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Suitability of cut corm as planting materials on flowering and corm-cormel production of gladiolus cultivars

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ABSTRACT

An experiment was conducted to study the cut corm as planting materials on flowering and corm-cormel production of gladiolus cultivars. Four different colored gladiolus viz. yellow (V_1), lemon yellow (V_2), white (V_3), pink (V_4) and cut corm viz. half corm (C_1) with whole corm (control, C_2) were used in experiment. Maximum floret number (13.0/spike), basal floret head diameter (9.2 cm) and vase life (5.2 days) was found from V_1. All the studied characters were found statistically similar result between C_1 and C_2. Use of the cut corm did not affect the significantly on the floral and reproductive characters. All cultivars were performed satisfactorily with cut corm. Number of floret/spike reduction was 10.2% in V_1, 19.7% in V_2 while no reduction in V_3 and V_4 in half corm over whole corm. Number of corm/plot was reduced 4.5% in V_1, 11.2 % in V_2 while increased 4.5% in V_3 and no reduction in V_4 in half corm over whole corm. Therefore using half corm may be beneficial for farmers by reducing half of the planting materials for gladiolus production.

Keywords: *Gladiolus, reproductive attributes, half corm and whole corm*

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I. Introduction

Gladiolus (*Gladiolus grandiflorus* L.) belonging to *Iridacee* has great demand in international cut flower market. Gladiolus is grown commercially from corms both for the flowering spikes and for corm production and it is principally propagated by natural multiplication of new corms and cormels (Memon *et al.*, 2009; Hartman *et al.*, 1990; Ziv and Lilien-kipnis, 1990). However, owing to their low rate of multiplication and to a high percentage of spoilage of corms during storage, there is an insufficient supply of planting material (Memon *et al.*, 2012; Singh and Dohare, 1994). A mother corm normally produces one new daughter corm each season along with several cormels. These cormels require three to four seasons to attain sufficient size for flowering. Physiological dormancy of corms and cormels usually lasts for 4–5 months and incidence corm rot during storage are major problems (Priyakumari and Sheela, 2005). In such a case, propagation may be done by cutting the corms into

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several pieces to increase the number of planting material. The segment of corm to be used as a propagule should have at least one eye and a portion of basal plate or root zone. The corms are cut 7 to 10 days before planting. Small corms can be divided into 3 to 4 pieces while the large one can be divided into 7 to 10 pieces (Gromov, 1972). Better results can be obtained when radical cuts are made. Large numbers of cultivars are developed every year and hundreds of cultivars degenerated every year and these cultivars varied in their performance (Deshraj and Misra, 1998; Joshi *et al.*, 2011). Establishing a relationship between the different varieties of gladiolus, application of whole corm with half cut corm and quality and quantity of cut flower and corm produced will facilitate the use of cut corms for cut flower production thus increasing the number of planting material to many folds. Current study was undertaken to select the suitable variety using half cut corm to minimize the requirement of planting materials.

II. Materials and Methods

Experimental site and duration: The present investigations were carried out at the Sher-e-Bangla Agricultural University, Dhaka, Bangladesh experimental fields from the October 2012 to March 2013.

Experimental design: A 4 x 2 (4 cultivars x 2 corm types) factorial experiment was laid out in a Randomized Complete Block Design with 3 replications.

Treatments of the experiment: Gladiolus variety (V_1: Yellow colored; V_2: Lemon yellow colored; V_3: White colored and V_4: Pink colored) and corm types (C_1: Half cut corm and C_2: Whole corm) were used in the experiment.

Plot size: The size of unit plot was 1.0 m x 0.6 m. The distance between the blocks was 0.5 m and between the plots was 0.5 m. The plots were raised up to 15 cm.

Procedure for the application of treatments: Large corms were cut into two sections, retaining a bud with each section. Dithane M-45 was applied to the segments and whole corm to prevent fungus. Then the segments and whole corms are treated with GA_3 to break dormancy.

