Nepalese Horticulture

Vol 17, 2023

Nepalese Horticulture 17 : 31-40, 2023
ISSN : 2092-1122 | Print : 2542-2936(Online)
DOI: https://doi.org/10.3126/nh.v17i1.60629

Research Article

OPEN ACCESS

Assessment of Vegetative, Floral and Corm Characteristics in Gladiolus Genotype at Malepatan, Pokhara, Nepal

Urmila Devkota[1*], Prakriti Adhikari [2], Santosh Lohani[3] and Shreya Sharma[4]

[1] *Himalayan College of Agriculture Science and Technology, Kathmandu, Nepal*

[2]*Agriculture and Forestry University, Rampur, Chitwan, Nepal*

[3]*Nepal Agriculture Research Council, Malepatan, Pokhara, Nepal*

[4]*Tribhuwan University, Institute of Agriculture and Animal Science, Lamjung Campus, Lamjung. Nepal*

[*]Corresponding Author's Email: urmiladev33@gmail.com

[*] Orcid ID: https://orcid.org/0009-0005-2779-9187

Received on: 7August, 2023 **Revised on:** 26 November, 2023 **Accepted on:** 5 December, 2023

Abstract

Gladiolus (*Gladiolus grandifloras* L.), recognized for its bright, distinctively textured blossoms, is first commercially grown cut flower in Nepal. A study was carried out to assess vegetative, floral, and corm characteristics in gladiolus genotypes in Maltepatan, Pokhara. Twelve genotypes namely NGRV0130(ARSDG-04), RARSLG-014-1.1, RARSLG-014-1.11, RARSLG-014-2.8, RARSLG-014-3.10(A), RARSLG-014-3.11, RARSLG-014-6.8, RARSLG-014-6.12, RARSLG-014-6.13, RARSLG-014-7.27(A), RARSLG-014-8.22, RARSLG-014-9.10 were evaluated from March 02-August 07, 2022. The experiment was laid out in a Randomized complete block design with three replications. The crop geometry was maintained at 50 cm × 28.5 cm in a four-meter square plot containing twenty-eight corms per plot. The genotype RARSLG-014-3.11 was found earliest on days to 50% sprouting, spike initiation, and floret opening. The genotype RARSLG-014-6.12 was noted to have maximum number of florets per spike and number of spikes per hill, longest rachis length, and a maximum number of cormels. Similarly, the genotype RARSLG-014-1.11 was a promising genotype in having a maximum number of corms. The longest length of the spike (140.66 cm) was found for genotype RARSLG-014-6.8.

Keywords : Corm, rachis, randomized, spike

Introduction:

Gladiolus (*Gladiolus grandifloras* L.) is a plant native to South Africa, belonging to the Iridaceae family and the subfamily Ixioideae. It is commonly referred to as the corn lily or Sword lily, owing to its characteristic sword-shaped leaves. Gladiolus is often recognized as the "queen of bulbous plants" and is highly favored by both consumers and florists as a cut flower. Its popularity stems from the wide range of colors it offers, making it a versatile choice for inclusion in various floral arrangements(Lohani et al., 2022).The intriguing spikes of Gladiolus feature florets with diverse sizes and shapes, and their tepals exhibit a wide range of characteristics, including smooth surfaces, ruffled edges, deep crinkles, or laciniate textures. They may also display blotches or unique patches in a variety of colors and color combinations. This makes Gladiolus one of the most significant bulbous crops, cultivated for purposes such as cut flowers, bouquets, table arrangements, home décor, and garden displays (Kadam et al., 2014).

Approximately 300 wild species of gladioli originate primarily from Africa, particularly South Africa, with some species also found in the Mediterranean and various parts of Europe (Safeena &Thangam, 2019). The ploidy levels within the genus range from diploid (2n = 30) to decaploid (2n = 12x = 180). Notably, the roughly 30,000 existing garden cultivars have been developed through natural and cultivated hybridization involving around 23 distinct species (Solanki et al., 2019).

