Plant Archives Vol. 24, Special Issue (GABELS), 2024 pp.497-502 e-ISSN:2581-6063 (online), ISSN:0972-5210

Plant Archives

Journal homepage: http://www.plantarchives.org
DOI Url : https://doi.org/10.51470/PLANTARCHIVES.2024.v24.SP-GABELS.072

ASSESSING THE IMPACT OF GROWING CONDITIONS ON FLORAL CHARACTERISTICS OF GERBERA (*GERBERA JAMESONII*) CULTIVARS: A COMPARATIVE STUDY

Raveena[1*], Arvind Malik[1], Divya[1] and Aneja Nair M.[2]
[1]Department of Horticulture, CCS Haryana Agricultural University, Hisar, Haryana – 125004
[2]Department of Horticulture, Maharana Pratap Horticultural universit, Karnal, Haryana-132001
*Corresponding author E-mail: sainiraveena28@gmail.com

ABSTRACT

The experiment entitled "effect of growing conditions (polyhouse, insect proof net house, shade net house and open field) on floral characteristics of gerbera varieties (Szogun, Salsa, Kormoran and Feliks)" was conducted at Department of Horticulture, Chaudhary Charan Singh Haryana Agricultural University, Hisar during the year 2019-2020. The observations were recorded on various floral characteristics *i.e.* days to first flower bud initiation, stalk length, flower diameter, fresh and dry weight of flower. The results showed that, minimum days to flower bud initiation (99.18 days), maximum stalk length (59.76 cm), flower diameter (12.12 cm) and dry weight was observed under polyhouse, while, fresh flower weight (40.58 g) was found maximum under insect proof net house. Among varieties Szogun performed better with respect to days to flower bud initiation (99.96 days), flower diameter (11.65 cm), fresh flower weight (42.25 g) and dry weight (19.29 g), while Kormoran had maximum stalk length (51.20 cm). It can be recommended that to produce high quality of gerbera flowers for landscaping and commercial cut flower production, cultivation of Szogun under polyhouse condition is most beneficial.

Keywords **:** Floral characteristics, gerbera, growing conditions, varieties

Introduction

Because of its stunning inflorescence and rising demand in both the local and international markets, the gerbera (*Gerbera jamesonii*) is a highly valued and well-known cut flower (Maitra *et al*., 2020). It offers plenty of opportunity to increase income from the unit area because it is a high value crop. According to Elomaa *et al* (2018), gerbera is also referred to as a transverse daisy and is a member of the asteraceae family. It is a perennial herb without stems, and it's petiolate, coarse, or occasionally leathery leaves (Goldblatt *et al.,* 2019) and commonly found in South Africa, Africa, Madagascar, and tropical Asia. It typically has minimum three-year commercial flowering period. The cultivated area for cut flowers in India is close to 867 MT. from 53.26 hectare area (Anon 2020). Karnataka, Maharashtra, West Bengal, Tamil Nadu, Himachal Pradesh, Jammu and Kashmir, and Gujarat are the top gerbera-producing states in India (Anon 2019). In tropical and subtropical climes, they thrive in situations of partial shade (Xiwen *et al.,* 1986).

The blossoms of gerbera are available in a variety of colours, such as yellow, white, red, orange, pink, maroon, crimson, and subdued variations of these hues. Gerbera cut blooms of good quality are rare to find in open fields. Therefore, the high producing and long lasting types must be cultivated in protected environments like a greenhouse or polyhouse in order to achieve the qualitative and quantitative demands. Gerbera variety performance varies by geography, season, and other growth circumstances (Horn *et al.,* 1974). Significant relationship was observed between different substrates with flower quality and yield parameters of gerbera under protected structures (Panj *et al.,* 2012). The evaluation of new cultivars to meet the regional conditions has received limited study attention. It is necessary to assess new varieties for

their quantitative and qualitative features in order to select the best variety for the region because there is a constant demand for newer types with high yielding variants.

