International Journal of Environment and Climate Change

Volume 13, Issue 10, Page 366-370, 2023; Article no.IJECC.104765
ISSN: 2581-8627
(Past name: British Journal of Environment & Climate Change, Past ISSN: 2231–4784)

Variability of Chrysanthemum Species under Prayagraj Agro-climatic Conditions

Shweta Rani [a++*], Devi Singh [b#] and C. John Wesley [c#]

[a] Department of Horticulture (Floriculture and Landscaping), Naini Agricultural Institute, SHUATS, Prayagraj, Uttar Pradesh, India.
[b] Department of Horticulture, Naini Agricultural Institute, SHUATS, Prayagraj, Uttar Pradesh, India.
[c] Department of Irrigation and Drainage Engineering, Naini Agricultural Institute, SHUATS, Prayagraj, Uttar Pradesh, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJECC/2023/v13i102724

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/104765

Original Research Article

Received: 10/06/2023
Accepted: 12/08/2023
Published: 16/08/2023

ABSTRACT

The present study was made to identify the suitable variety for growing in Prayagraj, Uttar Pradesh. Twenty varieties were laid out in Randomized Block Design with three replications during 2022-2023 at Departmental field of Horticulture, NAI, SHUATS, Prayagraj. In this experiment out of 20 varieties 2 varieties, Fantasy and Hemant Sagar was not able to survive in this condition. In this experiment data were recorded for various characters viz; Growth parameter, Floral parameters, Yield parameters and Economic parameters. Variety White cotton ball was found as elite variety for height (cm) 30DAP, 60DAP, and 90DAP in comparison with other varieties. Nanako was for number of flowers per plant. Apsara (24.14t/ha) was for flower yield(t/ha) in comparison to other varieties. Maximum B:C was obtained in Apsara (2.85). Based on findings of this experiment, it is

[++] M.Sc. Research Scholar;
[#] Associate Professor;
**Corresponding author: E-mail: shwetarani686@gmail.com;*

recommended the Chrysanthemum varieties Apsara and White cotton ball should be used for commercial cultivation of chrysanthemum, although further studies may also be carried out for refinement for selection of best varieties from amongst these.

Keywords: Chrysanthemum; varietal evaluation; agro-climatic conditions.

1. INTRODUCTION

"Chrysanthemum (*Dendranthema grandiflora* T.) is one of the most important flower crops grown commercially in India for cut and loose flowers and is also used for garden display. It is commonly known as Guldaudi, Autumn Queen or Queen of the East belongs to the family Asteraceae. Growth of chrysanthemum has two distinguished phases, firstly a period of long day conditions (day length more than 12hrs) where the plants grow vegetatively and secondly short day conditions (daylengths less than 12 hrs), leading to flower induction and development. Long day and short day conditions are influenced by season and climatic conditions of that particular region [1,2]. The variations among chrysanthemum varieties are large in response to environment particularly temperature and the interaction between temperature and cultivar occur for every developmental trait. Therefore, varietal evaluation became necessary to identify the suitable variety for the specific region. The performance of any crop or variety largely depends on interaction between genotype and environment [3,4]. As a result, varieties, which perform well in one region, may not perform same in other regions of varying climatic conditions. Hence, it necessary to evaluate new genotypes for their quality traits under varying climatic conditions" [5].

"Its commercial cultivation is being done in states viz., Maharashtra, Rajasthan, Madhya Pradesh and Bihar and in places viz., Delhi, Kolkata, Lucknow, Kanpur and Allahabad mainly for the sake of decoration and participating in flower shows, with the help of pot grown plants. Chrysanthemums are mainly classified under two categories: Large flowered (standard type) and small flowered (spray type). Large flowered chrysanthemums which produce long, sturdy stems and good keeping quality are further classified into 13 classes which make it suitable for flower arrangement, cut flower production and as potted flowering plant for exhibition and decoration [5-7]. The extra-large bloomed cultivars are used for exhibition value, bouquets, vase etc, whereas small flowered are mostly grown for loose flower and are classified into 10 classes. The standard type flowers fetch higher prices though their share in export market is less but spray types have smaller flower size and have major share in the world market. In International cut flower trade, chrysanthemum ranks next to rose" [8]. Nursery raising of chrysanthemum/Guldaudi: Nursery sowing is done by suckers or terminal cuttings (5-7 cm long). Nursery raised by suckers is planted in February- March while nursery by terminal cuttings (5-7 cm long) is planted in June-July [9,10].

2. MATERIALS AND METHODS

2.1 Experimental Site

The experiment was conducted during the year 2022-23 in Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agricultural Technology and Sciences, Prayagraj. The area is situated on the South of Prayagraj on the right bank of Yamuna at Rewa road at a distance of about 6 km from Prayagraj city. It is situated at 25.8°N latitude and 81.50 °E longitudes on elevation of 98Meters from the sea level.

2.2 Climate and Weather

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 per cent. The average rainfalls in this area are around 1013.4 mm annually.