Gladiolus are grown for commercial purposes in order

to supply cut-flower trade and is quickly rising to prominence among cut flowers (Basnet et al., 2017). There are several varieties of Gladiolus available in the Nepali market, such as American beauty, Berlew, Bush balland, Camalton, etc. Regarding production and consumption, gladiolus is the most popular cut flower in Nepal and first to grown commercially(Dhakal et al., 2021). The demand for the Gladiolus is 3,500-4,500 sticks per day. Around 800,000 sticks per year are produced. The area under its cultivation and growth was 18.6 hectares (Gauchan et al., 2010). Every year, hundreds of cultivars degenerate, and a large number of cultivars are produced. To increase productivity and farmer returns, it is important to characterize these cultivars and identify the best ones for producing cut flowers as well as corms and cormels (Dhakal et al., 2021).

The flowers of this plant hold significant aesthetic, economic, and social importance in our country. While there are numerous varieties of this plant, selecting the most suitable ones for specific regions necessitates thorough examination. Evaluating these varietals becomes crucial to harness both domestic and international demand, focusing on qualitative and quantitative traits. The present study aimed to assess genotype variability and identify the best flower genotypes in order to optimize flower, corm, and cormel production and meet the preferences of regional consumers. It's worth noting that Gladiolus cultivation in Nepal has evolved from a leisurely pursuit to a thriving business within the past three decades.

Various experiments were conducted on Gladiolus in different locations such as Dailekh, Lumle and Khumaltar. In the Lumle trial, the genotypes NGRV0139, NGRV0140, and NGRV0137 were determined to be superior performers when evaluating various characteristics. Similarly, during research conducted in Khumaltar, it was found that ARSDG-04, ARSDG-05, and ARSDG-03 exhibited superior traits compared to other genotypes in terms of major characteristics. Lumle-1 and Lumle-2 are recently released varieties of gladiolus.

The aim of this trial is to study the vegetative, floral, and corm characteristics of gladiolus plants.

Materials and Methods:

The field study was carried out at the Horticultural Research Station in Pokhara, Nepal, from March 2nd to August 7th, 2022. The station is situated at about 28°13'6.8"N Latitude and 83°58'27.72"E

Longitude with an elevation of 848 masl. The climate at the station is sub-tropical humid type. Individual plot size was four square meters with crop geometry set at 50 cm × 28.5 cm, accommodating 28 corms per plot. Plots were 50cm apart, and replications were 1m apart. Corms were planted at a consistent depth of 4-5 cm. Before plantation, the land was thoroughly plowed to bring the soil to a fine tilth. The field was prepared three days before planting. Chemical fertilizers were applied to the soil, 175 kg N, 100 kg P_2O_5 and 150 kg K_2O/ ha. Nitrogen were split into two doses – the first dose applied before planting and the second dose applied one month after planting. Additionally, the farmyard manure, 30t/ha, was incorporated into the soil. The experiment was laid out in a randomized complete block design with three replications. A total of 12 genotypes of gladiolus were evaluated. Data on vegetative, floral, and corm traits were recorded.

Initially, vegetative traits i.e. days to 50% germination, and days to first spike emergence were recorded. Secondly, the floral traits i.e. floret diameter, spike length, rachis length, days to first floret opening, days to first floret wilting, days to seventh floret opening, days to seventh floret wilting, no. of florets per spike, no. of spikes per hill were recorded. Then lastly, corm and cormel traits i.e. no. of corm, no. of cormels, corm length, corm weight, corm diameter, total no. of cormel (sample plant), and total no. of corm (sample plant) were recorded and analyzed ANOVA. The data were analyzed by using the statistical software R Studio.


RARSLG-014-1.11


RARSLG-014-2.8


RARSLG-014-3.10(A)


RARSLG-014-3.11


RARSLG-014-6.8


RARSLG-014/6.12


RARSLG-014-6.15


RARSLG-014-7.27(A)


RARSLG-014-8.22


RARSLG-014-9.10

Results:

Table 1 : Days to 50% sprouting, days to first spike emergence, floret diameter, spike length, rachis length