Materials and Methods

The present investigation "effect of growing conditions on floral characteristics of gerbera (*Gerbera jamesonii*)" was carried out at Department of Horticulture, CCS Haryana Agricultural University, Hisar (Haryana) during the year 2019-20. The experiment was carried out with four different growing conditions *viz.* polyhouse, insect proof net house, 50% shade net house, open field and four varieties *viz.* Szogun, Salsa, Kormoran and Feliks. Healthy tissue cultured plants (3–4 leaf stage) of the gerbera varieties (Sozogun, Kormoran, Salsa, and Feliks) from Progreen Biotech Private ltd., New Delhi were used for the experiment. The planting was completed in the second week of October. With three replications and treatments, sixteen treatment combinations were examined. The treatments included:

T1: Polyhouse

T2: Shade net

T3: Open field

T4: Insect proof net

The data were examined in accordance with the steps outlined by Panse and Sukhtme (1967) for the study of completely randomised designs (CRD). Using critical differences (C.D.) at a 5% level of significance, the overall significance of differences between the treatments was examined. A windows-based computer programme called OPSTAT was used to statistically assess the results (Sheoran *et al* 1998).

Result and Discussion

Flowering characters like days to first flower bud initiation, stalk diameter, flower diameter, number of ray florets per flower, number of flowers/m^2/plant, fresh weight of flower and dry weight of flower were significantly influenced by different growing conditions and varieties.

Days to first flower bud initiation

It is evident from the data given in Table 1, that minimum days taken for bud initiation was observed in polyhouse (94.18 days) followed by insect proof net house (101.88 days). However, the maximum days taken for bud initiation was recorded in open field conditions (110.08 days) which were statistically at par with shade net (108.25 days). Among the varieties the minimum days taken for first flower bud initiation was recorded in Szogun (99.96 days), while maximum days was observed in var. Salsa (105.18 days) which was statistically at par with Kormoran (104.93 days) and Feliks (104.33 days). Variation in days taken to first flower bud initiation may be due to genetic makeup of varieties (Kandpal *et al.,* 2003). Similar observations were recorded by Shweta *et al.* (2014). The interaction was found non-significant between different growing conditions and varieties with respect to days taken to bud initiation.

Stalk length (cm)

The data regarding stalk length had showed significant differences for different growing conditions. However, the interaction between different growing conditions and varieties with respect to stalk length was found non-significant (Table 2). Among the growing conditions, maximum stalk length (59.76 cm) was produced by flowers grown under polyhouse followed by insect proof net (50.81 cm), while minimum stalk length (38.58 cm) was recorded in open field condition. Among the varieties, the maximum stalk length was recorded in Kormoran (51.20 cm), which was statistically at par with Szogun (48.21 cm) and Salsa (49.60 cm), whereas, minimum stalk length (45.51 cm) was observed in Feliks. The stalk length is a genetic factor varied from variety to variety therefore, among the cultivars as earlier observed by Sarkar and Ghimaray (2004). Stalk length is a very important factor for a cut flower crops from the market point of view especially for gerbera flower. It decides the flower quality of gerbera. As there will be more stalk length more reserved food stored in the stalk of flower, which will later be available to the flower for longer time period for better vegetative growth. Similar, findings was observed by Mahmood *et al.* (2013). Similar results were also observed by Kandpal *et al.* (2003) who also reported the variation in stalk length among the genotypes due to the genetic characters of particular genotype.

Flower diameter (cm)

Regarding the effects of different growing conditions and varieties on flower diameter indicated that flower size was influenced significantly by both the factors; however, interaction was found non-significant (Table 3). The maximum flower diameter (12.12 cm) was recorded from the plants grown under polyhouse which was statistically at par with insect proof net (11.79 cm) and the minimum flower diameter (9.82 cm) was observed in open field condition. Among the varieties the maximum flower diameter (11.65 cm) was observed in Szogun (11.65 cm) which was statistically at par with Feliks (11.26 cm). However, the minimum flower diameter was recorded

in Kormoran (10.86 cm) which was statistically at par with (11.08 cm). The bigger diameter of flower might be due to the inherent characters of individual cultivars. Similar results were observed by Mahmood *et al.* (2013) and Gotz (1983), who reported large differences in the flower diameter of different gerbera varieties. This is perhaps due to the inherent character of the individual variety. These findings are in accordance with results of Luna and Choudhury (2019), who reported large difference in flower diameter of different gerbera cultivars. The increase in flower diameter was due to bigger ray florets recorded in the cultivars. The above results are in conformity with the findings of Singh and Ramchandran (2002) in gerbera.

