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Corm and Cormlets characterization of Novel Hybrids of Gladiolus (*Gladiolus hybrida*) in off-Season

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Abstract— *The present study was conducted during 2024-25 at the Horticulture Farm, Rajasthan College of Agriculture, MPUAT, Udaipur, to evaluate the performance of nine novel gladiolus hybrids under off-season conditions. The study aimed to assess their corm production traits to identify superior genotypes suitable for off-season cultivation. Significant variation was observed among the hybrids for all studied parameters. Hybrid H_5 ♀ GS-2 × ♂ Arka Amar recorded highest corm diameter (3.94 cm), corm weight (23.60 g), final corm weight (23.60g) While H_6 ♀ Gunjan × ♂ Dhanvantari recorded highest corm / plant (1.87) and cormlets / plant (5.93). Furthermore, hybrids H_5 ♀ GS-2 × ♂ Arka Amar and H_8 ♀ GS-2 × ♂ Pricella demonstrated promising results for corm diameter and weight indicating potential for commercial multiplication.*

Keywords— ***Gladiolus, corms, hybrids, traits, cormlets***.

I. INTRODUCTION

Gladiolus (*Gladiolus hybrida*) commonly known as sword lily belongs to Iridaceae family. It is indigenous to South Africa and the area around the Jambisi River in the Cape. It is a fragile perennial herbaceous plant which is grown from seeds and corms for commercial use. Most South African species have a basic chromosomal number (X = 15) and are diploid (2n = 30). Gladiolus is a very appealing plant because of its enormous, colorful florets, bright hues, and long-lasting spikes. It is a popular option for herbaceous borders, beds, rock gardens, pots, and as a cut flower due to its produces lovely the inflorescence in a variety of hues. After roses, carnations, and chrysanthemums, gladiolus comes in at the fourth position in the global cut flower trade (Ahmad *et al*., 2008). The United States, Netherlands, Italy, France, Poland, Bulgaria, Brazil, Australia, and Israel are among the major gladiolus-producing countries.

II. MATERIAL METHOD

At the Shed Net House Horticulture Farm, Rajasthan College of Agriculture, MPUAT, Udaipur, Rajasthan, a field experiment was conducted. The experiment was carried out in 0.58 x 0.39 m^2 plastic crates with six corms / plastic crate. The experimental design was laid completely randomized design (CRD) with 9 treatments and 3 replications. Th experimental unit situated at 24° 57' N latitude and 73° 70' E longitudes at an elevation of 573.8 meters above mean sea level. The region falls under agro-climatic Zone IV A (Sub-humid Southern Plain and Aravali

Hills) of Rajasthan. The temperature ranges from 22.7°C to 34.7°C and relative humidity was maintained between 60 to 90 (per cent). To conduct this experiment On August 13, 2024, the uniformly sized corms of the 9 novel hybrids were chosen and immersed in a solution of GA_3@200 ppm for a whole day, to break the corms dormancy and kept in shade for 2 hours. The nine novel hybrids treated 6corm of gladiolus were planted in media Soil: Sand: Vermicompost (2:1:1v/v) at a depth of 3-5cm in plastic crates on 14 Aug 2024 in shed net house. Further, the observation was recorded from five randomly selected corms of each replication to assess the Corm and cormlets traits: Corms / plant, Corm diameter (cm), Polar diameter (cm), Cormlets / plant, Cormlets diameter (cm), Initial weight of corm (g), Final corm weight (g), Propagation coefficient (%).

Treatment details

S. No	Treatments	Treatment details
1.	**H_1**	♀ Punjab Beauty ×♂ Friendship
2.	**H_2**	♀ Pusa Shubham ×♂ Arka Pratham
3.	**H_3**	♀ Punjab Beauty × ♂ Praha
4.	**H_4**	♀ Gunjan × ♂ Arka Pratham
5.	**H_5**	♀ GS-2 × ♂ Arka Amar
6.	**H_6**	♀ Gunjan × ♂ Dhanvantari
7.	**H_7**	♀ Punjab Beauty × ♂ Punjab Glad2
8.	**H_8**	♀ GS-2 × ♂ Pricella
9.	**H_9**	♀ Mohini × ♂ GS-2

2.1 Statistical Analysis

The data statistically analyzed by using Completely Randomized Design (CRD) with three replications. The level of significance was noticed at P = 0.05% to determine the significant difference ((Cochran and Cox, 1950).

