



Evaluation of Exotic Cultivars of Gerbera (*Gerbera jamesonii* L.) under Naturally Ventilated Polyhouse in Western Odisha

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ABSTRACT

An endeavor was made during 2014-16 to evaluate and identify superior and most promising commercial variety in respect of important morphological and economic trait amongst 18 exotic cultivars of gerbera under naturally ventilated Poly house in Western Odisha. Variations in different growth parameters were prominent. Among vegetative parameters, 'Dreamer' recorded least mean value in terms of plant height, leaf area, number of leaves per plant, length and breadth of leaf, plant spread, number of lobes per leaf, fresh weight, vase life and yield per sq. m among quality parameters. Higher leaf area was found in 'Shimmer' followed by 'Paradiso' while 'Dune' has intermediate plant height and plant spread. 'Power Play' exhibited more number of leaves per plant with higher petiole length and more number of suckers per clump. With respect to flower and quality characters, the cultivar 'Diablo' found superior with respect to plant height, disc diameter and neck thickness and higher fresh weight. Minimum number of ray florets per flower with thicker petals were recorded in 'Colt', while 'Artist' have recorded highest number of ray florets with lesser petal thickness. 'Prime rose' had maximum flower diameter with minimum disc diameter and maximum length of ray floret. 'Universal' and 'Pink Power' recorded longest and shortest stalk length respectively. 'Amulet' had maximum stalk diameter and longer vase life (19.5 days). The cultivar 'Jaffer' recorded highest number of flowers per sq.m. Followed by 'Yucador' and 'Blind Date'. 'Shimmer' took lesser days from flower bud formation to flowering however 'Alex' and 'Colt' recorded maximum shelf life.

Key Words: Gerbera, Polyhouse, Shelf life, Vase life.

INTRODUCTION

Gerbera (*Gerbera jamesonii* L.) belongs to family Asteraceae is an important cut flower regarded as latest sensation to commercial floriculture industry on account of its remarkable form, magnificent colour variation, unsurpassed beauty and potentialities in the local, domestic and international market. It ranks fourth in the international cut flower market and a popular cut flower in Holland, Germany and USA. Choudhury *et al* (2000). There are many excellent varieties of gerbera with magnificent flowers in exhaustive range of colours, different shades and size and wide

range of keeping quality. The success of commercial cultivation of gerbera is mainly cultivar specific. All the gerbera varieties have their own characteristic features and suitability to a particular region. Gerbera is produced in 6 ha of land with 88 lakh stems in odisha condition which shows the infancy stage of this crop. Mohanty *et al* (2016). Due to the existence of extensive diversity in the crop will pave the way for selecting a suitable genotype performing best under Odisha condition particularly western central table land zone of Odisha. To meet the qualitative and quantitative standards, hybrid cultivars have to be grown under protected conditions Magar *et*

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al (2010). Although general cultural information for this crop is available, few studies describe the flowering habit and yield potential of various cultivars. Therefore, a systematic attempt was made to evaluate 18 varieties for their performance under naturally ventilated poly house.

MATERIALS AND METHODS

The present investigation was carried out in instructional farm, College of Horticulture, Chiplima during the year 2014-16. The experiment consisted of eighteen variety of gerbera viz., 'Diabolo', 'Paradiso', 'Blind Date', 'Dune', 'Power Play', 'Prime Rose', 'Colt', 'Pink Power', 'Alex', 'Rosalin', 'Amulet', 'Sunway', 'Yucador', 'Shimmer', 'Universal', 'Artist', 'Jaffer' and 'Dreamer' were bought from Kumar Florist (KF-Bio plants), Pune. The genotypes were evaluated in randomized block design (RBD) replicated three times. Raised beds of 30 cm height 70cm width and 16metre long were prepared inside a naturally ventilated poly house of 400sq.m (20mX20m.). Recommended dose of neem cake, FYM were applied at the time of planting. Tissue cultured plants of above mentioned varieties were planted on 6th November 2014 at a spacing of 30 X 30 cm in two rows in each bed. The data recorded on 21 parameters consisting of morphological trait, floral trait and quality traits from three randomly tagged plants in each plot. The data obtained were analyzed statistically and the significance level among the treatments was compared at 5 per cent of probability.