3. RESULTS AND DISCUSSION

The present investigation was carried out for "Varietal evaluation of chrysanthemum (*Dendranthema grandiflora* L.) Under Prayagraj agro-climatic conditions" was made to To find out best performing variety of Chrysanthemum in terms of flowering and yield, and to estimate the economics of different varieties. For this purpose, 20 cultivar were laid out in Randomized block Design (RBD) with three replications. The Varieties are Poornima white, Scent white, White

Table 1. Mean Performance of Plant height

S. No.	Varieties	30DAP	60DAP	90DAP
1	Poornima white	16.8	30.4	48.8
2	Scent white	21.13	34	49.33
3	White cotton ball	21.73	40	69.8
4	Diamond	30.93	45.66	55.8
5	Apsara	21.53	39.13	66.86
6	Poornima yellow	18.6	33.93	55.66
7	Aishwarya-1	19.26	34.73	48.46
8	Aishwarya-2	14.8	34.73	40.73
9	Scent yellow	21.46	36.06	48.4
10	Navneet yellow	17.6	35.6	39.2
11	Bronze red	19.2	31.6	37.86
12	Ice berg	22.66	38.46	50.26
13	Rani	22.13	44.73	62.06
14	Dongigar	20.13	36.33	42.2
15	Tinkerbel	22.26	41.8	55.73
16	Pompom	25.33	53.67	67.66
17	Flood	17.4	43.87	64.46
18	Nanako	13.46	27.8	39.4
F-TEST		S	S	S
C.D(5%)		7.22	9.8	12.2
CV		21.39	15.58	14.04
SE(d)		3.55	4.82	6

Table 2. Mean Performance of different varieties of Chrysanthemum

S. No	Varieties	No. of days to emaergence of flower bud initiation	Days to 50% flowering	Flower Diameter	Duration of flowering
1	Poornima white	67.53	93.26	4.94	63.53
2	Scent white	64	91.66	5.45	67.46
3	White cotton ball	66.66	90.73	7.86	68.4
4	Diamond	48	88.4	4.43	73
5	Apsara	65.6	89.06	7.06	67.6
6	Poornima yellow	67.46	91.8	5.34	65.73
7	Aishwarya-1	52.86	84.46	5.92	66.8
8	Aishwarya-2	51.4	86.4	6.99	65.2
9	Scent yellow	51.26	85.8	5.02	66.13
10	Navneet yellow	54.13	81.06	2.96	57.4
11	Bronze red	51.93	76.86	4.23	52.6
12	Ice berg	59.2	87.46	4.94	63.13
13	Rani	60.66	88.33	4.06	70.26
14	Dongigar	48.4	80.86	5.99	57.8
15	Tinkerbel	59.66	83.93	2.44	74.4
16	Pompom	57.33	87.73	4.13	63.13
17	Flood	64.46	90.53	6.96	69.4
18	Nanako	62.26	93	4.2	70.26
F-TEST		S	S	S	S
C.D(5%)		5.41	1.49	0.17	1.13
CV		5.57	1.03	2.00	1.04
SE(d)		2.66	0.73	0.08	0.55

Table 3. Mean Performance of different varieties of chrysanthemum

S. No	Varieties	No. of flowers per plant	Weight of 1 flower(gm)	Yield of flower per plant(gm)	Flower yield(t/ha)	Shelf life(days)
1	Poornima white	38.66	2.94	113.28	10.19	6
2	Scent white	35.2	3.12	109.62	9.86	6.33
3	White cotton ball	32.33	6.92	223.22	20.08	8,66
4	Diamond	45.4	2.62	118.93	10.69	7.33
5	Apsara	42.06	6.38	268.29	24.14	8
6	Poornima yellow	29.6	3.38	99.95	8.98	9
7	Aishwarya-1	22.93	4.073	93.40	8.4	6.33
8	Aishwarya-2	24.66	5.82	143.05	12.87	6.33
9	Scent yellow	37.4	3.08	113.38	10.2	6.66
10	Navneet yellow	60.86	1.76	107.54	9.67	7
11	Bronze red	29.8	2.45	73.19	6.58	5.66
12	Ice berg	32.4	3.05	100.93	9.07	7.33
13	Rani	49.13	3.98	196.07	17.64	9.66
14	Dongigar	23.46	4.213	98.14	8.83	6.66
15	Tinkerbel	44.33	1.72	76.28	6.86	10.33
16	Pompom	48.06	3.98	192.82	17.34	7.66
17	Flood	33.53	6.07	203.41	18.30	9.33
18	Nanako	61.13	2.48	151.55	13.63	7.66
F-TEST		S	S	S	S	S
C.D(5%)		6.37	0.08	23.33	2.09	1.96
CV		10	1.4	10.19	10.18	15.7
SE(d)		3.13	0.04	11.48	1.03	0.96