Genotypes	Days to 50 % sprouting (Days)	Days to first spike emergence (Days)	Floret diameter (cm)	Spike length(cm)	Rachis length(cm)
NGRV0133(ARSDG 04)	17.33b	66.33 de	11.36b	101.16efg	60.38de
RARSLG-014-1.1	21.00a	78.26b	10.17cde	115.24cd	62.30de
RARSLG-014-1.11	18.00b	67.46de	11.10bc	93.52g	58.28e
RARSLG-014-2.8	23.00a	86.00a	9.61de	104.03efg	60.90de
RARSLG-014-3.10(A)	17.66b	71.46bcde	11.03bc	109.70de	64.65de
RARSLG-014-3.11	17.0b	65.80e	12.36a	97.96fg	66.12d
RARSLG-014-6.12	20.66a	76.00bc	10.48bcd	132.76ab	90.53a
RARSLG-014-6.13	21.00a	75.20bc	10.13cde	106.10def	59.77de
RARSLG-014-6.8	22.00a	73.86bcd	10.76bc	140.66a	86.31ab
RARSLG-014-7.27(A)	21.00a	76.21bc	9.30e	123.66bc	76.46c
RARSLG-014-8.22	21.33a	77.00bc	9.21e	117.10cd	59.10e
RARSLG-014-9.10	17.33b	69.33cde	12.87a	123.76bc	80.50bc
Grand Mean	19.77	73.57	10.7	113.8	68.77
SEM±	2.08	16.46	0.28	37.1	13.11
LSD0.05	2.44***	6.87***	0.90***	10.30***	6.13***
CV%	7.3	5.51	4.97	5.34	5.26

Means within the column followed by the same letter are not significantly different at 5 % level of significance by DMRT (Significant at 0.05 level of significance; ** Significant at 0.01 level of significance and *** significant at 0.001 level of significance)*

Days to 50% sprouting:

A significant difference among the genotypes for days to 50% germination was seen. The days to

50% germination ranged from 17-23 days after sowing with the mean value of 19.77. The earliest

(17 DAS) days to 50% germination was recorded for RARSLG-014-3.11 followed by (17.33) NGRV0133 (ARSDG-04) and (17.33) RARSLG-014-9.10 while the longest (23 DAS) days to fifty percent germination was found for the genotype RARSLG-014-2.8. Similarly, 17.66, 18, 20.66, 21, 21, 21, 21.33, and 22 days were taken by the treatments RARSLG-014-3.10(A), RARSLG-014-1.11, RARSLG-014-6.12, RARSLG-014-6.13, RARSLG-014-1.1, RARSLG-014-7.27(A), RARSLG-014-8.22, and RARSLG-014- 6.8 for days to 50% sprouting respectively (Table 1).

Days to first spike emergence:

Highly significant differences were recorded for days to the first spike emergence (Table 1). It was variable between 65.80 days - 86 days with a grand mean of 73.57. It was considerably early in RARSLG-014-3.11 (65.80) days and significantly delayed in RARSLG-014-2.8 (86.00) days. Similarly, 66.33, 67.46, 69.33, 71.46, 73.86, 75.20, 76, 76.21, 77, 78.26 days were taken by the treatments ARSDG-04, RARSLG-014-1.11, RARSLG-014-9.10, RARSLG-014-3.10(A), RARSLG-014- 6.8, RARSLG-014-6.13, RARSLG-014-6.12, RARSLG-014-7.27(A), RARSLG 014-8.22 and RARSLG-014-1.1 respectively for spike initiation (Table 1).

Floret diameter:

It ranges from (9.21-12.87)cm with a grand mean value of (10.70)cm. The longest (12.87) cm floret diameter was found for RARSLG-014-9.10 which was at par with RARSLG-014-3.11 (12.36) cm while the shortest (9.21) cm was found for RARSLG-014-8.22 which was at par with RARSLG014-7.27(A) (9.30) cm. Similarly, 9.61, 10.13, 10.17, 10.48, 10.76, 11.03, 11.10 and (11.36cm) were recorded for the treatments RARSLG-014-2.8, RARSLG-014- 6.13, RARSLG- 014-1.1, RARSLG-014-6.12, RARSLG-014-6.8, RARSLG-014-3.10(A), RARSLG-014-1.11 and ARSDG- 04 respectively (Table 1).

Spike length:

It was variable between 93.52 cm – 140.66 cm with a grand mean value of 113.80. The longest (140.66) cm and shortest (93.52) cm length of the spike was found for RARSLG-014-6.8 and

RARSLG-014-1.11 respectively. Similarly, 97.96, 101.16, 104.03, 106.10, 109.70, 115.24, 117.10, 123.66, and (123.76 cm) were recorded by the treatments

RARSLG-014-3.11, ARSDG-04, RARSLG-014-2.8, RARSLG-014-6.13, RARSLG-014-3.10(A), RARSLG-014- 1.1, RARSLG-014- 8.22, RARSLG-014-7.27(A) and RARSLG-014-9.10 respectively (Table 1).

