

Original Research Article

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Performance Testing of New Chrysanthemum (*Dendranthema grandiflora* Tzvelev) Genotypes for Loose Flower and Pot Culture Production

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ABSTRACT

Keywords

Chrysanthemum, Genotypes, Loose flower, Pot culture

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An experiment was conducted to evaluate the performance of fifteen (15) new chrysanthemum genotypes for loose flower (7) and pot culture (8) for three years (2015-16 to 2017-18) at Floricultural Research Station, SKLTSHU, Hyderabad. The results revealed that, among loose flower genotypes maximum plant height (46.75 cm) was recorded in Bidhan Madhuri and minimum (26.20 cm) in Arka Yellow Gold. Earliest in flower bud appearance (60.44 days) was noticed in HCC-2 followed by Bidhan Purna (61.55). Maximum number of flowers per plant (68.60) was observed in HCC-2 and minimum in Arka Yellow Gold (30.61). Among pot culture genotypes, maximum plant height (50.12 cm) was recorded in Pusa chitraksha and minimum (17.86 cm) in Arka Pink Star. Highest number of branches per plant (17.87) was registered in Arka Kirti and minimum (6.31) in Arka Usha Kiran. Further, maximum number of flowers per plant (226.40) was recorded in Bidhan Tarun and minimum in Pusa Adithya (97.76). From the results it can be concluded that, Bidhan Purna, Bidhan Maduri, HCC-2 are suitable for loose flower and Bidhan Tarun, HCC-2, Pusa Chitraksha, Arka Pink Star for pot culture production.

Introduction

Chrysanthemum a Asteraceae member commonly called as Queen of the East, and has become popular as commercial flower crop in all parts of the world.

It is a short day plant and has two phases in its growth cycle, long days (> 12 hours) are required for vegetative growth and short days (<12 hours) for induction and development of flowering. Thus, photoperiodic responses influence the growth and development in chrysanthemum genotypes.

The wide variation in flower colours, sizes, petal shapes and structures make it more valuable flower crop for different purposes viz. loose flower, cut flower, pot mums, garden plant etc. It is cultivated over a wide range of climatic conditions, but growth of a definite cultivar varies with environmental factors like temperature and photoperiod. The successful cultivation of chrysanthemum depends on the interaction of the cultivar with specific environment where it is growing. Every year many numbers of cultivars are introduced in chrysanthemum depending on the preferences of the farmers and consumers.

Hence, identifying the suitable cultivars for a particular region for determined purpose is very imperative in chrysanthemum. Evaluation of new genotypes for distinct environment is always necessary to study the quality traits under varying climatic conditions. In view of the above facts, present research was conducted to assess the performance of new genotypes of chrysanthemum for loose flower and pot culture under Hyderabad conditions.

Materials and Methods

The experiment was conducted at Floriculture Research Station, SKLTSHU for three years during 2015-16 to 2017-18. The experimental site comes under semi arid tropical climate with an average rainfall of 615.6 mm, located at an altitude of 542.3 above mean sea level at latitude of 17.90⁰ North and longitude of 78.23⁰ East. Seven genotypes of loose flower and eight genotypes of pot plants were evaluated in the investigation.

The loose flower experiment was carried out in Randomized Block Design with three replications with spacing of 30X40 cm and 30 plants were planted in each replication. Pot culture experiment was conducted in Completely Randomized Design with three replications. Nine inch size pots were used with standard media, each pot was planted with single plant. Uniform cultural operations were subjected to all the genotypes throughout the experimental period.

Five randomly tagged plants per replication were used for recording various observations on vegetative parameters *viz.* plant height (cm), plant spread (cm), number of branches per plant; floral parameters *viz.* day to first bud appearance, days to 50 per cent flowering, flower diameter; yield parameters *viz.* number of flowers per plant. The data recorded was statistically analysed using

OPSTAT software and the difference of means was compared at five per cent level of significance.

