



Comparative Performance of Cultivars for Post Harvest Attributes of Gladiolus (*Gladiolus Hybridus* Hort L.)

KEYWORDS

Zahoor Ahmed

Department of Floriculture and Landscaping, Punjab Agricultural University, Ludhiana-141004

K K Dhatt

Department of Floriculture and Landscaping, Punjab Agricultural University, Ludhiana-141004

Kushal Singh

Department of Floriculture and Landscaping, Punjab Agricultural University, Ludhiana-141004

ABSTRACT Postharvest studies were carried out on forty six cultivars of gladiolus (*Gladiolus hybridus* Hort.) to evaluate their performance for various attributes. The laboratory experiment was carried out in controlled room having 20 ± 2 °C temperature and $68 \pm 2\%$ relative humidity for two consecutive years (2012-13 and 2013-14). The analysis of post harvest attributes of gladiolus revealed a significant difference in behaviour of gladiolus cultivars. Punjab Glad 1 statistically at par with Punjab Glance, Yellow Stone, Happy End, Big Time Supreme, Pusa Kiran took lowest number of days to opening of basal floret (1.32 days). Punjab Glad 1 statistically at par with Punjab Flame, Oscar, Pusa Kiran, Peter Pears, PG-9-2, PG-23-55 and PG-18-1 recorded maximum vase life (5.55 days), percent opening of florets (73.34%) and water absorption spike-1 (67.79 ml). On the other hand Punjab Flame recorded highest number of florets open at one time (4.20). PG-9-2 statistically at par with PG-6-16, Punjab Glance and Punjab Pink elegance recorded maximum floret diameter (8.90 cm)

Introduction

In recent years, growing of speciality cut flower crops has become a popular way to fetch higher profits to improve the economic livelihood of the growers by raising their living standards. However, to get maximum benefit of these crops, their production and postharvest handling technologies need to be optimized. Flowers are highly perishable and deteriorate very rapidly as the development and opening of buds is an active growth process characterised by an increase in rate of respiration (Singh and Singh 2009). The cut flower is a very complex system composed of heterogeneous parts each of which differ morphologically and physiologically and contribute significantly to the senescence of petals. Keeping quality of cut flower is an important parameter for evaluation of quality for both domestic and international markets. The techniques for prolonging the vase life of flowers may prove great asset to both growers and users (Nair et al. 2003). Keeping quality of flowers is affected by internal as well as external factors. The internal factors which affect the keeping quality of cut blooms are the rate of water absorption, transpiration and respiration. External factors that affect cut flower life include temperature, relative humidity and wind velocity (Meman and Dabhi 2006). Post harvest senescence is an integral part of normal developmental cycle of plants and is highly regulated process that involves structural, biochemical and molecular changes in the plant tissue (Shahri 2011). Different flowers and varieties are reported to differ in their vase life due to genetic, physiological or anatomical characteristics (Redman et al 200, Bala et al 2008). However the information on comparative performance of gladiolus cultivars for post harvest attributes is very meagre. Hence this experiment was carried out to get information on comparative performance of gladiolus cultivars for various post harvest attributes so that specific type of cultivars may be identified.

Material methods

The present investigations was carried out in two successive years during 2012-13 and 2013-14 in the laboratory of Department of Floriculture and Landscaping, PAU, Ludhiana, India. The cut spikes of 46 cultivars of gladiolus

were procured from the research farm of Department of Floriculture and Landscaping, PAU, Ludhiana. The flower spikes were kept in a controlled room having 20 ± 2 °C temperature and $68 \pm 2\%$ relative humidity for post harvest evaluation. In the laboratory, after checking and rejecting abnormal, diseased and damaged flowers, the spikes (stalk) of the selected cultivars were kept 70 cm long by giving a slanting cut at the base and were kept in 250 ml jars filled with 200 ml distilled water. After keeping spikes in the distilled water, the jars were kept under the cool white fluorescent lamps throughout the experiment. The observations were recorded on days taken to opening of basal floret, vase life, floret diameter, percent opening of florets and water absorption spike⁻¹. Floret diameter was measured with the help of measuring scale. The treatments were laid out in a complete randomized design (CRD) with 3 replications and statistical analysis was carried out in R and S-plus software package (Box et al, 1978).

