

# PERFORMANCE OF GLADIOLUS (*Gladiolus grandiflora* L.) CULTIVARS UNDER THE CLIMATIC CONDITIONS OF BAGH AZAD JAMMU AND KASHMIR PAKISTAN

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## Abstract

The aim of the study was to evaluate the performance of most suitable cultivar under the climatic conditions of Bagh. Five cultivars of *Gladiolus* namely Amsterdam, Applause, Fidelio, Peter pears and Priscilla were evaluated for their adoptability and performance. Results on vegetative characteristics showed that cultivars Applause and Amsterdam took less number of days for sprouting, Fidelio and Priscilla produced more plants per corm and Applause obtained maximum plant height. Results on floral characteristics showed that cultivar Applause and Peter pears were earlier for spike emergence, Priscilla and Peter pears took minimum days to flowering, maximum florets were produced by Peter pears and Applause, Applause obtained maximum spike length and Peter pears remained attractive for longer time. Results on corm and cormels characteristics showed that Peter pears produced more corms, Applause produced maximum cormels and gained maximum corm size, maximum corm weight was recorded in Fidelio. From the results we conclude that keeping in view the vegetative and reproductive characteristics Applause, Peter pears and Fidelio are recommended for general cultivation.

**Keywords:** Pakistan, Kashmir, cultivars, climatic conditions, flower, gladiolus, performance

## Introduction

*Gladiolus* (*Gladiolus grandiflora* L.) is an herbaceous and one of the most cultivated, economically important and common flowering plants worldwide including Pakistan. The genus *gladiolus* is classified in the family *Iridaceae* and many

species of this genus are found in South Africa, Tropical Africa, Madagascar and Eurasia. The current number of species in the genus is 255 (Goldblatt, and Manning, 1998). Gladiolus is known as queen of the bulbous plants is very popular as a cut flower, both with the consumer and the florist alike because of its many spike forms, colours and colour combinations, an advantage in every floral arrangement (Bushman, 1990). Modern Gladiolus an important cut flower, considered to have been bred originally from only six species (Lewis, *et al.*, 1972). Gladiolus grows from corms, which consist of one or more buds. Once planted the buds on the corms develop into leaves and flowering spikes. At the same time as the leaves and spikes are extending, a new corm forms at the base of the leaves while at the union of the parent and daughter corm, stolons grow out, terminating in cormels which are used for propagation (Bushman, 1990).

Besides their intangible aesthetic value, gladiolus can contribute to the economy of Pakistan by earning and saving valuable foreign exchange.

Coetzee (2002) stated that the Netherlands earns more from South African flowers than South Africa earns from its gold. To boost its economical production, it is very important to evaluate cultivars with desired characteristics that are adoptable to particular climatic conditions.

Safiullah and Ahmad (2001) evaluated ten Dutch hybrid cultivars of gladiolus : Blad Jack, My Love, T512, Deciso, Spic and Span, Mary housley, Njova lux, Her majesty, Rose Delight and Trader Horn for their performance in terms of floral characters, corm and cormlets production and recommended Deciso, Trader horn, T512, Blad jackp, Rose delight, Nova lux and Mary housley for general cultivation.

Ahmad, *et al.* (2002) studied on the introduction and evaluation of ten exotic gladiolus cultivars namely, Wine and Roges, Wing's sensation, Red beauty, Oscar, Praha, City light, Green wood packer, Priscilla and Victor borge for their performance and recommended Wine and Roges, Red beauty, Blue Isle, Victor broge and City light for general cultivation due to their performance.

Kem, *et al.* (2003) conducted an experiment and recommended Oscar and Melody for general cultivation similarly Kamble, *et al.* (2004) worked on the performance of gladiolus cultivars: Summer sunshine, Sylvia, Trust, Majic, Vendanapoli, American beauty, Melody, Snow white and Yellow cup.

Ram, *et al.* (2005) evaluated the performance of 8 gladiolus cultivars, i.e. American beauty, Nova lux, White prosperity, Sylvia, Peter pears, Jester gold, and Picardy, under sodic soil conditions. White prosperity recorded the highest number of corms (1.79) and cormlets per plant (32.25).

Rao and Janakiram (2006) studied on the performance of gladiolus cultivars and found that plant height, spike length and rachis length were maximum in Dhiraj while Maximum floret size was recorded in Kumkum whereas the maximum number of florets per spike in Dhiraj.

Chopde et al. (2012) evaluated eight varieties of gladiolus for flower and corm production and inferred that varieties Psittacinus Hybrid and Phule Tejas were superior in respect of quantitative yield of spikes and corms, whereas for quality production of spikes and corms, the varieties Phule Ganesh, Pink Perfection, Monte Alto and Phule Neelrekha were found better than the other varieties of gladiolus.

