

Original Research Article

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Varietal Evaluation of Gerbera (*Gerbera jamesonii*) under Naturally Ventilated Polyhouse Condition in Prayagraj

MD. Akhtar*, Devi Singh and Urfi Fatmi

Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad, India

*Corresponding author

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The present experiment was carried out during December 2019 to April 2020 in Research Field, Department of Horticulture, SHUATS, Prayagraj. The experiment was conducted in Randomized Block Design (RBD), with ten varieties of Gerbera, the varieties were replicated thrice. The varieties were V₁ (Regina), V₂ (Bernika), V₃ (Martyana), V₄ (Albert), V₅ (Salsa), V₆ (Marzena), V₇ (Marta), V₈ (Lisiecka), V₉ (Korman) and V₁₀ (Pal). Form the present investigation it is found that among the ten varieties of Gerbera. Variety Bernika found superior in Growth and yield characters followed by variety Korman and Martyana. In disc diameter and suckers yield variety Albert found superior. In vase life, Korman was superior, Minimum growth and yield was recorded in variety Marta, Pal and Regina. Maximum gross return, net return and Cost: benefit ratio was recorded in variety Bernika and minimum in variety Regina.

Introduction

Gerbera botanically known as *Gerbera jamesonii* belongs to the family Asteraceae. This group at present comprises 45 species, native to tropical Asia and Africa. Among the different species of gerbera viz., *G. asplenifolia*, *G. aurantiaca* *G. kunzeana* and *G. jamesonii*, the only species under cultivation is *Gerbera jamesonii* with chromosome number n = x = 25. There are two types of gerberas, one is single, in which there are one or two rows of ray florets and the flower quality is good and another one is double type. For commercial purpose, double type are grown, which are much more in demand than the single ones. They have more

than two rows of ray florets and flower quality is better than single. The leaves are petioled, entire or pinnately lobed, coarse or sometimes tubular and two lipped. Achenes are beaked; pappus or rough bristles in two or more rows. The daisy like flowers are available in wide range of colours including yellow, red, orange, cream, white, pink, brickred, scarlet, salmon peach, maroon and various other intermediate shades.

Gerbera as a cut flower has tremendous demand in domestic and international markets. Due to globalization and increase in per capita income the demand for flowers is increasing both nationally and internationally. Though the crop can be cultivated in

moderately warmer open sunny conditions, the performance of the crop is enhanced when grown in protected or semi-protected structures.

The main advantage of growing the crop under cover or protected conditions is exploitation of genetic potential of the genotypes. Further the crops can also be managed successfully throughout the year. Success of Gerbera under protected conditions has encouraged farmers to take up its protected cultivation extensively during the past few years in India.

Materials and Methods

The Experimental was conducted in Randomized Block Design (RBD) with 10 Varieties of Gerbera with three replications in the, Research field, Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during the December, 2019 to April, 2020. Total number of varieties were twelve viz. V₁ (Regina), V₂ (Bernika), V₃ (Martyana), V₄ (Albert), V₅ (Salsa), V₆ (Marzena), V₇ (Marta), V₈ (Lisiecka), V₉ (Korman) and V₁₀ (Pal). Recommended dose of manures and fertilizers were applied in each variety.

Climatic condition in the experimental site

The area of Prayagraj district comes under subtropical belt in the south east of Utter Pradesh, which experience extremely hot summer and fairly cold winter.

The maximum temperature of the location reaches up to 46° C- 48° C and seldom falls as low as 4°C- 5°C. The relative humidity ranges between 20 to 94 %. The average rainfall in this area is around 1013.4 mm annually. However, occasional precipitation is also not uncommon during winter months.

Results and Discussion

The present investigation entitled “Varietal evaluation of Gerbera (*Gerbera jamesonii*) under naturally ventilated polyhouse condition” was carried out during December 2019 to April 2020 in Research Field, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.) India. The results of the present investigation, regarding the varietal evaluation of Gerbera, have been discussed and interpreted in the light of previous research work done in India and abroad. The experiment was conducted in Randomized block design with 10 Varieties, and three replications.