Results and Discussion

Mean performance of loose flower genotypes for vegetative and floral characters

The data pertaining to loose flower genotypes recorded significant differences for the traits studied is presented in the Table 1. Among the seven genotypes evaluated, the mean plant height for three years ranged from 46.75 to 26.20 cm. Maximum plant height (46.75 cm) was recorded in Bidhan Madhuri followed by Bidhan Purna (41.90 cm) without significant difference.

Whereas, minimum plant height (26.20 cm) was registered in Arka Yellow Gold. Plant growth is usually a good index of plant vigour, which may contribute towards greater productivity (Jeebit Singh *et al.*, 2019). The variation in plant height might be due to their genetic makeup of the individual genotype (Rajiv Kumar, 2014). Similar variation in plant height among genotypes was also recorded in chrysanthemum by Kim *et al.*, (2014) and Suvija *et al.*, (2016).

Days to first bud appearance ranged from 60.44 to 106.33 days. The earliest flower bud appearance (60.44 days) was noticed in HCC-2 genotype and maximum (106.33 days) was registered in Arka Yellow Gold. Remaining genotypes showed intermediate results without significant difference. Days to 50 per cent flowering were recorded maximum (120.07 days) in HCC-3 and minimum (104.96 days) in Bidhan Purna. The variation for late or early flowering seems to be genetically controlled character in genotypes and have been reported by Rao and Pratap (2006) and Roopa *et al.*, (2018).

Table.1 Mean performance of loose flower genotypes of chrysanthemum for vegetative and floral characters

S. No.	Genotype	Plant height (cm)	Days to first bud appearance (days)	Days to 50%flowering
1	Arka Yellow Gold	26.20	106.33	117.99
2	Bidhan Jayanthi	30.19	71.22	117.93
3	Bidhan Madhuri	46.75	73.58	122.67
4	Bidhan Purna	41.90	61.55	104.96
5	HCC-1	33.36	82.07	119.56
6	HCC-2	32.19	60.44	106.13
7	HCC-3	29.39	76.78	120.07
	SE (m)	3.18	5.61	3.52
	CD 5%	9.91	17.48	10.95

Table.2 Mean performance of loose flower genotypes of chrysanthemum for flower quality and yield attributes

S. No.	Genotype	Diameter of flower (cm)	No. of flowers/plant
1	Arka Yellow Gold	4.84	30.61
2	Bidhan Jayanthi	4.97	41.46
3	Bidhan Madhuri	5.41	51.24
4	Bidhan Purna	5.39	58.04
5	HCC-1	2.78	64.82
6	HCC-2	3.38	68.60
7	HCC-3	6.35	35.35
	SE (m)	0.26	5.23
	CD 5%	0.81	16.29

Table.3 Mean performance of pot culture genotypes of chrysanthemum for vegetative characters

S. No.	Genotype	Plant height (cm)	Plant spread (cm)	No of branches/plant
1	Arka kirti	41.38	40.12	17.87
2	Arka Pink Star	17.86	43.00	10.80
3	Bidhan Mum	41.34	31.00	7.78
4	Bidhan Tarun	43.77	35.63	11.40
5	HCC-2 (Check)	43.20	41.63	14.69
6	Pusa Adithya	41.74	36.34	9.78
7	Pusa Chitraksha	50.12	45.55	12.42
8	Arka Usha Kiran	30.08	29.90	6.31
	SE(m)	3.01	2.40	1.11
	CD 5%	9.11	7.27	3.35

Table.4 Mean performance of pot culture genotypes of chrysanthemum for flowering and yield characters