Planting of the corms: Corms were planted at 7 cm depth in the plot maintaining 20 cm x 20 cm spacing. In each plot, 15 corms were planted.

Data collection: Data were collected on days to 80% germination, plant height (cm), leaf area (cm^2), number of days taken for flower spike initiation (visual observation), number of days taken for first floret opening, spike length (cm), spike diameter (mm), number of floret/spike, basal floret head diameter (cm), number of daughter corms/plot, number of cormels/plot, single corm weight (g), single corm diameter (cm) and vase life. The leaf area was measured at 60 DAP using CL-202 Leaf Area Meter by destructive method. Spike length was measured from 25 cm above of the internode to fourth leaf up to tip of spike. Spike and corm diameter was measured using Digital Caliper-515 (DC-515). Vase life was measured using tap water.

Statistical analysis: Collected data were statistically analyzed using MSTAT-C computer package programme. Difference between treatments was assessed by Duncan's Multiple Range Test (DMRT) test at 5% level of significance (Gomez and Gomez, 1984).

III. Results and Discussion

Days to 80% germination

Maximum days were required for 80% germination by V_4 (26.7 days) whereas minimum from V_2 (19.3 days) which was statistically similar with V_1 and V_3 (Table 01). Corm size of V_4 was smaller than other varieties. Bigger corms took half time to sprout than smaller corms (Singh, 1998). Larger sized corm sprouted faster than the smaller one, which might be due to more food reserve in larger corm than

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smaller ones and hence metabolic activities also takes place at a faster rate. Sprouting and germination from half corm was pictorially presented on Plate 1. Maximum days required for 80% germination by C_1 (23.8 days) whereas lowest from C_2 (19.0 days) (Table 02). Earlier germination was found from whole corm than small corm (Laishram *et al.*, 2011). This may be attributed to the fact that dormancy breaking of apical bud takes place earlier than that of axillary bud present on the cut pieces. This could be due to segments had to undergo injuries and therefore took more time to produce callus and to heal. Maximum days required for 80% germination was observed in V_4C_1 (30.3 days) whereas the minimum from V_1C_2 and V_2C_2 (17.3 days) (Table 03).

a)

b)

Plate 01. a) Sprouting from half cut corm and b) Seedling germination from half cut corm

Plant height

Tallest plant was found from V_2 (121.7 cm) which was statistically similar with V_1 (118.7 cm) while shortest V_4 (87.7 cm) at 80 days after planting (DAP) (Table 01). Plant height variations in gladiolus varieties were also observed previously by Dod *et al.* (1989), Saini *et al.* (1991), Sidhu and Arora (2000) and Kishan *et al.* (2005). Several varieties of the same species behave different even grown under same environment (Mushtaq *et al.*, 2013). Variation in plant height among varieties may be due to genetic variation and difference in adaptation to agro-climatic condition. Tallest plant was found in C_2 (111.0 cm) whereas minimum from C_1 (105.5 cm) at 80 DAP and these were statistically identical (Table 02). Whole corm provided tallest plant which was similar with ½ excised corms in gladiolus cv. Jester (Barman *et al.*, 2006). Large sized half corm (117.7 cm) showed tallest plant height (Laishram *et al.*, 2011). This may be due to more stored food material and sufficient hormone in whole corm which helped in early and rapid plant growth. Cutting of corm may also cause leaching of nutrients which results shorter plant. Tallest plant was recorded in V_2C_2 (131.00 cm) at 80 DAP. The shortest plant was recorded in V_4C_2 (88.3 cm) at 80 DAP (Table 03).