The present study was aimed to explore the possibility of producing high valued crop, to expand the employment opportunities and to contribute to floriculture industry in the state/country. Bulbs as well as flowers are used for the commercial purposes are very expensive and can be used as effective substitute for the conventional crops. Gladiolus is a winter flower but it can be grown in summer under Rawalakot, because

in summer the climatic conditions are favorable for its cultivation and can be grown as off season crop and more chances to get better return.

### Materials and Methods

Experiment on the evaluation of different cultivars of gladiolus was carried out at district Bagh Azad Jammu & Kashmir, Pakistan. Five cultivars : Amsterdam, Applause, Fidelio, Peter pears and Priscilla of gladiolus were selected for the experiment on the basis of their performance in other areas. The study was laid out by following a Randomized Complete Block Design RCBD with five treatments and replicated three times. All the cultural practices i.e., irrigation, hoeing, weeding, spraying and fertilizer application at the rate of 0.018 kg urea and 0.028 kg DAP was given in time during the entire growth period for obtaining better yield. The following parameters were studied Days to sprouting, Number of plants per corm, Plant height (cm), Number of leaves per plant, Days to spike emergence, Days to flowering, Number of spikes per plant, Spike length (cm), Number of florets per spike, Average field life of spike (days), Number of corms per plant, Number of cormels per plant, Average weight of corms (g), average Size of corm (cm), Average size of cormels (cm), Average Weight of cormels (g). The comparison of means was made by LSD-test (Steel *et al.*, 1997).

## Results

### Vegetative Characteristics:

Table 1: Vegetative characteristics of gladiolus cultivars

Cultivars	Days to sprouting	Number of plants/corm	Number of leaves/plant	Plant height (cm)
Amsterdam	11.55 c	1.44 c	8.33 a	145.7 b
Applause	8.33 d	2.55 b	8.66a	160.0 a
Fidelio	14.00 b	4.10 a	8.00a	135.7 c
Peter pears	14.33 b	2.50 b	8.22a	127.4 d
Priscilla	16.23 a	3.75 a	7.66 a	99.0 e

Means on the same column followed by the same letter are not significant different (P<0.05)

**Floral Characteristics:**

Table 2: Floral characteristics of gladiolus cultivars

Cultivars	Days to spike emergence	Days to flowering	Number of florets per spike	Number of spikes per plant	Spike length (cm)	Average field life of spike (days)
Amsterdam	74.00 b	77.23 b	16.89 b	1 .00a	80.00 c	19.11 ab
Applause	62.89 c	66.33 c	20.66 a	1 .33a	90.00 a	18.77 abc
Fidelio	72.22 b	75.22 b	15.66 b	1 .55a	70.33 d	17.00 bc
Peter pears	63.77 c	68.21 c	19.00 a	1 .77a	83.67 b	20.55 a
Priscilla	80.67 a	85.00 a	13.55 c	1 .44a	64.67 e	16.66 c

Means on the same column followed by the same letter are not significant different (P<0.05)

**Corm and Cormels characteristics:**

Table 3: Corm and cormels characteristics of gladiolus cultivars

Cultivars	Corms per plant	Cormels per plant	Weight of corms (g)	Weight of cormels (g)	Size of corms (cm)	Size of cormels (cm)
Amsterdam	1.33 d	33.44 c	50.94 b	1.87 ab	5.37 abc	1.25 a
Applause	2.11 c	90.0 a	64.00 a	2.01 a	6.19 a	1.06 a
Fidelio	3.77 b	55.11 b	66.78 a	1.34 b	4.47 c	1.01 a
Peter pears	5.33 a	25.33 d	51.11 b	0.98 c	5.09 bc	1.25 a
Priscilla	1.11 d	10.00 e	37.60 c	0.75 c	4.95bc	0.53 b

Means on the same column followed by the same letter are not significant different (P<0.05)

## Discussion

### **Vegetative Characteristics:**

The results for vegetative characteristics as shown in table 1 are discussed below.

**Days to sprouting:** Earliest sprouting of (8.33) days were observed in Applause followed by Amsterdam, Fidelio and Peter pears. Priscilla was too late and took 16.23 days to sprouting. Hundred percent sprouting was observed in all the cultivars.

**Plants per corm:** More plant per corm were obtained from Fidelio (4.10) and Priscilla (3.75), while least of (1.44) in Amsterdam.

**Number of leaves per plant:** The number of leaves per plant shows non-significant results.

**Plant height:** Maximum plant height of 160.0cm was shown by Applause and least of 99.0cm by Priscilla. Different cultivars showed variable responses for vegetative characteristics. Cultivars under study were given same soil and climatic conditions but variations were there. This might be due to the soil and climatic conditions prevailing in the area. Safiullah and Ahmed (2001) evaluated the performance of 10 exotic gladiolus cultivars and observed variation in vegetative and floral characteristics. Ahmed, *et al.* (2002) also observed variation in vegetative characteristics of 10 gladiolus cultivars. Similar results were obtained by Shaukat, *et al.* (2008) in gladiolus cultivars under the climatic conditions of Rawalakot Azad Jammu & Kashmir.

