THE EFFECT OF DIFFERENT CORMS SIZES ON THE GROWTH AND FLOWER PRODUCTION OF GLADIOLUS

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ABSTRACT

The experiment on "The effect of different corm sizes on the growth and flower production of gladiolus", was carried out at Ornamental Plant Nursery, Department of Horticulture, The University of Agriculture Peshawar. Three corm sizes i.e., large corm size, Medium corm size and Small corm size were used in the experiment. The experiment was laid out in Randomized Complete Block Design (RCBD) with three replications. The data were recorded on days to plant emergence, plant height (ft.), number of leaves plant^{-1}, number of florets spike^{-1}, emergence of spike and size of spike (ft.). The results showed that different corms sizes significantly affected all of the growth parameters. Data regarding various corms size showed that maximum days to spike emergence (11.3) were recorded in small corm size, which are statistically similar to emergence of spike (91) and no of leaves,(12.0) while maximum no of florets spike^{-1}, (13) ,plant height (3.1ft),size of spike(1.7ft) were found in plants planted by large corm size. It is concluded that corm of larger size (>1.0cm) enhanced most of the studied parameters in gladiolus as compared to medium and smaller corms.

KEYWORDS: Corms Size, Flower, Gladiolus, Growth, Production.

I. Introduction

Gladiolus (*Gladiolus grandiflorus* L.), popularly known as "Sword lily" is ornamental plant belong to South Africa. It belongs to the family irridaceae, having around one hundred and fifty recognized species (Negi *et al.*, 1982). Gladiolus produces flowers with variation in spike length, floret color and size etc. Flower form range from those with simple petals to intensely ruffled and cut. Florets range in size from 1 to 10 cm in thickness. Except true blue, gladiolus exhibits almost all colors. Due to their coloring shapes, they are cultivated in pots and fields for aesthetic and cut flowers production throughout the world. Gladiolus spikes can be harvested from sixty (60) to hundred (100) days after planting, but depend upon the cultivars and climate (Jenkins, 1963; Jenkins et al., 1970). Gladiolus containing herbaceous stem and its leaves are intently linear, smoothed at the sides, wrapped at base. Flowers are bi-sexual having three stamens. Ovary of gladiolus is completely inferior (Hutchinson, 1959). The corm of gladiolus is an enlarged underground stem. One or few buds on top of the corms produce shoots which emit leaves and florets. Every year a fresh corm is developed on the old corm, which afterward contract and dies. Buds developed on the new corm are used for producing plants in the following year. Older leaves containing papery bases which wrap the corm, which are known as husks. The husks overlie with one another and get together to make a point at the top. While gladiolus form new corm (daughter corm) on the older corm which develop on the top of it, small new cormels develop on the base of daughter corms. Corms and cormels are means of propagation of gladiolus. Corm of gladiolus usually graded by sizes: large corm> 1.0cm diameter, medium corm> 0.5 cm and <1.0 cm and small corm < 0.5 cm (Larson, 1992). The formation of cormels occur when flower spike start initiation. Cormels are produced when the spikes are in full bloom. The cormels increase in size after flowering when the photosynthesis is directed downwards (Hartmann *et al.*, 1981). The total area of 450 acre is under the cultivation of gladiolus in Pakistan and 150 acre area was in Khyber Pakhtunkhwa (Anonymous, 2003) there are number of production factors which need to be investigated and standardized for the production of good quality gladiolus. One of these factors is the use of proper corm size for corms and flowers production. Corms sizes had considerable effects on growth and production of gladiolus (Farid, 2002). Ko *et al.*, (1994) studied the effect of corm size and planting time on the duration of gladiolus

