHA	DFR, Pune
22.	V22	PUNAB BINK CHALNU	DFR, Pune

Table 2. Skeleton ANNOVA

Source of Variation	D.F	M.S.	E.M.S	F. Value
Replication with in environment	N(r-1)	M_1		
Environment (E)	(n-1)	M_2	$\sigma^2\varepsilon + \rho\sigma^2\gamma\varepsilon + \rho\gamma\sigma^2\varepsilon$	M_2/M_4
Genotype(g)	(g-1)(n-1)	M_3	$\sigma^2\varepsilon + \rho\,\sigma^2\gamma\varepsilon + \mu\sigma^2\,\gamma$	M_3/M_4
G x E	(g-1)(n-1)	M_4	$\sigma^2\varepsilon + \rho\sigma^2\gamma\varepsilon$	M^4/M_5
Pooled error	n(r-1)(g-1)	M_5	$\sigma^2\varepsilon$	

2.5 Correlation Coefficient Analysis

The correlation coefficients among all possible character combinations at phenotypic (rp) and genotypic (rg) level were estimated employing formula by Johnson et al. (1955).

$$\text{Genotypic correlation (G)} = \frac{\text{Cov}_{xy}\,(G)}{\sqrt{\text{Vx(G)xVy(G)}}}$$

$$\text{Phenotypic correlstion (P)} = \frac{\text{Cov}_{xy}\,(P)}{\sqrt{\text{Vx(P)xVy(P)}}}$$

Where,

Cov_{xy} (G) = Genotypic coefficient of variance between x and y

Cov_{xy}(P) = Phenotypic coefficient of variance between x and y

V_x(G) = Genotypic variance of character x

V_x(P) = Phenotypic variance of character x

V_y(G) = Genotypic variance of character y

V_y(P) = Phenotypic variance of character.

3. RESULTS AND DISCUSSION

Analysis of variance showed significant ($p < 0.01$) differences among the genotypes for the

22 characters studied except for days taken to emergence of flower spike and days taken to show color of basal floret. In other words, the performance of the genotypes with respect to these characters was statistically different, suggesting scope for growth, flowering and corm yield characters improvement in Gladiolus. The present investigation confirms the earlier finding Ahmad et al. (2012), Bhujbal et al. (2013) and Ramzan et al. (2016).

3.1 Genotypic Coefficient of Variation (GCV)

The estimates of GCV from present investigation are presented in Table 4. Wide range of genotypic coefficient of variation (GCV) was observed for the characters ranging from No.of leaves at 30DAS (52.70) to days to show color of basal florets (4.32). Similar results were obtained from Geeta et al [44-46] Karuppaiah and Senthil [47] reported the correlation analysis which indicated that the flower yield per plant was found to be significantly and positively correlated with number of branches per plant, flower size, flower weight, number of flowers per plant and xanthophylls content. Days to first flowering showed a negative association with flower yield per plant.

High magnitude of GCV are recorded in No.of leaves (52.70), Corm yield/plant (46.41), No.of cormels/hectare (39.15), Cormel diameter (38.35), No.of corms/hectare(28.95), No.of corms per plant(28.95),No.of leaves at 60DAS(26.65), No.of shoot(26.65).

3.2 Phenotypic Coefficient Variation (PCV)

Wide range of phenotypic coefficient of variation (PCV) was observed for the characters ranging from No.of leaves at 30DAS (52.92) to days to show color of basal floret(5.79) [48] studied the correlation analysis which was carried out among 22 diverse varieties of gladiolus for 20 characters related to growth and flowering. It showed positively significant association with plant height, which ultimately increases the rachis length, thereby increasing the value of the genotype. Vinutha *et al.* (2023) reported that the magnitude of phenotypic coefficient of variation (PCV) was higher than genotypic coefficient of variation (GCV). The highest GCV and PCV was observed for number of spikes per plant (38.06), numbers of corm per clump (33.48), days for first to last floret opening (29.88) and vase life of flower (29.63). Among the traits studied the highest heritability estimates was recorded in spike length (99.95%), plant height (99.86%) and days for first floret opening (99.77%).

