

DIFFERENTIAL RESPONSE OF GLADIOLUS CORM TO STORAGE CONDITION

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Gladiolus is one of the top ranking cut flower in the world. Its flower and corm production varies considerably due to anatomical, physiological, physical, biochemical and genetic make up of the cultivars. In addition, storage of corm at low temperature is an essential prerequisite for its grown and flowering (Crossly and Arrowsmith, 1972). The temperature during winter months in Sikkim is comparatively low (Table 1) and corm can be stored at ambient temperature but this response to storage condition has to be worked out for viable floriculture trade in this region. Keeping this in view, the experiment was designed to compare the efficiency of ambient storage condition with its standardized cold storage for its successful cultivation.

The corms of seven commercially grown cultivars were harvested during October, 2000 and ninety six uniform sized corms of each of seven cultivars were subjected to the storage under two different condition (ambient and cold storage). Initially all the corms were stored at ambient condition in a ventilated room for a period of two weeks. Later on, one set of corms of each cultivar was transferred to cold storage condition at $5 \pm 1^\circ \text{C}$ with relative humidity of $80 \pm 5\%$ while the control corms were continued to be stored at ambient condition until February 2001. The mean monthly temperature and relative humidity data of the storage room (ambient condition) is presented in table 1. The corms from both the storage conditions were planted during first week of March, 2001 at ICAR Research Complex for NEH Region, Sikkim Centre, Tadong, Gangtok. The experiment was laid out in two factorial randomized block design with three replications. Uniform cultural operations were followed to grow a successful crop. Observations were recorded on various vegetative and floral parameters.

The cold stored corm increased the spike and rachis length irrespective of the cultivar and a maximum increase of 11.83 and 11.10 cm was registered in their respective character of American Beauty (Table 2). However, the flowering was considerably delayed in all the cultivars by pre-planting cold storage of corm over its ambient storage treatment. Among the cultivars, Friendship was the latest to flower under both the storage condition while Snow Princes and American Beauty took significantly less number of days for their flowering. Maximum number and size of floret in all the cultivars was recorded when the corms were stored at low temperature. These results are in close conformity with the findings of Shillo and Simchon (1973) who reported that the shoots from the corms stored at 7.3°C emerged and flowered earlier than those from corms stored in controlled atmosphere storage.

In general, the number of floret remained opened at a time, were recorded to be highest from the corms stores at ambient condition of stores room. Storage of corm at low temperature ($5 \pm 10^\circ \text{C}$) significantly reduced the number of floret remained open at a time cultivar Oscar, Eight Wonder and Her Majesty but not in others. However, quality of flower in terms of number of floret per spike was significantly improved by pre-planting storage of corm at low temperature in all the cultivars. Cold storage also increased the size of the floret in some of the cultivars. Durability of spike was increased in most of the cultivars when the corms were subjected to preplanting low temperature storage in Her Majesty, which recorded significantly higher durability of flower spike due to storage treatment of corms at ambient condition. Such variation in various quality parameters might be ascribed to its later responses to temperature and day length (Tsukamoto and Yagi, 1960).

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The ambient storage condition increased the number and weight of daughter corm per plant in most of the cultivars and maximum increase in number and weight of daughter corm was noticed in Eight Wonder followed by American Beauty and Snow Princess (Table 3). Though the size of corm was inversely related to ambient storage condition but the difference was not significant. Among the cultivars, significantly larger corms were produced in American Beauty, Friendship and Jester that can be attributed to their genetic factors as reported by Shillo (1970).

Storage condition did not exert any striking effect on control production. However, among various cultivars, the difference was found to be significant only in Eight Wonder that produced largest number of cormels (28.08) per plant by preplanting exposer of corm to ambient storage condition. There was appreciable increase in the weight of cormels due to storage condition, cultivars and their interaction. Mazimum cormel weight (7.7g) per plant was recorded in the cultivar Eight Wonder by pre-planting storage of corm at ambient temperature while minimum (3.2g) was recorded in Her majesty when corm subjected to cold storage at low temperature.