Leaf area

Maximum leaf area was found from V_2 (97.2 cm^2) whereas minimum V_3 (76.1 cm^2) which was statistically similar with V_4 (76.5 cm^2) (Table 01). Mushtaq *et al.* (2013) found Pietmohlen variety (150.0 cm^2) showed maximum leaf area and Florared variety (90.0 cm^2) showed minimum. This result is also agreed with the findings of Dhankhar *et al.* (1999); Sharma *et al.* (2006) and Padmalatha *et al.*, (2013). This might be due to different varieties contain different concentration level of carbon, nitrogen, phosphorous and potassium. Maximum leaf area was found in C_2 (93.0 cm^2) while minimum in C_1 (78.2 cm^2) and these were statistically identical (Table 02). Maximum leaf area given by whole corm was due to having more food assimilates, resulting in plants acquiring optimum growth and development also may be due to difference between CO_2 uptakes during photosynthesis. Maximum leaf area was found in V_2C_2 (106.6 cm^2) while minimum from V_4C_2 (69.6 cm^2) which was statistically identical with V_3C_2 and V_3C_1 (Table 03).

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Days to basal floret opening

Early basal floret opening was found from V_1 (43.7 days), C_2 (44.8 days) and V_1C_1 (40 days) while late from V_2 (59.8 days), C_1 (53.5 days) and V_4C_1 (65 days) (Table 01, 02 and 03). Variation among the variety was also found by Rani and Singh (2005); Dalal *et al.* (2006); Rashmi (2006) and Mushtaq *et al.* (2013).

Spike length

Longest spike was found in V_3 (65.2 cm) which was statistically identical to V_1 (63.0 cm) whereas shortest in V_4 (45.2 cm) (Table 01). Length of flower spike was significantly influenced by different variety (Basavaraddy, 2004; Shiramagond and Hanamashetti, 1999; Dalal *et al*., 2006; Hossain *et al.*, 2011). Longest spike was recorded in C_2 (59.6 cm) whereas shortest in C_1 (54.0 cm) and these were statistically identical (Table 02). Significantly longer spike (105.8 cm) was obtained from large corm cut into two pieces (Laishram *et al.*, 2011). Longest spike was recorded in V_3C_2 (68.7 cm) whereas shortest in (43.0 cm) in V_4C_1 (43.0 cm) which was statistically identical with V_4C_2 (47.3 cm) and V_2C_1 (48.0 cm) (Table 03).

Spike Diameter

Thicker spike was found from V_2 (10.4 mm) which was statistically identical with V_1 (10.0 mm) and V_3 (9.2 mm) whereas thinner from V_4 (6.4 mm) (Table 01). Similar result was also found by Kamble (2001) and Rashmi (2006). Spike diameter determines sturdiness which is important character of cut flowers (Malik, 1968). Thinner spikes have less sturdiness which caused bending after some time in vases. Thicker spike was found from C_2 (9.5 mm) whereas thinner from C_1 (8.5 mm) and these were statistically identical (Table 02). Thicker spike was found in V_2C_2 (10.8 mm) thinner from V_4C_1 (5.8 mm) (Table 03).

Number of florets per spike

Maximum number of florets/spike was found from V_1 (13.0) which was statistically identical with V_2 (12.3) whereas minimum from V_4 (9.3) (Table 01). Number of florets/spike was significantly influenced by different variety (Basavaraddy, 2004; Patil, 2003; Kamble, 2001; Ram *et al*., 2005; Dalal *et al*., 2006) and floret no./spike ranged from 5.3 to 20.0 (Negi *et al*., 1982); 8.0 to 18.0 (Lal and Pant, 1989) and 8.4 to 14.3 (Hossain *et al*., 2011). Plant height and spike length had direct influence on number of florets per spike and improvement in spike length and plant height directly increased number of florets per spike (Mahesh *et al*., 2011). Maximum number of florets/spike was found from C_2 (12.1) whereas minimum from C_1 (11.1) and these were statistically identical (Table 02). Large corm cut into two pieces produced significantly higher number of florets/spike (14.7) followed by medium corm cut into two pieces (14.3) (Laishram *et al*., 2011). Maximum number of florets/spike was from V_1C_2 and V_2C_2 (13.7) which were statistically identical with V_1C_1 (12.3) while minimum from V_4C_1 and V_4C_2 (9.3) (Table 03).

