

Improvement and Performance of Gladiolus Hybrids for Flower Traits/ Novel Colour and Higher Corm Multiplication

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Abstract – Gladiolus is very important cut flower crop and also ideal both for garden display and floral arrangements for table and interior decoration as well as making high quality bouquet. The main emphasis in gladiolus improvement has to be on development of varieties having attractive novel 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. Hence, it is important to develop Indian hybrids and evaluate them for different traits suitable for commercial cultivation in northern plains. The experiment was conducted with twenty seven hybrids along with a check at the research farm of the Division of Floriculture & Landscaping, Indian Agricultural Research Institute, New Delhi during the year 2016-17 to study the performance and suitability of hybrids for different traits. The mean performance of gladiolus hybrid data were highly significant for all the characters studied. The results indicated that almost all the hybrids performed well for most of the important characters; however, the hybrids such as Salmon Queen Open Seedling, Suchitra x Melody, Bindiya (mutant), Green Pasture x Regency, Pink Parassol Open Seedling have recorded maximum plant height, spike length and rachis length. Two hybrids such as Suchitra x Melody and Bindiya (mutant) produced 21.33 and 21.00 number of florets per spike respectively. But, remaining hybrids have also produced more than 16.00 numbers of florets per spike as compared to check. Number of shoots per plant have also been recorded 3.00 or more than 3.00 by many hybrids such as Pink Parassol Open Seedling, Melody Open Seedling, Suchitra x Melody, Vidushi (mutant) and Green Pasture x Regency etc.

Keywords – Gladiolus, Hybrids, Flower Characters, Corms, Cormels.

I. INTRODUCTION

Gladiolus (*Gladiolus hybridus* Hort.) belongs to Family *Iridaceae* and Sub-family *Ixiodeae* originated from South Africa. It 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 (1). The main emphasis in gladiolus improvement has been on development of varieties having attractive novel 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 (8). 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 (3). 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 (6). It is also important to develop Indian hybrids and evaluate them with the existing cultivar for their superior desirable characters (2). Hence, the present experiment was conducted to know the performance of newly developed hybrids for different traits and also suitable for commercial cultivation in northern plains.

II. MATERIAL METHODS

The present experiment was carried out at the Research Farm of the Division of Floriculture and Landscaping, Indian Agricultural Research Institute, New Delhi during 2016-17 with twenty seven gladiolus hybrids including best check. Uniform size of each hybrid was planted during October 2016. The experiment was laid out in randomized block design with three replications, at a spacing of 45 cm x 15 cm at 6-8 cm depth in a plot size of 5.00 m x 3.00 m. Irrigation was given immediately after planting. The fertilizers dose was given according to need of the crop at appropriate time. 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 experiment to grow a healthy crop. Other agronomic practices were followed as and when required. Data for various vegetative and flowering parameters were recorded at appropriate time after planting and analyzed statistically as suggested by Panse and Sukhatme (11).

III. RESULTS AND DISCUSSION

Vegetative Characters

Analysis of variance revealed significant differences among all the morphological characters studied, indicating considerable amount of variability in gladiolus hybrids and the mean performance of gladiolus hybrids indicated significantly for days to flowering, plant height, spike length, rachis length and corm parameters. The data pertaining to vegetative growth such as days to first flowering, plant height, spike length and rachis length is presented in the Table 1. Among the different hybrids studied, hybrid Salmon Queen Open Seedling significantly produced taller plants (154.66 cm) followed by Suchitra x Melody (150.00 cm), Bindiya (mutant) 146.00 cm and Green Pasture x Regency (145.66 cm) whereas, hybrid

Cignet x Little Fawn (yellow) produced shortest plants (99.33 cm). This might be due to varied growth rate among the hybrids. Similar variations for plant height was also observed by Kalasaraddi (7) and Shiramgond (14), Sidhu and Arora (15) in different gladiolus cultivars/hybrids. The perusal of data on flowering appearance revealed that hybrid Melody Open Seedling was the earliest to initiate the first floret to open (74.66 day) followed by P-16-1 x Eurovision (84.33 day, whereas, Pink Parassol Open Seedling and Cignet x Miss America recorded (109.66 and 104.00 day respectively) and were the latest one. The results of the present hybrids may be classified as early (75-90 day) mid (91-100 day), late (>101 day) based on number of days, time taken for first floret to open. The data also indicated that there was significant difference among the hybrids with respect to number of days taken for first floret opening and planning for supply of gladiolus spike can be charted out daily taking into account the time taken for florets initiation the various hybrids. The results are in confirmation with the findings of Naresh *et al.* (10), Punam *et al.* (12), Tul *et al.* (17), Syed *et al.* (16), Archana *et al.* (2) and Ganesh *et al.* (4) in gladiolus.