Results and discussion

Perusal of data (Table 1) significant variation in days taken to opening of basal floret, vase life, number of florets open at one time and floret diameter was observed among different cultivars of gladiolus. The cultivars may be divided into several groups on the basis of days taken to opening of basal floret. First group comprised of those cultivars in which the basal floret open quickly and comprised of Punjab Glad1, Punjab Glance, Yellow Stone, Happy End, Big Time Supreme, Peter Pears, Shobha, Pusa Kiran, SGN, Sunset, Dhanvantri, PG-10-11, PG-19-15 and Anglia. These cultivars could be suitable for the nearby market as florets open quickly. This is followed by an immediate group of cultivars showing intermediate values from early to late opening of basal floret and is comprised of Punjab Pink Elegance, White Prosperity, Jacksonville Gold, Punjab Lemon Delight, Oscar, CPG, Novalux, Praha, Hunting Song, Arka Anmol, Alexander Great, PG-9-2, Priscilla, Punjab Dawn, PG-18-1 and PG-21-51. Cultivars in these groups can reasonably be used for distant places as the florets open slowly. Another group of cultivars comprised of Sylvia, Suchitra, Shagun, Sancerrae, Aldebran and Wind Song has

showed delayed opening of basal florets. All the cultivars within each group are statistically at par with each other. Punjab Glad 1 followed by PG-19-15, Big Time Supreme and Sunset took minimum days to opening of basal floret (1.32 days) whereas Sancerrae followed by Shagun, Sylvia, Aldebran and Red Beauty took maximum days to opening of basal floret (4.66 days). The analysis for vase life and number of florets open at one time grouped the cultivars into a continuous pattern from high to low range. Punjab Glad1, Punjab Flame, Oscar, Pusa Kiran, Peter Pears, Nova Lux, Hunting Song, PG-9-2, PG-23-55, PG-18-1 and PG-21-51 showed high values for vase life and number of florets open at one time. Among this group of cultivars, Punjab Glad 1 recorded highest vase life (5.55 days) and Punjab Flame recorded highest number of florets open at one time (4.20). The cultivars that show moderate values for vase life and number of florets open at one time include White Prosperity, True Yellow, Rose Supreme, Big Time Supreme, Red Advance, Arka Anmol, Sunset, PG-10-11, PG-20-64 and PG-19-15. The cultivars that show lower values for vase life and number of florets open at one time include Aldebran, Chandni, Sylvia, Suchitra, Shagun, Sancerrae, Wind Song and Anglia. Chandni and Priscilla recorded lowest vase life (1.67 days) and number of florets open at one time (1.98), respectively. Variation in vase life among cultivars was observed in gladiolus (Sarkar and Chakraborty 2014) and anthurium (Islam et al, 2013). Regarding floret diameter (Table 1) much variation among cultivars was not found. PG-9-2 followed by PG-6-16, Punjab Glance and Punjab Pink Elegance showed significantly maximum floret diameter (9.90 cm) where as Anglia followed by Chandni showed lowest floret diameter (4.63 cm). There occurs a variation in floret diameter among different cultivars of gladiolus (Singh and Singh, 2009; Saleem et al 2012)

Perusal of data (Table 2) a significant variation in percent opening of florets and water absorption spike⁻¹ was found among different cultivars of gladiolus. Continuous variation for per cent opening of florets and water absorption spike⁻¹ was observed among the cultivars. High values of percent opening of florets and water absorption spike⁻¹ was observed in Punjab Glad 1, Punjab Flame, Punjab Glance, Oscar, Pusa Kiran, PG-9-2, PG-23-55, PG-18-1. This was followed by a group of cultivars showing high to medium range of per cent opening of florets and water absorption spike⁻¹ which include Sunset, Punjab Pink elegance, Nova Lux, Praha, Yellow Stone, Big Time Supreme and Alexander Great. The cultivars having low percent opening of florets and water absorption spike⁻¹ include Anglia, Sancerrae, Chandni, Aldebran, Red Beauty and Wind Song. The highest percent opening of florets (73.34%) and water absorption spike⁻¹ (67.79 ml) was recorded by Punjab Glad 1 whereas lowest percent opening of florets (32.77 %) and water absorption spike⁻¹ was recorded by Anglia. The cultivars differ in their response to water absorption in Gerbera (Javad et al, 2011)

Table 1: Performance of gladiolus cultivars for post harvest attributes

Genotypes	Days taken to opening of basal floret	Vase life (day)	Number of florets open at one time	Floret diameter (cm)
Punjab Glance	2.33	4.00	3.28	8.51
Punjab Pink Elegance	2.67	3.51	3.71	8.50