3.2.1 Heritability

The estimates of heritability from present investigation are presented in Table 4. The higher heritability in broad sense is observed for the characters in Corms yield/ plant (99.10), No.of leaves 30das (99.21), Plant height at 60DAS (87.17), Floret length (83.21), No. of cormels/ hectare(99.10), Cormels diameter(97.90), No.of corms/plant(96), No.of shoot per plant(96.30), No.of leaves 60DAS(97.90), No.of spikes per plant(96.95), Weight of corm(93.06), No.of florets per spike(91.17), Plant height at 30DAS (89.89), Floret diameter (87.32), No.of leaves(88.41), Corm diameter (97.90), Days to first flowering (96.18), Rachis length (95.11).

3.2.2 Genetic advance

In the present investigation, the genetic advance estimates are found to be high in No.of cormels/hectare (3208828), No.of corms/hectare (164829). Kispotta [4] reported out of these ten cultivars, genetic variability, heritability, phenotypic coefficient of variation (PCV) was higher than the genotypic coefficient of variation (GCV) and genetic correlation for the characters *viz.,* plant height at (30, 60, 90 DAS), number of leaves per plant at (30,60,90 DAS), no. of shoots per plant, days taken for corm sprouting, rachis length, days taken to spike emergence, days taken colour break stage, no. of floret per spike, no. of spike per plant, no. of days taken for first basal open, no. of days taken for last floret open, spike length, floret diameter, weight of daughter corm, weight of mother corm, corm diameter, corm weight, no. of corm per hectare, and corm yield/ plant were observed. for all characters, the highest GCV and PCV were recorded for the characters *viz.,* weight of daughter corm (g) (33.6786 and 47.569), number of leaves per plant at 30 DAS (25.70 and 37.81), number of leaves per plant at harvest (24.73 and 35.25), number of shoots per plant (25.47 and 31.19), weight of mother corm (25.18 and 33.90), corm weight (25.11 and 33.38), days taken for corm sprouting (23.7566 and 23.7566) and the lowest GCV and PCV were recorded for floret diameter (17.50 and 40.95).

Table 3. Analysis of variance for 23 different growth, flowering and corm yield of Gladiolus

S.No.	Characters	Analysis of Variance			
		Replication df=2	Genotypes df=14	Error df=28	Total=44
1.	Plant height (cm) 30DAS	0.21	107.15**	4.12	36.73
2.	Plant height (cm) 60DAS	20.21	174.91	7.74	61.50
3.	Plant height (cm) 90DAS	17.08	172.41**	18.65	67.50
4.	No. of leaves per plant at 30DAS	0.07	41.35**	0.11	13.23
5.	No. of leaves per plant at 60DAS	0.04	23.20**	0.21	7.52
6.	No. of leaves per plant at 90DAS	0.62	14.12**	0.60	4.90
7.	No. of shoots per plant	0.001	0.500**	0.004	0.161
8.	Days taken for 50% sprouting	0.001	1.390**	0.065	0.484
9.	Rachis length(cm)	17.57	347.64**	4.63	114.36
10.	No. of days to emergence of flower spike	14.36	65.00**	9.06	27.10
11.	Days to show colour of basal floret	10.69	53.38**	10.98	24.46
12.	No. of florets per spike	0.42	8.51**	0.29	2.91
13.	No. of spikes per plant	0.000	0.467**	0.005	0.152
14.	Floret length(cm)	0.043	2.689**	0.173	0.968
15.	Floret diameter(cm)	0.319	2.991**	0.127	1.047
16.	No. of corms produced per mother plant	0.000	0.713**	0.005	0.230
17.	Corm diameter(cm)	0.01	0.341**	0.073	
18.	Weight of corms(g)	0.034	2.958**	0.036	0.966
19.	Weight of corms per plant(gm)	0.56	179.86**	4.37	60.03
20.	Cormel diameter(cm)	0.00	1.01**	0.00	0.33
21.	No. of corms/hectare	20843542	19793699048**	149260589	6393926597
22.	No. of cormels/hectare	56581729239	7389188389789**	27749460061	2371336040846
23.	Yield of corms/plant(g)	13.91	3932.11**	11.90	1259.33

Table 4. Estimation of components of variance and genetic parameters for 23 character growth, flowering and corm yield of 15 genotypes in Gladiolus

