

EVALUATION OF PROMISING GENOTYPES OF GLADIOLUS FOR IMPORTANT VEGETATIVE AND FLORAL CHARACTERS UNDER MID-HILL ENVIRONMENT OF DAILEKH

T. B. Poon, B. Chalise and OB. OLI

Senior Scientist, National Citrus Research Program, Dhankuta

Senior Scientist, Horticulture Research Station, Jumla

³ Technical Officer, Horticulture Research Station, Dailekh

ABSTRACT

Seven promising genotypes of gladiolus viz., 'HRSDG-01', 'HRSDG-02', 'HRSDG-03', 'HRSDG-04', 'HRSDG-05', 'HRSDG-06' and 'HRSDG-07' were evaluated for their performances in terms of important vegetative and floral characters. Of these genotypes, 'HRSDG-04' and 'HRSDG-03' were promising ones for earlier sprouting of corms and per cent of corm sprouting. 'HRSDG-04' as well as 'HRSDG-02' were earlier for the first spike emergence, full spike emergence and first floret unfurling. 'HRSDG-01' and 'HRSDG-04' were better for maximum number of marketable spikes per mother corm. 'HRSDG-3' and 'HRSDG-06' were noted to be more promising in terms of plant height, floret diameter, and number of florets per spike, spike length and rachis length. Keeping in view of overall performances, 'HRSDG-04' and 'HRSDG-03' proved to be recommended for general cultivation of gladiolus.

Key Words: Floral, rachis, spike, vegetative, unfurling

INTRODUCTION

Gladiolus (*Gladiolus grandiflorus* L.) is one of the most popular flowers for garden use and cut flower. It is a member of Iridaceae (Iris family) and sub-family Ixioideae, originated from South Africa, with some species found wild in southern Europe and the Near East. Being an important bulbous ornamental plant, it occupies a prime position among commercial flower crops which has high demand in both domestic and international markets. With changing life style and increased urban affluence, floriculture has assumed a definite commercial status in recent times, and it has emerged as an important agri-business venture. In this regard gladiolus has gained much importance as it is the Queen of bulbous flower. The plants, ranging from two to six feet in height, have sturdy sword shaped leaves and produce flower spikes with trumpet-shaped florets borne in double rows. Gladioli have great diversity of flower color and shape. Flower shapes range from those with plain petals to those that are deeply ruffled and cut. The colors cover the spectrum and there are solid as well as bicolor types. Florets range in size from 2.5 cm in diameter up to giants 19.00 cm in diameter (Grieving, 1987; Mishra et al. 2014). Its magnificent inflorescence in a variety of colors coupled with its long lasting vase life has made it excellent for vase decoration, preparation of bouquets and other pots and also in garden display (Singh, 2006). Gladiolus is very rich in its varietal wealth and every year there is an addition of new varieties; hence varietals evaluation becomes necessary to find out suitable variety for a particular region. The performance of any crop or cultivar largely depends on a genotype and environmental interaction. Improvement of any crop is a continuous process and in gladiolus also there is scope to improve existing cultivars or genotypes. In gladiolus, the most common method of improvement is through hybridization due to its highly heterozygous nature (Cantor and Pop, 2011). At present, large numbers of exotic as well as Indian cultivars are under cultivation, transformation of gladiolus cultivation from the hobbyist activity into a commercial enterprise started only from the past decades ago in Nepal. The information available on performances of important vegetative and floral characters of commercially cultivated genotypes of gladiolus is not adequately available for further utilization in varietal development work in Nepal. The availability of well-documented vegetative and floral characters will definitely provide additional opportunity of developing preferable

new gladiolus variety exploiting desirable traits by discovering variations found in commercially cultivated varieties. Hence, investigation was set up so as to discover suitable genotypes with important vegetative and floral characters among seven promising gladiolus genotypes in the mid –hill environment of Dailekh district.