Punjab Glad1	1.32	5.55	3.90	7.30
Punjab Flame	3.20	4.61	4.20	6.65
Yellow Stone	2.43	3.31	3.25	6.42
White Prosperity	3.33	3.89	3.41	6.10
Jacksonville Gold	3.01	2.67	3.30	5.79
Sylvia	4.28	2.15	2.45	5.65
Punjab Lemon Delight	2.57	2.86	3.28	6.87
Happy End	2.50	2.38	3.03	7.53
True Yellow	3.82	3.82	3.45	6.83
Suchitra	4.00	2.84	2.86	5.96
Red Beauty	3.92	2.42	2.56	6.98
Shagun	4.66	3.05	2.79	5.91
Rose Supreme	2.07	4.30	3.40	5.32
Oscar	2.80	4.85	3.69	6.06
Big Time Supreme	1.80	4.15	3.36	6.10
CPG	3.54	3.88	2.83	4.38
Peter Pears	2.47	4.71	4.08	4.53
Nova Lux	3.40	4.67	3.95	6.80
Praha	3.75	3.37	3.27	6.71
Red Advance	3.64	4.04	3.37	6.25
Hunting Song	2.67	4.80	3.56	5.99
Sancerre	4.66	2.83	2.54	4.05
Arka Anmol	3.08	4.50	3.45	4.50
Aldebaran	3.99	3.19	2.12	6.50
Shobha	2.50	3.70	3.75	7.36
Pusa Kiran	2.48	4.80	3.70	4.62
SGN	2.01	3.88	3.18	8.05
Sunset	1.93	4.17	3.78	6.50
Dhanavantri	2.04	3.50	2.50	7.05
Alexander Great	2.83	4.25	3.34	6.10
Wind Song	3.93	3.17	2.57	4.27
PG-9-2	3.17	5.37	4.15	8.90
PG-6-16	2.50	3.67	3.43	8.67
PG-10-11	2.32	4.56	3.39	5.88
PG-23-55	2.83	4.99	3.55	8.25
PG-20-64	2.92	4.53	3.44	5.25
PG-19-15	1.33	4.03	3.50	4.25
Priscilla	3.07	3.99	1.98	6.03
Anglia	2.50	2.39	2.62	3.63
Chandni	3.33	1.67	3.12	3.65
Punjab Dawn	3.17	3.50	3.74	7.48
PG-2-1	2.50	3.99	3.15	7.15
PG-18-1	2.87	5.38	4.20	8.50
PG-21-51	2.99	4.63	3.66	8.25
CD (P=0.05)	1.23	0.95	0.68	2.43

Table 2: Performance of gladiolus cultivars for percent opening of florets and water absorption spike¹

Genotypes	Per cent opening of florets	Water absorption spike ¹ (ml)
Punjab Glance	62.55	54.30
Punjab Pink Elegance	64.55	53.92
Punjab Glad1	73.34	67.79
Punjab Flame	72.23	63.60
Yellow Stone	62.71	52.44
White Prosperity	56.95	46.34
Jacksonville Gold	58.95	42.22
Sylvia	45.68	34.37
Punjab Lemon Delight	57.72	42.22
Happy End	42.90	34.50
True Yellow	64.44	47.27
Suchitra	53.95	44.96
Red Beauty	38.00	30.58
Shagun	38.13	32.50
Rose Supreme	60.10	51.55
Oscar	66.78	65.33
Big Time Supreme	60.50	55.88
CPG	39.93	38.36
Peter Pears	55.51	47.92
Nova Lux	66.63	51.95
Praha	65.39	35.95
Red Advance	50.15	49.95
Hunting Song	65.41	52.16

Sancerre	33.02	36.58
Arka Anmol	60.41	52.36
Aldebaran	33.06	35.00
Shobha	45.48	39.00
Pusa Kiran	66.45	62.99
SGN	33.69	39.00
Sunset	65.25	57.50
Dhanavantri	42.74	47.67
Alexander Great	62.35	49.83
Wind Song	38.54	34.83
PG-9-2	68.85	65.25
PG-6-16	45.35	48.67
PG-10-11	37.09	44.46
PG-23-55	70.86	62.35
PG-20-64	42.16	53.99
PG-19-15	57.12	48.60
Priscilla	40.03	38.00
Anglia	32.77	29.75
Chandni	33.02	30.50
Punjab Dawn	50.50	50.83
PG-2-1	38.21	46.15
PG-18-1	70.41	62.58
PG-21-51	69.22	52.17
CD (5%)	6.90	7.87

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