Characters	Mean	Min	Man	var (g)	var (p)	Heritability (%)	GA	GA% mean	GCV (%)	PCV (%)
Plant height cm (30 days)	47.94	40.05	61.32	34.31	38.43	89.28	11.40	23.31	12.01	12.71
Plant height cm (60 days)	72.17	58.90	93.17	55.71	63.49	87.17	14.40	19.68	10.21	10.88
Plant height cm (90 days)	106.54	88.20	118.65	51.29	69.92	73.32	12.62	12.09	6.86	8.01
No.of leaves (30 das)	7.20	2.15	12.09	13.74	13.87	99.21	7.60	108.12	52.71	52.91
No.of leaves (60 das)	10.10	6.17	14.41	7.65	7.82	97.09	5.24	54.16	26.65	27.01
No.of leaves (90 das)	18.08	14.50	21.85	4.57	5.10	88.41	4.00	22.7	11.74	12.45
No. of shoot per plant	1.52	1.10	2.21	0.11	0.15	96.30	0.89	54.62	26.65	26.96
Days taken for 50% sprouting	6.16	5.50	7.00	0.47	0.58	87.10	1.29	20.75	10.70	11.46
Days to first flowering	12.59	8.73	18.50	6.57	6.85	96.18	5.20	38.75	18.84	19.21
Rachis length (cm)	62.02	47.99	80.11	114.35	118.94	95.11	21.62	33.72	16.74	17.01
No. of days for emergence of flower spike	76.91	66.47	83.29	18.69	27.77	67.29	7.65	9.39	5.56	6.78
Days to show colour of basal floret	89.57	79.32	92.25	14.12	25.15	56.29	5.88	6.78	4.32	5.78
No. of florets per spike	14.65	11.78	17.60	2.75	3.01	91.17	3.25	22.76	11.65	12.21
No.of spikes per plant	1.62	1.87	2.14	0.17	0.11	96.95	0.87	53.70	26.41	26.88
Floret length	12.24	8.93	11.88	0.82	1.05	83.20	1.75	16.79	8.90	9.82
Floret diameter	9.50	8.07	10.96	0.91	1.01	87.32	1.85	20.21	10.32	11.01
No. of corms per plant	1.86	1.04	2.52	0.23	0.22	96	01	59.08	28.95	29.30
Corm diamter (cm)	5.82	3.43	6.45	0.98	1.07	95.91	2.10	37.96	18.66	18.96
Weight of corm(gm)	45.60	34.30	60.11	58.51	62.85	93.65	15.30	34.20	17.24	17.85
Cormel diameter(cm)	1.20	0.41	2.47	0.35	0.36	97.90	1.20	78.48	38.35	38.66
No. of corms / hectare	279339	174998	434994	65481461 52	66974067 40	98	164829	59.09	28.95	29.38
No.of cormels /hectare	4004537	1856311	7147009	24538129 76575	24815624 36630	99.10	3208828	80.16	39.15	39.38
Corms yield/plant(g)	78.10	35.49	156.61	1308	1320	99.10	74.15	95.16	46.41	46.62

Table 5. Estimates of genotypic correlation coefficient for 23 Growth characters, Spike yield and vase life with Corms yield/plant (g)