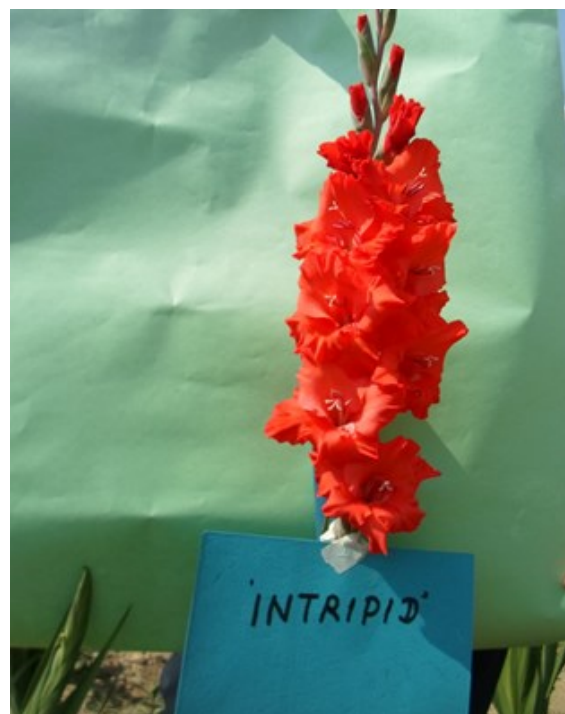
METHODOLOGY

Seven promising genotypes of gladiolus that were selected on the score of important vegetative and floral characters from the previous experiment: they were evaluated under further experiment in RCBD design with three replications. Genotypes viz., 'Check/HRSDG-01', 'HRSDG-02', 'HRSDG-03', 'HRSDG-04', 'HRSDG-05', 'HRSDG-06' and 'HRSDG-07' were evaluated during early spring-late summer season in the field of Horticulture Research Station (HRS), Dailekh during two consecutive years (2013 and 2014). In each replication, thirty five corms of each genotype were planted in the spacing of 47 cm between the rows and 30 cm within the row. In the second fortnight of February, thirty five corms were planted in each plot size of 7.852 m as per experimental design. The recommended FYM 20 t/ha and fertilizer 60kg N, 80 kg P₂O₅ and 60 kg K₂O were incorporated into soil during the operation of land preparatory tillage. Remaining 60 kg Nitrogen was applied into two split doses: 30 kg Nitrogen/ha at 3-5 leaf stage and 30 kg Nitrogen/ha at 7-9 leaf stage. Uniform cultural operations like intercultural weeding, plant protection measures, and remaining all practices were adopted to grow successful crop. Ten plants/genotype/replication were labeled and used for recording various parameters of vegetative and floral characters. The performances of six vegetative characters (days to 50% sprouting, per cent of corm sprouting, days to the first emergence of spike, days to full spike emergence, number of marketable spikes/ mother corm and plant height) and six floral characters (days to the first floret unfurling, number of florets opening at a time, floret diameter, number of florets /spike, spike length and rachis length) that keep significant values from the view point of crop improvement were recorded in both years (2013 and 2014), and values were exposed to statistical analysis of variance.

Photos of evaluated Genotypes of Gladiolus for Vegetative and Floral Traits



ARSDG-01 (American Beauty)



ARSDG-02 (Interpid)



ARSDG-03 (Ginger Red)



ARSDG-04 (Unidentified genotype)



ARSDG-05 (Summer Sun Shine)



ARSDG-06 (White Prosperity)



ARSDG-07 (Pscittacinus Hybrid)

RESULTS AND DISCUSSION

The performances of six vegetative and six floral characters of evaluated gladiolus genotypes are projected in Tables 1, 2, 3, 4, 5 and 6. The pooled results of five vegetative characters (days to 50% sprouting, per cent of corm sprouting, days to the first emergence of spike, days to full spike emergence and plant height) were noted to be highly significant but only one character (number of marketable spikes /mother corm) was significant. Almost analogously, the pooled results of six floral characters (days to the first floret unfurling, number of florets opening at a time, floret diameter, number of florets/spike, spike length and rachis length) were noted to be highly significant. The pooled results of six vegetative characters have been highlighted in Table1, 2 and 3.

