



Varietal Evaluation of Chrysanthemum (*Dendranthema grandiflora* T.) under Open Field Conditions of Prayagraj

Uppuleti Sai Prakash^{a*} and Urfi Fatmi^{b#}

^a Department of Horticulture (Floriculture and Landscaping), SHUATS, Prayagraj, Uttar Pradesh-211007, India.

^b Department of Horticulture, Naini Agricultural Institute, SHUATS, Prayagraj, Uttar Pradesh-211007, India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJPSS/2022/v34i2131274

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/89336>

Original Research Article

Received 30 April 2022

Accepted 05 July 2022

Published 14 July 2022

ABSTRACT

The present research was conducted with an aim to identify the most suitable chrysanthemum variety under the agroclimatic conditions of Prayagraj. The experiment was conducted in Randomized Block Design (RBD), with fifteen varieties replicated thrice. The experiment was carried out during September, 2021 to February, 2022 in Research Field, Department of Horticulture, SHUATS, Prayagraj. From the experimental findings, it was found that taller plants were found in the variety Tinkerbel (37.8 cm), whereas more plant spread was found in the variety Iceberg (43.0 cm), number of primary branches (6 branches), earliness in flowering (39 days), flower yield per plant (172.12 g/plant) was found maximum in the variety Aishwarya-2, average flower weight was recorded more in the variety Cream White (8.7 g), duration of flowering (76 days) was found maximum in the variety Aishwarya-2.

Keywords: *Chrysanthemum; variety; significant; open field.*

^oM.sc. Scholar;

[#]Assistant Professor;

*Corresponding author: E-mail: saii1920.sp@gmail.com;

1. INTRODUCTION

Chrysanthemum (*Dendranthema grandiflora* T.) belongs to the Asteraceae family. It is believed to be native to the northern hemisphere chiefly Europe and Asia and was believed to have been originated in China [1].

In the trade of global flower market, chrysanthemum is the second largest cut flower after rose and holds fifth rank as pot plant. It is commercially grown in different parts of the world. Netherlands, Italy, Colombia, Spain, Germany and USA are the important countries where it is mainly grown under greenhouse conditions. Japan is the largest producer of chrysanthemum in the world. In India, it is commercially grown in Karnataka, Tamil Nadu and Maharashtra. Chrysanthemum covers 20,090 ha area with production of 1,85,240 MT of loose flowers and 14,930 MT of cut flowers in India during 2016-2017. Karnataka is the most prominent chrysanthemum growing state with an area of 5100 ha and production of 61,200 MT of loose flowers during 2014-2015 (source from NHB) [2].

In India, chrysanthemum occupies a place of pride both as a commercial crop and as a popular exhibition flower. The erect and tall growing cultivars are suitable for background planting in borders. The cultivars with the dwarf and compact growing habit, on the other hand, are suitable for front row plantation or pot culture [3]. The decorative and fluffy bloomed small-flowered cultivars are ideal for garland making and hair decoration. The extra-large bloomed cultivars are used for exhibition value. Loose flowers are used for garlands, venis, worship etc. Long stem flowers or cut flowers are used for bouquet, vase etc. [4]. In North India various hues of red, yellow, white and purple chrysanthemums are grown in abundance for decorating the landscape either in the ground or in pots. But, in South India mostly the yellow-colored flowers are preferred and grown as loose flowers for trade [5].

Chrysanthemum is a short-day plant and cannot normally form flower buds when the day length exceeds 14.5 hours and developed them when it exceeds 13.5 hours. Due to nature of flowering under short day conditions, availability of chrysanthemum flower is restricted to short span of not more than three months [6].

2. MATERIALS AND METHODS

The field experiment entitled "Varietal evaluation of chrysanthemum (*Dendranthema grandiflora* T.) under open field conditions of Prayagraj" was carried out at Horticulture Research Field, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology And Sciences (SHUATS), Prayagraj, during the season of 2021-2022.

