

Original Research Article

Evaluation of Different Cultivars of Chrysanthemum (*Dendranthema grandiflora* L.) Under Gird Region of Madhya Pradesh

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ABSTRACT

Keywords

Chrysanthemum,
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Design and
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Characters

The field experiment entitled “Evaluation of different cultivars of Chrysanthemum (*Dendranthema grandiflora* L.) under Gird region of Madhya Pradesh” was conducted at Research field, Department of Horticulture, School of Agriculture, ITM University Gwalior, (M.P.) during the year 2014-15. The experiment was laid out in Randomized Block Design with three replications. The experiment comprised of ten cultivars of chrysanthemum viz. Discovery, Neelima, White Prolific, PusaKesri, Pusa Centenary, Thai Chin Queen, PusaAnmol, PusaArunima, PusaAditya and PusaChittraksha. It is clear from the experimental analysis that all the vegetative characters were significantly affected by different varietal treatments. Maximum plant height (50.55 cm), number of leaves per branch (11.90), number of primary branches per plant (9.89), length of leaves (3.88cm) were recorded with PusaAditya followed by PusaKesari and PusaAnmol respectively.

Introduction

Floriculture has become a lucrative industry in many countries as a result of science based techniques and steady supply of improved plant material. Total value of different floricultural products at wholesale level has been estimated to be over 50 billion US\$ from about 2 million hectare area in the world. Indian floriculture industry is also fast becoming aware of the importance of offering products as per the wishes of consumers. India is known for growing of traditional flowers such as marigold, jasmine, tuberose, chrysanthemum, rose, carnation, gladiolus, gerbera etc. Chrysanthemum (*Dendranthema grandiflora* L.) is one of the

most important flower crops commercially grown in different parts of India. It is commonly known as Guldaudi, Autumn Queen or Queen of the East belonging to family Asteraceae. It is the native to the northern hemisphere chiefly Europe and Asia. The wide variation exhibited by large number of genotype makes it conceivable for flower crop. 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 (Pleog and Heuvelink *et al.*, 2006). The factors accounting for variation in growth and yield of crop plants are of very complex nature. The growth and yield are known to be influenced by the

environment and the genetic potential to a great extent. The former is controllable to some extent through cultural practices while the later is governed by the heredity. However, the genetic makeup of any crop can be exploited only when they are subjected to favorable environmental conditions. Therefore, in any crop plant, information on genetic characters particularly which those contribute to economic characters would be very useful in planning breeding programme leading to effective selection. Various bio-metrical techniques have been developed to know the genetic architecture of quantitative characters. There was no comprehensive report on evaluation of Chrysanthemum cultivars for vegetative and flora parameter under agro climatic condition of Gwalior, hence the present study was undertaken to study the performance of different Chrysanthemum cultivars under Gwalior region.

Materials and Methods

The present research work was conducted at Research field, Department of Horticulture, School of Agriculture, ITM University Gwalior (M.P.) during the winter season of 2014-15. The experiment comprises of twelve different varieties of dahlia tested under Gwalior condition. The soil type of experimental field was sandy loam in nature. The experiment was laid out in Randomized Block Design with three replications All the agronomic practices wear practiced as per recommended except the variety wise planting material used as per treatment. The experiment field was ploughed thrice with the help of disc harrow followed by leveling. Then plots of 0.90 X 1.50 m were prepared and 2 kg of well rotten FYM plot⁻¹ was added and mixed thoroughly in the soil. Nitrogen, Phosphorus and Potash applied 30g, 60, and 17g plot⁻¹ respectively. These nutrients supplied by Urea, Di- ammonium

phosphate (DAP) and Muriate of Potash (MOP). Some amount of nitrogen was supplied by Di-ammonium phosphate (DAP) and remaining nitrogen was applied through urea as top dressing at 30 days after sowing. The different morphological character were observed, recorded and analyzed as per recommended procedure to find out the result of present investigation.

Results and Discussions

The observation on the plant growth, phenological parameters flowering character and yield which were recorded have been tabulated, statistically computed and the same are presented here under the appropriate headings.

