

Evaluation of gerbera (*Gerbera jamesonii* Bolus) cultivars for growth and flower characters under Assam conditions

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Abstract: The present investigation was carried out to study the performance of twelve cultivars of gerbera (*Gerbera jamesonii* Bolus) under open field conditions in Assam. Vegetative, flowering and flower characters varied significantly among the cultivars. Mean performance of the cultivars revealed that cv. Pride of Sikkim was the tallest (61.80 cm) and produced longest stalk length (49.51cm). Cultivar Red Gem produced maximum number of leaves per plant (46.55), plant spread (54.10 cm) and number of suckers per plant (24.04). Days taken to bud visibility and full bloom varied greatly among cultivars under the study. Cultivar Pink Melody took least number of days, 63.78 and 76.00 for bud visibility and full bloom respectively. With respect to flower characters, cv. Red Gem recorded the maximum number of flowers per plant (53.17) and possessed longest self life (19.96 days) and vase life (9.81 days). Largest flower diameter was found in cv. Orange Gleam (11.20 cm) which was followed by cv. Classic Beauty (10.95 cm). Heaviest flowers were produced by the cv. Classic Beauty (16.71g). Duration of flowering was longest in cv. Red Gem (130 days). Wide variation in flower colour was also observed among the cultivars. Cultivar Red Gem expressed best performance on various growth and flower characters followed by other cultivars viz. Orange Gleam, Classic Beauty and Pink Melody.

Key words: Assam, evaluation, gerbera and performance.

I. Introduction

Gerbera (*Gerbera jamesonii* Bolus) with chromosome number $2n = 50$, commonly known as Transvaal Daisy, Barberton or African Daisy is considered as one of the nature's beautiful creations because of its excellent flowers with exquisite shape, size and bewitching colours. It belongs to the family Asteraceae with single and double flowers. Variety in colour has made this flowering plant attractive for use in garden decorations, such as herbaceous borders, bedding and pots plants and for cut flowers as it has a long vase life [1] and [2]. The vase life of gerbera lasts for a week which can be extended upto 15 days with selection of suitable cultivars and pre-harvest treatment. It ranks fourth in the international cut flower market and a popular cut flower in Holland, Germany and USA [3].

Nowadays, with the increase in economic importance of ornamentals in many countries, the international demand for gerbera flowers has also rapidly expanded and such it has become one of the most important commercial cut flower for presentation and interior decoration. Though a wide array of gerbera cultivars are grown in North Eastern Region, it becomes inevitable to evaluate new cultivars for their qualitative and quantitative characters, to identify and finally to recommend the suitable cultivars for the agro-climatic conditions of Assam, so as to match the demand of both the domestic and international markets.

II. Material And Methods

The experiment was carried out at the Experimental Farm of the Department of Horticulture, Assam Agricultural University, Jorhat for two years during 2010-12 in a Randomized Block Design (RBD) which was replicated thrice. Geographical location of the site falls between latitude of $26^{\circ}47'N$ and a longitude of $94^{\circ}12'E$ and 86.8 m above the sea-level. The annual average rainfall is 2500 mm with uneven distribution throughout the year. Rainfall intensity is highest in monsoon season which normally begins from first week of June. The intensity then decreases from October onwards reaching the minimum during December/January. Twelve cultivars of the type having uniform vigour and age were selected and planted on 25th of October in both the years of the study at a spacing of 30 cm x 30 cm. The beds of 3 sq. m were raised to 25cm from the ground level to avoid water stagnation. The crops were raised following the recommended package of practices in both the years. Data on growth and flower parameters were recorded after four months of planting when the plants were fully grown and the mean values of the data were analyzed statistically.