RESULTS AND DISCUSSION

Vegetative parameter

Plant height

The growth economic character displayed a wide range of variation and showed significant differences among genotypes (Table 1). The interpretation of analyzed data revealed that the cultivar 'Diablo' recorded maximum plant height (47.9 cm) and remained superior over others while

'Dreamer' being the short stature recorded minimum plant height (27.3cm). A similar variation in plant height among gerbera cultivars was observed by Reddy *et. al.* (2003).

Leaf area and number of leaves

Higher leaf area was found in shimmer (114.0 cm²) followed by Paradiso (101.2cm²) least being in 'Dreamer' (34.5 cm²). 'Power play' exhibited more number of leaves per plant (35.3) with higher petiole length (13.7 cm) and more number of suckers per clump(5.0), while 'pink power' exhibited poor suckering habit(2.0).

Plant spread

'Artist' has recorded maximum plant spread with (55.8cm) minimum length of petiole (4.3cm). This difference among the cultivars may be due to bigger sized leaves produced by respective cultivars. The results were in accordance with the findings of Singh and Ramachandran (2002) and Thomas *et. al.* (2004). Higher length and breadth and number of lobes (39.1cm, 10.5cm, 9.0cm), respectively was registered by 'Yucador' while lowest recorded in 'Dreamer' (24.6cm, 2.6cm, 4.7cm respectively). The marked variation in vegetative characters may be due to differential characters of individual varieties that expressed their genetic characters. These results were in conformity of findings of Kumari *et al* (2010); Wankhede and Gajbhiye (2013); Sarmah *et al* (2014) and Deka (2015) who reported significant difference among gerbera varieties with regards to vegetative characters like plant height, plant spread, and number of leaves, petiole length and number of lobes on leaves.

Floral attributes

Number of flower per square meter

The cultivar 'Jaffer' recorded highest number of flowers per sq.m. Followed by 'Yucador' and 'Blind Date'. The yield potential of particular variety might be due to inherent genetic potential of that variety also better vegetative growth of the variety which enable the plant for transformation of accumulated stock of photosynthesis to reproductive sinks

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Meeramanjusha *et al*, (2003); Kumar and Kumar, (2001). This appreciably good yield might be due favorable conditions under protected conditions. Malik *et al*, (2013).

Days from flower bud initiation to flowering

‘Shimmer’ and ‘prime rose’ took less number of days from flower bud initiation to flower opening and remain at par with each other, however, slow development of flower after initiation of buds were marked in ‘Diabolo’

Shelf life

Significant variation was observed in case of shelf life of cultivars; however, ‘Alex’ and ‘Colt’ recorded maximum shelf life. In general, both shelf life and vase life of flower greatly depend on the general condition of the mother plant. The varieties which exhibit longer shelf 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 (Deka *et al*, 2015).

Quality parameter

Flower diameter and length of ray florets

The diameter of flower and length of ray florets varied significantly among the cultivars evaluated. Maximum flower diameter with longer ray florets was observed in ‘Prime rose’ (101.8mm) followed by ‘Shimmer’ (99.2 mm). They also exhibited the maximum length of ray florets (5.5cm and 5.2cm) respectively. However, ‘Alex’ showed minimum flower diameter (80.6mm) and length of ray florets (3.7cm). The size of these flowers may be due to bigger ray florets and the inherent characters of individual varieties.

Number of ray florets and petal thickness

Minimum number of ray floret per flower (65.0) with thicker petals (0.6mm) was recorded in ‘colt’, while ‘Artist’ has recorded higher number of ray florets (522.7) with lesser petal thickness (0.4mm).

Disc diameter

The mean value with respect to disc diameter remain at par with each other as observed in ‘Diabolo’ (22.8mm) and ‘Blind Date’ (21.8mm), whereas, ‘Prime rose’ (13.5mm) had smallest concealed disc followed by ‘Alex’ (13.9mm). Similar trend was noticed by Megokhono and Alila (2008).

Stalk length

Stalk length is an important factor while assessing a cultivar for cut flower. Long stalk with considerable girth and neck thickness imparts mechanical strength to flowers which helps in better handling, keeping quality and transportation. The stalk length is a genetic factor and therefore, it is expected to vary among the cultivars. Considerable variation was observed in stalk length of cultivars under study. ‘Universal’ and ‘Pink Power’ recorded longest (67.0cm) and shortest stalk length (41.7cm), respectively. These differences in cut flower quality characters may be due to the presence of additive genes present in the individual cultivar. The results were in conformity of findings of Ahlawat *et al* (2012); Chobe *et al* (2010); Malik *et al* (2013) and Deka *et al* (2015).