The pooled values for days taken to 50% sprouting were variable between 21.15 and 41.34 with the mean value of 28.90 days. Genotype 'HRSDG-04' revealed the earliest for days taken to 50% sprouting in both the years (19.30 days and 23.00 days respectively). The pooled values of days to 50% sprouting were inconsequentially early in three genotypes viz., 'HRSDG-04' with 21.15 days, 'HRSDG-03' with 23.48 days and 'HRSDG-02' with 24.00 days. 'HRSDG-07' recorded contrastingly and consequentially the greatest number of days for pooled value of days to 50% sprouting (41.34 days). Check genotype 'HRSDG-01' recorded the pooled value of days to 50% sprouting (29.17 days) which was statistically insignificant from 'HRSDG-05' with 30.14 days and 'HRSDG-06' with 32.84 days but different from early group ('HRSDG-04' with 21.15 days, 'HRSDG-03' with 23.48 days and 'HRSDG-02' with 24.00 days) as well as late genotype ('HRSDG-07' with 41.34 days) for days to 50% sprouting. Of the evaluated genotypes in this experiment, only four genotype such as 'Check/HRSDG-01' (29.17 days), HRSDG-02' (24.00 days), 'HRSDG-03' (23.48 days) and 'HRSDG-04' (21.15 days) reflected more or less the similar results in those genotypes viz., 'City Light' (27.40 days), 'Praha' (24.60 days), 'Red Beauty' (23.40 days), and 'Oscar' (21.00 days) as evaluated by Ahmed et al. (2002) under Jammu and Kashmir condition of India.

The pooled values of per cent of corm sprouting were highly variable from 56.17 to 88.62 with the mean value of 72.54. The genotype 'HRSDG-04' showed the highest per cent of sprouting (88.62) but inconsequentially followed by 'HRSDG-03' with 83.90 and 'HRSDG-05' with 82.18. In contrast, three genotypes viz., 'HRSDG-06', 'HRSDG-02' and 'HRSDG-07' showed considerably the lowest per cent of sprouting (56.17, 61.69 and 64.78 respectively). Three genotypes viz., 'HRSDG-04', 'HRSDG-03' and 'HRSDG-05' were superior to check/'HRSDG-01' whereas three genotypes viz., 'check/HRSDG-01', 'HRSDG-07' and 'HRSDG-02' were statistically at par. On the contrary, 'HRSDG-06' was inferior to check/'HRSDG-01' in respect of per cent of corm sprouting (Table 1). The per cent of corm sprouting in three genotypes such as 'HRSDG-4' (88.62), 'HRSDG-3' (83.90) and 'HRSDG-5' (82.18) were in consonance with the results of two cultivars viz., 'Red Majesty' (86.23) and 'Early Yellow' (82.14) cited by Kareem et al. (2013).

The pooled value for the days taken to the first spike emergence was significantly variable from 76.42 to 90.99 with the mean value of 83.34. Two genotypes viz., 'HRSDG-02' and 'HRSDG-04' reflected considerably early for the days taken to the pooled value of the first spike emergence of spike (76.42 and 77.34 respectively). On the contrary, two genotypes viz., 'HRSDG-07' and 'HRSDG-06' showed remarkably the greatest number of days taken for the first spike emergence (90.99 and 87.50 respectively). As for the pooled value of days taken to the first spike emergence, only two genotypes viz., 'HRSDG-02' and 'HRSDG-04' were found superior to check/'HRSDG-01' but 'HRSDG-07' was found remarkably late as comparing to that of check/'HRSDG-01' in this regard (Table 2). Days taken to the first spike emergence of seven genotypes recorded in the study were relatively late in comparison to those in five genotypes viz., 'Priscilla' (80.87 days), 'Amsterdam' (74.00 days), 'Fidelio' (72.22 days), 'Peter Pears' (63.77 days) and 'Applause' (62.89 days) cited by by Shaukat et al. (2013).

The pooled value for the days taken to full spike emergence considerably varied from 80.00 to 93.49 with the mean

Table 1: Performance of seven promising genotypes of gladiolus on vegetative traits viz., days to 50% sprouting and per cent of corm sprouting during two consecutive years 2012/013 and 2013/014 at HRS, Dailekh.