Basal floret head diameter

Maximum basal floret diameter was found from V_1 (9.2 cm) which was statistically similar with lemon yellow variety (9 cm) and minimum diameter of floret head was observed in white and pink variety (8.1 cm) (Table 01). The varieties varied significantly with respect to the floret head diameter (Ram *et al*., 2005 and Rashmi, 2006). This may be due to different plant height of these varieties. Diameter of florets indicating that with the incensement of plant height this associated character could be improved (Kumar *et al*., 2011). Bigger floret head was found C_2 (8.8 cm) whereas minimum from C_1 (8.4 cm) but these were statistically identical (Table 02). Diameter of first floret was significantly bigger in large and medium half corm and small whole corm (11.4 cm to 11.5 cm) (Laishram *et al.*, 2011). Maximum floret head diameter (9.5 cm) was recorded in V_2C_2 (9.5 cm) which was statistically similar with V_1C_2 (9.3 cm) while minimum floret head diameter was recorded with V_3C_1 and V_4C_1 (8.0 cm) which was statistically similar with V_3C_2 (8.2 cm) and V_4C_2 (8.2 cm) (Table 03).

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Table 01. Response of gladiolus variety to different growth and flowering attributes[x]

Treatment	Days to 80% germination		At 80 DAP Plant height (cm)		At 80 DAP Leaf area (cm^2)		Days to basal floret opening		Spike length (cm)		Spike diameter (mm)		No. of floret/ spike		Basal floret head diameter (cm)	
V_1	19.7	b	118.7	a	92.6	ab	43.7	c	63.0	a	10.0	a	13.0	a	9.2	a
V_2	19.3	b	121.7	a	97.2	a	59.8	a	53.8	b	10.4	a	12.3	ab	9.0	a
V_3	20.0	b	105.0	b	76.1	b	47.7	bc	65.2	a	9.2	a	11.7	b	8.1	b
V_4	26.7	a	87.7	c	76.5	b	55.5	ab	45.2	c	6.4	b	9.3	c	8.1	b
$LSD_{0.05}$	*2.7*		*9.0*		*17.1*		*8.3*		*6.2*		*1.4*		*1.2*		*0.7*	
CV%	*10.1*		*6.7*		*16.2*		*12.9*		*8.9*		*12.3*		*8.4*		*6.8*	

[x]In a column means having similar letter (s) are statistically identical and those having dissimilar letter (s) differ significantly as per 0.05 level of probability

Table 02. Effect of corm division on different growth and flowering attributes[x]

Treatment	Days to 80% germination		At 80 DAP Plant height (cm)		At 80 DAP Leaf area (cm^2)		Days to basal floret opening		Spike length (cm)		Spike diameter (mm)		No. of floret/ spike		Basal floret head diameter (cm)	
C_1	23.8	a	105.5	a	78.2	b	53.5	a	54.0	a	8.5	a	11.1	a	8.4	a
C_2	19.0	b	111.0	a	93.0	a	49.8	a	59.6	a	9.5	a	12.1	a	8.8	a
$LSD_{0.05}$	*3.4*		*7.8*		*10.8*		*4.1*		*6.1*		*1.8*		*1.8*		*1*	
CV%	*10.1*		*6.7*		*16.2*		*12.9*		*8.9*		*12.3*		*8.4*		*6.8*	

[x]In a column means having similar letter (s) are statistically identical and those having dissimilar letter (s) differ significantly as per 0.05 level of probability

Table 03. Interaction effect of gladiolus variety and corm division on different growth and flowering attributes[x]