Table 4. Gross Return, Net Return, Benefit Cost Ratio

Varieties	Yield(t/ha)	Selling price/t(Rs)	Gross return(Rs)	Total cost(Rs)	Net return(Rs)	Benefit cost ratio
Poornima white	10.16	30000	305700	187922.5	117777.5	0.62
Scent white	9.86	30000	295800	187922.5	107877.5	0.57
White cotton ball	20.08	30000	602400	187922.5	414477.4	2.2
Diamond	10.69	30000	320700	187922.5	132777.5	0.7
Apsara	24.14	30000	724200	187922.5	536277.5	2.85
Poornima yellow	8.98	30000	269400	187922.5	81477.5	0.43
Aishwarya-1	8.4	30000	252000	187922.5	64077.5	0.34
Aishwarya-2	12.87	30000	386100	187922.5	198177.5	1.05
Scent yellow	10.2	30000	306000	187922.5	118077.5	0.62
Navneet yellow	9.67	30000	290100	187922.5	102177.5	0.54
Bronze red	6.58	30000	197400	187922.5	9477.5	0.05
Ice berg	9.07	30000	272100	187922.5	84177.5	0.44
Rani	17.64	30000	529200	187922.5	341277.5	1.81
Dongigar	8.83	30000	264900	187922.5	76977.5	0.4
Tinkerbel	6.86	30000	205800	187922.5	17877.5	0.09
Pompom	17.34	30000	520200	187922.5	332277.5	1.76
Flood	18.3	30000	549000	187922.5	361077.5	1.92
Nanako	13.63	30000	408900	187922.5	220977.5	1.17

cotton ball, Diamond, Apsara, Poornima yellow, Aishwarya-1, Aishwarya-2, Scent yellow, Navneet yellow, Bronze red, Ice berg, Fantasy, Hemant sagar, Rani, Dongigar, Tinkerbel, Pompom, Flood, Nanako. These varieties of chrysanthemum were planted during rabi 2022-23. In present experiment data were recorded for various characters, viz., (A) Growth parameter: Plant height (cm) 30, 60, 90 DAP, (B) Floral parameter: Number of days for emergence of flower initiation, Days to 50% flowering, Number of flowers per plant, Weight of 1 flower, Flower form, Flower diameter, Shelf life, Duration of flowering, Flower colour (C) Yield parameters: Number of flowers per plant, Yield of flower per plant, Total yield(t/ha) (D) Economic parameters: Cost of cultivation, Gross return, Net return, Benefit cost ratio. The results of the present work are presented under following headings.

Significant at 5% level of significance indicating presence of good amount of variability among the treatments for these characters. This indicated ample scope for varietal selection in freesia. Replications were non-significant for all the characters indicating good homogeneity among replications. This suggests that there is an ample scope to identify suitable variety to improve varietal performance in chrysanthemum.

Among the above mentioned 20 varieties, Apsara, White cotton ball, Rani, Flood and Pompom are best suitable varieties under Prayagraj Agro-climatic conditions.

4. CONCLUSION

From the above experiment it may be concluded that in terms of yield ; Apsara , White cotton ball, Flood, Pompom and Rani was found to be best suited varieties under Prayagraj agro-climatic condition. In terms of vase life Tinkerbel and Rani was found to be best variety. In terms of Benefit Cost Ratio Apsara and White cotton ball was found to be best variety i.e, gives the high return.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Beeralingappa. Morphological Characteriz-ation of Chrysanthemum genotypes under Central Dry Zone of Karnataka., M.Sc. (Horti) thesis, University of Agricultural and Horticultural Sciences, Shivamogga (India). 2016;45-74.
2. Kher MA. Chrysanthemum in India. New Delhi, Associated Publishing Company. 1988;4.
3. Kumar A. Evaluation of chrysanthemum varieties for loose flower production in Chhattisgarh plains. M. Sc. Thesis, IGKV, Raipur. 2011;132-155.
4. Swaroop K, Prasad KV, Raju DVS. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) germplasm in winter season under Delhi condition. J Orna. Hort 2008;11(1):58 -61.
5. Kumar R, Prasad VM, Singh D. Varietal evaluation of chrysanthemum (*Dendranthema grandiflora* L.) under Prayagraj agro-climatic conditions. The Pharm Innov J. 2021;10(12):245-8.
6. Srilatha V, Sunil KK, Deepthi KY. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) varieties in southern zone of Andhra Pradesh. Agric. Sci. Digest. 2015;35 (2):155-157.
7. Suvija NV, Kannan M, Suresh J, Subesh RK. Evaluation of chrysanthemum (Chrysanthemum morifolium Ramat) genotypes for loose flower, cut flower and pot mums. Inter. J Innov. Res. And Adv. Studies 2016;3(4):100-10.
8. Bhattacharjee SK, De LC. Dried flowers and plant parts. Advanced commercial floriculture. 2003;162:173.
9. Jamal 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;4(1):40-51.
DOI: 10.18801/jbar.040115.41.
10. Prakash A, Kumar M, Kumar A, Gupta A, Badal DS. 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.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/104765