Rachis length:

A significant difference was seen among the genotypes for rachis length. The value ranges from 58.28cm-90.53cm with a grand mean value of 68.77. The longest (90.53) cm length of rachis was found for RARSLG-014-6.12 whereas the shortest (58.28) length of rachis was found for RARSLG-014-1.11. Similarly, 59.10, 59.77, 60.38, 60.90, 62.30, 64.65, 66.12, 76.46, 80.50, and 86.31cm were recorded by the treatments RARSLG-014-8.22, RARSLG-014-6.13, ARSDG-04, RARSLG-014-2.8, RARSLG-014-1.1, RARSLG-014-3.10(A), RARSLG-014-3.11, and RARSLG 014-7.27(A), RARSLG-014- 9.10 and RARSLG-014-6.8 respectively (Table 1).

No. of florets per spike:

A significant difference was seen among the genotypes for parameter No. of florets per spike. The value ranges from 14cm-23.60cm with the grand mean value of 17.04. The highest (23.60) no. of florets per spike was found for RARSLG-014-6.12 which was at par with RARSLG-014-9.10 (22.06) whereas the lowest (14.00) no. of florets per spike was found for RARSLG-014-1.11 which was at par with RARSLG-014-8.22 (14.20) and NGRV0133, ARSDG-04 (14.26) respectively.

Similarly, 15, 15.73, 15.80, 16, 16.80, 17.40, and 19.60 were recorded by the treatments RARSLG

014-6.13, RARSLG-014-1.1, RARSLG-014-7.27(A), RARSLG-014-2.8, RARSLG-014-3.10(A), RARSLG-014-3.11 and RARSL-014-6.8 respectively (Table 2).

Days to first floret opening:

The fastest (73.73 days) to first floret opening was found in the treatment NGRV0133(ARSDG 04) which was at par with RARSLG-014-3.11 (74.53 days) and RARSLG-014-1.11 (74.86 days) and the longest (87.00 days) to first floret opening was found in the treatment RARSLG-014- 7.27(A) which was at par with RARSLG-014-1.1 (86 days). Similarly, 77.40, 79.13, 81.46, 83.13, 83.46, 84.13 and 84.46(DAS) were recorded for the treatments RARSLG-014-9.10, RARSLG-014-3.10(A), RARSLG-014-8.22, RARSLG-014-2.8, RARSLG-014-6.8, RARSLG014-6.13 and RARSLG-014-6.12 respectively (Table 2).

Days to first floret wilting:

The fastest (76.86 days) to first floret wilting was found in the treatment NGRVO133(ARSDG 04) which was at par with (77.73 days) RARSLG-014-1.11 and (77.86 days) RARSLG-3.11 and the longest (90.66 days) to first floret wilting was found in the treatment RARSLG-014-

Table 2 : No. of florets per spike, Days to 1st floret opening, Days to 1st floret wilting, Days to 7th floret opening, Days to 7th floret wilting

Genotypes	No.of florets per spike	Days to 1st floret opening (DAS)	Days to 1st floret wilting (DAS)	Days to 7th floret opening (DAS)	Days to 7th floret wilting (DAS)
NGRV0133(ARSDG-04)	14.26e	73.73e	76.86f	78.60d	81.40d
RARSLG-014-1.1	15.73cde	86.00a	89.06ab	91.73a	94.66a
RARSLG-014-1.11	14.00e	74.86e	77.73f	79.06d	82.13d
RARSLG-014-2.8	16.00cde	83.13ab	86.26bc	88.60ab	91.46ab
RARSLG-014-3.10(A)	16.80cd	79.13cd	82.13de	83.53c	86.26c
RARSLG-014-3.11	17.40c	74.53e	77.86f	77.46d	80.73d
RARSLG-014-6.12	23.60a	84.46ab	87.66abc	88.13ab	91.80ab
RARSLG-014-6.13	15.00de	84.13ab	87.33abc	88.33ab	91.06ab
RARSLG-014-6.8	19.60b	83.46ab	87.13abc	87.73ab	90.93ab
RARSLG-014-7.27(A)	15.80cde	87.00a	90.66a	88.73ab	91.66ab
RARSLG-014-8.22	14.26e	81.46bc	84.53cd	85.00bc	88.53bc
RARSLG-014-9.10	22.06a	77.40de	80.60ef	81.60cd	84.66cd
Grand Mean	17.04	80.77	83.98	84.87	87.94
SEM±	1.35	4.33	4.486	5.39	5.05
LSD0.05	1.96***	3.52***	3.58***	3.93***	3.80***
CV%	6.81	2.57	2.52	2.73	2.55