Treatment	Days to 80% germination		At 80 DAP Plant height (cm)		At 80 DAP Leaf area (cm^2)		Days to basal floret opening		Spike length (cm)		Spike diameter (mm)		No. of floret/ spike		Basal floret head diameter (cm)	
V_1C_1	22.0	bc	118.3	bc	81.0	bc	40.0	d	63.3	ab	9.5	ab	12.3	ab	9.0	ab
V_1C_2	17.3	d	119.0	ab	104.1	ab	47.3	cd	62.7	ab	10.4	ab	13.7	a	9.3	a
V_2C_1	21.3	bc	112.3	bcd	87.8	abc	57.7	abc	48.0	c	10.0	ab	11.0	bc	8.5	ab
V_2C_2	17.3	d	131.0	a	106.6	a	62.0	ab	59.7	b	10.8	a	13.7	a	9.5	a
V_3C_1	21.7	bc	104.3	d	74.2	c	51.3	bcd	61.7	ab	8.7	bc	11.7	b	8.0	b
V_3C_2	18.3	cd	105.7	cd	78.0	c	44.0	d	68.7	a	9.7	ab	11.7	b	8.2	b
V_4C_1	30.3	a	87.0	e	69.6	c	65.0	a	43.0	c	5.8	d	9.3	c	8.0	b
V_4C_2	23.0	b	88.3	e	83.4	abc	46.0	cd	47.3	c	6.9	cd	9.3	c	8.2	b
$LSD_{0.05}$	*3.8*		*12.7*		*24.2*		*11.7*		*8.8*		*1.9*		*1.7*		*1.0*	
CV%	*10.1*		*6.7*		*16.2*		*12.9*		*8.9*		*12.3*		*8.4*		*6.8*	

[x]In a column means having similar letter (s) are statistically identical and those having dissimilar letter (s) differ significantly as per 0.05 level of probability

Number of corms per plot: Gladiolus cultivars showed identical to number of corms/plot production. Maximum number of corms/plot was found from V_2 (13.5) while minimum from V_4 (12.7) (Table 04). Maximum and minimum number of corms/plant was produced by American beauty and apple blossom respectively (Shiramagond and Hanamashetti, 1999). Variety of gladiolus varied in respect of corm production (Anuradha and Gowda, 1994; Ram *et al.*, 2005 and Hossain *et al.*, 2011). Corm production from half corm and whole corm was pictorially represented in Plate 02. Maximum number of corm was found from C_2 (13.3) while minimum from C_1 (12.8) and these were statistically identical (Table 05). Whole corm produced maximum 1.3 corm/plant (Laishram *et al.*, 2011). Highly significant effect of cut corm technique was noted on number of corm/plant (Memon *et al.*, 2009). Maximum number of corm/plot was recorded in V_2C_2 (14.3) which was statistically similar to all other treatments while the minimum from V_4C_2, V_4C_1, V_3C_2 V_2C_1 and V_1C_1 (12.7) (Table 06). Compared to

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whole corm, significant reductions occurred in response to half corm in white friendship and peter pears (Memon *et al.*, 2009).


a)


b)

Plate 02. a) Corm produced from half corm and b) Corm produced from whole corm

Number of cormels per plot

Maximum number of cormels/plant was found from V_2 (647.5/plot) while minimum from V_4 (428.2/plot) (Table 04). Production of number of cormels varied with variety (Shiramagond and Hanamashetti, 1999; Ram *et al*., 2005; Hossain *et al*., 2011). Maximum number of cormels was found from C_2 (555.7/plot) while minimum from C_1 (527.6/plot) but these were statistically similar (Table 05). Large half corm showed maximum cormel production (Laishram *et al.*, 2011). Cormel no/plant varied significantly due to cut corm technique (Memon *et al.*, 2009). Maximum number of cormels was found from V_1C_2 (662.7/plot) while minimum from V_4C_1 (418.3) (Table 06). The number of cormels significantly decreased in white friendship, peter pears and tradehorn for half corm compare to whole corm (Memon *et al.*, 2009).

