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## Post-harvest studies of various gladiolus varieties grown under Kota climatic condition

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### Abstract

A post-harvest analysis of the various varieties of gladiolus was carried out. With respect to most post-harvest parameters, American beauty reported the best results, i.e. days to open 5th florets, days to wither 5th florets, number of florets open at a time, percentage of open florets/spike, 5th day water uptake, total water uptake (ml), vase-life (days) and pigment quality. In terms of days of opening of the 3rd and 4th florets, days of withering of the 3rd and 4th florets, Regency shows the best results. The maximum diameter was recorded with C.V. of 3rd, 4th, 5th florets and sugar reduction. Pricilla. C.V. was registered with the highest non-reducing sugar and total sugar. Friendship, while the dry weight of cut spikes was reported with C.V. at senescence. Dawn Punjab.

**Keywords:** Gladiolus, cultivars, post-harvest, biochemical and spike

### Introduction

Gladiolus (*Gladiolus grandiflorus*), generally called “Glad”, a member of family Iridaceae and sub-family Ixiodeae, originated from South Africa, is a prominent bulbous cut flower plant. Gladiolus is an important commercial flower crop and is very common in both the domestic and foreign market as a cut flower. The flower is famous for its magnificent spikes, which have beautiful, spectacular and delicate florets that are attractive. Flowers usually remain turgid until harvested at the proper stage of growth. Flowers cut at an advanced stage have decreased lifespan compared to younger ones. The optimal gladiolus harvesting process is at the point when 2-5 buds reveal colours. Currently, identifying appropriate varieties for post-harvest life has been crucial, post-harvest senescence is an essential part of the natural plant growth cycle and is a highly regulated process requiring structural, biochemical and molecular changes in plant tissue. Due to genetic, physiological or anatomical features, various flowers and varieties are noted to vary in their vase life. However, the data on the comparative output of post-harvest attributes of gladiolus cultivars is rather meagre. This experiment was therefore carried out to collect data on the comparative output of gladiolus cultivars for different post-harvest characteristics in order to distinguish particular types of cultivars (Ahmed *et al.*, 2014) [1].

### Materials and Methods

The current experiment was performed at the Horticulture Research Farm and post-harvest experiments were conducted at the Department of Floriculture and Landscape Architecture Laboratory, and the research will be conducted at the School of Agriculture Sciences, Career Point University, Kota, Rajasthan, India. In this experiment 09 cultivars namely African Star, Friendship, Hunting Song, Priscilla, Punjab Dawn, Regency, Sancere, Sunayana and American beauty were used as experiment material. Such varieties grow in the field; during the field trial, typical packages of cultural traditions were followed. The cut spikes is harvested in the morning for post-harvest research when two lower spike florets are harvested with the aid of a sharp knife and put in a water-containing bucket and immediately taken to the laboratory. In 250 ml conical flasks which contain distilled water, spikes were mounted. 1.00 cm is re-cut at the basal ends of spikes during the procedure, with the aid of a sharp knife for better absorption of distilled water solution. With the aid of essential instruments and tools, various measurements were reported and these data were statistically analysed.

### Results and Discussion

Post-harvest studies of nine varieties were collected and described in Tables 1, 2 in post-harvest studies of various gladiolus varieties, the cultivars of Gladiolus differed significantly.

Data showed that there was a major variation between the various variety experiments in the days of the 3rd floret opening. Maximum opening days for the 3rd floret recorded with Friendship cultivars (3.68 days) followed by Friendship (3.72 days) and African Star cultivars (3.31 days). With cultivars Sunayana (2.69 days) followed by cultivars Sancere (2.87 days), Priscilla (2.91 days), American beauty (2.94 days), Hunting Song (2.98 days) and Punjab Dawn (3.00 days), the minimum time needed to open the 3rd floret has been registered, both of which are statistically equal to each other.

The maximum period needed for the opening of the 4th floret registered with the Regency cultivars (4.23 days) was statistically equal to the Friendship cultivars (4.14 days), Pricilla (4.11 days), Sancerre (3.98 days) and the minimum duration required for the opening of the 4th floret was recorded with the Hunting Song cultivars (3.12 days) followed by Punjab Dawn (3.37 days). The minimum time needed to open the 5th floret was recorded with the Friendship cultivars (4.84 days), followed by the African Star cultivars (4.90 days).

The maximum days of 3rd floret wilting were reported with Regency (6.80 days), which was statistically equal to Pricilla (6.74 days). However, the minimum days of 3rd floret withering were recorded in cultivar Friendship (5.76 days) followed by African Star cultivars in cultivar Friendship (5.76 days) (5.95 days).