Means within the column followed by the same letter are not significantly different at a 5 % level of significance by DMRT (Significant at 0.05 level of significance; ** Significant at 0.01 level of significance and *** significant at 0.001 level of significance)*

7.27(A).

Similarly, 80.60, 82.13, 84.53, 86.26, 87.13, 87.33, 87.66 and 89.06 were recorded for the treatments RARSLG-014-9.10, RARSLG-014-3.10(A), RARSLG-014-8.22, RARSLG-014-2.8, RARSLG-014-6.8, RARSLG-014-6.13, RARSLG-014-6.12 and RARSLG-014-1.1 respectively (Table 2).

Days to seventh floret opening:

A significant difference was observed in the treatments with respect to days to seventh floret opening. The value ranged from 77.46-91.73 days with a grand mean value of 84.87 days. The fastest days to seventh floret opening (77.46days) were found in the treatment RARSLG-014-3.11 which was at par with ARSDG-04 (78.60 days) and RARSLG-014-1.11 (79.06 days) whereas the longest days to seventh floret opening (91.73 days) was found in the treatment RARSLG-014-1.1. Similarly, 81.60, 83.53, 85, 87.73, 88.13, 88.33 and 88.73 were recorded for the treatments

RARSLG-014-9.10, RARSLG-014-3.10(A), RARSLG-014-8.22, RARSLG-014-6.8, RARSLG 014-6.12, RARSLG-014-6.13 and RARSLG-014-7.27(A) respectively (Table 2).

Days to seventh floret wilting:

The fastest days to seventh floret wilting (80.73days) was found in the treatment RARSLG-014- 3.11 which was at par with ARSDG-04 (81.40days) and RARSLG-014-1.11 (82.13days) whereas the longest days to seventh floret wilting (94.66days) were found in the treatment RARSLG-014- 1.1. Similarly, 84.66, 86.26, 88.53, 90.93, 91.06, 91.46, 91.66 and 91.80 were recorded for the treatments RARSLG-014-9.10, RARSLG-014-3.10(A), RARSLG-014-8.22, RARSLG-014-6.8, RARSLG-014-6.13, RARSLG-014-2.8, RARSLG-014-7.27(A) and RARSLG-014-6.12 respectively (Table 2).

No. of spikes per hill:

The maximum (5.00) no. of spikes per hill was found in the treatment RARSLG-014-6.12 and the minimum (2.40) no. of spikes per hill was found in the treatment RARSLG-014-3.10(A). Similarly, 2.46, 2.60, 2.60, 3.20, 3.20, 3.60, 3.93, 4.33, 4.33, 4.60 no. of spikes per hill were recorded for the treatments RARSLG-014-2.8, RARSLG-014-1.11, RARSLG-014-3.11, ARSDG 04, RARSLG-014-9.10, RARSLG-014-8.22, RARSLG-014-7.27(A), RARSLG-014-6.8, RARSLG-014-6.13, and RARSLG-014-1.1 respectively (Table 3).

