



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.23

TPI 2021; 10(12): 280-282

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www.thepharmajournal.com

Received: 15-10-2021

Accepted: 29-11-2021

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Performance of standard chrysanthemum (*Dendranthema grandiflora* Tzvelev.) cultivars for growth and post-harvest life under Malwa region of M.P.

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Abstract

The present investigation was conducted during 2019-2020 under the shade net house, of Department of Floriculture and Landscape Architecture, College of Horticulture, Mandsaur, RVSKVV, Gwalior (M.P.). The experiment was comprised of eight cultivars (Coffee, Hybrid-1, Hybrid-2, Mountaineer, Star White, Star Yellow, Tata Century and Thai Chen Queen) laid out in a Completely Randomized Design (CRD) with three replication. Study revealed that the cultivars showed significant difference with respect to growth and post harvest life parameters. Among the standard cultivars studied the cultivar Star Yellow showed best performance with respect to plant height at 30 and 60 DAT and plant spread at 30 DAT, while maximum plant spread (at 60 DAT), number of leaves (at 60 DAT), number of leaves per plant at 60 DAT, vase life, maximum fresh weight of flowers at harvest, and fresh weight of flowers at senescence was recorded with Thai Chen Queen. On the other hand cultivar maximum number of leaves per plant at 30 DAT was noticed in the cultivar Star White. However, the minimum plant height (at 30 and 60 DAT), plant spread (30 DAT and 60 DAT), number of leaves per plant (at 60 DAT), vase-life, fresh weight of flower at harvest and fresh weight of flower at senescence was found in cv. Hybrid-1.

Keywords: Chrysanthemum cultivar, CRD, growth and post harvest parameters

Introduction

Chrysanthemum is one of the most beautiful flowering plant referred as “Queen of the East” and “Autumn flower”, while, in India it is called Guldaudi. It belongs to family Asteraceae, botanically known as *Dendranthema grandiflora* Tzelev and chromosome number is $n = 9$ and $2n = 36, 45, 47, 51, \text{ and } 75$, native of China. Chrysanthemum is the national flower of Japan. The species of chrysanthemum have fibrous root system (shallow rooted plant), herbaceous perennial plant growing to 50-150 cm tall, with deeply lobed leaves and large flower heads like white, yellow or pink (Singh, 2006) [10].

It is one of the leading commercial flowers, having important once as a cut flower and lose flower as well as pot plant. Spray type chrysanthemum ranks second after rose while, Standard type chrysanthemum stands seventh in term of consumption (NHB, 2019) [1]. In Madhya Pradesh, chrysanthemum is cultivated on an area of 1145.82 ha, with a production of 14316.85 metric tons and productivity of 12.49 metric tons of loose and cut flowers (Anonymous, 2020) [2]. Its commercial cultivation is being done in states like Maharashtra, Rajasthan, Madhya Pradesh, Bihar and Delhi. Chrysanthemums are mainly classified under two categories: Large flowered (standard type) and small flowered (spray type). Large flowered chrysanthemums which produce lengthy, strong stems and good vase-life quality while small flowered are frequently grown for loose flower and are categorized into 10 groups. The standard type flowers fetch higher prices though their share in export market but Spray types i.e. smaller flower size and are major share in the world market (Siddiqua *et al.* 2017) [9].

Materials and Methods

The present investigation was conducted during the year 2019-2020 in shade net house, Department of Floriculture and Landscape Architecture, College of Horticulture, Mandsaur, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior (M.P.). The experiment was laid out in a Completely Randomized Design (CRD) with three replications and eight cultivars namely Coffee, Hybrid-1, Hybrid-2, Mountaineer, Star White, Star Yellow, Tata Century, and Thai Chen Queen.

The pots were filled by the medium (Soil: Sand: FYM - 1:1:1) @ 5 kg/ pot and uniform sized thirty days healthy rooted cuttings with 3-4 fresh leaves were planted in pots and were kept under shade net house. Five plants were tagged from each replication for carrying out evaluation study. The data on growth and post harvest life parameters were recorded and statistically analyzed.

Results and Discussion

The data presented in the Table 1 revealed that standard chrysanthemum varieties statistically significant for all characters under study.

The maximum height of plant at 30 DAT (38.60 cm) and 60 DAT (78.33 cm) was recorded with cultivar Star Yellow followed by Thai Chen Queen and Star White. The lowest height of plant at 30 DAT (29.20 cm) was recorded with cultivar Hybrid-1, while at 60 DAT with cultivar Hybrid-1 (56.67 cm).

The variation in plant height among the various genotypes might be due to varietal character and the similar results were reported by Madam *et al.* (2016) [5] and Suvija *et al.* (2016) [13]. This could be due to genetic constituents of genetic variability and agro-climatic conditions. These results are confirmed by Singh *et al.* (2017) [11] and Parmar *et al.* (2019) [6]. The maximum plant spread at 30 DAT was found in cultivar Star Yellow (12.17 cm) followed by cultivar Star White (11.40 cm) and Thai Chen Queen (10.53 cm) while at 60 DAT maximum plant spread was observed with cultivar Thai Chen Queen (18.43 cm). The minimum plant spread at 30 DAT (8.53 cm) was recorded with cultivar Hybrid-1, while at 60 DAT (15.07 cm) was recorded in cultivar Hybrid-1. The variation in plant spread may be due to genetic nature of the plant. Similar results were also obtained by Suvija *et al.* (2016) [13], Singh *et al.* (2017) [11] and Parmar *et al.* (2019) [6].

