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Standardization of harvesting stage on maximum buds opening and longer vase-life of gladiolus (*Gladiolus grandiflorus* L.) flower cv. Nova Lux

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Abstract

The present experiment was carried out to different harvesting stage on maximum buds opening and longer vase-life of gladiolus (*Gladiolus grandiflorus* L.) flower cv. Nova Lux. The spikes were harvested at 4 stages namely tight bud stage, basal pair opened bud stage, half opened bud stage and fully opened bud stage. The maximum vase-life of gladiolus cv. Nova Lux was found with continuous increase in spike length, absorption of vase solution first increase thereafter decreased and continuous florets opening, maximum spike weight and moderate florets drooping could be get, when gladiolus spikes were harvested at basal pair opened bud stage and put into vase solution containing only distilled water kept at ambient temperature in laboratory of Department of Horticulture.

Keywords: *Gladiolus grandiflorus* L. Different harvesting stage, Flower buds opening, Spike length, Vase-life

1. Introduction

Gladiolus (*Gladiolus grandiflorus* L.) is also known by other vernacular names such as sword lily, corn flag and gladioli. It belongs to the family Iridaceae and one of the leading cut flower of India and world. It has been appropriately crowned as “Queen of Bulbous Flower”. The flower is popular for its majestic spikes which comprise attractive, elegant, dazzling and delicate florets. The opening of florets in sequence over longer duration makes it to be a good quality of cut flower. The gladiolus is available in fantastic colour range and spikes of almost any colour near black to white, white, pink, yellow, violet, mauve and combination of these colours are available. The herbaceous plant sprouts from auxiliary buds of an underground modified stem called corm.

This crop is grown in the open and under plastic houses in South France in 220 hectares. It has become an important cut flower for both National and International markets. As regards the aesthetic value of cut flower, the bulbous flowers are very popular throughout the world. Bulbous ornamentals constitute one of the most important groups of the floriculture wealth of the country. The beauty, fragrance, wide range of colour and form make them the most attractive group among flowers. Bulbous flowers have become integral part of commercial floriculture. A survey conduct in Solan district of Himanchal Pradesh shows that on an average one hectare of land produces 203 thousand gladiolus spikes valued Rs. 0.76 million (Sindhu, 2001) [7]. In India the various floricultural activities including flower trade, bedding, plant industry, plant rental services, flower seeds and dry flower industry are running. The changing life style of Indians with a tendency to “say it with flower” and celebration of festivals like Valentine’s day, Christmas, Mather’s day has created a tremendous demand of cut flowers like rose, carnation, gerbera, gladiolus, and tuberose. Improvement of keeping quality and enhancement of vase-life of cut flowers are important areas in Horticultural research. The vase-life of gladiolus are around 6-7 days under normal condition. Since it has many florets which open sequentially, extension of vase-life of these flowers will help more economic utilization of this flower industry. Researcher attempts have been made to study the effect of different harvesting stage on the longevity of vase-life of cut flowers (Kumar and Deen, 2013) [3]. Most of the cut flowers were kept in many floral preservatives, is the most economical and practicable method for extending the post harvest life of cut flowers (Salunkhe *et al.*, 1990) [6], but now a days; scientists have introduced to improve the vase-life of cut flowers by different harvesting stage putting into vase containing vase solution only distilled water (Kumar and Deen, 2013) [3].

Investigations pertaining to extend the vase-life of cut flowers by the vase solution containing distilled water after harvest of spike have been made with varying harvesting stage.

2. Materials and Methods

The experiment was conducted to observe the effect of different harvesting stage on maximum buds opening and longer vase-life of gladiolus flower was conducted at post graduate laboratory of Department of Horticulture, Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad (U.P.), India during the year 2014-2015. The spikes were procured from commercial cultivation of gladiolus crop at Main Experiment Station of Department of Horticulture. The four stages of spike were harvested with treatments i.e. T₁ = Tight bud stage, T₂ = Basal pair opened bud stage, T₃= Half opened bud stage and T₄ = Fully opened bud stage (control). The spikes were harvested in early morning by sharp knife and brought to laboratory into bucket containing only distilled water. In laboratory 3 cm lower portion of the spikes were removed by making slanting cut and put separately treatment wise into vase solution containing 200 mL distilled water. The observations were recorded on opening of florets, absorption of vase solution, fresh weight of spike, drooping of florets and vase-life at 2 days intervals. The collected data were analyzed to find out the 5% level of significant in Complete Randomized Design with 3 replications (Panse and Sukhatme, 1985) [5].

3. Results and Discussion

3.1 Florets opening

From the table-1, it is revealed that florets opening were recorded to be continued on 8th day in spikes harvested at all four stages. The maximum per cent opening of florets were recorded with basal pair opened bud stage and minimum was recorded with harvested at tight bud stage. The differences in bud opening in all the harvesting stage might be due to physiological maturity of spikes and substantial demand of carbohydrate in the developing spikes of gladiolus. The maximum opening was recorded on 8th day of observation with basal pair opened bud stage might be due to synthesis and accumulation of buds opening organic substances. The opening was increased with harvested at basal pair opened bud stage was significantly in comparison to other treatments. Kumar and Deen (2013) [3] also reported tuberose spike cut at different harvesting stage and kept in distilled water to maximum opening was recorded at basal pair opened bud stage.