The results of the experiment are summarized below (Table 1 and 2).

Growth parameters

In terms of Plant height, maximum plant height (26.21, 32.29, 35.19 and 39.04 cm) at 30, 60, 90 and 120 days was recorded in Bernika followed by variety Korman with (24.32, 29.67, 32.11 and 35.35 cm) and minimum plant height (18.04, 21.88, 25.20 and 28.57 cm) were observed in variety Pal. Plant height is a varietal character as it varies from variety to variety. Sarmah *et al.*, (2014) reported maximum plant height in Dune (54.70 cm) cultivar of Gerbera.

In terms of number of leaves, maximum number of leaves (9.50, 12.27, 13.81 and 14.82) at 30, 60, 90 and 120 days was recorded in Korman followed by variety Lisiecka with (8.38 leaves in 30 DAS) variety Salsa with (11.12 leaves in 60 DAS) and variety Bernika with (12.25 and 13.48 in 90 and 120 days) and minimum number of leaves (5.98, 7.90, 9.53 and 10.88) was observed in variety Marta. The increase in number of

leaves was probably influenced by the increased photosynthetic activity of the plants at later stages which in turn produced better vegetative growth and maximum number of leaves. The results are in accordance with the findings of Ahlawat *et al.*, (2012) and Jangde *et al.*, (2019) in gerbera under protected conditions.

In terms of plant spread, maximum plant spread (32.58, 37.24, 43.51, 49.07 cm) at 30, 60, 90 and 120 days respectively was recorded in Bernika followed by variety Martyana with (28.83 cm in 30 DAS) and variety Korman with (23.53, 28.70 and 33.37 cm in 60, 90 and 120 days) and minimum plant spread (14.08, 17.32, 22.32 and 27.26 cm) was observed in variety Lisiecka. The difference among the varieties may be due to bigger sized leaves produced by respective cultivars. The results are in accordance with the findings of Singh and Ramachandran

(2002), Thomas *et al.*, (2004) and Jangde *et al.*, (2019).

In terms of days to first flower open, minimum number of days for first flower open (70.75) was recorded in Bernika followed by variety Korman with (73.65) and Martyana (74.41) and maximum number of days for flower open (86.35 days) was recorded in variety Marta. The early flowering in Bernika (73.65 days) might be attributed to maximum number of leaves which would have resulted in production and accumulation of more photosynthates resulting in early flowering. The data reveals that a significant variation existed in the number of days required for first flowering among the different cultivars under study. Barua and Bordoloi (2012) and Jangde *et al.*, (2019) reported the similar results as that of the present investigation.

Table.1 Plant height (cm) and Number of leaves/plant of Gerbera varieties under naturally ventilated polyhouse condition

Variety Symbol	Variety Name	Plant Height (cm)				Number of leaves/plant			
		30 DAS	60 DAS	90 DAS	120 DAS	30 DAS	60 DAS	90 DAS	120 DAS
V ₁	Regina	21.16	25.40	27.34	30.71	8.280	10.700	12.210	13.420
V ₂	Bernika	26.21	32.29	35.19	39.04	7.630	10.640	12.250	13.480
V ₃	Martyana	23.29	27.47	30.11	33.36	7.310	10.230	11.780	13.040
V ₄	Albert	18.50	22.80	26.47	29.60	6.940	9.740	10.960	12.050
V ₅	Salsa	20.86	24.71	27.40	30.51	8.130	11.120	12.240	13.310
V ₆	Marzena	19.95	23.77	26.26	29.30	6.470	8.970	10.690	11.900
V ₇	Marta	21.80	26.07	29.05	31.90	5.980	7.900	9.530	10.880
V ₈	Lisiecka	21.40	25.64	28.43	31.40	8.380	10.560	12.110	13.220
V ₉	Korman	24.32	29.67	32.11	35.35	9.500	12.270	13.810	14.820
V ₁₀	Pal	18.04	21.88	25.20	28.57	6.370	9.010	10.770	12.040
F-test		S	S	S	S	S	S	S	S
SE(d)		0.772	1.041	0.980	0.994	0.206	0.562	0.501	0.496
C.V.		4.387	4.910	4.176	3.807	3.371	6.810	5.275	4.741
C.D. at 5%		1.635	2.204	2.076	2.104	0.437	1.191	1.061	1.050