Genotypes	Days to 50% sprouting			Per cent of Corm sprouting		
	2012/013	2013/014	Two years ' Pooled value	2012/013	2013/014	Two years ' Pooled value
Check/HRSDG-01	24.00	34.33	29.17	64.33	76.54	70.44
HRSDG-02	22.00	26.00	24.00	74.00	49.38	61.69
HRSDG-03	22.30	24.67	23.48	82.67	85.13	83.90
HRSDG-04	19.30	23.00	21.15	93.30	83.95	88.62
HRSDG-05	23.30	37.33	30.14	69.30	95.05	82.18
HRSDG-06	26.00	39.67	32.84	59.30	53.03	56.17
HRSDG-07	38.00	44.67	41.34	74.00	55.55	64.78
GM	24.98	32.81	28.90	73.84	71.23	72.54
F-test	**	**	**	**	**	**
LSD (0.01)	2.047	7.39	4.718	11.18	11.83	11.505
CV%	2.72	12.67	7.695	27.78	9.35	12.565

**** Highly significant**

value of 86.62. Two genotypes viz., 'HRSDG-02' and 'HRSDG-04' reflected considerably early for the days taken to the pooled value of the full spike emergence (80.00 and 81.34 respectively). On the contrary, two genotypes viz., 'HRSDG-07' and 'HRSDG-06' showed remarkably the greatest number of days taken for the full spike emergence (93.49 and 92.17 days respectively). As for the pooled value of days taken to the full spike emergence, only two genotypes viz., 'HRSDG-02' and 'HRSDG-04' were found superior to 'check/HRSDG-01' but 'HRSDG-07' and 'HRSDG-06' were found remarkably late as comparing to that of check/ 'HRSDG-01'(Table 2).

The pooled value for the number of marketable spikes/mother corm was recorded to be variable from 1.18 to 2.28 with the mean value of 1.69. The pooled number of marketable spikes /mother corm was significantly high in two genotypes viz., 'Check/HRSDG-01' (2.28) and 'HRSDG-04' (2.12). Genotype viz., 'HRSDG-07' produced remarkably the low pooled number of marketable spikes (1.18/mother corm). The pooled number of marketable spike/mother corm was statistically higher in 'check/HRSDG-01' than five genotypes: 'HRSDG-03' (1.70), 'HRSDG-06' (1.58), 'HRSDG-05' (1.56), 'HRSDG-02' (1.42), and 'HRSDG-07' (1.18) in (Table 3). The number of marketable spikes/ mother corm of seven genotypes in the study were comparably similar to those of six genotypes such as 'Subnam' (2.23), 'GS-10' and 'Urmil'(2.00), 'Sancerre' (1.60), 'Dhanvantri'(1.47/spike) and 'Peter Pears' (1.40) as reported by Choudhary et al. (2011). The number of marketable spike /mother corm is very much important as it decides the spike yield per unit area. In Gladiolus, the number of spikes /mother corm depends on the number of shoots/mother corm, which also decides the number of corms/mother corm (Shiramagondi and Hanamashetti, 1999).

The pooled value of plant height varied significantly from 100.05 cm to 147.50 cm with the mean value of 115.36 cm. Genotype 'HRSDG-01' had the shortest plant with 100.05 cm but its pooled plant height was at par with

Table 2: Performance of seven promising genotypes of gladiolus on vegetative traits viz., days to the first emergence of spike and days to full spike emergence during two consecutive years 2012/013 and 2013/014 at HRS, Dailekh.

Genotypes	Days to the first emergence of spike			Days to full spike emergence		
	2012/013	2013/014	Two years ' Pooled value	2012/013	2013/014	Two years ' Pooled value
Check/ HRSDG-01	84.67	85.00	84.84	88.00	88.00	88.00
HRSDG-02	75.00	77.83	76.42	79.33	80.67	80.00
HRSDG-03	85.00	84.67	84.84	87.00	87.67	87.34
HRSDG-04	76.00	78.67	77.34	81.00	81.67	81.34
HRSDG-05	79.30	83.67	81.49	81.00	87.00	84.00
HRSDG-06	85.00	90.00	87.50	91.67	92.67	92.17
HRSDG-07	91.30	90.67	90.99	93.30	93.67	93.49
GM	81.89	84.36	83.34	85.90	87.33	86.62
F-test	**	**	**	**	**	**
LSD (0.01)	3.93	3.05	3.490	3.325	3.39	3.357
CV%	6.67	2.03	4.320	6.35	2.19	4.870

