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Morphological Evaluation and Selection of Gladiolus (*Gladiolus×Hybridus* L.) Hybrids for Commercial Traits

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Abstract

This experiment was conducted with twenty-five gladiolus hybrids along with a check at the research farm of the Division of Floriculture & Landscaping, ICAR, Indian Agricultural Research Institute, New Delhi to study the performance and suitability of hybrids for different traits. The mean performance of gladiolus hybrid data was highly significant for all the characters studied; however, the results indicated that early flowering was seen in six hybrids such as Smokey Lady×Heady Wine Open seedling, The Berton Open seedling, Green Willow× Oscar, Shweta×Regency, Canada×Green Finch and Howard×Rose Time Steamboat and ranging from 82.33 to 86.00 days after planting. The maximum plant height 127.66 cm, spike length 116.00 cm and rachis length 63.33 cm were observed in Rose Time Steamboat hybrid, but number of florets per plant 19.33 was recorded in Canada×Green Finch hybrid. The number of corms i.e., three or more than three were recorded in seven hybrids namely; Oscar×Green Willow, (Snow Princess×Ratna)×Urmil, Smokey Lady×Mayur, Snow Princess.×Howard, Berlew Open seedling (Dark orange), Rose Time Steamboat Open seedling and Pink Parassol Open seedling respectively; whereas number of cormels in the range of 50.00 – 64.00 were recorded in five hybrids including check variety.

Keywords: Gladiolus, hybrids, vase life, flowering and corm traits

1. Introduction

Gladiolus is one of the most important among the bulbous ornamentals for cut flower trade in India. It is also ideal both for garden display and floral arrangements for table and interior decoration as well as making high quality bouquet (Lepcha et al., 2007). The main emphasis in gladiolus improvement has been on development of varieties having attractive colour and large number of florets mainly for cut flower, long spikes, more number of well–spaced large sized florets and good corm multiplication ability. Gladiolus is very rich in varietal wealth and every year there is an addition of new varieties (Rajiv Kumar and Yadav, 2005). Multiplication of planting material of gladiolus is most important, because the cut flower trade of gladiolus is lagging behind over the recent years, owing to the unavailability of sufficient quality planting material at large scale (Barman et al., 2005). Moreover, new varieties also come from other countries, and the performance of these varieties depends upon climatic conditions of the region under which they are grown. As a result, cultivars, which perform well in one region, may not perform same in other regions of varying climatic conditions (Kamble et al., 2004). It is also important to develop Indian hybrids and evaluate them with the existing cultivar for their superior desirable characters (Archana et al., 2008). Hence, the present experiments were conducted to know the performance of newly developed hybrids for different traits and further commercial in the country.

2. Materials and Methods

The present experiments were carried out at the Research Farm of the Division of Floriculture and Landscaping, ICAR, Indian Agricultural Research Institute, New Delhi during winter season from October–2021 to April–2022 with twenty–five gladiolus hybrids including standard check variety. Uniform size of each hybrid was planted during October. The experiments were laid out in randomized block design with three replications, at a spacing of 60 cm x 10 cm under double row system at 6–8 cm depth in a plot size of 5.00x3.00 $m^{2.}$ The hybrids experimented were: Oscar×Green Willow, (Miss America×Creamy Green)×Smokey Lady,Viola×Rangmahal, Melody×PFT, (Snow Princess×Ratna)×Urmil, Smokey Lady ×Mayur, Melody×Suchitra, AVE×Jane, Snow Princess× Howard, Ratna×Berlew, Canada×Green Finch, Howards× Rose Time Steamboat, Shweta×Regency, Dhanvantri×Rose Time Steamboat, Smokey Lady×Heady Wine Open seedling, Green Willow×Oscar, The Berton Open seedling, White Oak Open seedling, Berlew Open seedling, Rose Time Steamboat

Open seedling, Pink Parassol Open seedling, Berlew Open seedling(Light purple), Pusa Red Valentine Open seedling, Pusa Kiran (Local Check) and White Prosperity (National Check). Irrigation was given immediately after planting. Plots were kept weed free by hand weeding. Adequate soil moisture was maintained in the soil by giving regular irrigation from time to time. Disease control measures were taken up by spraying fungicides such as Bavistin, Captan or M–45 whenever necessary throughout the experimental period to grow a healthy crop. Other agronomic practices were followed as and when required. Data for various vegetative, flowering and corms parameters were recorded at appropriate time after planting and analyzed statistically as suggested by Panse and Sukhatme (1965).