Flower and Corm Characteristics of 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 Salmon Queen Open Seedling, Bindiya (mutant), Green Pasture x Regency and Suchitra x Melody had produced significantly longer spikes (142.66 cm, 136.00 cm and 132.66 cm respectively) as compared to the other hybrids and check; whereas, spike length was minimum in hybrid Cignet x Little Fawn (yellow) 89.00 cm. On the other hand, rachis length was longer in hybrids Bindiya (mutant) 81.00 cm, Suchitra x Melody 77.00 cm and Vidushi (mutant) 69.66 cm (table 1). Variation for spike length and rachis length was also observed by Hegde (5). The spike quality is more precisely measured in terms of number of florets per spike. Number of florets/spike were recorded more in hybrids Suchitra x Melody (21.33, Bindiya (mutant), Salmon Open Seedling each (21.00), Vidushi (mutant) 19.66, Pearl Beauty x Lucky Shemrock 19.33 and Mayur x Howard (Purple Blue) 19.33; while it was minimum in hybrid White Oak x Flirt (14.66). Superiority of few hybrids over other hybrids for number of florets might be due to genetically make up of plants. Hybrids such as Pink Parassol Open Seedling, (Melody x Mayur) x Heady Wine and Mayur x Green Willow produced and opened more number of florets at a time 7.66 each. The number of corms and cormels per plant was higher in hybrid Suchitra x Melody (4.33 and 88.00 respectively), however, many hybrids such as Pink Parassol Open Seedling, P-16-1 x Eurovision, Melody Open Seedling, Smokey Lady x Oscar (Red), Salmon Queen Open Seedling (Veerangana), (Melody x Mayur) x Heady Wine and White Oak x Flirt produced 3.33 corms per plant each, while check variety produced only 1.66 corms per plant (table 2). Hybrids Mayur x Howard (Purple Blue), Smokey Lady x Heady Wine and Vidushi (mutant) had also

produced 80.00, 77.66 and 72.66 cormels per plant respectively. Sharma and Gupta (13) 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. These findings confirm the results of present investigation.

IV. CONCLUSION

The results indicated and concluded that almost all the hybrids performed well for most of the important characters; however, the hybrids such as Salmon Queen Open Seedling, Suchitra x Melody, Bindiya (mutant), Green Pasture x Regency, Pink Parassol Open Seedling have recorded maximum plant height, spike length and rachis length. Two hybrids such as Suchitra x Melody and Bindiya (mutant) produced 21.33 and 21.00 number of florets per spike respectively. But, remaining hybrids have also produced more than 16.00 numbers of florets per spike as compared to check. Number of shoots per plant have also been recorded 3.00 or more than 3.00 by many hybrids such as Pink Parassol Open Seedling, Melody Open Seedling, Suchitra x Melody, Vidushi (mutant) and Green Pasture x Regency etc.