2.1 Geographical Location of the Site

The experimental site is being located at a latitude of 25.41° North and longitude of 81.84 ° East, with an altitude of 98 meters above the mean sea level (MSL).

2.2 Experimental Details

The experiment was laid out in Randomized Block Design (RBD) with 15 varieties and each variety was replicated thrice. The varieties used in this experiment were Aishwarya-1, Aishwarya-2, Branz Red, Cream White, Donzigar, Fantasy, Iceberg, Lily, Panchu, Peet, Poornima White, Poornima Yellow, Scent White, Scent Yellow and Tinkerbel. After 30, 60 and 90 days of planting, observations were recorded viz., plant height (cm), plant spread (cm), number of primary branches, earliness in flowering (days), flower yield per plant (g), average flower weight (g) and duration of flowering (days). The data recorded during the experiment were subjected to statistical analysis by using analysis of variance (ANOVA). The significant difference among the varieties were compared against the critical difference at 5% level of significance ($CD_{0.05}$).

3. RESULTS AND DISCUSSION

3.1 Vegetative Parameters

Significantly, taller plants were found in variety Tinkerbel (37.8 cm), which was found to be at par with variety Poornima Yellow (34.8 cm). While, shorter plants was found in variety Panchu (15.9 cm). The difference in plant height may be due to the varietal character and vigour of the genotypes under study. Similar results were recorded in chrysanthemum by Singh et al., [6] and Archana et al., [7]. Significantly, the maximum plant spread was found in variety Iceberg (43.0 cm), which was found to be at par

with the variety Tinkerbel (38.4 cm). Whereas, minimum plant spread was found in variety Panchu (28.1 cm). The difference in plant spread among all the varieties may be due to their genetic makeup and development of more number of secondary branches. Similar results were recorded in chrysanthemum by Bala [8] and Henny et al., [9]. Significantly, more number of primary branches were found in variety Aishwarya-2 (6 branches), which was found to be at par with variety Scent Yellow (5 branches). While, least number of primary branches was recorded in variety Lility (2). The difference in number of primary branches may be due to the genetic makeup of the varieties. Similar results were recorded in chrysanthemum by Parmar et al., [10]. The statistically analysed data was presented in Table 1.

3.2 Floral Parameters

Significantly, earliness in flowering was recorded in the variety Aishwarya-2 (39 days), whereas late flowering was observed in the variety Lility (64 days). Earliness in flowering had significantly differed and the difference may be due to the inherent character and genetic makeup of the variety. Similar results were recorded in chrysanthemum by Deka et al., [11] and Kumar et al., [12]. Significantly, maximum flower weight was recorded in the variety Cream White (8.7 g),

which was found to be at par with the variety Aishwarya-1 (8.2 g). Whereas, minimum flower weight was recorded in the variety Panchu (1.2 g). The difference in the flower weight may be due to the varietal character, habitat type and genetic makeup of the varieties. Similar results were recorded in chrysanthemum by Gaikwad et al., [13] and Patil et al., [14]. Significantly, higher flower yield was recorded in the variety Aishwarya-2 (172.12 g), which was found to be at par with the variety Cream White (141.84 g). While, lesser flower yield was recorded in the variety Panchu (30.35 g). The difference in the flower yield per plant may be due to the varietal character, habitat type, environmental factors and genetic makeup of the varieties. Similar results were recorded in chrysanthemum by Singh et al., [15] and Chawla et al., [16]. Significantly, maximum duration of flowering was recorded in the variety Aishwarya-2 (76 days), which was found to be at par with the variety Scent Yellow (73.0 days). Whereas, minimum duration of flowering was found in the variety Lility (52 days). The difference in the flowering duration may be due to the varietal character, environmental factors, habitat type and genetic makeup of the varieties. Similar results were recorded in chrysanthemum by Balaji et al., [17] and Srilatha et al., [18]. The statistically analysed data was presented in Table 2.