flower production. Corms of different size 6-8 cm, 8-10 cm and 10-12 cm were planted on 19thMay, 17th June and 15thJuly. It was found that earlier planting with larger corms 10 -12 cm in diameter produced longer spikes, higher floret weight, and maximum number of floret, floret length and diameter and higher percentage of best quality flowers. Mohanty *et al.* (1994) studied the effect of corm size and pre planting chemical treatment of corm on growth and flowering production of gladiolus cv. Vink's Beauty. They planted the corm of different sixes viz. large (2.45 -2.55 cm in diameter) , medium (1.25 – 1.30 cm) and small (0.85 – 0.90 cm) with soaking in solution containing GA_3at 50, 100 or 150 ppm and ether at 100, 250 or 500 ppm or in distilled water for 24 hour. It was reported taller and thicker plants with more leaves were obtained from the large corm than those from medium and small corms. Patil *et al*. (1995) conducted an experiment to investigate the effect of different spacing and corm size on the flower and corm production of gladiolus. Corm of 3 sizes (>4.1, 3.1 – 4.0 and 2.1 – 30 cm) were planted at the spacing of 30 x 20 or 30 x 30 cm. corm size and spacing have no significant effect on spike length, floret size, number of floret per spike or the size of corm produced. Mollah *et al*, (1995) carried out an experiment to investigate the effect of cormel size and plant spacingon growth and yield of flower and yield of flower and corm of gladiolus at pahartalil, Bangladesh. It was found that cormel of 7.0 $\pm$ 0.20 g in size with widest plat spacing (15 x 15 cm) produced the longest rachis (43.5 cm), maximum number of floret per reachis (11.9), Heavier corm (31.33) and highest number of cormels (21.87) per plant. Azad (1996) carried out a research to examine the result of pant spacing and corm size on growth and flowering of gladiolus, Gladiolus Corm of (6.5, 16.0 and 30.0 gm) sizes were planted at the spacing of 20 x10, 20 x 15 and 20 x 20 cm. the maximum yield 13.17 tha^{-1} of mother corm and cormels 22.36 t ha^{-1} were found from treatment arrangement of close spacing 20 x 10 cm and large corm size 30.0 gm. Kalasareddi *et al.*, (1997) observed the effect of different corm size (very small, small, medium and large) on flowering of gladiolus cv. Snow white and found the corm size significantly influenced the time taken for spike emergence, time taken for flowering, time taken for complete flowering, spike length, spike girth, number of flowers per spike and number of spikes per hectare. Large corms flowered earlier than smaller corms and produced better quality spikes. The highest yield of spikes (37333/ha) was obtained from large corms. Singh and Singh (1998) conducted an experiment to investigate the influence of corm size on corm

production and flowering of gladiolus Cv. Sylavia. They have used three corm size large, medium and small. It was observed that percentage of sprouting was highest in large corms compare to medium and small corm size respectively. Large corm were also superior in respect of number of spikes, number of shoots corm^{-1} time of sprouting, plant height, spike length, number of floret spike^{-1} and diameter of corm produced. Singh (2000) revealed the effect of corm size on flowering, growth, and corm production of gladiolus. It was reported that larger corms take longer time period to sprout but produce flower before. Large size corm produce taller plants with large leaves, maximum florets spike^{-1} and produced more cormels plants^{-1} compared with medium or small size corms. Paswan *et al.* (2001) conducted a field trial to investigate the influence of corm pieces and corm size of gladiolus. Corms (>5.1, 3.2 to <3.8 and 1.9 to <2.5 cm) based on their diameter. Medium and large size corms produced more number of leaves with greatest length and breadth. Farid *et al.* (2002) studied the result of depth of planting and corm sixe on the flowering and growth of gladiolus cv. Friendship using the grouping of four corm size (15gm, 10gm, 3gm) and three depth (10.0 cm, 7.5 cm, and 5.0 cm). Corm size have shown good significant impact on all the parameters. Large corm (15 gm) took less time to complete eighty percent (80%) emergence (15.89 days) and flower emerging (60.44 days). The planting depth shows no significant effect on the parameters studied apart from percent lodging of plant. The maximum lodging of plants (19.83 %) was seen in deepest planting depth (10.0 cm). The relationship or interaction of planting depth and corm size has effect on all parameters studied apart from number of spikelets^{-1}. The maximum number of leaves (62.33), length of flower stalk (26.07 cm) plant height (97.56 cm), and lodging of plants (33.14 %) in the treatment arrangement of large sized corm plant at 5.0 cm depth and the lowest treatment arrangement of very small corm with 10 cm depth. Dilta et al, (2004) evaluated different corm sizes i.e. A- grade (>5.00 to <6.00 cm in diameter) and B- grade (>2.50 to <= 3.50cm in diameter) under field condition s for flower and corm production. A- Grade corms resulted in increased plant height, less days taken flowering and increased number of florets spike^{-1} compared to B- grade corms. Memon *et al.* (2009) investigated the effect of corm size on the vegetative, floral attributes and corm and cormel production in gladiolus. They planted corms of three commercially grown varieties viz. trader horn, white friendship and Peter Pears of three different size-small, (2.2 – 3.5 cm in diameter), medium (2.7 -3.0 cm in diameter) and large (3.2 –