Table.2 Plant spread, Days to first flower open, Diameter of flower, disc-diameter of flower, stalk length, stalk girth, number of flowers/plant, Number of Flower/m², Number of suckers/plant, Vase life and Cost benefit ratio of Gerbera varieties under naturally ventilated polyhouse condition

Variety Symbol	Variety Name	Plant Spread (cm)				Days to First Flower Open	Diameter of Flower (cm)	Disc – Diameter of Flower (cm)	Stalk Length (cm)	Stalk Girth (mm)	Number of Flower/Plant	Number of Flower/m ²	Number of Suckers/Plant	Vase Life (days)	Cost : Benefit Ratio	
		30 DAS	60 DAS	90 DAS	120 DAS											
V ₁	Regina	21.20	24.89	30.01	35.62	83.32	8.47	2.24	50.27	10.30	7.36	63.31	1.25	6.49	1.25	
V ₂	Bernika	32.58	37.24	43.51	49.07	70.75	11.55	2.59	57.54	15.29	10.64	91.47	2.13	8.40	1.81	
V ₃	Martyana	28.83	32.53	38.03	42.26	74.41	8.52	2.58	54.16	13.44	9.77	83.96	2.00	8.16	1.66	
V ₄	Albert	17.04	20.31	25.51	31.00	82.17	8.87	3.22	47.26	12.71	7.82	69.31	2.38	7.28	1.37	
V ₅	Salsa	16.68	19.93	26.12	30.97	82.66	9.51	2.41	46.540	12.33	8.32	71.16	1.55	7.07	1.40	
V ₆	Marzena	18.10	21.08	37.05	31.27	78.19	10.25	2.30	42.72	12.55	8.36	73.19	1.71	8.02	1.44	
V ₇	Marta	15.08	18.52	23.72	28.47	86.35	8.00	2.74	50.58	10.28	7.69	67.24	1.34	6.13	1.33	
V ₈	Lisiecka	14.08	17.32	22.32	27.26	80.52	10.24	2.51	44.14	11.20	9.03	80.20	2.14	7.69	1.58	
V ₉	Korman	20.02	23.53	28.70	33.37	73.65	11.15	2.49	49.29	14.07	8.57	73.87	1.84	8.74	1.46	
V ₁₀	Pal	14.42	17.54	22.51	27.64	83.50	9.05	2.06	52.40	9.98	7.94	69.30	1.81	6.40	1.37	
F-test		S	S	S	S	S	S	S	S	S	S	S	S	S	S	
SE(d)		0.430	0.430	0.408	0.450	0.753	0.336	0.190	1.437	0.692	0.328	0.974	0.082	0.229		
C.V.		2.662	2.263	1.736	1.636	1.159	4.305	9.263	3.555	6.936	4.700	1.606	5.548	3.767		
C.D. at 5%		0.911	0.911	0.863	0.953	1.594	0.711	0.403	3.041	1.465	0.695	2.063	0.174	0.484		

Quality Parameters

In terms of Flower diameter, maximum flower diameter (11.55cm) was recorded in Bernika be due to bigger ray florets which are in conformity with the findings of Singh and Ramchandran (2002) in gerbera. The bigger diameter of Corona might be due to the inherent characters of individual cultivars.

These findings are also in accordance with the results of Gotz (1983) and Jangde *et al.*, (2019) who also reported large followed by variety Korman with (11.15 cm) and minimum flower diameter (8.00 cm) were observed in variety Marta. The size of these flowers may differences in the flower diameter of different gerbera cultivars under greenhouse conditions.