No. of cormels:

The maximum no. of cormels (101.40) was found in RARSLG-014-6.12 and the minimum no. of cormels (21.60) was found in RARSLG-014-6.8 which was at par with RARSLG-014-2.8 (27.13). Similarly, 44.13, 47.26, 47.66, 50.20, 53.93, 62.20, 86.73, 87.46 and 94 no. of cormels were recorded for the treatments RARSLG-014-3.11, RARSLG-014-6.13, RARSLG-014-9.10, RARSLG-014-1.1, RARSLG-014-7.27(A), RARSLG-014-3.10(A), ARSDG-04, RARSLG-014-

Table 3 : No. of spikes per hill, No. of cormels, No. of Corm, Ind. Length of Corm, Ind. Weight of corm

Genotypes	No. of spikes per hill	No. of cormels	No. of corm	Ind. length of corms (mm)	Ind. Weight of corm(g)
NGRV0133(ARSDG-04)	3.20cde	86.73abc	3.66a	25.92	52.53
RARSLG-014-1.1	4.60ab	50.20bcd	3.06abcd	26.87	52.13
RARSLG-014-1.11	2.60de	87.46abc	3.46a	25.79	58.53
RARSLG-014-2.8	2.46e	27.13d	1.73e	27.16	39.13
RARSLG-014-3.10(A)	2.40e	62.20abcd	3.20abc	28.62	61.86
RARSLG-014-3.11	2.60de	44.13cd	3.4ab	27.27	66.26
RARSLG-014-6.12	5.00a	101.40a	2.06cde	26.06	66.93
RARSLG-014-6.13	4.33ab	47.26bcd	3.40ab	28.5	42.46
RARSLG-014-6.8	4.33ab	21.60d	2.80abcde	25.84	54.66
RARSLG-014-7.27(A)	3.93abc	53.93bcd	1.86de	28.35	52.33
RARSLG-014-8.22	3.60bcd	94.00ab	2.86abcde	27.61	40.06
RARSLG-014-9.10	3.20cde	47.66bcd	3.66a	27.13	77.13
Grand Mean	3.51	60.31	2.8	27.09	55.33
SEM±	0.34	589.52	0.44	8.03	334.24
LSD0.05	0.99***	41.11**	1.12*	NS	NS
CV%	16.81	40.25	23.69	10.46	33.03

Means within the column followed by the same letter are not significant different at 5 % level of significance by DMRT (Significant at 0.05 level of significance; ** Significant at 0.01 level of significance and *** significant at 0.001 level of significance)*

1.11 and RARSLG-014-8.22 respectively (Table 3).

No. of corms:

The maximum no. of corms (3.66) was found in treatment NGRV0133 (ARSDG-04) which was at par with RARSLG-014-9.10 (3.66) and (3.46) RARSLG-014-1.11 and minimum no. of corms (1.73) was found in RARSLG-014-2.8. Similarly, 1.86, 2.06, 2.80, 2.86, 3.06, 3.20, 3.4, 3.4 and 3.46 no. of corms were recorded for treatments RARSLG-014-7.27(A), RARSLG-014-6.12, RARSLG-014-6.8, RARSLG-014-8.22, RARSLG-014-1.1, RARSLG-014-3.10(A), RARSLG 014-3.11, RARSLG-014-6.13 and RARSLG-014-1.11 respectively (Table 3).

Discussion:

The mean number of days required for the first spike emergence was 83.34 days in seven genotypes at the Horticulture Research Station (HRS), Dailekh (Poon & Chalise, 2016).In the current study, the mean value for the same characteristic was recorded as 73.57 days. As per the findings of (Dhakal et al., 2021) variations in the duration required to initiate spike growth may be attributed to the genetic traits inherent to the respective genotypes. The time taken for spike emergence is a pivotal varietal characteristic in gladiolus, which appears to be predominantly determined by the genetic composition of the individual varieties. Early spike initiation can be attributed to the temperature fluctuations between day and night, coupled with a more favorable thermal environment.(Akpinar & Bulut, 2011). Variability in the timeframe for spike initiation may also be linked to the plant's nutrient reserves. These reserves could be associated with the rate of plant growth, influencing the accumulation of the necessary carbohydrate levels needed for this process(Singh et al., 2020).

The mean spike length of forty-six inter-varietal genotypes, along with one check genotype, was documented as 106.70 cm in Lumle (Poon et al., 2021). In the current study, the mean measurement for the same characteristic was noted as 113.80 cm, while in Khumaltar, it was recorded as 95.40 cm(Dhakal et al., 2021).These findings indicate a relatively modest variation in spike length between the results obtained from Lumle, Khumaltar, and HRS, Pokhara.