3.5 cm in diameter) in split pot design consecutively for two years. They obtained the large sixe corms significantly increase the leaf breadth, length of flowering spike, and number of florets spike^{-1} over those produced from small and medium sized ones, whereas plant height was greatly decreased in response to large sized corms.

II. Materials and Methods

An experiment on "The effect of different corm sizes on the growth and flower production of gladiolus was conducted during late spring March at ornamental nursery, Department of Horticulture, The University of Agriculture Peshawar, Pakistan. The research was performed in Randomized Complete Block Design (RCBD). The treatment were repeated three times. All cultural practices like weeding irrigation, hoeing, fertilizer application etc. were kept uniform for all treatments during the entire period of study. The plot was thoroughly prepared by repeated working with spade. The corms of three different sizes i.e. Large (>1.0cm), medium (>0.5cm and <1.0cm) and small (<0.5). Corms were cleaned by removing the dried scales or tunics present on them. These corms were planted on 29 march and at a spacing of 30 x 30 cm in each row. Weeds were kept under control by hand weeding when needed. Regular irrigations were given as when required, during crop growth period. All other agronomic practices were carried out uniformly. The collected data was analyzed by using Randomized Complete Block Design (RCBD). A statistical package Statistic (8.1) was used for the analysis of recorded data.

III. Results and Discussion

The experiment on "The effect of different corm sizes on the growth and flower production of gladiolus" was carried out at ornamental nursery, Department of horticulture, the University of Agriculture Peshawar. Experiment was arranged in RCBD design. Data were recorded on days of plant emergence, emergence of spike, plant height, number of leaves plant^{-1}, emergence of spike, plant height, spike length and number of florets spike^{-1}

Days to plant emergence

The data regarding days to plant emergence are presented in Table-1 and its ANOVA is given in Table 1a. The statistical analysis of the data showed that various corm sizes had significant effect on days to plant emergence in gladiolus. The results

showed that maximum days to plants emergence (11.33) were taken by small corm size (<0.5cm), followed by days to plant emergence (10.0) recorded in plants grown by medium corm size while larger corm size resulted in minimum days to plant emergence (6.667). There is significantly variation in days to plant emergence among various corm sizes of gladiolus. The variation due might be to genetic makeup of these plants and their performance in environmental and soil condition of tasted area (Qasam *et al.* 2015).

Spike Emergence

Data regarding emergence of spike are shown in Table 1 and its ANOVA is given in Table 1a.Statistical analyses showed that emergence of spike were significantly affected by corm sizes in gladiolus. Statistically data of various corm sizes Table–1 showed that the maximum days to spike emergence (91) were recorded in small size of corms that were followed by medium corm size while the minimum days to spike emergence (71) were noted in large corm size. The data revealed that larger corm size resulted in early spike emergence as compared to medium and smaller corm size. This might be due to the more reserved food material in larger corms.