Character	Plant Height cm (30 days)	Plant Height cm (60 days)	Plant Height cm (90 days)	Number of Leaves (30 das)	Number of Leaves (60 das)	Number of Leaves (90 das)	No. of Shoot Per Plant	Days Taken for 50% Sprouting	Days to First Flowering	Rachis Length (cm)	No. Of days for Emergence of Flower Spike	days to show Colour of Basal Floret	No. Of Florets Per Spike	Number of Spikes Per Plant	Floret Length	Floret Diamter	No. of Corms Per plant	Corm Diamter cm	Weight of Corm (gm)	Cormel Diameter (cm)	No. Of corms / hectare	Number of cormels /hectare	Corms yield/plant (g)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Plant height cm (30 days)	1.000	0.548**	0.497**	0.176	0.152	0.204	0.174	-0.214	0.278	0.219	-0.312*	-0.687**	0.379*	0.126	0.177	0.239	0.031	0.157	0.000	0.187	0.012	0.023	0.002
Plant height cm (60 days)			0.821**	0.143	0.174	0.201	0.136	-0.193	0.156	0.066	-0.298*	-0.235	0.376*	0.127	0.277	0.303*	0.002	0.146	-0.026	0.324*	0.020	-0.044	-0.003
Plant height cm (90 days)				-0.032	0.039	0.075	-0.005	-0.035	0.120	0.050	-0.076	-0.273	0.357*	-0.045	0.033	0.048	-0.212	-0.153	-0.234	0.334*	-0.227	-0.239	-0.212
Number of leaves (30 das)					0.994**	0.998**	0.967**	-0.906**	0.932**	0.937**	-0.676**	-0.719**	0.691**	0.960**	0.975**	0.977**	0.913**	0.734**	0.899**	-0.001	0.917**	0.881**	0.897**
Number of leaves (60 das)						0.925**	0.982**	-0.935**	0.952**	0.953**	-0.731**	-0.713**	0.754**	0.977**	0.992**	0.964**	0.907**	0.677**	0.883**	-0.016	0.902**	0.868**	0.893**
Number of leaves (90 das)							0.991**	-0.951**	0.989**	0.969**	-0.716**	-0.789**	0.748**	0.966**	0.971**	1.000**	0.852**	0.675**	0.833**	0.029	0.862**	0.826**	0.852**
No. of shoot per plant								-0.934**	0.956**	0.956**	-0.765**	-0.713**	0.771**	1.006**	0.988**	0.958**	0.930**	0.689**	0.891**	0.051	0.931**	0.900**	0.918**
Days taken for 50% sprouting									-0.906**	-0.863**	0.652**	0.660**	-0.833**	-0.934**	-0.978**	-0.950**	-0.881**	-0.669**	-0.834**	0.015	-0.887**	-0.855**	-0.865**
Days to first flowering										0.967**	-0.838**	-0.778**	0.773**	0.949**	0.917**	0.945**	0.859**	0.687**	0.847**	0.068	0.863**	0.837**	0.854**
Rachis length (cm)											-0.781**	-0.806**	0.656**	0.967**	0.893**	0.867**	0.865**	0.608**	0.848**	-0.029	0.859**	0.831**	0.860**
No. Of days for emergence of flower spike												0.755**	-0.766**	-0.761**	-0.688**	-0.744**	-0.646**	-0.391**	-0.617**	0.042	-0.628**	-0.685**	-0.654**
days to show colour of basal floret													-0.641**	-0.735**	-0.716**	-0.670**	-0.633**	-0.429**	-0.633**	0.232	-0.627**	-0.603**	-0.649**
No. Of florets per spike														0.760**	0.815**	0.822**	0.651**	0.484**	0.574**	0.300*	0.649**	0.656**	0.638**
Number of spikes per plant															0.993**	0.936**	0.933**	0.674**	0.878**	0.016	0.928**	0.913**	0.923**
Floret length																0.912**	0.968**	0.777**	0.941**	-0.028	0.966**	0.929**	0.950**
Floret diameter																	0.911**	0.816**	0.883**	0.135	0.899**	0.884**	0.872**
No. of corms per plant																		0.855**	0.994**	-0.136	1.008**	0.996**	0.998**
Corm diamter cm																			0.877**	0.019	0.856**	0.841**	0.819**
Weight of corm(gm)																				-0.234	0.992**	0.991**	0.994**
Cormel diameter(cm)																					-0.135	-0.109	-0.206
No. Of corms / hectare																						0.981**	0.995**
Number of cormels /hectare																							0.990**
Corms yield/plant(g)																							1.000

Table 6. Estimates of Phenotypic correlation coefficient for 23 Growth characters, Spike yield and vase life with Corms yield/plant