**** Highly significant**

those of other four genotypes viz., 'HRSDG-04'(101.42 cm), 'HRSDG-07'(108.45 cm), 'HRSDG-05'(112.63 cm) and 'HRSDG-01'(113.85 cm). 'HRSDG-03' recorded remarkably the tallest plant (147.50 cm). The pooled value of plant height of check/'HRSDG-01' (113.85 cm) was inconsequential with those of other four genotypes viz., 'HRSDG-05'with 112.63 cm, 'HRSDG-07' with 108.45 cm, 'HRSDG-04' with 101.42 cm and 'HRSDG-02' with 101.05 cm (Table 3). Plant height(cm) in all evaluated genotypes were noted to be nearly in agreement with the results of plant height in six genotypes viz., 'Applause (146 cm),'Amsterdam'(136.70 cm),'Fidelio' (129.70 cm),'Peter Pears' (124.40 cm), 'Nova Lux'(117.70 cm) and 'Priscilla'(99.00 cm) as evaluated by Shaukat et al. (2015) under the Rawalakot condition of Pakistan.

The pooled results of six floral characters have been projected in table 4, 5 and 6. As for days taken to the first floret unfurling was considerably early in two genotypes viz., 'HRSDG-04' (86.17 days) and 'HRSDG-02' (86.67 days) but two genotypes such as 'HRSDG-07' and 'HRSDG-06' recorded considerably late for the days taken to the first floret unfurling (99.65 days and 96.67 days respectively). In respect of this floral character, the differences In 'Check/HRSDG-01' (93.84 days) were noted to be consequentially similar to those of 'HRSDG-03' (93.82 days) and 'HRSDG-05' (91.67 days).On the other hand, 'HRSDG-07' (99.65 days) was significantly late as comparing against the 'check/HRSDG-01' (93.84 days). All seven genotypes evaluated in the experiment proved almost same results as those three genotypes such as 'Hb-15-A' (84.67 days), 'Hb-15-4' (86.67 days) and 'Hb-2-22' (99.00 days) as assessed under low hills of Himanchal Pradesh, India by Nagi et al.(2014).

The pooled values of number of florets opening at a time was maximally the highest in 'HRSDG-06' (7.85) and minimally the lowest in 'HRSDG-07' (3.40 days) revealing the mean value of 6.29. Although 'HRSDG-06' reflected the highest pooled number of floret opening at a time (7.85) rest of genotypes such as 'HRSDG-03' (7.00) and 'HRSDG-05' (6.95) were at par with that of 'HRSDG-06'. 'HRSDG-07' recorded remarkably the lowest pooled number of floret opening at a time (3.40).Check/'HRSDG-01' (6.85) did not differ significantly

Table 3: Performance of seven promising genotypes of gladiolus on vegetative traits viz., number of marketable spikes /corm and plant height during two consecutive years 2012/013 and 2013/014 at HRS, Dailekh.

Genotypes	Number of marketable spikes / mother corm			Plant height (cm)		
	2012/013	2013/014	Two years ' Pooled value	2012/013	2013/014	Two years ' Pooled value
Check/ HRSDG-01	3.00	1.56	2.28	112.30	115.40	113.85
HRSDG-02	1.67	1.17	1.42	99.00	101.10	100.05
HRSDG-03	1.67	1.72	1.70	152.30	142.70	147.50
HRSDG-04	2.30	1.94	2.12	103.67	99.17	101.42
HRSDG-05	1.67	1.45	1.56	112.67	112.60	112.63
HRSDG-06	1.67	1.49	1.58	121.30	125.80	123.55
HRSDG-07	1.30	1.06	1.18	104.30	112.60	108.45
GM	1.91	1.48	1.69	115.09	115.63	115.36
F-test	NS	**	*	**	**	**
LSD (0.01)	-	0.35	0.19	25.405	10.56	17.98
CV%	40.34	13.21	26.77	16.45	5.13	10.79

NS Non-significant * Significant **highly significant

from 'HRSDG-02' (6.75) in this regard (Table 4). The pooled number of floret opening at a time recorded in the present study was comparatively high In comparison to the findings registered by Choudhary et al. (2011) under the condition of Rajasthan, India as the values of number of floret opening at a time were found varying from 3.33 ('Chandani' and 'GS-2') to 5.33 ('Priscilla') with the mean value of 4.30.

Table 4: Performance of seven promising genotypes of gladiolus on vegetative traits viz., days to the first floret unfurling and number of florets opening at a time during two consecutive years 2012/013 and 2013/014 at HRS, Dailekh.