III. RESULTS AND DISCUSSION

Corms and Cormlets traits

3.1 Corms per plant

The observations recorded Corms per plant as presented in Table 3.1. The maximum number of corms plant^{-1} was observed at hybrid H_6 -♀ Gunjan × ♂ Dhanvantari (1.87) followed by H_4 - ♀ Gunjan × ♂ Arka Pratham (1.47) and H_1 - ♀ Punjab Beauty × ♂ Friendship while the minimum corm/plant was recorded at H_7 -♀ Punjab Beauty × ♂ Punjab Glad2 (1.13) respectively. However, the corm per plant among the hybrids H_1 - ♀ Punjab Beauty ×♂ Friendship, H_4 - ♀ Gunjan × ♂ Arka Pratham were statistically at par with H_3 -♀ Punjab Beauty × ♂ Praha and H_4 - ♀ Gunjan × ♂ Arka Pratham. Similar results were shown by Swaroop (2010) in American beauty (3.33), Poon *et al*. (2010) and Kumar *et al.* (2011) where number of corms, with greater weight and size were observed. These values reflect efficient energy partitioning and robust below-ground development, essential for sustainable cultivar production.

3.2 Corm diameter (cm)

The observations recorded Corm diameter (cm) as presented in Table 3.1. The highest corm diameter was recorded at hybrid H_5- ♀ GS-2 × ♂ Arka Amar (3.94 cm) followed by H_3 - ♀ Punjab Beauty × ♂ Praha (3.76 cm) and H_8 - ♀ GS-2 × ♂ Pricella (3.73 cm) respectively. The lowest corm diameter was observed at hybrid H_2 -♀ Pusa Shubham ×♂ Arka Pratham (2.70 cm). Similar results were observed by Kujur *et al*. (2016) for corm diameter (6.68 cm) was recorded in cv. Candyman and size. The accumulation of photosynthesis in this hybrid indicates effective assimilate mobilization from leaves as source and sink as stems into underground modified stem.

3.3 Polar diameter (cm)

The observations recorded Polar diameter (cm) as presented in Table 3.1. The largest polar diameter was recorded at hybrid H_3 -♀ Punjab Beauty × ♂ Praha (2.67 cm) followed by H_5- ♀ GS-2 × ♂ Arka Amar (2.55 cm) and H_6 -♀ Gunjan × ♂ Dhanvantari (2.34cm) respectively. The smallest polar diameter was observed at hybrid H_1- ♀ Punjab Beauty ×♂ Friendship (1.92 cm). According to Azimi *et al*. (2020), Kirtimala *et al.* (2011) observed the maximum corm diameter in Genotype Melody.

3.4 Cormlets / plant

The observations recorded Cormlets per plant as presented in Table 3.1. The hybrid H_6 -♀ Gunjan × ♂ Dhanvantari recorded the maximum number of cormlets plants^{-1} (5.93) followed by H_9 - ♀ Mohini × ♂ GS-2(5.27), H_7 -♀ Punjab Beauty × ♂ Punjab Glad-2 (5.13), H_8 - ♀ GS-2 × ♂ Pricella (5.13) while the minimum cormlets were recorded at H_5 - ♀ GS-2 × ♂ Arka Amar (3.80). However, hybrid H_7 -♀ Punjab Beauty × ♂ Punjab Glad-2 (5.13), H_8 - ♀ GS-2 × ♂ Pricella (5.13) were statistically at par with H_9 - ♀ Mohini × ♂ GS-2 (5.27) for cormlets produced plants^{-1}. According to Priyanka *et al*. (2023), Nalage *et al*. (2019) observed the maximum no. of cormlets per plants (138.87) were noticed in variety Phule Tejas.'Phule Prerana'.

3.5 Cormlets diameter

The observations recorded Cormlets diameter as presented in Table 3.2 and Fig.3.1. Cormlets diameter was highest at

gladiolus hybrid H_3-♀ Punjab Beauty × ♂ Praha (1.55 cm) followed by H_6 -♀ Gunjan × ♂ Dhanvantari (1.34cm), H_1 - ♀ Punjab Beauty ×♂ Friendship (1.20cm), while the lowest cormlets diameter was recorded at H_9 - ♀ Mohini × ♂ GS-2 (0.81cm), respectively. Similar results observed by Dhakal *et al*. (2021) for cormlets diameter.