Fresh weight

Observations on fresh weight of flowers indicated that the cultivar ‘Diablo’ was found superior over all other varieties (40.3g) followed by ‘Rosalin’ (17.5g) whereas ‘Dreamer’ exhibited least weight (16.9g) which might be due to bigger size of flower, more stalk length. The difference in quality character might be due to inherent characters of the individual cultivars and presence of additive genes present in the individual cultivar. Similar results were observed by Kankana (2015) who reported the existence of large differences in quality parameters of Gerbera.

Vase life

The vase life of flowers (days) in 2 per cent sugar solution under ambient conditions was found to vary significantly. It was observed that ‘Amulet’

TABLE 1. Growth Parameters

Name of Variety	Plant Height (cm)	Leaf Area (cm ²)	No of Leaves/ Plant	Length (cm)	Breadth (cm)	Plant Spread (cm)	Petiole Length (cm)	No of Lobes	No of Sucker
DIABOLO	47.9	67.5	15.3	30.2	6.8	44.3	5.5	8.3	3.0
PARADISO	36.3	101.2	12.3	30.4	6.9	44.7	8.3	5.7	4.0
BLIND DATE	41.1	49.0	10.3	38.8	9.0	46.0	10.0	6.7	3.0
DUNE	42.7	85.2	15.7	34.8	7.3	48.9	10.4	6.3	4.3
POWER PLAY	33.6	96.2	35.3	31.4	6.8	38.0	13.7	6.3	5.0
PRIMEROSE	29.7	95.4	35.0	30.7	6.8	47.9	6.4	7.3	3.3
COLT	34.0	100.9	13.0	31.2	8.7	45.6	6.5	6.3	3.3
PINK POWER	28.3	70.9	19.7	31.6	7.0	39.5	10.4	6.3	2.0
ALEX	32.0	57.8	25.7	27.9	3.4	46.9	10.0	6.3	3.7
ROSALIN	31.0	83.1	16.7	29.4	5.5	38.0	8.9	6.0	3.0
AMULET	41.3	85.3	16.0	29.9	4.1	45.1	6.7	5.0	4.3
SUNWAY	37.5	70.1	18.3	30.9	4.8	47.4	6.2	7.3	2.7
YUCADOR	36.0	91.3	16.7	39.1	10.4	41.6	10.2	9.0	3.0
SHIMMER	37.0	114.0	16.3	33.0	6.0	41.1	6.8	7.0	3.3
UNIVERSAL	35.2	54.4	13.0	25.8	5.1	47.0	5.4	5.3	2.7
ARTIST	29.7	81.8	14.3	28.6	4.1	55.8	4.2	6.7	3.7
JAFFER	29.0	70.0	17.0	29.5	4.5	42.0	6.5	5.7	4.7
DREAMER	27.3	34.5	21.0	24.6	2.6	28.6	8.8	4.7	3.7
MEAN	34.9	78.1	18.4	31.0	6.1	43.7	8.1	6.5	3.5
CD at 5%	6.343	7.0	8.3	6.2	2.3	7.2	3.0	2.3	1.6
SEm	3.1	3.5	4.1	3.0	1.1	3.5	1.5	1.2	0.8

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TABLE 2. Flowering and Quality Parameters