III. Results And Discussion

The results obtained from the present investigation on various characters of growth and flowering of gerbera cultivars revealed significant differences among the cultivars as it was evident from TABLE 1, 2 and 3. Pooled analysis showed that cultivar Pride of Sikkim recorded maximum plant height (61.80 cm), followed by

Indukumari (57.75 cm), whereas the lowest was recorded by cultivar Pink Melody (42.33 cm). Number of leaves per plant varied from 30.34 (cv. Jawahar) to 46.55 (cv. Red Gem). Longest (21.77 cm) and broadest (9.03 cm) leaves were produced by cv. Red Gem and cv. Pride of Sikkim respectively; whereas cv. Pink Melody recorded shortest leaves (17.32 cm) and cv. Avon produced narrower leaves (6.70 cm). Plant spread was recorded highest in cv. Red Gem (54.10 cm) followed by cv. Orange Gleam (50.22 cm) while the lowest was recorded under cv. Pride of Sikkim (41.16 cm). Variation in plant spread was due to the inherent genetic character of the individual cultivars and also it depended upon the leaf length of the cultivars. Maximum number of suckers were produced by cv. Red Gem (24.04) followed by cv. Orange Gleam (18.02) while the minimum were produced by cv. Jawahar (7.29). The cultivars Red Gem, Orange Gleam which produced higher number of leaves per plant exhibited greater plant spread and produced higher number of suckers per plant compared to other cultivars indicating a positive correlation between number of leaves and suckers which is in accordance with the results of [4] in gerbera.

The perusal of data presented in TABLE 2 revealed that flowering characters varied significantly among the cultivars. Cultivar Pink Melody took minimum duration for flower bud visibility (63.78 days) whereas maximum duration for flower bud visibility was recorded in cv. Avon (103.33 days). Cultivars Pink Melody and Red Gem recorded minimum period (76.00 days) and (76.13 days) respectively from planting to full bloom while the cv. Avon took longest duration (113.08 days). Since early and late flowering characters are genetically controlled, cultivars might be chosen accordingly for getting prolonged flowering duration. Longest flowering duration was recorded in cv. Red Gem (130.00 days) while minimum was recorded in cv. Indukumari (93.83 days) and Avon (94.50 days), and both were at par. This variation might be attributed to the inherent varietal character of the cultivars as have been reported by [5]. Hence, from Table 2., the cultivars viz. Pink Melody, Red Gem, Pride of Sikkim, Indukumari, Popular and Classic Beauty could be grouped as early flowering due to their minimum requirement from 76.00 days to 80.27 days. Yellow Queen and Avon could be placed in the group of late flowering as they took more than 90.00 days. The remaining cultivars could be placed in the intermediate groups. The flower bud opening from visibility of bud was generally early in cultivars with more number of leaves, higher leaf area and more number of suckers.

The pooled analysis of the flower quality parameters such as flower size, fresh weight and stalk length revealed significant variation among the cultivars as shown in TABLE 3. The significant and maximum flower size was recorded in the cv. Orange Gleam (11.20 cm) followed by cv. Classic Beauty (10.95 cm), both were at par; while the minimum (8.78 cm) was recorded in the cv. Indukumari. The increase in flower size was due to bigger ray florets recorded in the same cultivars [6]. Longest stalk length was recorded in cv. Pride of Sikkim (49.51 cm) and the shortest length of the stalk was observed in cv. Avon (37.70cm). These differences in cut flower quality characters may be due to the presence of additive genes present in the individual cultivar.

Flower production per plant was observed to vary significantly among the cultivars. Among the cultivars, cv. Red Gem produced maximum number of flowers per plant (53.17) and it was followed by cvs. Orange Gleam (46.17) and Pink Melody (43.86) flowers per plant. The increase in flower yield may be attributed to the greater leaf area and more number of leaves per plant as well as plant spread which might have resulted in production and accumulation of maximum photosynthates, ultimately resulting in more number of flowers with bigger size. This was in accordance to the findings of [7].

The difference in self life and vase life were found significant among the cultivars. It was evident from TABLE 3 that the cv. Red Gem recorded maximum self life (19.96 days). Minimum self life was recorded in cv. Jawahar (10.75 days) and Pride of India (12.29 days) and they were significantly different from rest of the cultivars. Minimum vase life was recorded in cv. Jawahar (4.10 days) and Avon (5.08 days). The variation in vase life of different accessions of gerbera might be attributed to genetic variability. In general, both self life and vase life of flower greatly depend on the general condition of the mother plant. The varieties which exhibit longer self life and vase life might possess better water uptake capacity and higher accumulation of metabolic sugars (reducing and non-reducing) in the plant as well as in the petal cells. The cultivar Red Gem due to its long vase life could be a very popular choice in the wholesale market.