Table 1. Effect of different varieties of chrysanthemum on vegetative characters

Varieties	Plant height (cm)	Plant spread (cm)	Number of primary branches
V ₁ Aishwarya-1	32.86	36.67	4.44
V ₂ Aishwarya-2	22.42	37.49	6.22
V ₃ Branz Red	23.53	38.30	5.33
V ₄ Cream White	32.62	34.27	5.56
V ₅ Donzigar	26.92	32.51	3.67
V ₆ Fantasy	33.20	32.91	4.33
V ₇ Iceberg	28.94	43.09	4.33
V ₈ Lility	22.34	28.56	2.22
V ₉ Panchu	15.92	28.17	3.44
V ₁₀ Peet	24.86	31.71	4.78
V ₁₁ Poornima White	34.47	36.80	5.56
V ₁₂ Poornima Yellow	34.87	36.18	4.67
V ₁₃ Scent White	30.47	35.81	4.67
V ₁₄ Scent Yellow	21.50	32.98	5.78
V ₁₅ Tinkerbel	37.86	38.46	5.11
F- test	S	S	S
SEd (±)	2.97	2.36	0.82
CD _{0.05}	6.08	4.83	1.68
CV	12.92	8.28	21.58

Table 2. Effect of different varieties of chrysanthemum on floral characters

Varieties	Earliness in flowering	Flower yield per plant (g)	Average flower weight (g)	Duration of flowering (days)
V ₁ Aishwarya-1	47.56	85.86	8.27	68.44
V ₂ Aishwarya-2	39.56	172.13	7.77	76.44
V ₃ Branz Red	44.67	82.32	4.27	71.33
V ₄ Cream White	47.11	141.84	8.70	68.89
V ₅ Donzigar	45.56	78.73	4.37	70.44
V ₆ Fantasy	53.44	66.52	2.77	62.56
V ₇ Iceberg	50.22	85.82	4.23	66.00
V ₈ Lility	64.44	41.07	1.80	52.67
V ₉ Panchu	60.33	30.36	1.27	56.33
V ₁₀ Peet	50.56	65.57	2.20	65.44
V ₁₁ Poornima White	59.22	58.49	3.77	56.78
V ₁₂ Poornima Yellow	53.67	80.01	4.00	62.33
V ₁₃ Scent White	55.00	56.19	4.33	60.89
V ₁₄ Scent Yellow	42.78	84.93	7.07	73.00
V ₁₅ Tinkerbel	53.89	72.58	3.10	62.11
F-test	S	S	S	S
SEd (±)	2.86	6.11	0.95	2.59
CD _{0.05}	5.83	12.49	1.95	5.29
CV	6.83	9.00	26.63	4.88

4. CONCLUSION

It is concluded from the present investigation that 15 chrysanthemum varieties showed significant variation in all the parameters observed. Variety Aishwarya-2 showed the best performance in most of the parameters like number of primary branches (6 branches), earliness in flowering (39 days), flower yield per plant (172.12 g/plant) and duration of the flowering (76 days), followed by varieties Cream White and Aishwarya-1. Hence, the varieties Aishwarya-2, Cream White and Aishwarya-1 could be recommended for open field conditions of Prayagraj.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