The maximum days taken to withering of 4th floret were recorded with Regency (7.97 days) which was statistically at par with Sunayana (7.91 days), Sancerre (7.84 days) significant to other cultivars. However, the minimum days taken too withering of 4th floret was recorded in cultivar African Star (6.92 days) which was at par with cultivars Pricilla (7.04 days), significant to other cultivars.

The maximum days to withering of 5th floret were recorded with American beauty (10.48 days) which was statistically at par with Regency (10.12 days) and significant to other cultivars. However, the minimum days to withering of 5th floret was recorded in cultivar Hunting Song (9.31 days) which was at par with cultivars African Star (9.38 days), Friendship (9.50 days).

In Priscilla (8.50 cm), followed by Punjab Dawn (8.26 cm), American beauty (8.1 cm), the maximum diameter of the 3rd floret was observed, and Pricilla displayed a statistically important result with respect to all the other cultivars in this experiment. In Hunting Song (6.94 cm), the minimum floret diameter was reported, followed by Regency (7.14 cm).

In Priscilla (8.56cm), followed by Punjab Dawn (8.26 cm) and American beauty cultivars, the maximum diameter of the 4th floret was observed (8.16 cm). However, as reported in Hunting Song, the minimum floret diameter (7.04 cm) w, followed by Regency (7.24 cm), Sunayana (7.44 cm) and African Star (7.71 cm), both of these cultivars vary statistically from each other. In Priscilla (8.61 cm), which was statistically important for other cultivars, the maximum diameter of the 5th floret was identified. However the minimum floret diameter was reported in Hunting Song (7.10 cm) which was statistically at par with Regency (7.29 cm) and differs to Friendship (7.62 cm), African and other cultivars.

American beauty recorded the maximum number of florets open at a time (6.72 florets), which was statistically superior to the other cultivars in this experiment. However, the minimum number of florets open at a time was reported in Pricilla (3.85 florets) followed by African Star Regency (4.93

florets) cultivars (5.62 florets).

American beauty recorded the maximum number of florets open at a time (6.72 florets), which was statistically superior to the other cultivars in this experiment. However, the minimum number of florets open at a time was reported in Pricilla (3.85 florets) followed by African Star Regency (4.93 florets) cultivars (5.62 florets).

The higher amount of water uptake on 5th day of vase was recorded with cultivar American beauty (62.88 ml) which was statistically significant to other cultivars. However, with the cultivars Sancerre (39.99 ml) followed by Sunayana (42.63 ml), Regency (44.65 ml), Priscilla, the minimum water absorption on the 5th day of the vase was reported (52.13 ml). The higher amount of water uptake was recorded with cultivar American beauty (84.46 ml) which was statistically significant to other cultivars. However, the minimum water uptake was recorded with cultivar Sancerre (62.47 ml) followed by Regency (67.13 ml), Sunayana (67.18 ml), Friendship (68.08 ml). With the cultivar Punjab Dawn (7.63 g), which was significantly superior to other cultivars, the maximum dry weight of the cut spikes at senescence was recorded. However, with the cultivar African Star (4.06 g) followed by Pricilla (4.28 g), American beauty (4.48 g), Friendship (5.79 g) and Sunayana, the minimum dry weight of cut spikes at senescence was recorded (4.91 g).

American beauty (15.15 days) and African Star (14.49 days) cultivars were found to have the longest vase-life of cut spikes, both of which are statistically equal to each other and differ from other cultivars. However, with the cultivar Sancerre (9.60 days), which was on par with Regency (10.50 days), Friendship (11.56 days), Sunayana (11.75 days) and Hunting Song (12.23 days), the shortest vase life of cut spikes was recorded for other cultivars.

The highest sugar reduction was found in the Priscilla variety (0.91 mg/g), which was statistically superior to other cultivars. However, with the cultivar African Star (0.61 mg/g) followed by Friendship, the lowest reducing sugars were reported, both of which are statistically equal to each other and distinct from other cultivars.

With the cultivar Friendship (0.65 mg/g), which was significantly different from other cultivars, the highest non-reducing sugars were found. However, with the cultivar Sancerre (0.14 mg/g) followed by American beauty (0.25 mg/g), the lowest non-reducing sugars were recorded, both of which were at par with each other and significant for other cultivars.

With the Friendship cultivar (1.32 mg/g), which was equal to the Hunting Song cultivar (1.21 mg/g) and important to other cultivars, the highest total sugars were found. However, with African Star (0.84 mg/g) followed by Sancere (0.96 mg/g), the lowest total sugars were recorded, both of which were statistically similar to each other and differed from other cultivars.