3.6 Initial corm weight (g)

The observations recorded Initial weight of corm per plant as presented in Table 3.2. and Fig.3.1.The highest initial weight of corm plant^{-1} was recorded at hybrids H_5 - ♀ GS-2 × ♂ Arka Amar (19.07 g) followed by H_8 - ♀ GS-2 × ♂ Pricella (18.07 g), H_4 - ♀ Gunjan × ♂ Arka Pratham (17.00g). However, the minimum initial weight corm plant^{-1} was recorded at H_2 - ♀ Pusa Shubham ×♂ Arka Pratham (13.47 g). According to Hossain *et al.* (2012) observed highest weight of corms and size.

3.7 Final corm weight (g)

The observations recorded Final corm weight as presented in Table 3.2. and Fig 3.1.The hybrid H_5 - ♀ GS-2 × ♂ Arka Amar recorded the highest corm weight (23.60 g) followed by H_8 - ♀ GS-2 × ♂ Pricella (22.93g), H_4 - ♀ Gunjan × ♂ Arka Pratham (20.80g) while the lowest final corm weight was observed at H_2 -♀ Pusa Shubham ×♂ Arka Pratham (17.80 g) respectively. However, significant final corm weight among the hybrids H_4 - ♀ Gunjan × ♂ Arka Pratham (20.80g), H_7 -♀ Punjab Beauty × ♂ Punjab Glad-2 (20.47g), H_9 - ♀ Mohini × ♂ GS-(20.27g) were statistically at par with hybrid H_5 - ♀ GS-2 × ♂ Arka Amar, respectively. The accumulation of photosynthesis in this hybrid indicates effective assimilate mobilization from leaves as source and sink as stems into underground modified stem. Sankari *et al*. (2012) observed highest weight of corms and size. This might be due to reason that no. of leaves was highest which resulted in the production of more photosynthates in the plant with transfer towards the roots.

3.8. Propagation coefficient (%)

The observations recorded Propagation coefficient as presented in Table 3.2.and Fig 3.1 The highest propagation coefficient was observed at hybrid H_3- ♀ Punjab Beauty × ♂ Praha (42.64%) followed H_9- ♀ Mohini × ♂ GS-2 (38.40%), H_2- ♀ Pusa Shubham ×♂ Arka Pratham (32.87%), H_7- ♀ Punjab Beauty × ♂ Punjab Glad-2 (32.85%), respectively. However, lowest propagation coefficient was recorded at H_4- ♀ Gunjan × ♂ Arka Pratham (22.54%).), Patel *et al*. (2022) emphasized that genotypic makeup plays a vital role in determining propagation traits and overall reproductive efficiency in gladiolus. Suggesting high reproductive efficiency and adaptability. These features are vital for breeders focusing on fast propagation and commercial scaling.

IV. CONCLUSION

It was concluded that the gladiolus hybrid H_5 - ♀ GS-2 × ♂ Arka Amar had the highest corm diameter (3.94cm), corm weight (23.60gm). The corm per plant (1.87), cormlets/ plant (5.93) recorded at hybrid H_6- ♀ Gunjan × ♂ Dhanvantari while the lowest corm/plant (1.20) and minimum corm weight (17.80g) were observed in hybrid H_2- ♀ Pusa Shubham ×♂ Arka Pratham, respectively. Hybrid H_3 ♀ Punjab Beauty × ♂ Praha observed highest cormlets diameter (1.55 cm) and polar diameter (2.67 cm) while the highest propagation coefficient was observed at hybrid H_3- ♀ Punjab Beauty × ♂ Praha (42.64%), respectively. Under off-season protected culture, the discovered elite hybrids H_5, H_6, H_3 exhibited superior adaptability for corm production potential. These hybrids offer valuable genetic resources for enhancing gladiolus year-round availability, propagation efficiency and future breeding programs.

Table. 3.1. Novel hybrids of Gladiolus hybrida influence on corms and cormlets traits under shed net house in off-season.