Genotypes	Days to the first floret unfurling			Number of florets opening at a time		
	2012/013	2013/014	Two years ' Pooled value	2012/013	2013/014	Two years ' Pooled value
Check/ HRSDG-01	94.00	93.67	93.84	6.80	6.90	6.85
HRSDG-02	85.00	88.33	86.67	6.80	6.70	6.75
HRSDG-03	94.30	93.33	93.82	7.00	7.00	7.00
HRSDG-04	85.00	87.33	86.17	5.20	5.00	5.10
HRSDG-05	89.00	94.33	91.67	7.00	6.90	6.95
HRSDG-06	94.00	99.33	96.67	7.80	7.90	7.85
HRSDG-07	100.30	99.00	99.65	3.30	3.50	3.40
GM	91.61	93.62	92.62	6.30	6.27	6.29
F-test	**	**	**	**	**	**
LSD (0.01)	3.013	3.16	3.086	0.975	0.970	0.973
CV%	6.03	1.90	3.965	23.54	21.42	22.480

** Highly significant

The pooled value of floret diameter (cm) significantly varied from 5.53 to 9.92 with the mean value of 8.04 cm. Despite the widest floret diameter in 'HRSDG-03' (9.92 cm), it was at par with two genotypes such as 'HRSDG-06' (9.36 cm) and 'HRSDG-01' (9.17 cm). In contrast, 'HRSDG-07' recorded remarkably the narrowest pooled diameter (5.53 cm) which was consequentially different from those of other five genotypes viz., 'HRSDG-02' (7.15 cm), 'HRSDG-05' (7.52 cm), 'HRSDG-04' (7.66 cm), 'HRSDG-01' (9.165 cm) and 'HRSDG-03' (9.92 cm). 'Check/HRSDG-01' with 9.17 cm reflected inconsequentially similar to those of two genotypes viz., 'HRSDG-03' (9.92 cm) and 'HRSDG-06' (9.36 cm) but 'check/HRSDG-01' was consequentially different from those of 'HRSDG-04' (7.66 cm), 'HRSDG-05' (7.52 cm), 'HRSDG-02' (7.15 cm) and 'HRSDG-07' (5.53 cm) in this regard (Table 5). The pooled floret diameter of all seven genotypes varying from 5.53 cm to 9.92 cm in the recent study showed more or less analogous findings of eleven different genotypes by Negi et al. (2014) as they recorded the floret size varying from 4.83 cm ('Hb-6-31') to 9.00 cm ('Hb-2-52') in their study under low hill of Himanchal Pradesh, India.

The pooled values of number of floret/spike were noted to be consequentially variable between 11.95 and 19.54 with mean value of 15.70. The genotype 'HRSDG-03' recorded the greatest number of florets (19.54/spike) inconsequentially followed by HRSDG-06' (17.67/spike). In contrast, HRSDG-07' produced the lowest number of florets (11.95/spike) inconsequentially followed by 'HRSDG-04' (13.47/spike). The number of florets of check/HRSDG-01' (15.14) was at par with those of two genotypes viz., 'HRSDG-02' (15.44/spike) and 'HRSDG-05' (16.67/spike). Since any genotype having more than 12 florets /spike is contemplated as suitable one for marketing purpose, leaving out 'HRSDG-07' (11.95 florets/spike), remaining six genotypes viz., 'HRSDG-01' (15.14 spike), 'HRSDG-02' (15.44 /spike), 'HRSDG-03' (19.54/spike), HRSDG-04' (13.47/spike), HRSDG-05' (16.67/spike) and 'HRSDG-06' (17.67/spike) were more or less suitable for marketing as cut flower (Table 5). Of evaluated seven genotypes, five genotypes viz., 'HRSDG-03' (19.54/spike), 'HRSDG-06' (17.67/spike), 'HRSDG-02' (15.44/spike), 'Check/HRSDG-01' (15.14/spike) and 'HRSDG-04' (13.47/spike) noted in the study reflected nearly analogous results to those of six genotypes viz., 'Peter Pears' (19.00/spike), 'Applause' (18.66/spike), 'Amsterdam' (16.89/spike), 'Nova Lux' (16.00/spike), 'Fidelio' (15.66/spike) and 'Priscilla' (13.55/spike) which

Table 5: Performance of seven promising genotypes of gladiolus on vegetative traits viz., floret diameter and number of florets/ spike during two consecutive years 2012/013 and 2013/014 at HRS, Dailekh.