Fresh weight of flower (g)

The data presented in Table 4 regarding fresh weight of flower shows significantly influenced of different varieties and growing conditions. The interaction between different growing conditions and varieties with respect to fresh weight of flower was also found significant. Among the varieties, maximum fresh weight of flower was recorded in Szogun (42.26 g), which was statistically at par with Salsa (40.71 g), while minimum fresh weight of flowers was observed in Feliks (34.46 g). Among the different growing conditions, maximum fresh weight of flower (40.58 g) was produced by plants grown under Insect net proof house, which was statistically at par with polyhouse (40.19 g) and shade net house (39.45 g). Minimum fresh weight of flower (35.62 g) was recorded in plants grown in open field condition. This might be due to better vegetative growth of plants under polyhouse because favourable environment was found which effect on floral characters.

Dry weight of flowers (g)

The data pertaining to Table 5 revealed that dry weight of flower varies significantly with respect to different varieties. It was noted that in different varieties maximum dry weight of flowers was recorded in Szogun (19.29 g) and minimum dry weight of flowers were observed in Feliks (17.77 g), which was statistically at par with Kormoran (18.20 g) and Salsa (18.37 g). Dry weight of flowers was affected significantly by different growing conditions maximum dry weight of flowers (19.00 g) were recorded in plants grown under polyhouse which was statistically at par with shade net house (18.36 g) and insect proof net house (18.65 g). Minimum dry weight of flowers (17.61 g) was, recorded in plants grown in open field. The interaction was found non-significant between different growing conditions and varieties with respect to fresh weight of flower.

Table 1: Effect of different growing conditions and varieties on days to first flower bud initiation in gerbera

Growing conditions	Varieties				Mean
	Szogun	Kormoran	Salsa	Feliks	
Poly house	91.82	96.31	94.17	94.40	**94.18**
Shade net	103.86	111.14	108.53	109.47	**108.25**
Insect proof net	96.47	101.47	106.27	103.33	**101.88**
Open field	107.67	110.80	111.73	110.13	**110.08**
Mean	**99.96**	**104.93**	**105.18**	**104.33**	
CD (p=0.05)	**Condition = 2.36**	**Varieties = 2.36**	**Condition × Varieties = N.S.**		

Table 2: Effect of different growing conditions and varieties on stalk length (cm) in gerbera

Growing conditions	Varieties				Mean
	Szogun	Kormoran	Salsa	Feliks	
Poly house	58.91	61.79	60.91	57.45	**59.76**
Shade net	45.01	47.89	46.57	42.01	**45.37**
Insect proof net	50.15	54.21	50.22	48.63	**50.81**
Open field	38.79	40.90	40.68	33.93	**38.58**
Mean	**48.21**	**51.20**	**49.60**	**45.51**	
CD (p=0.05)	**Condition = 2.37**	**Varieties = 2.37**	**Condition × Varieties = N.S.**		

Table 3: Effect of different growing conditions and varieties on flower diameter (cm) in gerbera

Growing conditions	Varieties				Mean
	Szogun	Kormoran	Salsa	Feliks	
Poly house	12.53	11.75	12.02	12.17	**12.12**
Shade net	11.25	10.92	11.15	11.17	**11.12**
Insect proof net	11.96	11.49	11.83	11.89	**11.79**
Open field	10.85	9.29	9.33	9.79	**9.82**
Mean	**11.65**	**10.86**	**11.08**	**11.26**	
CD (p=0.05)	**Condition = 0.54**	**Varieties = 0.54**	**Condition × Varieties = N.S.**		

Table 4: Effect of different growing conditions and varieties on fresh weight of flowers (g) in gerbera

Growing conditions	Varieties				Mean
	Szogun	Kormoran	Salsa	Feliks	
Poly house	44.84	40.33	42.87	32.72	**40.19**
Shade net	43.01	37.36	41.39	36.03	**39.45**
Insect proof net	43.82	39.58	42.56	36.37	**40.58**
Open field	37.36	36.37	36.03	32.72	**35.62**
Mean	**42.26**	**38.41**	**40.71**	**34.46**	
CD (p=0.05)	**Condition = 1.57**	**Varieties = 1.57**	**Condition × Varieties = 3.15**		

Table 5: Effect of different growing conditions and varieties on dry weight of flowers (g) in gerbera

Growing conditions	Varieties				Mean
	Szogun	Kormoran	Salsa	Feliks	
Poly house	20.56	18.46	18.80	18.17	**19.00**
Shade net	19.03	18.29	18.48	17.65	**18.36**
Insect proof net	19.62	18.40	18.53	18.05	**18.65**
Open field	17.95	17.64	17.66	17.19	**17.61**
Mean	**19.29**	**18.20**	**18.37**	**17.77**	
CD (p=0.05)	**Condition = 0.72**	**Varieties = 0.72**	**Condition × Varieties = N.S.**		

Plate 1: Polyhouse

Plate 2: Open field

Plate 3: Insect net proof house

Plate 4: Shade net house

Conclusion

From the present investigation, it has been concluded that the variety Szogun performed better with respect to flowering parameters such as days to first flower bud initiation, stem diameter (cm), flower diameter (cm), fresh weight of flower (g) and dry weight of flower (g) as compared to other varieties (Kormoran, Salsa and Feliks). Whereas, floral parameters were found superior in the plants harvested from polyhouse.

