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Performance of spray chrysanthemum cultivars (*Dendranthema grandiflora* Tzvelev.) in polyhouse conditions

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Abstract

An experiment was laid out to evaluate the growth and flowering performance of spray chrysanthemum cultivars in naturally ventilated polyhouse condition. Nine spray chrysanthemum cultivars were evaluated in the experiment. Star Pink recorded maximum plant height (104.29 cm), flower diameter (6.77 cm). Maximum leaf area per plant (1533.68 cm²), number of leaves per stem at harvest (138.25), weight of cut stem (263.39 g), number of flowers per plant (109.67) and number of flowers per square meter (1108.5) were observed in cv. Bronze Spoon. Minimum number of days (95.50) for first flower bud initiation and duration of flowering (45.75 days) was recorded by cv. Indiana. Minimum number of days for 50 per cent flowering and first flower harvest (133.50, 128.50 days), prolonged vase life of (7.50 days) in distilled water was observed in cv. Red Stone.

Keywords: Spray chrysanthemum cultivars, Growth and flower characteristics.

Introduction

Chrysanthemum is one of the most beautiful and perhaps the oldest flowering plant, commercially grown in different parts of the world. Chrysanthemum (*Dendranthema grandiflora* Tzvelev) is popular flower meaning *Chryos* – golden, *anthos* – flower, a leading flower crop grown in many parts of the world. It belongs to family Asteraceae (Composite) native to Northern Hemisphere, chiefly Europe and Asia with a few in other areas. It is one of the most beautiful flowering plant referred to as “Queen of the East” and “Autumn flower”. The present number of varieties in the world is about 2000 and in India there are about 1000 varieties (Datta and Bhattacharjee, 2001) [3]. In International cut flower trade, chrysanthemum ranks next to rose (Bhattacharjee and De, 2003) [2].

The chrysanthemum has been recognized in India as one among the five important commercially potential flower crops by the All India Coordinated Floriculture Improvement Project (ICAR) and is most important flower grown on commercial scale. 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). Spray types are mostly grown for loose flower and are classified into 10 classes and have major share in the world market.

Recently the hi-tech units are also venturing for cultivation under greenhouse conditions. Today with the advancement of technology like using the greenhouse for climate control and with the arrival of foreign collaborations with expertise and resources, chrysanthemum cultivation is all set to go hi- tech. At present in India, growing chrysanthemum using the modern methods to alter photoperiod mechanism is at nascent stage with most of the growers concentrated in Bangalore, Pune, Delhi, Calcutta and Yercaud but more and more entrepreneurs are now preparing to take up chrysanthemum cultivation in polyhouse.

Materials and Methods

The experiment was conducted in naturally ventilated polyhouse at Horticultural college and research institute, located at Anantharajupeta, Kadapa district, Andhra Pradesh during the period October 2015 – March 2016. The experimental material consisted of nine spray cultivars of chrysanthemum such as Terry – anemone, White Dolly – anemone, Yellow Spoon – spoon, Red Stone – decorative, Star Pink – decorative, Bronze Spoon – spoon, Paper

White – decorative, Kelvin Victory – Pompon and Indiana – pompon. The experiment was laid out in Randomized block design (RBD) with four replications. Five plants were randomly selected from each replication for carrying out performance studies. All the recommended practices were followed. The data on various vegetative characters and floral characters were recorded and statistically analysed.

Results and Discussion

The data recorded on growth and flowering parameters presented in Table 1 and 2 revealed significant variations among the spray chrysanthemum cultivars. Among the nine spray cultivars cv. Star Pink recorded maximum plant height (104.29 cm) followed by cv. Yellow Spoon (92.59 cm) whereas minimum (69.86 cm) in cv. Paper White. Shanker

and Tiwari (1993) [16] suggested that plant height is an important criterion for selecting chrysanthemum cultivars. Manohar Rao and Pratap (2006) [9] reported that taller plants are generally preferred for cut flower production, whereas medium to short plants are more suitable for high density planting and pot culture in chrysanthemum.

Maximum number of leaves at harvest per stem (138.25) was observed in cv. Bronze Spoon followed by cv. Terry (125), cv. Paper White (123.75) whereas cv. Kelvin Victory recorded minimum number of leaves per stem at harvest (94). Vetrivel and Jawaharlal (2014) [19] reported that leaves are functioning units for photosynthesis on which growth and flower yield depend greatly. These findings were previously quoted by Meera *et al.* (2003) [10] in gerbera.

Table 1: Performance of spray chrysanthemum cultivars for vegetative parameters in polyhouse conditions.