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

S.N.	Hybrids	Days to first flowering	Plant height (cm)	Spike length (cm)	Rachis length (cm)
1	Pink Parassol Open Seedling	109.66	136.66	127.00	51.66
2	P-16-1 x Eurovision	84.33	119.66	105.33	58.66
3	Melody Open Seedling	74.66	123.66	114.00	64.00
4	BL Open Seedling (Dark Orange)	98.33	112.33	96.33	53.00
5	Suchitra x Melody	103.33	150.00	132.66	77.00
6	Bindiya (mutant)	98.66	146.00	136.00	81.00
7	Vidushi (mutant)	95.00	129.00	120.66	69.66
8	Smokey Lady x Oscar (Red)	97.00	105.33	94.33	48.66
9	Salmon Queen Open Seedling(Veerangna)	91.00	154.66	142.66	68.00
10	Melody x Mayur) x HW	95.66	115.66	99.66	53.66
11	Smokey Lady x HeadyWine(Ash colour)	103.00	128.66	118.66	62.66
12	Green Pasture x Regency	94.00	145.66	136.00	63.66
13	Berlew x HeadyWine (Good purple)	88.00	125.00	114.00	63.33
14	RTS Open Seedling(Light Red)	97.00	129.00	116.33	63.66
15	Green Lilac Open Seedling(S.N. Giant Orange colour)	95.66	120.00	108.00	60.33
16	BL Open Seedling (Light purple)	100.66	118.33	106.00	51.66
17	Cignet x Little Fawn (Yellow)	100.33	99.33	89.00	50.333
18	White Oak x Flirt	96.00	106.33	98.00	55.00
19	Howard Open Seedling(White)	91.00	126.33	118.00	69.00
20	High Hopes Open Seedling (White)	88.00	115.00	103.00	58.66
21	Mayur x Howard (Purple Blue)	97.00	106.66	96.66	56.33
22	Wind Song x P. Frost Open (White)	87.66	114.00	104.00	57.00
23	Pearl Beauty x Lucky Shemrock	102.00	100.33	90.33	57.66
24	Howard x RTS (Pink Red)	92.33	118.66	107.33	61.66
25	Smokey Lady Open x Mayur	85.00	138.00	128.00	72.66
26	Mayur x GreenWillo (Pink)	95.00	129.00	109.00	57.66
27	Cignet x Miss America	104.00	133.00	122.33	54.00
28	White Prosperity (Check)	102.66	109.66	100.66	60.66
	C D at 5 %	1.38	4.55	3.54	3.92

Table 2: Performance of developed most promising hybrids for number of florets per spike, florets opened at a time number of corms and cormels per plant.

S. N.	Hybrids	No. of florets per spike	Florets opened at a time	No. of corms per plant	No. of cormels per plant
1	Pink Parassol Open Seedling	16.00	7.66	3.33	60.33
2	P-16-1 x Eurovision	16.33	6.33	3.33	11.33
3	Melody Open Seedling	18.33	6.00	3.33	16.33
4	BL Open Seedling (Dark Orange)	18.66	5.66	2.66	34.00
5	Suchitra x Melody	21.33	6.66	4.33	88.00
6	Bindiya (mutant)	21.00	7.00	3.00	66.00
7	Vidushi (mutant)	19.66	6.00	2.66	72.66
8	Smokey Lady x Oscar (Red)	18.00	7.00	3.33	38.66
9	Salmon Queen Open Seedling(Veerangna)	21.00	7.00	3.33	44.00
10	Melody x Mayur) x HW	15.66	7.66	3.33	33.00
11	Smokey Lady x HeadyWine(Ash colour)	18.33	6.66	2.66	77.66
12	Green Pasture x Regency	17.33	6.33	2.66	39.00
13	Berlew x HeadyWine (Good purple)	16.66	5.66	2.33	30.66

S. N.	Hybrids	No. of florets per spike	Florets opened at a time	No. of corms per plant	No. of cormels per plant
14	RTS Open Seedling(Light Red)	18.00	6.66	2.66	47.66
15	Green Lilac Open Seedling(S.N. Giant Orange colour)	18.33	6.33	2.33	19.66
16	BL Open Seedling (Light purple)	18.33	6.33	3.00	36.33
17	Cignet x Little Fawn (Yellow)	16.66	6.00	2.33	29.66
18	White Oak x Flirt	14.66	7.00	3.33	18.66
19	Howard Open Seedling(White)	18.00	6.66	3.00	69.33
20	High Hopes Open Seedling (White)	18.66	6.33	2.66	48.00
21	Mayur x Howard (Purple Blue)	19.00	6.33	2.33	20.33
22	Wind Song x P. Frost Open (White)	16.66	5.66	2.66	80.00
23	Pearl Beauty x Lucky Shemrock	19.33	6.33	2.33	40.66
24	Howard x RTS (Pink Red)	17.66	5.66	2.33	38.33
25	Smokey Lady Open x Mayur	16.66	6.66	2.33	50.00
26	Mayur x GreenWillo (Pink)	19.00	7.66	2.00	22.00
27	Cignet x Miss America	17.00	7.00	2.33	28.00
28	White Prosperity (Check)	16.66	5.33	1.66	17.66
	C D at 5 %	1.31	1.08	0.88	7.15

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