The mean rachis length forty-six inter-varietal genotypes, along with one check genotype, was documented as 72.52 cm in Lumle (Poon et al., 2021).In the current study, the mean value for the same characteristic was noted as 68.77 cm. The outcomes of these experiments revealed a more limited disparity between the results obtained in Lumle and Pokhara.

In the same field, the genotypes displayed variations in the length of both spike and rachis.The observed variation in spike length and rachis length among the different genotypes could likely be attributed to a combination of genetic factors and environmental influences. Furthermore, the disparities in spike and rachis length between the genotypes may be linked to variations in corm size. It appears that larger corms tend to give rise to plants with longer spike and rachis lengths, whereas smaller corms result in plants with shorter spike and rachis lengths(Dhakal et al., 2021)

The mean value of days to first floret wilting is 2.4 days

Table 4 : Individual diameter of corms, Total weight of corms, Total weight of cormels.

Genotypes	Ind. diameter of corms (mm)	Total weight of corms (g)	Total weight of cormels (g)
NGRV0133(ARSDG-04)	39.06	589.33	258
RARSLG-014-1.1	41.81	460.33	142
RARSLG-014-1.11	41.39	461	349.33
RARSLG-014-2.8	37.83	231.66	54
RARSLG-014-3.10(A)	42.43	686.66	142
RARSLG-014-3.11	40.22	467.08	141.33
RARSLG-014-6.12	38.34	336.66	181.33
RARSLG-014-6.13	42.32	443.63	149
RARSLG-014-6.8	41.43	482	96.33
RARSLG-014-7.27(A)	39.2	397	184.66
RARSLG-014-8.22	40.09	279	346.33
RARSLG-014-9.10	44.45	486.66	126.33
Grand Mean	40.71	443.42	180.88
SEM±	8.26	35917.64	15211.23
LSD0.05	NS	NS	NS
CV%	7.05	42.74	68.18

Among the tested genotype, the parameters; individual length of corms, individual weight of corms, individual diameter of corms, total weight of corms, and total weight of cormels were found insignificant (Table 3 and 4).

earlier in present study in comparision with chitwan condition(Joshi et al., 2012).The influence of corm size is noticeable in the initial wilting of the first floret. This could be attributed to the prolonged availability of respiratory substrates, stemming from the greater accumulation of stored carbohydrates during the growth phase, which likely accounts for the delayed withering of the first floret in spikes originating from larger corms. The variations in the duration it takes for the initial floret to wither may be contingent on factors such as the quantity of stored carbohydrates, the activity level of alpha amylase, and the weight of the spike. Consequently, the diversity in these attributes is likely to be influenced by the genetic composition of the different varieties.(Joshi et al., 2012).

The mean value of florets per spike was 15.70 under Dailekh conditions, (Poon & Chalise, 2016) whereas in the current study, the mean value for the same character is 17.04, indicating an increase in the average number of florets per spike in the present study as compared to the Dailekh conditions.

(Pragya et al., 2010) also noticed significant differences in floret numbers from different cultivars. Cultivars boasting more than 16 florets are eligible to enter the international gladioli cut flower market, as the minimum requirement for achieving a fancy grade, specifically an "A grade," is 16 florets. This presents a promising opportunity for high-altitude gladiolus growers to explore

export-oriented floriculture(Pragya et al., 2010)

In this trial, the average number of spikes per hill, which is (3.51), surpasses the (2.76) spikes per mother corm observed in the inter-varietal cross lines in Lumle(Poon et al., 2021). The variation in the number of spikes per hill might be due to variability in the genetic constitution of the varieties controlling the apical dominance. (Lohani et al., 2022).

The number of corms and cormels varied among the tested genotypes. This might be due to genetic makeup and environmental effects (Lohani et al., 2022).

Conclusion:

From the study, the genotype RARSLG-014-3.11 was found earliest on days to 50% sprouting, Spike initiation, and floret opening which concludes this genotype has better growth. The genotype RARSLG-014-6.12 was found superior on no. of florets per spike, no. of spikes per hill, longest rachis length, and a maximum number of cormels. Similarly, the genotype RARSLG-014-1.11 was superior in having a maximum number of corms. Since the genotype RARSLG-014-6.12 was found superior on no. of florets per spike and RARSLG-014-6.8 has the longest spike length, we can conclude that these two genotypes have better flower quality. The genotype RARSLG-014- 6.12

also gives a better yield, since it has the highest no. of spikes per hill.

