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

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## A B S T R A C T

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). From 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.

## Keywords

- Gerbera and Varieties

## Article Info

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## 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 pinnatly 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. \( V_1 \) (Regina), \( V_2 \) (Bernika), \( V_3 \) (Martyana), \( V_4 \) (Albert), \( V_5 \) (Salsa), \( V_6 \) (Marzena), \( V_7 \) (Marta), \( V_8 \) (Lisiecka), \( V_9 \) (Korman) and \( V_{10} \) (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 Uttar 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 |
| V1             | Regina       | 21.16 25.40 27.34 30.71 | 8.280 10.700 12.210 13.420 |
| V2             | Bernika      | 26.21 32.29 35.19 39.04 | 7.630 10.640 12.250 13.480 |
| V3             | Martyana     | 23.29 27.47 30.11 33.36 | 7.310 10.230 11.780 13.040 |
| V4             | Albert       | 18.50 22.80 26.47 29.60 | 6.940 9.740 10.960 12.050 |
| V5             | Salsa        | 20.86 24.71 27.40 30.51 | 8.130 11.120 12.240 13.310 |
| V6             | Marzena      | 19.95 23.77 26.26 29.30 | 6.470 8.970 10.690 11.900 |
| V7             | Marta        | 21.80 26.07 29.05 31.90 | 5.980 7.900 9.530 10.880 |
| V8             | Lisiecka     | 21.40 25.64 28.43 31.40 | 8.380 10.560 12.110 13.220 |
| V9             | Korman       | 24.32 29.67 32.11 35.35 | 9.500 12.270 13.810 14.820 |
| V10            | 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     | 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/m² | Number of Suckers/Plant | Vase Life (days) | Cost : Benefit Ratio |
|----------------|--------------|-------------------|---------------------------|------------------------|-------------------------------|------------------|-----------------|---------------------|--------------------|----------------------|------------------|------------------------|
| V1             | Regina       | 21.20 24.89       | 30.01 35.62               | 83.32 84.7             | 2.24 50.27                    | 10.30            |                 | 7.36 63.31          | 1.25 6.49          | 1.25                 |                 |                        |
| V2             | 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                 |                 |                        |
| V3             | 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                 |                 |                        |
| V4             | 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                 |                 |                        |
| V5             | 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                 |                 |                        |
| V6             | 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                 |                 |                        |
| V7             | 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                 |                 |                        |
| V8             | 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                 |                 |                        |
| V9             | 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                 |                 |                        |
| V10            | 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         |              |                   |                           |                        |                               |                  |                 |                     |                   |                     |                  |                        |
| SE(d)          | 0.430 0.430  | 0.408 0.450       | 0.753 0.336               | 0.190 1.437            | 0.092 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 Ghimaray (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 sencencing 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.

Form 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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