Original Research Article

VARIETAL EVALUATION OF CHRYSANTHEMUM (*Dendranthema grandiflora* T.) UNDER OPEN FIELD CONDITIONS OF PRAYAGRAJ

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 significantly more plant spread was found in the variety Iceberg (43.0 cm) and significantly more flower weight was recorded in the variety Cream White (8.7 g). The variety Aishwarya-2 performed significantly better in most of the parameters like number of primary branches (6 branches), earliness in flowering (39 days), duration of flowering (76 days), flower yield per plant (172.12 g/plant).

Keywords: Chrysanthemum, variety, significant, open field.

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. The basic chromosome number of chrysanthemum is 9, while 2n ranges from 36 to 75 though most of them are hexaploid. It is the national flower of Japan. It is commonly called as “Queen of the East”, “Autumn Queen”, “Guldaudi” in India and “Mum” in America. The word chrysanthemum is derived from the Greek word “chryos” means gold and “anthemon” or “anthos” means flower **(Negi *et al.,* 2019).**

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 APEDA)**.

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 **(Uddin *et al.,* 2015)**. 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. **(Prakash *et al.,* 2018)**. 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. **(Thakur *et al.,* 2018)**.

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 **(Madhumathi *et al.,* 2018)**. Chrysanthemum inflorescences consist of central hermaphrodite disc florets (pistillate + staminate) and marginal ray florets (pistillate). The species of *Chrysanthemum* are herbaceous perennial plants, growing to 50–150 centimeters tall, with deeply lobed leaves and large flower heads, which are white, yellow, or pink in the wild species **(Roopa *et al.,* 2018)**.

2. MATERIAL AND METHODS / EXPERIMENTAL DETAILS / METHODOLOGY

2.1 Experimental site

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.

2.2 Geographical location of the site

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

2.3 Planting material

For this experiment, a total of 15 chrysanthemum varieties were used. The varieties used in this experiment were:

i. Aishwarya-1
ii. Aishwarya-2
iii. Branz Red
iv. Cream White
v. Donzigar
vi. Fantasy
vii. Iceberg
viii. Lility
ix. Panchu
x. Peet
xi. Poornima White
xii. Poornima Yellow
xiii. Scent White
xiv. Scent Yellow
xv. Tinkerbel

2.4 Experimental details

Name of the crop : Chrysanthemum

Scientific name	:	*Dendranthema grandiflora*
Family	:	Asteraceae
Experimental design	:	Randomized Block Design (RBD)
Number of varieties	:	15
Number of replications	:	3

Varieties	Plant height (cm)	Plant spread (cm)	Number of primary branches

Month of planting	:	September
Spacing	:	30 cm × 30 cm

3. RESULTS AND DISCUSSION

3.1 Vegetative parameters

Significantly, the maximum plant height was recorded in variety Tinkerbel (37.8 cm), which is found to be at par with variety Poornima Yellow (34.8 cm), followed by variety Scent White (30.4 cm). While, minimum plant height was recorded 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.*, (2017) and Archana *et al.*, (2019).** Significantly, the maximum plant spread was found in variety Iceberg (43.0 cm), which is found to be at par with the variety Tinkerbel (38.4 cm), followed by the variety Aishwarya-2 (37.4 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 in the varieties thereby increasing the plant spread. Similar results were recorded in chrysanthemum by **Madhu Bala (2015) and Henny *et al.*, (2021).** Significantly, maximum number of primary branches were found in variety Aishwarya-2 (6 branches), which is found to be at par with variety Scent Yellow (5 branches), followed by variety Aishwarya-1 (4 branches). While, minimum 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

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
	SEd (±)	2.97	2.36	0.82
	$CD_{0.05}$	6.08	4.83	1.68

results were recorded in chrysanthemum by **Parmar *et al.,* (2019).** The statistically analysed data was presented in table no.1.

Table no. 1. Effect of different varieties of chrysanthemum on vegetative characters.

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.,* (2001)** and **Kumar *et al.,* (2020)**. Significantly, maximum flower weight was recorded in the variety Cream White (8.7 g), which is found to be par with the variety Aishwarya-1 (8.2 g), followed by the variety Aishwarya-2 (7.7 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.,* (2001)** and **Patil *et al.,* (2017)**. Significantly, maximum flower yield per plant was recorded in the variety Aishwarya-2 (172.12 g), which is found to be par with the variety Cream White (141.84 g), followed by the variety Aishwarya-1 (85.85 g). While, minimum flower yield per plant 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 and genetic makeup of the varieties. Similar results were recorded in chrysanthemum by **Singh *et al.,* (2017)** and **Chawla *et al.,* (2021)**. Significantly, maximum duration of flowering was recorded in the variety Aishwarya-2 (76 days), which is found to be par with the variety Scent Yellow (73.0 days), followed by the variety BranzRred (71 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, habitat type and genetic makeup of the varieties. Similar results were recorded in chrysanthemum by **Balaji *et al.,* (2004)** and **Srilatha *et al.,* (2015).** The statistically analysed data was presented in table no.2.

Table no. 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
	SEd (±)	2.86	6.11	0.95	2.59
	$CD_{0.05}$	5.83	12.49	1.95	5.29

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.

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