Hybrids	Corms per plant	Corms diameter (cm)	Polar diameter (cm)	Cormlets per plant
H_1- ♀ Punjab Beauty ×♂ Friendship	1.40	3.35	1.92	4.27
H_2- ♀ Pusa Shubham ×♂ Arka Pratham	1.20	2.70	2.12	4.07
H_3- ♀ Punjab Beauty × ♂ Praha	1.33	3.76	2.67	4.80
H_4- ♀ Gunjan × ♂ Arka Pratham	1.47	3.43	2.16	4.33
H_5- ♀ GS-2 × ♂ Arka Amar	1.40	3.94	2.55	3.80
H_6- ♀ Gunjan × ♂ Dhanvantari	1.87	3.61	2.34	5.93
H_7- ♀ Punjab Beauty × ♂ Punjab Glad-2	1.13	3.52	2.21	5.13
H_8- ♀ GS-2 × ♂ Pricella	1.20	3.73	2.12	5.13
H_9- ♀ Mohini × ♂ GS-2	1.33	3.53	2.15	5.27

SEM (±)	0.04	0.09	0.06	0.13
CD (P=0.05)	0.11	0.28	0.18	0.38
CV (%)	4.66	4.62	4.63	4.61

Table. 3.2. Novel hybrids of Gladiolus hybrida influence on corms and cormlets traits under shed net house in off-season.

Hybrids	Cormlets diameter (cm)	Final corm weight(g)	Initial corm weight (g)	Propagation coefficient (%)
H_1- ♀ Punjab Beauty ×♂ Friendship	1.20	18.47	14.67	25.94
H_2- ♀ Pusa Shubham ×♂ Arka Pratham	0.97	17.80	13.47	32.87
H_3- ♀ Punjab Beauty × ♂ Praha	1.55	19.87	13.93	42.64
H_4- ♀ Gunjan × ♂ Arka Pratham	0.97	20.80	17.00	22.54
H_5- ♀ GS-2 × ♂ Arka Amar	1.07	23.60	19.07	24.33
H_6- ♀ Gunjan × ♂ Dhanvantari	1.34	19.20	15.13	26.92
H_7- ♀ Punjab Beauty × ♂ Punjab Glad-2	1.13	20.47	15.40	32.85
H_8- ♀ GS-2 × ♂ Pricella	0.95	22.93	18.07	26.83
H_9- ♀ Mohini × ♂ GS-2	0.81	20.27	14.67	38.40
SEM (±)	0.05	0.89	0.53	0.55
CD (P=0.05)	0.15	2.66	1.58	1.64
CV (%)	7.69	7.56	5.83	3.15