Weight of single corm (g)

Maximum weight of single corm was found from V_2 (96.3 g) whereas minimum from V_4 (45.8 g) (Table 04). Similar results were found by Sidhu and Arora (2000), Ram *et al*., 2005; Kumar (2009) and Hossain *et al*., (2011). This may be attributed to the good vegetative growth of plants in initial stages, which provides good amount of photosynthates for storage in corms. It may also due to highest corm weight and corm size at the time of planting. Maximum corm weight was found from C_2 (68.9 g) whereas minimum from C_1 (64.8) but these were statistically identical (Table 05). Large half corm produced significantly heavier corm (Laishram *et al*., 2011). It may be mentioned here that when the half corm or small whole corm were planted, the innermost corms developed on the terminal bud were larger and heavier than the outer corms which were smaller and lighter, implying that the available food materials were first translocated to the central corms and thereafter to the laterals. Maximum weight of single corm was recorded in V_2C_2 (99.5 g) whereas minimum from V_4C_1 (44.3 g) which was statistically identical with V_4C_2 (47.3 g) (Table 06). Peter pears showed significantly higher corm weight than other varieties when treated with half corm (Memon *et al.*, 2009).

Diameter of single corm

Maximum corm diameter was found from V_2 (67.3 mm) while minimum from V_4 (53.2 mm) (Table 04). Significant differences were recorded among varieties for corm diameter (Ram *et al*., 2005; Rashmi, 2006 and Kumar, 2009). But maximum diameter of corm was found from C_2 (61.3 mm) whereas minimum from C_1 (58.5 mm) (Table 05). Half corm produced significantly large corm diameter (59.5 mm) (Laishram *et al.*, 2011). Cut corm application did not significantly influence corm diameter (Memon *et al*., 2009). Maximum diameter of single corm was recorded in V_2C_2 (68.2 mm which was statistically identical with V_2C_1 (66.4 mm). On the other hand, the minimum diameter of single corm was recorded with V_4C_1 (51.6 mm) (Table 06). Interaction of varieties and cut corm application was

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highly significant and the maximum diameter was obtained in whole corm with tradehorn (Memon *et al.*, 2009).

Vase life

Maximum vase life was found from V_1 (5.2 days) while minimum in V_4 (4.0 days) (Table 04). Shiramagond and Hanamashetti (1999), Sidhu and Arora (2000) and Patil (2003) found significant variation among varieties for vase life. The typical vase life of individual florets is just 4-6 days and senescent florets remain at the bottom of the spikes after the opening of upper florets. A novel gene encoding cysteine protease (GgCyP) homologue is induced during senescence of gladiolus (Arora and Singh, 2004). Maximum vase life was found from C_1 (4.5 days) whereas minimum from C_2 (4.5 days) (Table 05). Large and medium half corm (13.8 days) showed significantly longer vase life (Laishram *et al.*, 2011). This may be due to decreased size of the half corm. Half corm plant produced lower leaf area, spike length and spike diameter which may be correlated with shorter vase life. Maximum vase life was observed in V_1C_2 (5.7 days) whereas minimum in V_4C_1 and V_4C_2 (4.0 days) (Table 06).

Table 04. The effect of variety on reproductive attributes and vase life[x]

Treatment	Number of corm/plot		Number of cormels/plot		Single corm weight (gm)		Single corm diameter (mm)		Vase life (days)	
V_1	13.0	a	559.0	b	68.9	b	62.0	b	5.2	a
V_2	13.5	a	647.5	a	96.3	a	67.3	a	4.7	ab
V_3	13.0	a	531.8	b	56.5	c	57.3	c	4.5	bc
V_4	12.7	a	428.2	c	45.8	d	53.2	d	4.0	c
$LSD_{0.05}$	*1.3*		*49.9*		*3.0*		*3.6*		*0.6*	
CV (%)	*8.0*		*7.4*		*3.6*		*4.8*		*10.5*	

[X]In a column means having similar letter (s) are statistically identical and those having dissimilar letter (s) differ significantly as per 0.05 level of probability