Declaration of conflict of interest and ethical approval:

We, the authors of this research article titled "Assessment of vegetative, floral, and corm characteristics in gladiolus genotype at Malepatan, Pokhara, Nepal," declare that there are no conflicts of interest related to this research study.

Authors' Contribution:

Urmila Devkota: Conceptualization of the study, design of the varietal trial, data collection, and analysis

Prakriti Adhikari: Assisted in the experimental setup, data interpretation, data analysis, and drafting of the manuscript.

Santosh Lohani: Provided expertise in gladiolus cultivation practices, supervised the overall research project, and revised the manuscript critically for intellectual content.

Shreya Sharma: Contributed to the data analysis and drafting of the manuscript

All authors have read and approved the final version of the manuscript and agree to take public responsibility for its content.

References:

Akpinar, E., & Bulut, Y. (2011). A study on the growth and development of some gladiolus (Gladiolus l.) varieties planted in different time under the ecological conditions of Erzurum.

African Journal of Agricultural Research, 6(13), 3143–3148. https://doi.org/10.5897/AJAR11.066

Basnet, M., Shakya, S. M., & Pant, S. S. (2017). Effect of Different Dose of Nitrogen and Phosphorous on Gladiolus Yield at Ilam, Nepal. Himalayan Biodiversity, 5(1), 32–37. https://doi.org/10.3126/hebids.v5i1.36151

Dhakal, M., Poon, T. B., Adhikari, P., Pandey, S., & Bhattarai, S. (2021). Characterization of Gladiolus Genotypes under Khumaltar Condition of Nepal. Journal of Nepal Agricultural

Research Council, 7(August 2022), 22–29. https://doi.org/10.3126/jnarc.v7i1.36915

Joshi, K., Gautam, D., Baral, D., & Pun, U. (2012). Effect of Corm Size and Varieties on Corm/Cormels Production and Vase Life of Gladiolus. Nepal Journal of Science and

Technology, 12, 35–40. https://doi.org/10.3126/NJST.V12I0.6477

Kadam, G. B., Kumar, G., Saha, T. N., Tiwari, A. K., & Kumar, R. (2014). Varietal evaluation and genetic variability studies on gladiolus. Indian Journal of

Horticulture, 71(3), 379–384.

Lohani, S., Aryal, S., Aryal, L., & Adhikari, S. (2022). Evaluation of Gladiolus Genotype (Gladiolus grandifloras L..) at Malepatan, Pokhara, Nepal. June. https://www.researchgate.net/publication/361580901

Poon, T. B., & Chalise, B. (2016). Evaluation of Promising Genotypes of Gladiolus for Important Vegetative and Floral Characters Under Mid-hill Environment of Dailekh. Nepalese Horticulture, 11, 1–10.

https://www.researchgate.net/publication/343442773_Evaluation_of_Promising_Genotypes_of

_Gladiolus_for_Important_Vegetative_and_Floral_Characters_Under_Midhill_Environment_of_Dailekh

Poon, T. B., Khanal, A., Timilsina, S., & Rijal, A. (2021). Assessment of Inter-varietal Cross Lines of Gladiolus on Vegetative and Floral Traits for Selection and Promotion in Nepal. Nepalese Horticulture, 15, 1–15. https://doi.org/10.3126/NH.V15I0.36640

Pragya, Ranjan, J. K., Attri, B. L., Das, B., Krishna, H., & Ahmed, N. (2010). Performance of gladiolus genotypes for cut flower and corm production under high altitude of Uttarakhand. Indian Journal of Horticulture, 67(SPEC. ISSUE), 386–390.

Safeena, S. A. *, & Thangam M. (2019). Field Performance of Gladiolus Cultivars for Growth, Yield and Quality Cut Flower Production under Humid Agro Climatic Conditions of Goa.

International Journal of Agriculture Sciences, 11(3), 7797–7800. https://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000217

Solanki, N. S., Kumar, M., & Singh, D. (2019). Studies on morphological characters of gladiolus (Gladiolus grandiflorus) Cultivars under Allahabad agro climatic Condition. ~ 115 ~ Journal of Pharmacognosy and Phytochemistry, 5, 115–119.