Genotypes	Floret diameter (cm)			Number of florets/ spike		
	2012/013	2013/014	Two years ' Pooled value	2012/013	2013/014	Two years ' Pooled value
Check/HRSDG-01	9.70	8.63	9.17	15.00	15.27	15.14
HRSDG-02	7.60	6.69	7.15	15.67	15.20	15.44
HRSDG-03	10.30	9.54	9.92	21.00	18.07	19.54
HRSDG-04	8.20	7.12	7.66	13.67	13.27	13.47
HRSDG-05	7.96	7.08	7.52	16.30	17.03	16.67
HRSDG-06	9.50	9.22	9.36	17.67	17.67	17.67
HRSDG-07	3.67	7.38	5.53	12.30	11.60	11.95
GM	8.13	7.95	8.04	15.95	15.44	15.70
F-test	**	**	**	**	**	**
LSD (0.01)	0.89	0.75	0.82	2.352	1.48	1.916
CV%	25.21	5.31	15.26	17.67	5.39	11.53

** Highly significant

were assessed by Shaukat et al.(2015) under the Rawalakot condition of Pakistan.

The pooled values of spike length (cm) were remarkably variable between 87.57 and 132.94 with mean value of 102.90 cm. The genotype 'HRSDG-03' possessed the longest spike (132.94 cm) consequentially followed by 'HRSDG-06' (109.70 cm) and 'HRSDG-01' (101.15 cm). On the contrary, 'HRSDG-02' possessed the shortest spike (87.57 cm) in spite of being at par with other five genotypes: 'HRSDG-04'(90.75 cm), 'HRSDG-07'(98.33 cm), 'HRSDG-05'(99.42 cm), 'HRSDG-06'(109.70 cm) and 'HRSDG-01'(101.15 cm).The spike length of check/'HRSDG-01' (101.15 cm) was considerably shorter than that of'HRSDG-03' (132.94 cm) but inconsequentially similar to those of other four genotypes viz., 'HRSDG-05' with 99.42 cm, 'HRSDG-07' with 98.33 cm, 'HRSDG-04' with 90.75 cm and 'HRSDG-02' with 87.57 cm (Table 6).

The pooled values of rachis length (cm) were noted to be consequentially different from 48.95 cm to 71.81 cm with the mean value of 58.29 cm. The genotype 'HRSDG-03' possessed the longest rachis (71.81 cm) inconsequentially followed by 'HRSDG-05' (66.61 cm) and 'HRSDG-06' (61.95 cm). On the contrary, 'HRSDG-07' possessed the shortest rachis (48.95 cm) in spite of being at par with other three genotypes: 'HRSDG-02'(49.54 cm), 'HRSDG-04'(50.95 cm), and 'Check/HRSDG-01'(58.25 cm).The rachis length of 'check/HRSDG-01' (58.25 cm) was considerably shorter than that of 'HRSDG-03' (71.81 cm), but inconsequentially similar to those of other two genotypes viz., 'HRSDG-06' with 61.95 cm, and 'HRSDG-05' with 66.61 cm (Table 6). The rachis length of seven genotypes in the recent study imparted almost similar results to those of seven cultivars viz., 'White Prosperity' (67.80 cm), 'Popy Tear' (61.73cm),'Candyman' as well as 'Red Majesty' (61.33cm), 'Jester'(59.47 cm),'Red Beauty' (56.33 cm) and 'Charm Flow' (57.47 cm) accordingly as noted under Gujarat condition of India by Chourasia et al.(2015).

Table 6: Performance of seven promising genotypes of gladiolus on vegetative traits viz., Spike length and rachis length during two consecutive years 2012/013 and 2013/014 at HRS, Dailekh.