In terms of Disc-diameter, maximum Disc – diameter of Flower (3.22 cm) was recorded in Albert followed by variety Marta with (2.74 cm) and minimum Disc – diameter of flower (2.06 cm) were observed in variety Pal. Diameter of Disc can be considered as a varietal character as it varies from variety to variety. Similar results were reported by Kumar *et al.*, (2014) and Jangde *et al.*, (2019).

In terms of Stalk length, maximum stalk length (57.54 cm) was recorded in variety Bernika followed by variety Martyana with (54.16 cm) and minimum stalk length (42.72 cm) were observed in variety Marzena. The stalk length is a genetic factor therefore it is expected to vary among the cultivars as earlier observed by Sarkar and Ghimariay (2004) and Jangde *et al.*, (2019). Stalk length is a very important factor for a cut flower, especially for gerbera flower. It decides the quality cut flowers. As there will be more stalk length more reserved food will be stored in the stalk which will later be available to the flower for longer time period.

In terms of Stalk girth, maximum stalk girth (15.29 mm) was recorded in variety Bernika followed by variety Korman with (14.07 mm) and minimum stalk girth (9.98 mm) were observed in variety Pal. The stalk girth is also a genetic factor therefore it is expected to vary among the varieties as earlier Kumar *et al.*, (2014) and Jangde *et al.*, (2019) reported the similar results as that of the present investigation.

In terms of vase life of flowers, maximum vase life (8.74 days) was recorded in variety Korman followed by variety Bernika with (8.40 days) and minimum vase life (6.13 days) was observed in variety Marta. The variation in vase life of flower might de due to differences in senscencing behavior of the variety by producing higher amount of ethylene formation enzymes and ethylene as reported by Jangde *et al.*, (2019) reported the similar results as that of the present investigation.

Yield Parameters

In terms of number of flowers per plant, maximum number of flower per plant (10.64) was recorded in variety Bernika followed by variety Martyana with (9.77) and minimum number of flower per plant (7.36) was observed in variety Regina. Maximum number of flowers per plant might be attributed to the greater leaf area and more number of leaves per plant as well as plant spread would have resulted in production and accumulation of maximum photosynthesis, resulting the production of more number of flowers with bigger size. Flower yield and its quality parameter decide the significance of the particular variety, which are suitable for commercial cultivation. The results are in accordance with the findings of Sarmah *et al.*, (2014) and Jangde *et al.*, (2019) in gerbera under protected conditions.

In terms of number of flowers per meter square, maximum number of flower/m² (91.47) was recorded in variety Bernika followed by variety Martyana with (83.96) and minimum flower yield per sq m (63.31) was observed in variety Regina. The higher yield might be due favorable conditions under protected conditions. Mahmood *et al.*, (2013) and Jangde *et al.*, (2019) reported the similar results as that of the present investigation in gerbera.

In terms of suckers/plant, maximum number of Suckers/plant (2.38) was recorded in variety Albert followed by variety Lisiecka and Bernika with (2.14) and (2.13) respectively and minimum number of Suckers/plant (1.25) was observed in variety Regina. Maximum number of suckers per plant might be attributed to the greater leaf area and more number of leaves per plant as well as plant spread would have resulted in production and accumulation of maximum photosynthesis, resulting the production of more number of suckers. Vasudevan *et al.*, (2010) and Jangde *et al.*, (2019) reported the similar results as that of the present investigation in gerbera.

Economics

In terms of economics, Maximum gross return (Rs. 73,176), net return (Rs. 32,681) and cost: benefit ratio (1: 1.81) was recorded in variety Bernika and minimum gross return (Rs. 50,648), net return (Rs. 10,153) and cost: benefit ratio (1: 1.25) was recorded in variety Regina.

From the present investigation it is concluded that among the ten varieties of Gerbera. Variety Bernika found superior in Growth and yield characters followed by variety Korman and Martyana. In disc diameter and suckers yield variety Albert found superior. In vase life, Korman was superior, Minimum growth

and yield was recorded in variety Marta, Pal and Regina. Maximum gross return, net return and Cost: benefit ratio was recorded in variety Bernika and minimum in variety Regina.

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