References

Anonymous (2020). Area and production of horticulture crops for 2018-19. http:// nhb.gov.inStatistics.aspx?enc= Wkeg dyuHokljEtehnJoq0KWLU79sOQCy+W4MfOk01GFOWQSEvtp9tNHHoiv3p49g.

Anonymous (2019). Statistical Data, http://hortharyana.gov.in/en.

Elomaa, P., Zhao, Y. and Zhang, T. (2018). Flower heads in Asteraceae recruitment of conserved developmental regulators to control the flower-like inflorescence architecture. *Hortic Res.,* 5, 36.

Goldblatt, P. and Manning, J.C. (2019). Temperate garden plant families: The essential guide to identification and classification. Timber Press, Portland. p 114.

Gotz, W. (1983). Information of gerberas: Container culture has advantages. *Deutscher Gartenbau,* 37(41), 1898-1900.

Horn, W., Wricke, G. and Weber, W.E. (1974). Genotypic and environmental effects on characters expression in *Gerbera jamesonii*. *Acta Horticulturae,* 39(3), 289-300.

Kandpal, K., Kumar, S., Srivastava, R. and Chandra, R. (2003). Evaluation of gerbera (*Gerbera jamesonii*) cultivars under Tarai condition. *Journal of Ornamental Horticulture,* 6(3), 252-255.

Luna, B.M. and Choudhury, T. (2019). Effect of organic fertilizer and microbial consortium on growth and quality parameters of gerbera cv. Red Gem and on Soil Health. *International Journal of Current Microbiology and Applied Sciences,* 8(09), 1176-1181.

Mahmood, M.A., Ahmad, N. and Khan, M.S.A. (2013). Comparative evaluation of growth, yield and quality characteristics of various gerbera (*Gerbera jamesonii* L.) cultivars under protected condition. *Journal of Ornamental Plants,* 3(4), 235-241.

Mitra, S., Shankar, T., Sairam, M. and Pine, S. (2020). Evaluation of gerbera (*Gerbera jamesonii* L.) cultivars for growth, yield and flower quality under protected cultivation. *Indian Journal of Natural Sciences,* 10(60), 20271-20276.

Panj, F.G., Sunila, K. and Parmar, P.B. (2012). Effect of growing media on growth, yield and quality of gerbera (*Gerbera jamesonii* bolus ex hooker f.) under protected culture. *International Journal on Agricultural Statistics Science,* 8(1), 275-282.

Panse, V.G. and Sukatme, P.V. (1967). Statistical methods for agricultural workers. Indian Council of Agricultural Research, New Delhi. pp.155.

Sarkar, I. and Ghimiray, T.S. (2004). Performance of gerbera under protected condition in hilly region of West Bengal. *Journal of Ornamental Horticulture,* 7(3&4), 230-234.

Sheoran, O.P., Tonk, D.S., Kaushik, L.S., Hasijaa, R.C. and Pannu, R.S. (1998). Statistical Software Package for

Agricultural Research Workers. Recent advances in information theory; statistics and computer application by D S Hooda and R C Hasija, Department of Mathematics Statistics, CCS HAU, Hisar. pp. 139-143.

Shwetha, K.B., Seetharamu, G.K., Ansar, H. and Kumar, S.A. (2014). Assessment of gerbera (*Gerbera jamesonii* Bolus ex. Hooker F.) cultivars under different growing conditions. *Madras Agricultural Journal,* 101(10/12): 390-395.

Singh, K.P. and Ramachandran, N. (2002). Comparison of greenhouses having natural ventilation and fan and pad evaporative cooling systems for gerbera production. *Journal of Ornamental Horticulture,* 5(2), 15-19.

Xiwen, L. and Walker, D. (1986). The plant geography of Yunnan Province, south-west China. *Journal of Biogeography,* 13, 367-397.