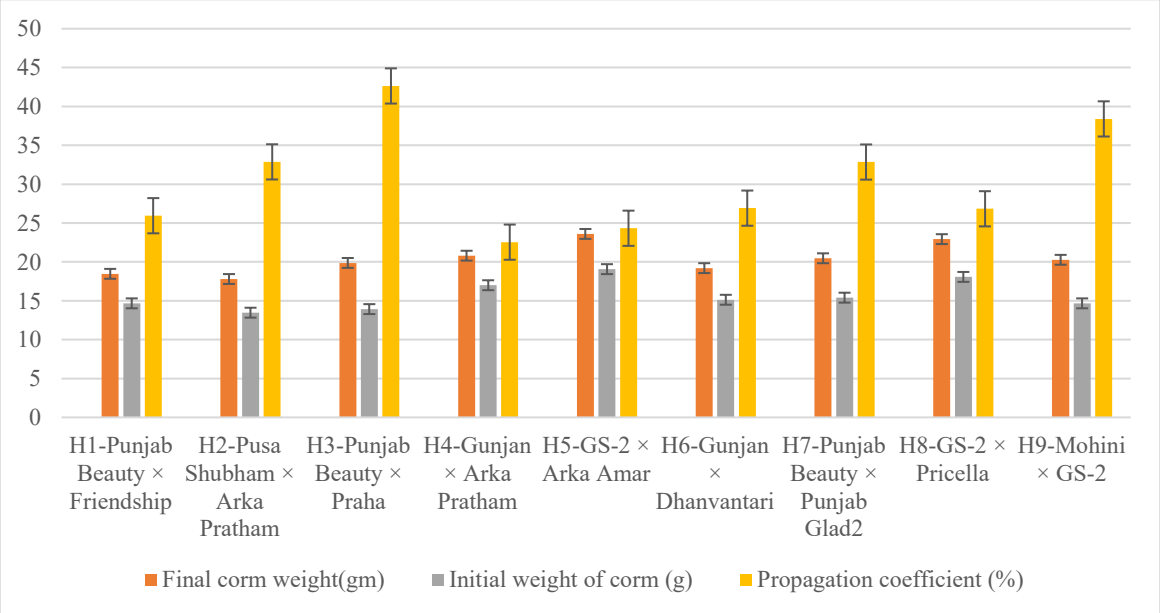

Fig. 3.1. Gladiolus novel hybrid influence on final weight (g), initial corm weight (g), propagation coefficient (%) traits under off-season.

REFERENCES

[1] Ahmad, S, Singh, R and Kumar, P. Gladiolus cultivation: A review. Horticultural Reviews.2008; 34: 123-145.

[2] Azimi, MH. Evaluation yield and genetically factors in different cultivars of gladiolus. Ornamental Horticulture. 2020; 26: 8-17.

[3] Blake, GR. Methods of Soil Analysis: Part 1 Physical and Mineralogical Properties, Including Statistics of Measurement and Sampling.1965; Chapter 29.
[4] Cochran, WG and Cox, GM Experimental Designs. John Willey and Sons, New York.1950.
[5] Dhakal, M, Poon, TB, Adhikari, P, Panday, S and Bhattarai, S. 2023. Characterization of gladiolus genotypes under Khulmaltar condition of Nepal. Journal of Nepal Agricultural Research Council. 2023; 7: 22-29.
[6] Hossain, MM, Rahman, MM and Islam, MA. Morphological characterization and true seed production in gladiolus genotypes. Bangladesh Journal of Agricultural Research.2012; 37(4): 567-574.
[7] Jackson, ML. Soil Chemical Analysis. Prentice Hall of India Private Limited, New Delhi.1973; 498: 151-154.
[8] Kirtimala, N, Nataraj, SK, Kulkarni, BS and Reddy, BS. Stability analysis for earliness and corm characters in gladiolus (*Gladiolus hybridus Hort.)*. Journal of Horticultural Sciences. 2011; 6(1): 41-45.
[9] Kujur, AN, Tirkey, T and Sharma, G. Varietal evaluation of gladiolus (*Gladiolus hybridus Hort*.) under Chhattisgarh plains. Journal of Ornamental Horticulture. 2016; 19: 48-52.
[10] Kumar, R, Kumar, S and Yadav, YC. Variability studies for yield and yield attributing traits in gladiolus. Progressive Agriculture. 2011; 11(2): 356-360.
[11] Nalage, NA, Haldankar, M, Gawankar, MS and Rathod, NG. Evaluation of different gladiolus varieties (*Gladiolus hybridus Hort.*) under Konkan conditions of Maharashtra. International Journal of Chemical Studies, 2019; 7(2): 2018-2021.
[12] Olsen, SR, Cole, CV, Frank, S and Dean, LA. Estimation of available phosphorus by extraction with sodium bicarbonate, United States Development of Agriculture Circular number.1954; 939.
[13] Patel, R, Tomar, S., Singh, AK. and Kumar, R. Performance of Indian and varieties of gladiolus (*Gladiolus hybridus Hort*.) under Banda agro-climatic conditions. Journal of Ornamental Horticulture. 2022; 25(2): 72-78.
[14] Piper, CS. Soil and Plant Analysis. Inter Science Publishers, New York.1960; pp:128-136.
[15] Poon, TB, Rao, TM, Kumar, DP and Dhananjaya, MV. Evaluation of different genotypes of gladiolus for corm and cormel production. Nepal Agricultural Research Journal.2010; 10: 50-54.
[16] Priyanka, K, Singh, D and Meenu, K. Evaluation of gladiolus genotypes for horticulture traits. International Journal of Agriculture Science. 2023; 15(8): 12599–12601.
[17] Sankari, A, Rajendran, R and Kumar, S. Evaluation of gladiolus cultivars in Eastern Ghats of Tamil Nadu. Journal of Horticultural Science. 2012; 7(1): 206-208.