- Negi R, Dhiman SR, Gupta YC. Studies on Growth and Flowering Behavior of Newly Evolved Genotypes of Chrysanthemum (*Dendranthema grandiflora* Tzvelev) for Loose Flower Production. International Journal of Current Microbiology and Applied Sciences. 2019;8(11): 341-346.
- Anonymous, National Horticulture Board. Accessed 17 February 2022. Available: <http://nhb.gov.in/Statistics.aspx?enc=WkegdyuHokljEtehnJq0KWL79sO>
- QCy+W4MfOk01GFOWQSEvtp9tNHHoiv3p49g Uddin AFMJ, Taufique T, Ona AF, Shahrin S, Mehraj H. Growth and flowering performance evaluation of thirty-two chrysanthemum cultivars. Journal of Bioscience and Agriculture Research. 2015;04(01):40-51.
- Prakash, A., Kumar, M., Kumar, A., Gupta, A. and Badal, D.S. Performance and flower characterization of chrysanthemum (*Dendranthema grandiflora*) genotypes under agro-climatic region of western Uttar Pradesh. International Journal of Chemical Studies. 2018;6(5):1439-1442.
- Thakur N, Sujatha Nair A, Kumar R, Bharathi TU, Dhananjaya MV, Venugopalan R. Evaluation of Chrysanthemum (*Dendranthema grandiflora* Tzvelev) for Desirable Horticultural Traits. International Journal of Current Microbiology and Applied Sciences. 2018;7(8):565-574.
- Singh AK, Singh DK, Kumar R. Evaluation of different chrysanthemum (*Chrysanthemum morifolium*) genotypes under shade net in North West Himalaya. International Journal of Pure and Applied Bioscience. 2017;5(1):980-985.
- Archana D, Prasanth P, Sreenivasan N, Joshi V. Pot Presentability of different Chrysanthemum Cultivars for Pot Mums based on Vegetative Attributes.

- International Journal of Current Microbiology and Applied Sciences. 2019; 8(12):3020-3023.
8. Bala M. Evaluation of chrysanthemum (*Chrysanthemum morifolium* Ramat.) genotypes for morphological traits. Journal of Horticultural Science. 2015;10(2):242-244.
 9. Henny T, Palai SK, Beura S, Chongloi L, Devi OB, Mishra S. Evaluation and selection of spray chrysanthemum (*Chrysanthemum morifolium* Ramat) genotypes suitable for commercial cultivation under coastal plain zone of Odisha. The Pharma Innovation Journal. 2021;10(4):124-126.
 10. Parmar R, Kanawjia A, Chaurasiya R, Dubey A, Parveen S, Kiran, Pawaiya S. Evaluation of Different Cultivars of Chrysanthemum (*Dendranthema grandiflora* L.) Under Gird Region of Madhya Pradesh. International Journal of Current Microbiology and Applied Sciences. 2019;8:38-44.
 11. Deka KK, Paswan L. Correlation and path analysis studies in Chrysanthemum. Annals of Biology. 2001;8(1):31-34.
 12. Kumar A, Kumar R, Singh J, Singh P, Singh V. On-farm Evaluation of Different Cultivars of Chrysanthemum under the Climatic Conditions of Western Uttar Pradesh. International Journal of Current Microbiology and Applied Sciences. 2020; 11:1937-1943.
 13. Gaikwad AM, Patil SSD. Evaluation of chrysanthemum varieties under open and polyhouse conditions. Journal of Ornamental Horticulture. 2001;4(2):95-97.
 14. Patil S, Mishra A, Nagar KK, Kumar C. Evaluation of Chrysanthemum (*Chrysanthemum morifolium* Ramat.) varieties for flowering traits Under Ecological Conditions of Sub-Humid Zone of Rajasthan. Chemical Science Review and Letters. 2017;6(22):1338-1342.
 15. Singh DD, Tyagi S, Singh S, Kumar P. Studies on the Performances and Flower Characterization of Chrysanthemum (*Dendranthema grandiflora* Tzvelev) Genotypes under Uttar Pradesh conditions. Advances in Research. 2017;9(1):1-7.
 16. Chawla SL, Patel RB, Dhaduk BK, Sudha P, Dipal B. Varietal assessment of Chrysanthemum (*Dendranthema grandiflora*) under South Gujarat agro-climatic conditions. Current Horticulture. 2021;9(2):64-67.
 17. Balaji SK, Reddy BS. Vegetative growth, Flower yield and Quality of different Chrysanthemum cultivars. Journal of Ornamental Horticulture. 2004;7(3):32-36.
 18. Srilatha V, Kumar KS, Kiran YD. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) varieties in southern zone of Andhra Pradesh. Agricultural Research Communication Centre. 2015;35(2):155-157.

© 2022 Prakash and Fatmi; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/89336>