The highest pigment content was found in American beauty (1.68 mg/100g), followed by Regency (1.56 mg/100g), Pricilla (1.51 mg/100g) and Sancere (1.62 mg/100g). However, with the cultivar African Star (0.24 mg/100 g), the lowest pigment content was recorded, followed by Hunting Song (0.97 mg/100g), Friendship (1.05 mg/100g), Sunayana (1.17 mg/100g), Punjab Dawn (1.34 mg/100g).

## Conclusions

With respect to most post-harvest parameters, American beauty reported the best results, i.e. days to 5th florets

opening, days to 5th florets withering, number of florets open at a time, percentage of open florets/spike, 5th day water uptake (ml), total water uptake (ml), vase-life (days) and pigment content. In terms of days of opening of the 3rd and 4th florets, days of withering of the 3rd and 4th florets, Regency shows the best results. With cv, the maximum

diameter of the 3rd, 4th and 5th florets and sugar reduction was reported from Priscilla. With cv, the maximum non-reducing sugar & total sugar was reported. Friendship was recorded with cv, while dry weight was recorded with cut spikes at senescence. Punjab Dawn.

**Table 1:** Performance of gladiolus cultivars for post-harvest studies

Treatment	Days to opening of 3 <sup>rd</sup> 4 <sup>th</sup> and 5 <sup>th</sup> floret			Days to withering of 3 <sup>rd</sup> 4 <sup>th</sup> and 5 <sup>th</sup> floret			Diameter of	Diameter of	Diameter of
	3 <sup>rd</sup> floret	4 <sup>th</sup> floret	5 <sup>th</sup> floret	days to withering of 3 <sup>rd</sup> floret	4 <sup>th</sup> floret	5 <sup>th</sup> floret	3 <sup>rd</sup> floret (cm)	4 <sup>th</sup> floret (cm)	5 <sup>th</sup> floret (cm)
African Star	3.31	3.83	4.90	5.95	6.99	9.38	7.70	7.71	7.78
Friendship	3.68	4.14	4.84	5.76	7.47	9.50	7.54	7.59	7.62
Hunting Song	2.98	3.12	5.21	6.07	7.54	9.31	6.94	7.04	7.10
Priscilla,	2.91	4.11	5.63	6.74	7.04	9.68	8.51	8.56	8.61
Punjab Dawn	3.00	3.37	5.33	6.32	7.29	10.00	8.22	8.26	8.18
Regency	3.72	4.23	6.13	6.80	7.97	10.12	7.14	7.24	7.29
Sancere	2.87	3.98	6.32	6.37	7.84	9.56	8.02	8.10	8.14
Sunayana	2.69	3.79	6.00	6.55	7.91	9.87	7.41	7.44	7.50
American beauty	2.94	3.61	7.17	6.19	7.17	10.48	8.13	8.16	8.29
Sem±	0.08	0.1	0.14	0.5	0.19	0.25	0.2	0.2	0.21
CD at 5%	0.24	0.3	0.44	0.16	0.58	0.75	0.6	0.61	0.62

**Table 2:** Post harvest studies of various varieties of gladiolus

Treatment	Number of florets open at a time					Vase life of cut spike(days)				
	Number of florets open at a time	Percentage of open florets spike	Water Uptake on 5th day of vase	Total water uptake (ml)	Dry Weight of cut spikes at senescence (g)	Vase -life of cut spike (days)	Reducing Sugars (mg/g)	Non Reducing Sugars	Total Sugar	Pigment Content (mg)
African Star	5.62	60.29	55.79	76.59	4.06	14.49	0.61	0.23	0.84	0.24
Friendship	6.55	66.72	43.53	68.08	4.79	11.56	0.67	0.65	1.32	1.05
Hunting Song	6.16	63.93	57.47	74.10	5.80	12.23	0.80	0.40	1.21	0.97
Priscilla,	3.85	57.58	52.13	75.57	4.28	12.32	0.91	0.24	1.15	1.51
Punjab Dawn	6.09	62.89	53.70	76.80	7.63	13.24	0.75	0.25	1.01	1.34
Regency	4.93	59.34	44.65	67.13	6.78	10.50	0.82	0.30	1.13	1.56
Sancere	6.60	67.59	39.99	62.47	5.89	9.60	0.81	0.14	0.96	1.62
Sunayana	5.92	61.44	42.63	67.18	4.91	11.75	0.79	0.25	1.04	1.17
American beauty	6.72	68.35	62.88	84.46	4.48	15.15	0.80	0.25	1.06	1.68
Sem±	0.14	1.57	1.27	1.82	0.13	0.31	0.02	0.009	0.02	0.03
CD at 5%	0.42	4.72	3.81	5.47	0.4	0.93	0.05	0.028	0.08	0.09

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