IV. Conclusion

The above mentioned findings indicated that out of the twelve cultivars studied, most attractive colour was found in Red Gem (bright red) which have higher acceptability in the market along with Orange Gleam (orange) and Pink Melody (pink). The variety Red Gem was found to be the best among all the cultivars showing significantly highest mean values for most of the growth and flower characters including number of leaves, leaf area, number of flowers per plant, self life (duration) of flower, vase life and sucker production. The other promising cultivars suitable for Assam condition are Orange Gleam, Classic Beauty, Pink Melody and Pride of Sikkim which also exhibited acceptable morphological and flowering quality characteristics.

Table 1. Vegetative growth characters of gerbera cultivars

Cultivar	Plant height (cm)	Number of leaves per plant	Leaf length (cm)	Leaf breadth (cm)	Plant spread (cm)	Number of suckers per plant
Red Gem	46.86	46.55	21.77	7.43	54.10	24.04
Pride of Sikkim	61.80	35.04	20.79	8.78	41.16	14.22
Avon	46.42	31.89	20.61	6.70	43.71	13.14
Jawahar	39.55	30.34	18.29	7.98	42.94	7.29
Orange Gleam	53.24	43.65	20.81	8.67	50.22	18.02
Indukumari	57.75	33.19	20.25	8.32	46.02	11.95
Classic Beauty	49.29	39.85	20.20	7.87	47.65	16.33
Pink Melody	42.33	37.93	17.32	8.60	48.79	17.83
Pride of India	50.90	34.05	17.85	8.16	44.06	10.71
Popular	53.20	34.99	19.84	7.89	45.86	13.99
Dream Time	49.50	31.56	18.38	8.59	45.43	9.84
Yellow Queen	45.81	38.73	20.35	8.28	48.34	7.94
S.Ed ±	0.572	0.661	0.770	0.123	0.994	0.500
C.D _{0.05}	1.153	1.333	1.554	0.248	2.004	1.007

Table 2. Flowering characters of gerbera cultivars

Cultivar	Days to flower bud visibility	Days to full bloom	Flowering duration	Flower colour
Red Gem	64.26	76.13	130.00	Red
Pride of Sikkim	64.56	78.03	119.05	White
Avon	103.71	113.08	94.50	Red
Jawahar	74.80	85.85	105.17	Light Pink
Orange Gleam	69.78	82.50	123.83	Dark Orange
Indukumari	66.30	78.70	93.83	Mezenta
Classic Beauty	68.16	80.27	124.33	Orange
Pink Melody	63.78	76.00	118.00	Pink
Pride of India	77.80	87.83	103.17	Light Orange
Popular	66.60	80.08	113.00	Pink
Dream Time	70.00	81.22	96.67	Dark Pink
Yellow Queen	75.82	90.75	96.50	Yellow
S.Ed ±	1.656	1.986	4.090	
C.D _{0.05}	3.339	4.005	8.249	

Table 3. Flower characters of gerbera cultivars

Cultivar	Flower size (cm)	Flower weight (g)	Stalk length (cm)	Number of flowers per plant	Self life (days)	Vase life (days)
Red Gem	9.57	11.33	46.64	53.17	19.96	9.81
Pride of Sikkim	10.94	9.99	49.51	42.67	14.95	7.11
Avon	9.74	8.14	37.70	33.25	12.28	5.08
Jawahar	9.36	8.68	40.70	36.83	10.75	4.10
Orange Gleam	11.20	12.62	48.40	46.17	18.52	8.51
Indukumari	8.78	11.51	49.30	32.67	14.09	7.98
Classic Beauty	10.95	16.71	42.45	42.92	17.12	8.33
Pink Melody	9.03	16.30	39.27	43.86	15.94	6.94
Pride of India	9.15	8.32	43.90	34.33	12.29	6.69
Popular	10.37	13.04	45.58	23.33	17.33	8.20
Dream Time	8.85	12.59	46.62	28.00	14.38	6.94
Yellow Queen	9.85	13.79	43.01	22.25	16.68	8.55
S.Ed ±	0.460	0.510	0.776	1.665	0.677	0.447
C.D _{0.05}	0.928	1.029	1.566	3.358	1.365	0.902

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