Cultivars	Plant height at harvest	Number of leaves per stem at harvest	Total leaf area per plant (cm ²)	No. of days taken to first flower bud initiation	Number of days taken to first flower harvest
Terry	88.50	125.00	1030.48	113.75	142.84
White Dolly	83.12	110.25	959.05	110.50	145.45
Yellow Spoon	92.59	112.25	1289.15	118.50	147.91
Red Stone	92.44	106.75	847.10	105.25	128.50
Star Pink	104.29	115.50	1474.95	108.50	138.50
Bronze Spoon	74.79	138.25	1533.68	108.00	141.75
Paper White	69.86	123.75	823.00	105.00	136.50
Kelvin Victory	78.75	94.00	691.89	108.75	146.50
Indiana	73.72	112.75	1009.83	95.50	130.32
S.E m±	1.04	2.50	3.16	3.29	1.09
CD (P=0.05)	3.02	7.30	9.23	9.59	3.19

The cv. Bronze found superior for total leaf area per plant (1533.68 cm²) whereas cv. Kelvin Victory found inferior (691.89 cm²). Higher leaf area in the cultivars was due to the increased number of leaves and their size as reported by Punetha *et al.* (2011) [14] in chrysanthemum. Variation in leaf area indicates additive gene effects as showed by Nair and Shiva (2003) [12] in gerbera.

Indiana took minimum number of days (95.50) for first flower

bud initiation followed by cv. Paper White (105 days), cv. Red Stone (105.25 days) whereas cv. Yellow Spoon took maximum number of days (118.50) to first flower bud initiation. Variation for late or early flowering seems to be genetically controlled characters in the varieties as stated by Behera *et al.* (2002) in chrysanthemum and similar observations were reported by Rao and Sushma (2014) [15], Kumar *et al.* (2015) [7, 17], Jamal *et al.* (2015) [4], Yadav *et al.* (2014) [20] in chrysanthemum.

Table 2. Performance of standard chrysanthemum cultivars for flowering parameters in polyhouse conditions

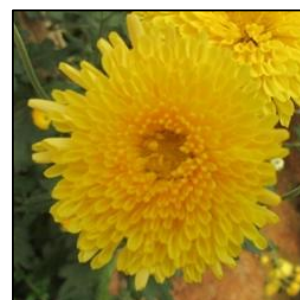
Cultivars	Stalk length (cm)	Flower diameter (cm)	Duration of flowering (days)	Weight of cut stem (g)	Vase life (days)
Terry	82.26	3.73	21.75	235.22	5.00
White Dolly	84.72	5.38	19.75	114.50	6.25
Yellow Spoon	94.63	4.56	36.50	215.51	4.00
Red Stone	81.55	6.42	32.75	111.61	7.50
Star Pink	86.14	6.77	23.25	244.15	5.25
Bronze Spoon	79.71	5.17	31.00	269.39	5.50
Paper White	57.56	5.55	20.25	189.13	5.00
Kelvin Victory	73.97	3.57	25.50	129.02	4.50
Indiana	60.83	3.32	45.75	139.02	5.50
S.E m±	2.08	0.12	1.14	3.10	0.11
CD (P=0.05)	6.08	0.36	3.32	9.06	0.23



Terry



White Dolly



Yellow Spoon



Red Stone



Star Pink



Bronze Spoon



Paper White



Kelvin Victory



Indiana

Minimum (128.50) number of days to first harvest was shown by cv. Red Stone followed by cv. Indiana (130.32 days) and they were statistically on par with each other whereas cv. Yellow Spoon took maximum number of days (147.91) to reach first harvest. The cultivar which is recorded early bloom will also reaches early to harvest and the number of days taken to first harvest is depends upon varietal character was reported by Peddi Laxmi *et al.* (2008) ^[13], Swaroop *et al.* (2008) ^[18] in chrysanthemum.

The cv. Yellow Spoon recorded maximum stalk length (94.63 cm) followed by cv. Star Pink (86.14 cm) while minimum stalk length (57.56 cm) was recorded in cv. Paper White. It was observed that the cultivars with higher plant height produced the longer flower stalk as compared to cultivars with smaller plant as stated by Jamal *et al.* (2015) ^[4] in chrysanthemum.

The cv. Star Pink recorded maximum flower diameter (6.77 cm) followed by cv. Red Stone (6.42 cm) and they were statistically on par with each other but found significantly superior over other cultivars whereas cv. Indiana recorded minimum flower diameter (3.32 cm). The variation in flower diameter might be due to the genetic makeup of the varieties and their interaction with prevailing genotype and environment by Punetha *et al.*, (2011) ^[14] in chrysanthemum.

Indiana recorded maximum duration of flowering (45.75 days) followed by cv. Yellow Spoon (36.50 days) while minimum (19.75 days) was recorded by cv. White Dolly. The variation in flowering duration among the varieties was attributed to genotype of the plant, environmental influence and other management factors as reported by Srilatha *et al.* (2015) ^[2] in chrysanthemum.