3.2 Absorption of vase solution

Data with respect to absorption of vase solution as rendered in table-2 clearly reflected that absorption of vase solution was increased up to 4th day of observation there after absorption was continuously decreased with increasing the study period in all the treatments. The minimum absorption was recorded with tight bud stage on 8th day of observation. The increase in absorption of vase solution was might be due to increase the opening of florets as well as respiration and transpiration rate up till 4th day and there after decreasing trends was observed because of might be due to decreasing trend the opening of florets and drooping was started and increased as well as physiological activity was slow down such as transpiration and respiration rate of the florets, and spikes was proceedings to words senescence. The findings are supported by Ali *et al.* (2008) [1] in cut daffodil flower, who found that vase solution

as distilled water uptake was increased up to 4th day of observation and decrease sharply after 6th day.

3.3 Weight of spike

Data regarding on spike weight of gladiolus flower are presented in table-3 showed that loss of spike weight was increased up to 6th day of observation in all the treatments and there after it was decreased on words. The first increased in spike weight was due to increase the opening of florets as well as increase the absorption of water by the spike. Decline in spike weight may be attributed to decrease in water relation parameters and drooping of florets was increased with periods. The results are supported by Wani *et al.* (2010) [8] in Asiatic liliun cv. Novecento.

3.4 Drooping of florets

Data incorporated in table-4 indicated clearly there was no drooping of florets was recorded up to 4th day of observation in all the treatments. The drooping of florets was started from 6th day and it was increased with period till end the experiment. The minimum (45.90 per cent) drooping was observed with basal pair opened bud stage on 8th day of observation. The increased in drooping of florets with increment of the observations periods that was because of senescence which is obvious after cutting the spike. The results in present study are in close conformity to the finding of Kumar and Deen (2017) [2] in tuberose flower during vase-life study.

3.5 Vase-life

Data as embodied in table-5 clearly reflected that the maximum 8.00 days vase-life was recorded in spikes harvested at basal pair opened bud stage followed by 6.00 days in spikes harvested at half open bud stage. The improving vase-life of basal pair opened bud stage without use of any preservation chemicals might be because of facts that indigenous carbohydrates present in the flower buds significantly contributes towards vase-life of the cut stem (Nowak and Rudniki, 1990) [4]. The analogous results was observed by Kumar and Deen (2013) [3] clearly reflected that tuberose spike were harvested at basal pair opened bud stage and kept in only distilled water found maximum days vase-life of flower.

Table 1: Effect of harvesting stage on opening of florets

Harvesting stages	Florets opening (%)			
	2 nd day	4 th day	6 th day	8 th day
Tight bud stage	13.20	23.18	25.10	27.00
Basal pair opened bud stage	24.80	46.20	63.20	86.00
Half opened bud stage	32.50	49.50	61.30	63.80
Fully opened bud stage	39.20	57.60	59.55	61.50
SEm±	3.66	4.39	4.65	4.73
CD at 5%	8.45	10.10	10.70	10.90

Table 2: Effect of harvesting stage on absorption of vase solution

Harvesting stages	Absorption of vase solution (ml)			
	2 nd day	4 th day	6 th day	8 th day
Tight bud stage	15.00	27.90	24.60	20.10
Basal pair opened bud stage	31.00	35.00	30.63	28.40
Half opened bud stage	42.00	49.00	29.80	25.20
Fully opened bud stage	55.00	62.00	26.10	23.10
SEm±	4.20	4.47	3.28	3.08
CD at 5%	9.68	10.30	7.57	7.11

Table 3: Effect of harvesting stage on weight of spike

Harvesting stages	Spike weight (g)			
	2 nd day	4 th day	6 th day	8 th day
Tight bud stage	24.70	27.13	31.20	28.06
Basal pair opened bud stage	47.23	51.20	59.36	53.42
Half opened bud stage	63.00	69.83	81.00	50.77
Fully opened bud stage	58.50	63.60	73.60	47.10
SEm±	4.66	4.868	5.218	6.268
CD at 5%	10.75	11.23	12.03	14.45

Table 4: Effect of harvesting stage on drooping of florets

Harvesting stages	Drooping of florets (%)			
	2 nd day	4 th day	6 th day	8 th day
Tight bud stage	0	0	24.30	61.30
Basal pair opened bud stage	0	0	28.60	45.90
Half opened bud stage	0	0	32.10	49.50
Fully opened bud stage	0	0	39.50	54.80
SEm±	-	-	3.66	4.34
CD at 5%	-	-	8.44	10.00

Table 5: Effect of harvesting stage on vase life of spike

Harvesting stages	vase life in days
Tight bud stage	5.40
Basal pair opened bud stage	8.23
Half opened bud stage	6.10
Fully opened bud stage	4.30
SEm±	1.79
CD at 5%	4.12

4. Conclusion

It is concluded from the present study that maximum 8.00 days vase-life of gladiolus cv. Nova Lux with continuous florets opening, maximum spike weight and moderate florets drooping could be get, when gladiolus spikes were harvested at basal pair opened bud stage and put into vase solution containing only distilled water.

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