

Short communication

Evaluation of gerbera genotypes for cut flower production under different growing conditions of Kashmir

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ABSTRACT

Twenty six gerbera varieties were evaluated for cut flower production under polyhouse and field conditions. Dune recorded maximum plant height (43.19 and 37.16 cm) and flower stalk length (65.85 and 60.12 cm) both under polyhouse and field conditions, respectively. The flower size was found maximum in Sunway (13.17 cm) under polyhouse conditions, while it was found maximum in Dune (11.58 cm) under field conditions. Dune also registered the maximum vase-life for under polyhouse (10.43 days) and field (8.20 days) conditions. The maximum number of flowers per plant (58.14) was recorded in Dune under polyhouse and for Dana Ellen (42.34) under field conditions.

Key words: Gerbera, evaluation, polyhouse, open conditions.

Gerbera (*Gerbera jamesonii* Bolus ex Hooker F.), a stemless perennial herb belongs to family Asteraceae. It is native to South Africa and Asia, also known as Transvaal, Barberton or African daisy. It ranked among the top ten cut flowers owing to its wide range of bewitching colours, forms and attractive geometrical shape. It is suitable for wide range of floral arrangements and also used for beds, borders, pot culture and rock gardens. About seven species were reported from India distributed in temperate Himalayas from Kashmir to Nepal at an altitude of 1300 to 3200 m (Bhattacharjee and De, 2). The temperate region of Kashmir Himalaya has good potential for commercial cut flowers production attributable to its favourable climate during summers and proximity to Delhi and Chandigarh markets. The protected cultivation of cut flowers is beneficial for high yield, better quality and enhanced flowering duration. There are very meagre reports on suitability of gerbera varieties, particularly for hilly areas of Kashmir Himalayas. Considering the above facts, an attempt was made to evaluate the performance of different gerbera varieties under protected and field conditions.

The experiment was carried out during 2009-10 and 2010-11 at the experimental farm of Central Institute of Temperate Horticulture, Srinagar (J&K) situated at about 33° 59' N latitude and 74° 46' E longitude and 1674.88 m elevation above mean sea level. The experiment was laid out in randomized block design with three replications as per method suggested by Gomez and Gomez (4). The soil characteristics of experimental field were clay loam to silt clay, pH 6.81 and EC 0.36 dsm⁻¹ with adequate drainage and

water holding capacity. Twenty six gerbera varieties were planted in last week of March under naturally ventilated polyhouse and field conditions at the spacing of 30 cm × 45 cm and recommended package of practices as followed uniformly. Data were recorded on vegetative and flowering attributes of gerbera and were analyzed statistically.

It is evident from Tables 1 & 2 that all the vegetative and flowering attributes were superior under polyhouse conditions except production of suckers. There were significant differences among the varieties with respect to vegetative and flowering attributes under both conditions. The similar results were also obtained by Hedau *et al.* (5) in gerbera under protected conditions of Uttarakhand. Maximum plant height was recorded in Dune (43.19 and 37.16 cm) both under polyhouse and field conditions. Winter Queen registered the maximum plant spread (61.35 and 58.74 cm) under both polyhouse and field conditions, respectively. The maximum number of leaves per plant was recorded in Winter Queen (31.48 and 27.17) followed by Rosalin (29.47 and 26.80) under polyhouse and field conditions, respectively. Sunway recorded maximum leaf length under both polyhouse (51.52 cm) and field (46.12 cm) conditions. Improved growth in polyhouse may be due to high photosynthetic rate. The similar variations have been reported by Kumar and Yadav (6), and Praneetha (8) in gerbera under different agro-climatic conditions. The variation in the growth attributes might be owing to difference in genetic makeup of the varieties.

The flower quality parameters such as flower stalk length, flower size and vase-life significantly varied amongst the varieties (Tables 1&2). The earliest

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Table 1. Vegetative and flowering attributes of gerbera under polyhouse conditions in Kashmir.