Character	Plant Height cm (30 days)	Plant Height cm (60 days)	Plant Height cm (90 days)	Number of Leaves (30 das)	Number of Leaves (60 das)	Number of Leaves (90 das)	No. of Shoot Per Plant	Days Taken for 50% Sproutin g	Days to First Flowering	Rachis Length (cm)	No. Of Days for Emergence of Flower Spike	Days to Show Colour of Basal Floret	No. Of Florets Per Spike	Number of Spikes Per Plant	Floret Length	Floret Diamter	No. of Corms Per Plant	Corm Diamter cm	Weight of Corm (gm)	Cormel Diameter (cm)	No. Of Corms / Hectare	Number of Cormels /Hectare	Corms Yield/Plant (g)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Plant height cm (30 days)	1.000	0.548**	0.497**	0.176	0.152	0.204	0.174	-0.214	0.278	0.219	-0.312*	-0.687**	0.379*	0.126	0.177	0.239	0.031	0.157	0.000	0.187	0.012	0.023	0.002
Plant height cm (60 days)			0.821**	0.143	0.174	0.201	0.136	-0.193	0.156	0.066	-0.298*	-0.235	0.376*	0.127	0.277	0.303*	0.002	0.146	-0.026	0.324*	0.020	-0.044	-0.003
Plant height cm (90 days)				-0.032	0.039	0.075	-0.005	-0.035	0.120	0.050	-0.076	-0.273	0.357*	-0.045	0.033	0.048	-0.212	-0.153	-0.234	0.334*	-0.227	-0.239	-0.212
Number of leaves (30 das)					0.994**	0.998**	0.967**	-0.906**	0.932**	0.937**	-0.676**	-0.719**	0.691**	0.960**	0.975**	0.977**	0.913**	0.734**	0.899**	-0.001	0.917**	0.881**	0.897**
Number of leaves (60 das)						0.925**	0.982**	-0.935**	0.952**	0.953**	-0.731**	-0.713**	0.754**	0.977**	0.992**	0.964**	0.907**	0.677**	0.883**	-0.016	0.902**	0.868**	0.893**
Number of leaves (90 das)							0.991**	-0.951**	0.989**	0.969**	-0.716**	-0.789**	0.748**	0.966**	0.971**	1.000**	0.852**	0.675**	0.833**	0.029	0.862**	0.826**	0.852**
No. of shoot per plant								-0.934**	0.956**	0.956**	-0.765**	-0.713**	0.771**	1.006**	0.988**	0.958**	0.930**	0.689**	0.891**	0.051	0.931**	0.900**	0.918**
Days taken for 50% sprouting									-0.906**	-0.863**	0.652**	0.660**	-0.833**	-0.934**	-0.978**	-0.950**	-0.881**	-0.669**	-0.834**	0.015	-0.887**	-0.855**	-0.865**
Days to first flowering										0.967**	-0.838**	-0.778**	0.773**	0.949**	0.917**	0.945**	0.859**	0.687**	0.847**	0.068	0.863**	0.837**	0.854**
Rachis length (cm)											-0.781**	-0.806**	0.656**	0.967**	0.893**	0.867**	0.865**	0.608**	0.848**	-0.029	0.859**	0.831**	0.860**
No. Of days for emergence of flower spike												0.755**	-0.766**	-0.761**	-0.688**	-0.744**	-0.646**	-0.391**	-0.617**	0.042	-0.628**	-0.685**	-0.654**
days to show colour of basal floret													-0.641**	-0.735**	-0.716**	-0.670**	-0.633**	-0.429**	-0.633**	0.232	-0.627**	-0.603**	-0.649**
No. Of florets per spike														0.760**	0.815**	0.822**	0.651**	0.484**	0.574**	0.300*	0.649**	0.656**	0.638**
Number of spikes per plant															0.993**	0.936**	0.933**	0.674**	0.878**	0.016	0.928**	0.913**	0.923**
Floret length																0.912**	0.968**	0.777**	0.941**	-0.028	0.966**	0.929**	0.950**
Floret diameter																	0.911**	0.816**	0.883**	0.135	0.899**	0.884**	0.872**
No. of corms per plant																		0.855**	0.994**	-0.136	1.008**	0.996**	0.998**
Corm diamter cm																			0.877**	0.019	0.856**	0.841**	0.819**
Weight of corm(gm)																				-0.234	0.992**	0.991**	0.994**
Cormel diameter(cm)																					-0.135	-0.109	-0.206
No. Of corms / hectare																						0.981**	0.995**
Number of cormels /hectare																							0.990**
Corms yield/plant(g)																							1.000

4. CONCLUSION

The analysis of variance for different quantitative characters reviled significant differences among the genotypes for parameters like Growth, and floret diameter with Corms weight/plant (g) of gladiolus. The highest corms yield/plant (g/plant) of genotype was observed in Arka Aayush (156.60) followed by P.B Clown and Red Ginger. It was observed that PCV was higher than GCV for all the traits studied highest GCV and PCV is recorded in No.of corms per plant (46.41 and 46.62). Genotypic and phenotypic correlation coefficient analysis revealed that Corms weight/plant (g) showed positive significant association with plant height, no.of leaves per plant, no.of shoot per plant, rachis length (cm), no. of floret per spike, no. of spike per plant, floret diameter (cm), corm weight per plot (g), weight of mother corm per plot, weight of daughter corm, corm diameter (cm), no. of corm per hectare, no.of cormels per hectare and corm yield/plant at both levels genotypic and phenotypic. Revealed that the highest direct positive effect on Corm Yield/Plant was exhibited by No.of leaves per plant, No.of shoots per plant, rachis length (cm), days for colour of basal floret, no of floret per spike, no. of spike per plant, corm weight per plot (g), weight of mother corm per plot, and no. of corm per hectare at both levels of genotypic and phenotypic.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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