Table 05. The effect of cut corm on reproductive attributes and vase life[x]

Treatment	Number of corm/ plot		Number of cormels/plot		Single corm weight (gm)		Single corm diameter (mm)		Vase life (days)	
C_1	12.8	a	527.6	a	64.8	a	58.5	a	4.5	a
C_2	13.3	a	555.7	a	68.9	a	61.3	a	4.7	a
$LSD_{0.05}$	*0.9*		*34.2*		*4.6*		*3.2*		*0.4*	
CV (%)	*8.0*		*7.4*		*3.6*		*4.8*		*10.5*	

[x]In a column means having similar letter (s) are statistically identical and those having dissimilar letter (s) differ significantly as per 0.05 level of probability

Table 06. Interaction effect of gladiolus variety and corm division on reproductive attributes and vase life[x]

Treatment	Number of corm/ plot		Number of cormels/plot		Single corm weight (gm)		Single corm diameter (mm)		Vase life (days)	
V_1C_1	12.7	a	542	c	67.2	c	60.4	bc	4.7	bc
V_1C_2	13.3	a	576	bc	70.6	c	63.6	ab	5.7	a
V_2C_1	12.7	a	632.3	ab	93.1	b	66.4	a	5.0	ab
V_2C_2	14.3	a	662.7	a	99.5	a	68.2	a	4.3	bc
V_3C_1	13.3	a	517.7	c	54.7	d	55.7	cde	4.3	bc
V_3C_2	12.7	a	546	c	58.2	d	58.9	bcd	4.7	bc
V_4C_1	12.7	a	418.3	d	44.3	e	51.6	e	4.0	c
V_4C_2	12.7	a	438	d	47.3	e	54.7	de	4.0	c
$LSD_{0.05}$	*1.8*		*70.6*		*4.2*		*5.0*		*0.8*	
CV%	*8.0*		*7.4*		*3.6*		*4.8*		*10.5*	

[x]In a column means having similar letter (s) are statistically identical and those having dissimilar letter (s)

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differ significantly as per 0.05 level of probability

Percentage of increase or decreases of half corm over whole corm

The whole corm treatment showed the best response in all four varieties. V_1 performed best for both C_2 and C_1 but floret/spike reduced to 10.2% in C_1 compared to C_2 (Table 07). V_2 gave similar result as V_1 by C_2 for number of floret/spike but 19.7% reduced in C_1 than C_2 while 0.0% reduced in V_3 and V_4 (Table 07). Number of corm reduced to 4.5% in V_1, 11.2% in V_2 but increased to 4.5% in V_3 and no reduction in V_4 in C_1 as compared to C_2 while number of cormels reduced 5.9% in V_1, 5.2% in V_3 and 4.6% in V_2 and V_4 (Table 07).

Table 07. Percentage of reduced or increases of half corm over whole corm on number of floret/spike, number of corms/plot and number of cormels/plot

Treatment	% reduced or increased (-) and increased (+)		
	Number of floret/spike	Number of corm/plot	Number of cormels
V_1	(-) 10.2	(-) 4.5	(-) 5.9
V_2	(-) 19.7	(-) 11.2	(-) 4.6
V_3	0.0	(+) 4.5	(-) 5.2
V_4	0.0	0.0	(-) 4.6

IV. Conclusion

V_1 (yellow) was superior in all flowering characters except spike length and diameter. Spike length was best in V_3 (white) and spike diameter in V_2 (lemon yellow) followed by V_1. In regarding leaf area, plant height, spike diameter, no. of corm/plot, no. of cormel/plot, weight of corm and diameter of corm V_2 showed best performance. Although germination percentage and leaf area were significantly affected by corm division but other vegetative, floral and reproductive parameters were not significantly influenced by cut corm application. So cut corm can be used for commercial gladiolus production and this might reduce the cost for planting materials.

V. References

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