Genotypes	Spike length (cm)			Rachis length (cm)		
	2012/013	2013/014	Two years ' Pooled value	2012/013	2013/014	Two years ' Pooled value
Check/HRSDG-01	102.30	100.90	101.15	59.00	57.50	58.25
HRSDG-02	89.30	85.83	87.57	51.30	47.77	49.54
HRSDG-03	142.67	123.20	132.94	76.67	66.95	71.81
HRSDG-04	95.00	86.49	90.75	52.67	49.23	50.95
HRSDG-05	102.67	96.17	99.42	65.00	68.21	66.61
HRSDG-06	111.00	108.40	109.70	62.20	61.70	61.95
HRSDG-07	96.67	99.98	98.33	48.30	49.60	48.95
GM	105.66	100.14	102.90	59.30	57.28	58.29
F-test	**	**	**	**	**	**
LSD (0.01)	27.170	10.76	18.695	11.03	11.08	11.055
CV%	17.84	6.04	11.940	16.64	10.87	13.755

**** Highly significant**

CONCLUSION

The present study anticipated that genotype 'HRSDG-04' proved to be the most suitable Gladiolus varieties for cultivation under the agro-climatic conditions of mid-hills of Dailekh and similar agro-climatic condition of mid-hills across the country. As this genotype revealed most of the characters viz., days taken to 50% sprouting, per cent of sprouting, days taken to the first spike emergence and full spike emergence, number of marketable spikes per corm, days taken to the first floret unfurling and plant height in the best ways in for suitable garden display and cut flower. Secondly, 'HRSDG-03' was proven to be having maximally high number of floret opening at a time, floret diameter, number of florets per spike, plant height coupled with rachis length and spike length as being the best for giant flower purpose.

REFERENCES

- Ahmed, M.J., J.Akbar, N.Kosar and Z.A. Khan.2002.Introduction and Evaluation of Exotic Gladiolus (*Gladiolus grandiflorus*) Cultivars. *Asian Journal of Plant Science* 1(5):560-562).
- Cantor, M. D. and R. Pop.2011.Evaluation of Promising Hybrids of *Gladiolus hybridus* L. *Journal of Ornamental Horticulture* 7 (3-4):71-74.
- Choudhary, M., S.K. Mood, A.Kumari and B.S, Beniwal. 2011. Evaluation of *Gladiolus* (*Gladiolus hybridus* Hort) Varieties for Cut Flower Production under Sub-tropical Condition of Rajasthan. *Crop Research* 41 (1, 2 and 3):123-126.
- Chourasia, A., R.R.Viadia, H. Ansar and S. Madle.2015. Evaluation of Different *Gladiolus* Cultivars for Growth, Flowering, Spike Yield and Corm Yield under Saurashtra Region of Gujarat. *An International Quarterly Journal of Life Sciences* 1(1):131-134.
- Grieving, A.J.1987.G87-852 Growing *Gladiolus*. Historical Material from University of Nebraska –Lincoln Extension Paper 978.<http://digitalcommons.unl.edu/extdharZensionhist/978>.
- Kareem, A., M.A. Khan, S.U.Rehman and I.Afzal.2013. Different Corm Sizes Affect Performances of *Gladiolus* cvs.Red Majesty and Early Yellow. *Advances in Zoology and Botany* 1 (4):86-91.
- Mishra, P. S., A.K. Singh and O.P. Singh.2014. Genetic Variability, heritability, Genetic advance, correlation coefficient and path analysis in *gladiolus*. *IOSR Journal of Agriculture and Veterinary Science* 7: 23-26 www.iosrjournals.org
- Negi, R., S. Kumar and S.R. Dhiman.2014.Evaluation of Different Cultivars of *Gladiolus grandiflorus* L.) Suitable for Low Hills of Himanchal Pradesh. *Indian Journal of Science Research and Technology* 2 (6):6-11.
- Shaukat, S.K., S.Z.A. Shah and S. W. Shaukat. 2013. Performance of *Gladiolus* (*Gladiolus grandiflora* L.) Cultivars under the Climatic Conditions of Bagh Azad Jammu and Kashmir, Pakistan. *Journal of Central European Agriculture* 14(2):636-645.
- Shaukat, S.A., Shah, S.Z.A., Aslam, M. Shaukat, S.K. and S.W. Shaukst.2015.Performance of *Gladiolus* Cultivars under Rawalakot AJ and K conditions. Pakistan. *Journal of Recent Advances in Agriculture* 3 (2):351-355.
- Shiramagond, M.S. and S.I.Hanamashetti.1999.Evaluation of Varieties in *Gladiolus* under Ghataprapha Command Areas. *Karnataka Journal of Agricultural Science* 12(1-4):159-163.
- Singh, A.K.2006. Cultivation and Management of *Gladiolus* Flower Crops. Publishing Agency Pitampura, New Delhi-110086, Pp.147-166.