Variety	Plant height (cm)	Plant spread (cm)	No. of leaves /plant	Leaf length (cm)	Flowering initiation (days)	Flower stalk length (cm)	Flower stalk dia. (mm)	Flower size (cm)	Vase-life (days)	No. of flowers /plant	Suckers /plant
Cacharell	25.24	53.35	27.69	33.34	64.60	55.56	5.84	12.11	9.40	37.35	2.21
Salvadore	39.62	52.51	25.79	34.61	65.53	51.93	7.71	10.26	8.60	35.32	3.41
Scope	31.94	57.44	26.91	41.38	69.36	46.31	7.43	11.33	6.03	29.04	3.28
Dana Ellen	28.25	60.16	25.77	47.67	56.68	55.11	7.31	12.57	9.61	49.51	4.40
Sunway	33.91	53.77	24.52	51.52	63.61	55.22	8.13	13.17	7.80	42.46	5.26
Kayak	25.76	54.59	29.07	34.65	65.48	48.14	8.11	10.02	9.10	32.57	3.63
Carambola	34.30	54.01	17.51	41.23	66.86	57.93	7.41	11.86	9.30	25.97	2.21
Dune	43.19	53.24	27.57	39.25	66.05	65.85	7.71	12.87	10.43	58.14	6.35
Rosalin	33.06	57.95	29.47	44.95	56.88	58.44	7.40	10.80	8.48	53.06	2.46
Winter Queen	39.46	61.35	31.48	45.45	60.68	48.24	7.82	12.38	9.68	33.67	6.30
Aura	27.05	45.48	24.53	31.23	63.50	30.40	5.30	8.76	6.68	34.50	3.48
Chateau	29.80	49.36	28.20	30.95	58.65	42.58	5.35	8.50	7.41	31.15	5.31
Endura	33.83	44.10	23.05	34.38	69.90	45.26	5.40	8.43	5.95	27.28	4.25
Essence	26.38	45.03	19.45	32.98	72.01	46.31	5.43	8.91	6.63	27.93	6.26
Excellence	28.33	51.86	15.90	33.45	63.06	49.83	6.23	10.48	8.70	32.23	4.23
Fiorella	28.03	43.31	18.15	38.50	63.58	46.13	5.63	11.63	6.75	34.18	3.36
Mistique	30.18	41.01	19.31	34.18	62.43	45.80	5.36	11.03	7.66	33.05	3.78
Ornella	30.10	47.10	18.13	36.28	57.98	45.46	6.41	8.83	6.75	34.65	4.55
Picobella	24.88	47.75	22.15	38.88	64.28	44.06	5.76	10.93	9.40	38.66	3.81
Carabole	25.46	49.85	24.31	30.01	62.66	45.00	6.43	8.66	8.86	35.01	3.46
Absolute	27.00	44.46	27.35	28.95	59.95	50.71	5.61	7.71	7.33	29.35	2.38
Zanzibar	23.83	46.45	25.91	34.28	57.20	51.80	6.28	9.15	9.40	32.25	2.56
Junkfrau	26.96	53.01	19.55	30.88	60.96	47.68	6.26	10.85	7.15	34.13	2.63
Silvester	34.21	52.10	18.76	35.05	60.40	52.65	6.23	9.81	5.58	32.35	3.38
Powerplay	30.93	55.66	17.81	33.70	65.85	49.58	7.48	10.78	7.71	37.31	5.43
Sunglow	31.51	54.61	18.78	37.09	65.26	45.55	5.36	12.26	8.66	35.35	4.26
CD at 5%	1.84	2.32	2.91	2.25	3.20	4.77	0.80	0.85	0.55	2.91	0.51

flowering initiation was reported in Dana Ellen (56.68 days), while delayed flower initiation was observed in Essence (72.01 days) under polyhouse conditions. Under field condition, late flowering initiation was recorded as compared to polyhouse condition. Among different varieties, flower stalk length varied from 30.40 to 65.85 cm under polyhouse conditions and from 27.28 to 60.12 cm under field conditions. Flower stalk length was noted highest in Dune (65.85 cm) followed by Rosalin (58.44 cm), which were superior over other varieties under polyhouse conditions. Under field conditions flower stalk length was recorded highest in Dune (60.12 cm) followed

by Carambola (53.11 cm). This could be attributed to the more favourable environment under polyhouse as compared to open field conditions. Similar result was also reported by Gaiwad and Patil (3) in chrysanthemum. Significant and maximum flower stalk diameter was recorded with Sunway (8.13 mm), which was at par with Kayak (8.11 mm) under polyhouse conditions, while under field conditions it was found maximum with Kayak (8.21 mm) followed by Sunway (8.02 mm). The important flower trait, viz., maximum flower size was recorded in Sunway (13.17 cm), which was at par with Dune (12.87 cm) and Dana Ellen (12.57 cm) under polyhouse. Under field

Table 2. Vegetative and flowering attributes of gerbera genotypes under open field conditions in Kashmir.