### **Floral Characteristics:**

The results for floral characteristics as shown in table 2 are discussed below.

**Days to spike emergence:** Number of days to spike emergence showed that Priscilla took more days (80.67) to spike emergence. Whereas minimum number of days were in Applause (62.89) and Peter pears (63.77).

**Days to flowering:** Maximum days to flowering were taken by Priscilla (85.00). Minimum days to flowering were taken by Applause (66.33) and Peter pears (68.21).

**Florets per spike:** Maximum floret were recorded in Applause (20.66) followed by Peter pears (19.00) whereas minimum (13.55) were observed for Priscilla.

**Spikes per plant:** Number of spikes per plant shows no significant differences for cultivars.

**Spike length:** Maximum spike length (90.00cm) was produced by Applause whereas minimum (64.67cm) was obtained by Priscilla.

**Field life of spike:** Peter pears remained attractive for longer period and obtained spike life of 20.55 days followed by Amsterdam and Applause (Table 2), while shorter spike life (16.66) was recorded for Priscilla. Variations among floral characteristics can be observed for different cultivars.

Similar variations in spike quality parameters of gladiolus varieties were quoted by the workers *viz.*, Rani *et al.* (2007) and Swaroop and Singh (2007) in gladiolus. The variations among the floral characteristics has been observed by Lal, *et al.* (1984). They observed that among 47 cultivars Ban voyage sport and Apple bloom were earliest to flowering. Patil, *et al.* (1994) evaluated 9 exotic gladiolus cultivars and observed that 'Sancerve' produced the longest spike and maximum number of florets per spike. Rao and Janakiram (2006) worked on the performance of gladiolus cultivars and observed that the spike length and rachis length were maximum in Dhiraj while maximum floret size was in Kumkum. Aswath and Parthasarathy (1996) evaluated 18 gladiolus cultivars and observed that 'Blue

moon', 'Power pufp', 'Friendship' and 'Red majesty' were found promising for spike characters .

### **Corm and Cormels characteristics:**

The results for Corm and Cormels characteristics as shown in table 3 are discussed below.

**Corms per plant:** Maximum corm per plant (5.33) were recorded in Peter pears followed by Fidelio (3.77) whereas least number in Priscilla (1.11) and Amsterdam (1.33).

**Cormels per plant:** Applause obtained the maximum number of cormels per plant (90.0) while least number of 10.00 were recorded in Priscilla.

**Corm weight:** Maximum corm weight (66.78 g) was observed in Fidelio followed by Applause (64.00g). The least corm weight (37.60g) was recorded in Priscilla.

**Cormels weight:** Maximum cormels weight (2.01 g) was observed in Applause while least (0.750g) in Priscilla.

**Corm size:** Maximum corm size of 6.19cm was observed in Applause, followed by 5.37cm in Amsterdam. The least corm size of 4.47cm was observed in 'Fidelio'.

**Cormels size:** Maximum cormels size of 1.25, 1.25, 1.06, and 1.01cm were recorded in Peter pears, Amsterdam, Applause, and Fidelio respectively while least 0.53cm in Priscilla.

Close observations of the corm and cormels characteristics showed variable responses for the cultivars. Different cultivars responded differently with soil and climatic conditions prevailing in the area depending upon their genetic makeup. Ram, *et al.* (2005) evaluated the performance of 8 gladiolus cultivars and recorded highest number of corms and cormels in White prosperity.

Superiority of some of the genotypes over the others in respect of corms plant<sup>-1</sup> of gladiolus was also reported by Kumar, *et al.* (2009).

### **CONCLUSION**

The evaluation of different cultivars of gladiolus was conducted under the climatic conditions of Bagh Azad Jammu & Kashmir Pakistan. Five cultivars of Gladiolus namely Amsterdam, Applause, Fidelio, Peter Pears and Priscilla were evaluated for their adoptability and performance. Results on vegetative characteristics showed that cultivars Applause (8.33) and Amsterdam (11.55) took less number of days for sprouting, Fidelio (4.10) and Priscilla (3.75) produced more plants per corm and Applause (160.0) obtained maximum plant height while number of leaves per plant shows no significant differences. Results on floral characteristics showed that cultivar Applause (62.89) and Peter pears (68.21) were earlier for spike emergence, Applause (66.33) and Peter pears (68.21) took minimum days to flowering, maximum florets were produced by Applause (20.66) and Peter pears (19.00), Applause (90.00) obtained maximum spike length and Peter pears (20.55) remained attractive for longer time. Results on corm and cormels characteristics showed that Peter pears (5.33) produced more corms, Applause (90.0) produced maximum cormels and gained maximum corm size (6.19), maximum corm weight was recorded in Fidelio (66.78).



From the results we concluded that keeping in view the spike length, field life of spike, number of florets per spike, corm and cormels production Applause, Peter pears and Fidelio were recommended for general cultivation.

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