Number of leaves plant

Data regarding number of leaves per plant are shown in Table 1 and its ANOVA is given in Table 1a.Statistical analyses showed that No. of leaves plant^{1} were significantly affected by corm sizes in gladiolus. The results showed that minimum no of leaves per plant (6.6) were taken by small corm size <0.5cm, followed by medium corm size while the maximum no of leaves (12) were recorded in plants of larger size corm.

Table 1. Effect of corm size on days to plant emergence, emergence of spike and no of leaves plant$^{-1.}$

Corm size (cm)	Days to plant emergence	Emergence of spikes	No of leaves plant^{-1}
Small (<0.5cm)	11.33a	91a	6.667c
Medium (>0.5 and <1.0cm)	10.00a	83b	8.667b
Large (>1.0cm)	6.667b	71c	12.00a
LSD P≤ 0.05	1.851	5.901	0.755

Table 1a. Mean square for days to plant emergence, emergence of spike and no of leaves plant$^{-1.}$

SOV	Days to plant emergence	Emergence of spikes	No of leaves plant^{-1}
Replications	0.333	8.778	1.444
Corm size	17.33**	293.44**	21.77**
Error	0.667	6.778	0.111
Total			

Number of florets spike^{-1}:

Data regarding Number of florets per spike are shown in Table 2 and its ANOVA is given in Table 2a.Statistical analyses showed that no. of florets per spike were significantly affected by corm sizes in gladiolus. The results showed that minimum No. of florets per spike (8) were taken by small corm size, followed by medium corm size while the maximum no of florets per spike (13) showed by larger size corm. Lager corm size resulted in more number of leaves that caused more photosynthesis and hence produced maximum number of florets per spike.

Plant height (ft):

Data regarding to plants height are shown in Table 2 and its ANOVA is given in Table 2a.Statistical analyses showed that plants height were significantly affected by corm sizes in gladiolus. The results showed that minimum plant height (2.13 ft) were taken by small corm size, followed by medium corm size while the maximum plant height (3.1 ft) was showed by larger size corm.

Spike length (ft):

Data regarding to size of spike are shown in Table 2 and its ANOVA is given in Table 2a.Statistical analyses showed that size of spike were significantly affected by corm sizes in gladiolus. The results showed that minimum length of spike (1.10 ft.) were taken by small corm size, followed by medium corm size while the maximum size of spike (1.73 ft.) was recorded in plants grown from larger size corms. The findings

revealed that tallest spikes were produced by larger corms. Larger corm due to more reserved food material resulted in max. No. of leaves and maximum plant height and hence produced maximum spike length in gladiolus.

Table 2. Effect of corm size on no of florets spike^{-1}, plant height and length of spikes.

Corm size (cm)	No of florets spike^{-1}	Plant height(ft.)	Length of spikes(ft.)
Small (<0.5cm)	8c	2.133c	1.100c
Medium (>0.5and <1.0 cm)	10.66b	2.600b	1.366b
Large (>1.0cm)	13a	3.166a	1.733a
LSD P≤ 0.05	1.194	0.130	0.206

Table 2a. Mean square for no of florets spike^{-1}, plant height and length of spikes.

SOV	No of florets spike^{-1}	Plant height(ft.)	Length of spikes(ft.)
Replications	1.778	0.040	0.000
Corm size	18.77**	0.803**	0.303**
Error	0.277	0.003	0.008
Total			

Conclusions

On the basis of the above results it is concluded that:

- Small corm size took maximum days to plant emergence and emergence of spike with least plant height, no. of leaves, no. of florets and spike length.
- Larger corms resulted in early emergence of plants and spike with maximum no. of leaves, plant height, spike length and no. of florets followed by medium corm size.

Recommendation

On the basis of the above conclusions the following recommendations made:

- Larger corm (>1.0cm) could be recommended for better growth and flower production in gladiolus.

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