3. Results and Discussion

Analysis of variance revealed significant differences among all the morphological characters studied and indicating considerable amount of variability in gladiolus hybrids. The mean performance of gladiolus hybrids (Table 1) showed significantly for days to flowering, plant height, spike length, rachis length, number of florets per spike, vase life and corm parameters. Among the different hybrids studied, the perusal of data on flowering appearance revealed that early flowering was seen in six hybrids such as Smokey Lady×Heady Wine Open seedling, The Berton Open seedling, Green Willow× Oscar, Shweta×Regency, Canada×Green Finch and Howard ×Rose Time Steamboat and its range was from 82.33 to 86.00 days after planting. The results of the present hybrids may be classified as early (75–90 days) mid (91–100 days),

Table 1: Performance of developed most promising hybrids for days to first flowering, plant height, spike and rachis length

Sl. No.	Hybrids	Days to first flowering	Plant height (cm)	Spike length (cm)	Rachis length (cm)
1.	Oscar×green willow	97.66	116.66	105.33	47.00
2.	(Miss America×Creamy green)×Smokey Lady	98.66	120.00	103.00	50.00
3.	Viola×Rangmahal	96.00	94.00	81.66	50.66
4.	Melody×PFT	95.33	98.00	87.00	47.00
5.	(Snow Princess×Ratna)×Urmil	89.33	107.00	90.33	43.33
6.	Smokey Lady×Mayur	110.66	116.00	105.00	51.66
7.	Melody×Suchitra	99.33	102.00	80.00	43.00
8.	AVE×Jane	95.66	82.66	74.00	37.33
9.	Snow Princess×Howard	94.00	93.00	82.00	29.00
10.	Ratna×Berlew	106.00	98.00	72.00	43.00
11.	Canada×Green Finch	85.33	95.33	76.00	43.00
12.	Howards×Rose time steamboat	86.00	99.33	78.33	48.66
13.	Shweta×Regency	84.66	105.33	91.66	57.00
14.	Dhanvantri×Rose time steamboat	97.33	95.66	70.33	41.00
15.	Smokey lady×Heady wine (Open seedling)	82.33	85.00	74.33	48.33
16.	Green Willow×Oscar	84.33	86.33	73.33	37.33
17.	The berton open seedling	83.66	109.66	97.33	57.33
18.	White oak open seedling	119.00	100.00	80.00	41.00
19.	Berlew open seedling	86.33	95.33	76.00	42.00
20.	Rose time steamboat open seedling	97.33	127.66	116.00	63.33
21.	Pink parassol open seedling	109.66	125.66	110.33	50.33
22.	Berlew open seedling (Light purple)	92.33	100.00	82.00	45.00
23.	Pusa red valentine open seedling	94.66	91.66	81.66	41.33
24.	Pusa kiran (Local Check)	82.66	117.33	109.00	60.00
25.	White prosperity (National Check)	103.00	110.00	99.33	61.00
	CD (p=0.05)	1.002	2.466	2.144	2.055
	C.V.	0.633	1.468	1.498	2.664

late (> 101 days) based on number of days, time taken for first floret to open. This study also indicates that one can plan for supply of gladiolus spikes in the market. The results are in confirmation with the findings of Naresh et al. (2015) and Kumari Poona (2012) in gladiolus. The maximum plant height 127.66 cm, spike length 116.00 cm and rachis length 63.33 cm were observed in Rose Time Steamboat hybrid. This might be due to varied growth rate among the hybrids. Similar variations for plant height were also observed by Kalasaraddi (1996) and Shiramgond (1997), Sidhu and Arora (2000) in different gladiolus cultivars/hybrids. The hybrids and check variety showed significant differences for spike length, rachis length, number of florets per spike and number of corms/ cormels per plant. In gladiolus, spike length is one of the most important characters and in the present investigation data showed that hybrids had produced significantly longer spikes as compared to the other hybrids and check; whereas, spike length was minimum (70.33 cm) in hybrid Dhanvantri x Rose Time Steamboat. On the other hand, rachis length (63.33 cm) was longer in Rose Time Steamboat hybrid (table 1). Variation for spike length and rachis length was also observed by Hegde (1996). The number of florets per spike 19.33 was recorded in Canada x Green Finch hybrid. The spike quality is more precisely measured in terms of number of florets per spike. Number of florets/spikes was also recorded more in five hybrids such as Melody×Suchitra, Ratna×Berlew, Shweta ×Regency, Berlew Open seedling (Light and Dark orange) respectively. Superiority of few hybrids over other hybrids for number of florets might be due to genetically make up of plants. The number of corms i.e., three or more than three were recorded in seven hybrids namely; Oscar×Green Willow, (Snow Princess×Ratna)×Urmil, Smoke Lady×Mayur, Snow Princess×Howard, Berlew Open (Dark orange), Rose Time Steamboat Open seedling and Pink Parassol Open seedling, while check variety produced only 1.66 corms per plant (table 2). Sharma and Gupta (2003) reported that availability of more food material stored in bigger sized mother corms that helped in better plant growth might be associated with the beneficial effect and corms production depends on the size of corms. The normal vase life in tap water i.e., 15.66, 15.33, 15.00 and 14.00 days was recorded in hybrids such as Oscar×Green Willow, Melody×Suchitra, AVE×Jane, Smokey Lady×Heady Wine Open seedling and (Miss America x Creamy Green)×Smokey Lady respectively; since the vase life is important crucial character for cut flower in gladiolus and variation in results are in accordance with the findings of Gupta et al. (2001) and Swaroop and Singh (2021). These findings confirm the results of present investigation.