Maximum weight of cut stem (269.39 g) was noted by cv. Bronze Spoon followed by cv. Star Pink (244.15 g) whereas cv. Red Stone recorded minimum (111.61 g) weight of cut stem. Joshi *et al.* (1997) ^[5], Mahawer *et al.* (2010) ^[8], Kumar and Yadav (2005) ^[7] in gerbera reported the variation in flower weight might be due to different genetic makeup of the different cultivars.

The cv. Red Stone lasts longer (7.50 days) with distilled water followed by cv. White Dolly (6.25 days) whereas minimum (4.00 days) was recorded by cv. Yellow Spoon. The variations in vase life may be due to the different accumulation of carbohydrates due to varied leaf production and sensitivity of cultivars to ethylene and turn variations in these aspects might be due to genetical makeup of genotypes was reported by Vetrivel and Jawaharlal (2014) ^[19] in chrysanthemum.

References

1. Behera TK, Sirohi PS, Anand Pal. Assessment of chrysanthemum germplasm for commercial cultivation under Delhi conditions. *J Ornamental Hort.* 2002; 5(2):11-14.
2. Bhattacharjee SK, De LC. Floriculture industry in India. *Advanced commercial floriculture chrysanthemum*, 2003, 1.
3. Datta SK, Bhattacharjee SK. *Chrysanthemum*. All India Coordinated Research Project on Floriculture. Indian Council of Agricultural Research, 2001.
4. Jamal Uddin AFM, 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.
5. Joshi RP, Mishra YK, Solanki SS. Performance of dahlia cultivars under U.P. hill conditions. *Prog. Hort.* 1997, 29:175-78.
6. Kumar A, Dubey P, Patanwar M, Sharma R. Evaluation of chrysanthemum varieties for loose flower production in Chhattisgarh plains. *Trends in Biosciences.* 2015; 8(1):175-177.
7. Kumar R, Yadav DS. Evaluation of gerbera (*Gerbera jamesonii* Bolus ex Hooker F.) cultivars under sub-tropical hills of Meghalaya. *J Orn. Hort.* 2005; 8:212-15.
8. Mahawer LN, Lalan Kumar, Shukla AK, Bairwa HL. Evaluation of dahlia cultivars under Aravalli hill conditions of Udaipur. *Indian J Hort.* 2010; 67(2):234-237.

9. Manohar Rao A, Pratap M. Evaluation of varieties and variability studies in chrysanthemum (*Dendranthema grandiflora* Tzvelev.) Journal of Ornamental Horticulture. 2006; 9(2):221-223.
10. Meera Manjusha AV, Patil VS, Dalis Mathews. Evaluation of gerbera genotypes. Indian Soc. of Ornamental Hort, 2003, 12-14.
11. Naik HB, Chauhan N, Patil AA, Patil VS, Patil BC. Comparative performance of gerbera (*Gerbera jamesonii* Bolus ex Hooker F.) cultivars under naturally ventilated polyhouse. Journal of Ornamental Horticulture. 2006; 9(3):204-207.
12. Nair SA, Shiva KN. Genetic variability, correlation and path coefficient analysis in gerbera. J. Orn. Hort. 2003; 6(3):180-187.
13. Peddi Laxmi, Pratap M, Reddy SA. Evaluation of yellow coloured chrysanthemum (*Dendranthema grandiflora* L.) cultivars for growth, flowering and yield. Orissa Journal of Horticulture. 2008; 36(1):116-119.
14. Punetha P, Roa VK, Sharma SK. Evaluation of different chrysanthemum (*Chrysanthemum morifolium*) genotypes under mid hill conditions of Garhwal Himalaya. Indian Journal of Agricultural Sciences. 2011; 81(9):830-3.
15. Rao DK, Sushma K. Performance of chrysanthemum (*Dendranthema grandiflora*) hybrids. The J Res. PJTSAU. 2014; 42(3):58-61.
16. Shankar V, Tiwari GN. Evaluation of chrysanthemum (*Chrysanthemum morifolium*) cultivars with special reference to their morphological characters. Bioved. 1993; 4(1):53-56.
17. Srilatha V, Sunil Kumar K, Deepthi Kiran Y. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) varieties in southern zone of Andhra Pradesh. Agric. Sci. Digest. 2015; 35(2):155-157.
18. Swaroop K, Prasad KV, Raju DVS. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) germplasm in winter season under Delhi conditions. Journal of Ornamental Horticulture. 2008; 11(1):58-61.
19. Vetrivel T, Jawaharlal M. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) varieties for yield and quality under subtropical hills. Trends in Biosciences. 2014; 7(14):1812-1815.
20. Yadav A, Sharma G, Dubey P. Flowering attributes of chrysanthemum varieties for loose flower production. Progressive Horticulture. 2014; 46(1):168-170.