Table 1. Mean monthly temperature and relative humidity in storage room.

Month	Temperature (o C)		Relative humidity (%)	
	Maximum	Minimum	Maximum	Minimum
October, 2K	25.3	15.7	88.00	56.4
November, 2K	20.5	12.6	88.8	59.4
December, 2K	18.5	9.2	83.0	51.9
January, 01	16.2	7.3	84.9	54.7
February, 01	16.6	7.0	81.8	50.1

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Table 2. Effect of storage condition on growth and flowering of seven gladiolus cultivars

Cultivar	Character													
	Days to first flowering		Spike length (cm)		Rachis length (cm)		No. of floret remained open at a time		No. of floret per spike		Size of first floret (cm)		Durability of spike (days)	
	Cold storage	Amb. Storage	Cold storage	Amb. Storage	Cold storage	Amb. Storage	Cold storage	Amb. Storage	Cold storage	Amb. Storage	Cold storage	Amb. Storage	Cold storage	Amb. Storage
American Beauty	90.2	78.0	49.1	38.0	98.4	104.2	4.8	5.1	13.7	11.3	11.0	10.4	9.8	8.9
Eight Wonder	92.2	86.1	51.1	42.2	108.4	104.0	4.61	5.0	13.3	11.8	10.5	10.2	9.9	9.0
Friendship	83.3	79.6	44.2	39.6	119.1	107.7	4.6	4.8	13.0	10.9	10.6	10.5	8.4	8.2
Her Majesty	78.1	73.2	40.0	36.3	101.5	92.0	4.1	4.4	11.0	9.7	9.8	9.4	7.8	8.1
Jester	84.4	80.0	42.3	42.7	111.1	97.3	4.4	4.7	10.1	9.0	10.0	9.1	8.8	8.1
Oscar	81.1	72.2	40.1	32.2	109.9	91.0	3.9	4.5	11.3	9.6	9.9	9.8	8.5	8.1
Snow Princess	80.0	75.5	36.3	37.0	94.0	84.1	4.4	4.6	12.1	11.0	10.2	9.4	8.9	8.5
C.D. at 5% for storage	2.4		1.7		1.4		0.3		0.5		0.2		0.2	
C.D. at 5% for variety	5.0		4.0		3.2		0.7		0.9		0.5		0.4	
C.D. at 5% for interaction	6.4		6.0		4.8		NS		NS		NS		NS	

Table 3. Effect of storage condition on corm and cornel production of seven gladiolus cultivars

Cultivar	Character														
	No. of corm per plant			Weight of corm (g)			Size of corm (cm)			No. of cornel per plant			Cornel weight per plant		
	Cold storage	Amb. Storage	Cold storage	Amb. Storage	Cold storage	Amb. Storage	Cold storage	Amb. Storage	Cold storage	Amb. Storage	Cold storage	Amb. Storage	Cold storage	Amb. Storage	
American Beauty	1.2	1.4	51.1	46.7	5.0	5.3	16.9	18.2	5.7	6.3					
Eight Wonder	1.3	1.6	48.6	43.1	4.9	4.8	21.1	28.9	5.3	7.7					
Friendship	1.2	1.1	43.2	44.0	5.1	5.0	16.1	19.1	4.1	6.8					
Her Majesty	1.1	1.1	35.5	32.1	4.4	4.1	7.1	9.6	3.3	9.7					
Jester	1.1	1.3	46.7	45.2	5.0	4.4	12.3	13.0	5.5	5.8					
Oscar	1.0	1.2	40.4	36.8	4.5	4.5	5.0	9.7	4.8	4.7					
Snow Princess	1.3	1.4	38.5	30.0	4.5	4.3	8.5	8.1	5.0	6.1					
C.D. at 5% for storage	0.1		2.8		NS		NS		0.7						
C.D. at 5% for variety	0.3		6.0		0.4		9.0		2.0						