Name of Variety	Flower diameter (mm)	Disc diameter (mm)	Stalk length (cm)	Stalk diameter (mm)	Neck thickness (mm)	Petal thickness (mm)	No. of ray floret (cm)	Length of ray floret (cm)	Days from bud initiation to flowering (Days)	Duration of flowering (Days)
DIABOLO	91.8	22.8	59.0	6.4	5.6	0.4	383.3	4.5	18.8	11.1
PARADISO	98.8	17.3	50.7	5.7	4.3	0.5	287.7	4.9	15.5	10.9
BLIND DATE	87.4	21.8	57.7	5.3	4.3	0.5	213.3	4.3	17.5	18.7
DUNE	97.0	18.0	50.0	6.5	3.5	0.4	250.0	4.9	15.2	15.5
POWER PLAY	83.0	17.3	53.3	5.4	5.2	0.5	420.0	4.6	13.3	16.9
PRIMEROSE	101.9	13.5	50.0	6.1	5.3	0.4	303.3	5.5	9.6	14.3
COLT	85.4	21.7	43.3	6.2	4.6	0.6	65.0	4.2	12.7	20.7
PINK POWER	91.7	21.8	41.7	5.8	4.6	0.4	247.7	4.4	17.9	15.3
ALEX	80.6	14.0	57.7	5.8	4.3	0.6	222.0	3.7	17.0	21.3
ROSALIN	96.0	16.6	54.0	4.9	3.7	0.4	341.3	4.5	14.8	18.9
AMULET	89.5	15.3	51.0	6.7	3.8	0.4	234.0	3.9	17.0	17.7
SUNWAY	94.8	20.7	56.7	6.0	4.4	0.5	283.3	4.5	18.4	14.1
YUCADOR	98.9	26.0	54.0	4.6	4.4	0.5	148.0	4.9	15.4	14.2
SHIMMER	99.2	15.5	52.3	4.9	4.9	0.4	233.7	5.2	9.5	15.7
UNIVERSAL	84.4	17.2	67.0	4.9	4.4	0.6	242.3	4.1	14.8	17.4
ARTIST	95.9	22.3	59.0	5.6	4.7	0.4	522.7	4.3	17.7	15.9
JAFFER	94.6	15.5	58.7	6.7	4.9	0.4	425.3	4.4	12.7	14.1
DREAMER	83.4	15.8	56.3	5.6	3.4	0.5	74.0	5.0	14.8	14.1
MEAN	91.9	18.5	54.0	5.7	4.5	0.5	298.3	4.5	15.1	15.9
CD at 5%										
SE(m)	9.7	4.2	7.7	1.3	1.3	0.0	108.0	0.6	0.9	1.8

TABLE 3. Quality Parameters

NAME OF VARIETY	Fresh weight(gm)	Vase life(Days)	Yield/m ² /year
DIABOLO	40.3	15.3	116.7
PARADISO	28.9	13.6	203.0
BLIND DATE	25.1	18.6	261.0
DUNE	18.5	14.5	250.0
POWER PLAY	24.6	11.1	255.7
PRIMEROSE	21.0	12.5	152.0
COLT	25.4	13.0	202.0
PINK POWER	20.1	13.8	251.0
ALEX	23.1	11.7	222.3
ROSALIN	17.5	14.0	157.0
AMULET	19.8	19.6	148.7
SUNWAY	19.3	9.5	208.0
YUCADOR	27.7	15.7	281.7
SHIMMER	20.8	10.0	159.7
UNIVERSAL	24.1	8.9	247.0
ARTIST	21.9	9.8	263.3
JAFFER	25.3	9.4	372.0
DREAMER	17.0	5.3	143.0
MEAN	23.4	12.6	216.3
CD at 5%	2.3	1.3	41.4
SE(m)	1.1	0.6	20.4

having higher stalk girth (6.7mm) followed by 'Dune' (6.5mm) have recorded highest vase life (19.6d) followed by 'Blind Date'(18.6d) while 'Dreamer' recorded minimum in vase life (5.3d). These distinct variations could be due to increase or decrease in stalk length and amount of food material reserved in flower stalk Kandpal *et al* (2003); Wankhede and Gajbhiye (2012) and better water uptake capacity and higher accumulation of metabolic sugars (reducing and non-reducing) in the plant as well as in the petal cells (Deka *et al*, 2015).

CONCLUSION

'Diablo' found superior with respect to plant height, disc diameter and neck thickness and higher fresh weight. 'Primerose' had maximum flower diameter with minimum disc diameter and maximum length of ray floret thus suitable for exhibition purpose. 'Universal' recorded longer stalk length. 'Amulet' has maximum stalk diameter and longer keeping quality which could be a very popular choice in the wholesale market. The cultivar 'Jaffer' recorded highest number of flowers per sq.m. Flowers remain fresh in plant itself for longer

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period in 'Alex' and 'colt'. 'Dune' has average growth and flower quality. 'Dreamer' is completely rejected due to low flower yield and quality point of view.

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