Table 2: Performance of developed most promising hybrids for number of florets per spike, vase life number of corms and cormels plant^{-1}

Sl. No.	Hybrids	No. of florets spike^{-1}	Vase life of spike in tap water (days)	No. of corms plant^{-1}	No. of cormels plant^{-1}
1.	Oscar×green willow	17.33	15.66	3.00	46.33
2.	(Miss America×Creamy green)×Smokey Lady	17.33	14.00	2.66	54.66
3.	Viola×Rangmahal	16.00	12.66	2.66	35.66
4.	Melody×PFT	17.00	12.33	2.66	41.00
5.	(Snow Princess×Ratna)×Urmil	16.66	12.33	3.00	34.00
6.	Smokey Lady×Mayur	17.00	13.00	3.00	34.33
7.	Melody×Suchitra	18.00	15.33	2.33	34.00
8.	AVE×Jane	14.00	15.00	2.66	41.33
9.	Snow Princess×Howard	14.33	11.33	3.00	30.33
10.	Ratna×Berlew	18.00	11.33	2.00	24.66
11.	Canada×Green Finch	19.33	12.33	2.33	30.00
12.	Howards×Rose time steamboat	13.33	12.66	2.66	22.33
13.	Shweta×Regency	18.66	13.00	2.33	26.00
14.	Dhanvantri×Rose time steamboat	13.33	13.00	2.66	30.33
15.	Smokey lady×Heady wine (Open seedling)	12.66	15.00	2.66	30.33
16.	Green Willow×Oscar	15.00	13.00	2.33	20.33
17.	The berton open seedling	15.00	13.66	2.33	25.66
18.	White oak open seedling	14.33	13.00	2.33	38.33

Table 2: Continue...

S l . No.	Hybrids	No. of florets spike^{-1}	Vase life of spike in tap water (days)	No. of corms plant^{-1}	No. of cormels plant^{-1}
19.	Berlew open seedling	18.00	13.00	3.00	28.33
20.	Rose time steamboat open seedling	17.33	13.00	3.00	50.00
21.	Pink parassol open seedling	16.33	11.66	3.00	61.00
22.	Berlew open seedling (Light purple)	18.00	12.33	2.33	52.33
23.	Pusa red valentine open seedling	16.00	12.33	2.33	23.00
24.	Pusa kiran (Local Check)	17.66	11.00	2.66	64.00
25.	White prosperity (National Check)	16.66	11.66	1.66	37.33
	CD (p=0.05)	0.923	2.228	0.277	2.451
	C.V.	3.436	10.333	18.273	4.062

4. Conclusion

Six hybrids such as Smokey Lady ×Heady Wine Open seedling, The Berton Open seedling, Green Willow×Oscar, Shweta ×Regency, Canada×Green Finch and Howard×Rose Time Steamboat were found suitable for early flowering, plant height, spike length and whereas the number of corms i.e., three or more than three were recorded in seven hybrids namely; Oscar×Green Willow, (Snow Princess x Ratna)×Urmil, Smokey Lady×Mayur, Snow Princess.×Howard, Berlew Open seedling (Dark orange), Rose Time Steamboat Open seedling and Pink Parassol Open seedling respectively.

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