S. No.	Genotype	Days to first bud appearance	Diameter of flower (cm)	No. of flowers/plant
1	Arka kirti	85.89	4.86	140.78
2	Arka Pink Star	72.00	3.19	185.22
3	Bidhan Mum	78.40	3.73	78.82
4	Bidhan Tarun	81.93	4.99	226.40
5	HCC-2 (Check)	73.82	4.21	218.31
6	Pusa Adithya	70.58	4.96	97.76
7	Pusa Chitraksha	86.56	4.47	190.13
8	Arka Usha Kiran	83.96	5.58	125.63
	SE(m)	2.84	0.24	17.42
	CD 5%	8.59	0.72	52.68

Mean performance of loose flower genotypes for flower quality and yield characters

It is vivid from the table 2, flower quality and yield characters differed significantly among genotypes. The flower diameter was recorded maximum (6.35 cm) in HCC-3 followed by Bidhan Madhuri (5.41 cm) and Bidhan Purna (5.39 cm). Whereas minimum (2.78 cm) flower diameter was observed in HCC-1. Maximum number of flowers per plant (68.60) was recorded in HCC-2 which was followed by HCC-1 (64.82) and Bidhan Purna (58.04) without any significant difference. However, minimum (30.61) number of flowers per plant was registered in Arka Yellow Gold. This variation in flower number per plant might due to their genetical nature that could be influenced by the environmental conditions viz. temperature and photoperiod prevailed during experimental period as reported by Punetha *et al.*, (2011).

Mean performance of pot culture genotypes for vegetative characters

The mean data recorded for vegetative and flowering traits of pot chrysanthemums is indicated in the Table 3. The mean plant

height of three years among the eight genotypes ranged from 30.08 to 50.12 cm. The maximum plant height (50.12 cm) was recorded in Pusa Chitraksha which was on par with all genotypes except Arka Usha Kiran (30.08). Maximum plant spread (45.55 cm) was documented in Pusa Chitraksha which was on par with Arka Pink Star (43.00 cm), HCC-2 (41.63 cm) and Arka kirti (40.12 cm). Whereas, minimum plant spread (29.90 cm) was noticed in Arka Usha Kiran. Number of branches per plant was registered maximum (17.87) in Arka kirti which was on par with HCC-2 (14.69) and minimum (6.31) was observed in Arka Usha Kiran. The variation in growth parameters among the genotypes may be due to the hereditary character, as all plants were similar cultural practices under same environmental conditions. Similar results were given by Baskaran *et al.*, (2016) and Kumar *et al.*, (2007). Further, increase in plant spread corresponded with increase in number of branches per plant.

Mean performance of pot culture genotypes for flowering and yield characters

The variations in flowering and yield characters are documented in table 4. Early

flower bud appearance (70.58 days) was observed in Pusa Adithya which was on par with Arka Pink Star (72.00 days), HCC-2 (73.82 days) and Bidhan Mum (78.40 days). However, late bud appearance was noticed in Pusa Chitraksha (86.56 days). Maximum flower diameter (5.58 cm) was registered in Arka Usha Kiran which was on par with Bidhan Tarun (4.99 cm), Pusa Adithya (4.96 cm) and Arka Kirti (4.86 cm). Significantly minimum flower diameter (3.19 cm) among all genotypes was documented in Arka Pink Star.

The maximum number of flowers per plant (226.40) was recorded in Bidhan Tarun which was on par with HCC-2 (218.31), Pusa Chitraksha (190.13) and Arka Pink Star (185.22). Minimum number of flowers per plant (78.82) was noticed in Bidhan Mum. Higher yield might be due to increase in vegetative parameters which might have contributed in production of more photosynthates resulting in production of more number of flowers per plant. The present results are in accordance with the results reported by Reddy *et al.*, (2016); Palai *et al.*, (2018) and Jeebit Singh *et al.*, (2019).

In conclusion the based on the above results, it can be concluded that, among loose flower genotypes Bidhan Purna, Bidhan Maduri, HCC-2 performed well and are suitable for loose flower production in this region. Whereas, for pot culture Bidhan Tarun, HCC-2, Arka Pink Star and Pusa Chitraka are found to be best.

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