The significantly maximum number of leaves at 30 DAT was recorded in cultivar Star White (24.33) followed by with cv. Star Yellow (22.20) and Thai Chen Queen (22.13), while at 60 DAT maximum number of leaves per plant was found in cultivar Thai Chen Queen (40.07) followed by cultivar Star White (39.27). The minimum number of leaves per plant at 30

DAT was recorded in cv. Hybrid-2 (15.47), while at 60 DAT was recorded in cultivar Hybrid-1 (29.87). The variation in number of leaves may be due to genetic character of genotypes. These results were advocated by Vetrivel and Jawaharlal (2014) [14].

The maximum vase life (27.00 days) was recorded with cultivar Thai Chen Queen, which was at par with cultivar Star Yellow (24.83 days), Star White (23.00 days) and Tata Century (22.17 days). While, the minimum vase life was recorded with cultivar Hybrid-1 (18.67 days). The variation in vase life might be due to differences among the cultivars and may be an inherent trait and stem plugging due to microorganisms. Similar results were also observed by Baskaran *et al.* (2010).

This might be due to the differences in senescencing behavior of the cultivars by producing higher amount of ACC ethylene forming enzymes and ethylene and genetic makeup. The above results are corroborated with the findings of Reddy *et al.* (2016) [8], Kumar and Polara (2017) [4], Siddiqua *et al.* (2017) [9], and Singh *et al.* (2017) [12].

The significantly maximum fresh weight of flowers at harvest was recorded in cultivar Thai Chen Queen (35.33 g) as compared to other cultivars. The minimum fresh weight of flowers at harvest (13.00 g) was recorded in cv. Hybrid-1. The variation in fresh weight of flowers at harvest might be due to mainly dependent upon the size of the flower head in the varieties, it may be attributed to the inherent characters of the individual cultivars and environmental factors. The similar variation in fresh weight of flowers at harvest was also noticed by Baskaran *et al.* (2010) and Patil *et al.* (2017) [17].

The maximum fresh weight of flowers at senescence (8.18 g) was recorded with Cultivar Thai Chen Queen followed by cultivar Star White (7.52 g), however the minimum fresh weight of flowers at senescence was found in cv. Hybrid-1 (3.12 g). The variation in fresh weight of flowers at senescence might be due to water loss due to decline in uptake of water coupled with transpiration leads to water deficit, which ultimately reduces turgidity in cut flower. The similar variation in fresh weight of flowers at senescence was also noticed by Baskaran *et al.* (2010).

Table 1: Performance of chrysanthemum cultivars for growth and post-harvest life parameters

Parameters Cultivar	Plant height (cm) at 30 days	Plant height (cm) at 60 days	Plant spread (cm) at 30 days	Plant spread (cm) at 60 days	Number of leaves per plant @ 30 days	Number of leaves per plant @ 60 days	Vase life of flowers (days)	Fresh weight (g) of flowers at harvest	Fresh weight (g) of flowers at senescence
Coffee	30.33	57.87	10.13	17.13	19.20	37.33	20.00	20.33	5.28
Hybrid-1	29.20	56.67	8.53	15.07	16.53	29.87	18.67	13.00	3.12
Hybrid-2	32.47	57.40	9.43	16.33	15.47	33.07	19.67	15.00	3.62
Mountaineer	33.13	61.53	10.23	16.87	19.60	36.53	21.10	17.50	4.02
Star White	35.07	61.60	11.40	17.50	24.33	39.27	23.00	30.83	7.52
Star Yellow	38.60	78.33	12.17	18.17	22.20	38.67	24.83	27.02	6.48
Tata Century	34.13	61.87	10.20	17.50	20.80	38.47	22.17	24.00	6.10
Thai Chen Queen	35.40	64.73	10.53	18.43	22.13	40.07	27.00	35.33	8.18
CD	3.88	7.16	1.89	1.94	4.59	3.62	2.52	3.76	0.80
S.Em.	1.29	2.39	0.63	0.65	1.53	1.21	0.84	1.25	0.27

Conclusion

In the present study, the different varieties show the significant variation with respect of most of the parameters.

Among the cultivar Star Yellow show the best performance with respect of plant height at 30 DAT, plant height at 60 DAT and plant spread at 30 DAT. The cultivar Thai Chen Queen show the best results with respect of plant spread at 60

DAT, number of leaves at 60 DAT, vase life and fresh weight of flower at harvest and at senescence, however cultivar Star White showed the best results with respect of Number of leaves at 30 DAT. On the basis of the above finding it may be concluded that cultivar Star Yellow and cultivar Thai Chen Queen showed the best performance with respect of growth and flowering respectively.

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