Variety	Plant height (cm)	Plant spread (cm)	No. of leaves /plant	Leaf length (cm)	Flowering initiation (days)	Flower stalk length (cm)	Flower stalk dia. (mm)	Flower size (cm)	Vase-life (days)	No. of flowers /plant	Suckers /plant
Cacharell	21.30	50.12	25.74	28.36	72.73	51.23	6.21	10.30	7.46	27.30	3.93
Salvadore	25.36	51.89	21.55	29.16	73.73	47.89	6.77	8.32	6.56	25.11	5.36
Scope	30.12	54.36	24.65	37.36	76.36	42.15	7.20	9.60	3.63	17.86	5.26
Dana Ellen	25.57	57.79	23.81	42.01	64.83	49.32	7.01	11.19	7.16	42.34	6.46
Sunway	30.11	50.12	23.02	46.12	71.36	50.68	8.02	10.32	4.60	39.09	7.23
Kayak	20.12	52.01	26.45	30.68	75.43	43.22	8.21	9.56	7.33	25.36	5.50
Carambola	31.11	53.22	15.12	36.31	53.14	53.11	7.18	10.36	7.70	17.82	4.16
Dune	37.16	48.34	22.37	32.73	74.46	60.12	7.63	11.58	8.20	41.02	7.90
Rosalin	28.10	55.65	26.80	40.43	65.13	52.98	7.23	9.10	6.46	37.82	4.46
Winter Queen	37.15	58.74	27.17	41.19	68.73	44.57	7.67	10.67	7.26	24.36	8.00
Aura	21.26	42.90	22.60	25.59	73.70	27.28	5.61	7.39	4.46	25.35	5.36
Chateau	24.03	46.25	24.46	26.79	47.32	40.45	6.21	8.19	5.13	26.68	7.26
Endura	29.66	41.38	20.60	29.23	79.03	43.03	6.36	7.68	4.30	22.42	6.16
Essence	22.45	46.97	15.83	30.25	82.06	43.97	5.76	8.36	4.46	22.12	7.83
Excellence	24.38	50.48	13.00	31.85	70.16	48.16	6.17	9.93	6.46	28.76	6.43
Fiorella	23.66	40.97	15.87	34.99	73.13	45.93	6.17	10.58	4.73	29.70	5.16
Mistique	24.35	41.65	16.38	32.36	71.46	40.41	5.72	10.10	5.50	26.42	4.96
Ornella	25.69	46.60	17.96	34.48	66.10	46.95	7.25	8.07	4.76	28.84	6.60
Picobella	20.71	44.69	20.57	35.46	73.70	43.45	6.36	9.46	7.13	32.02	5.63
Carabole	21.33	45.92	21.27	25.53	70.83	46.25	6.49	7.33	6.40	34.98	5.46
Absolute	21.18	42.63	22.39	26.43	67.93	47.25	5.75	7.28	5.20	26.47	4.36
Zanzibar	19.46	43.90	22.84	28.67	66.13	50.45	6.37	8.30	7.46	25.59	4.43
Junkfrau	22.30	51.33	15.75	26.09	68.90	44.08	6.41	9.13	5.40	30.53	4.56
Silvester	29.70	49.35	15.26	29.66	71.60	51.25	6.61	8.61	5.06	26.81	5.13
Powerplay	25.62	54.77	13.52	30.49	74.56	45.10	7.19	9.16	7.46	35.79	7.30
Sunglow	26.27	52.70	15.72	32.60	72.33	43.047	5.49	10.21	6.01	32.783	6.10
CD at 5%	2.77	4.17	2.93	2.19	N.S.	3.19	0.79	1.08	0.49	3.42	0.38

conditions flower size was found maximum in Dune (11.58 cm) followed by Dana Ellen (11.19 cm).

All the varieties showed longer vase-life under polyhouse as compared to field conditions. There were significant differences in vase-life among the varieties, which may be due to genotypic variations. Under polyhouse conditions vase-life of flowers was recorded maximum in Dune (10.43 days) followed by Winter Queen (9.68 days), while under field conditions it was recorded maximum in Dune (8.20 days) followed by Carambola (7.70 days). The longer vase-life under polyhouse conditions may be due to improved stalk length and flower size, free from dew

fall and high CO₂ concentration inside polyhouse (Mishra, 7). The variation in vase-life among different varieties was owing to structural difference in xylem and phloem vessels of the flower stalk. The quality of flowers was better under polyhouse as compared to field conditions as more bending incidence and flower deformation was observed. The number of flowers per plant for all varieties was higher under polyhouse compared to field conditions. This might be attributed to longer flowering duration and higher photosynthetic efficiency under polyhouse. Flower numbers per plant varied from 25.97 to 58.14 under polyhouse and 17.82 to 42.34 under field conditions.

Dune recorded maximum number of flowers per plant (58.14) followed by Rosalin (53.06) under polyhouse, whereas it was recorded maximum in Dana Ellen (42.34), which was statistically at par with Dune (41.02) and Sunway (39.09), under field conditions. The variation in vase-life and number of flowers was also observed by Ahlawat *et al.* (1) in gerbera varieties. The number of suckers per plant was reported less under polyhouse as compared to field conditions. This might be due to diversion of more food material to flowering attributes like- flower number, stalk length etc. under polyhouse conditions. The maximum number of suckers per plant was observed in Dune (6.35), which was at par with Winter Queen (6.30) under polyhouse conditions, while under field it was found maximum in Winter Queen (8.00) which was statistically at par with Dune (7.90).

The varieties Dune, Rosalin, Dana Ellen and Sunway performed better with regard to flower quality and yield, thus can be recommended for commercial cultivation under Kashmir conditions. Despite higher initial investment, gerbera cultivation under polyhouse was profitable than field conditions owing to improved quality and higher yield.

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