Plant height (cm)

The date recorded on plant height at harvest was statically analyzed and presented in (Table 1). The plant height (cm) of chrysanthemum was significantly influenced by different cultivars. The maximum plant height (cm) was recorded in PusaAditya (50.55 cm). However, it was at par with PusaKesari, PusaAnmol and Pusa Centenary. The minimum plant height was recorded in the variety Thai Chin Queen (31.25cm). This might be caused by varietal characters responsible by a gene (Jamal Uddin *et al.*, 2015). As a genetically controlled factor, plant height varied among the cultivars of chrysanthemum (Baskaran *et al.*, 2009). Vrsek *et al.*, (2006) reported that the higher plant height obtained from plants could be attributed to increased photosynthetic capacity of the plants in asters.

Plant spread (cm)

The plant spread indicates the growth of plant and vigour of plant. It may affect the yield also. The results presented in the table

1 revealed that different varieties significantly influenced the plant spread during the entire period of plant growth. There is a steady increase in plant spread irrespective of varieties during the entire crop growth period. The maximum plant spread was observed in PusaAditya (20.12 cm). This was followed by the cultivars PusaKesari (20.11) and PusaAnmol (18.32). However, the minimum plant spread was recorded in the cultivars Thai Chin Queen (14.16 cm). The difference in plant spread per plant is a varietal trait as it is governed by the genetic makeup. Similar variations in plant spread per plant among varieties were also observed in China aster by Rao and Negi (1990) and Ravikumar (2002).

Number of primary branches per plant

Different cultivars of chrysanthemum produced significant difference in number of primary branches per plant. The number of primary branches per plant ranged from 7.31 to 9.89 primary branches per plant. Maximum number of primary branches per plant was recorded under the cultivar Pusa Aditya (9.89 per plant). This was significantly higher than Neelima, Pusa Chitraksha, Pusa Arunima, White Prolific, Discovery and Thai Chin Queen and was at par with PusaKesari (9.08), PusaAnmol (8.92) and Pusa Centenary (8.76).

A wide range of variation in this parameter might be due to influence of genetical makeup of chrysanthemum cultivars (Chezhian *et al.*, 1985 and Kanamadi and Patil, 1993). The result obtained by Shaukat *et al.*, (2015) for varietal performance was in conformity of present findings. Variation among the varieties for number of branches per plant was also reported in chrysanthemum (Swaroop *et al.*, 2008 and Singh *et al.*, 2008).

Length of leaves (cm²)

The length of leaves (cm²) ranged from 1.76 to 3.88 cm². Maximum size of leaves per plant was recorded under the cultivar PusaAditya (3.88 cm²) which was significantly higher than PusaArunima (2.73 cm²), White Prolific (2.58 cm²) and Discovery (2.46 cm²) The variation on the vegetative growth parameters were attributed to genetic factors whose performance will be varied over a wide range of environment conditions. Greater leaf area may lead to more dry matter accumulation, which resulted in the accumulation of maximum photosynthates that contributed to produce bigger sized flower or more number of flowers (Jamal Uddin *et al.*, 2015). Variation in leaf area indicates additive gene effects would be effective in Gerbera (Nair and Shiva, 2003), Dahlia (Vikas *et al.*, 2011) and in Chrysanthemum (Barigidad and Patil, 1992).

Flower characters

Days to first bud initiation of chrysanthemum

Days for first bud initiation of chrysanthemum was recorded when the first bud were shown in the field. As shown in the table 2. The minimum days to first floret was observed in PusaAditya (24.48 days) and was the earliest in bud initiations. PusaKesari (30.30 days) was found to be at par with PusaAditya for days to first bud initiation. The maximum day for first bud initiation (37.08days) was recorded with the cultivars Thai Chin Queen. Difference in number of days for flower bud initiation number of days for flowering among different cultivars might be due to sufficient genetic variability (Jamaluddin, 2015). Srilatha (2015) also reported the variation in

time to flowering of different chrysanthemum genotypes.

Saud and Talukdar, (1999);Gantait and Pal, (2011).

Number of flowers per plant

The data shown in the table 2 reveals that the maximum number of flower per plant was recorded in variety PusaAditya (32.10) while minimum was observed in cultivar Thai Chin Queen (14.97) followed by PusaKesari (30.80), PusaAnmol (30.20) and Pusa Centenary (28.42).

More number of flower might be due to increase in morphological parameters like plant height, number of leaves and leaf area which might have contributed in production of more photosynthates resulting in greater accumulation of dry matter which in turn leads to production of more number of flowers per plant (Ramzanet al., 2014) . Variation of number of flowers and weight of flowers per plant due to genotypes has also reported (Barigidad and Patil, 1997)

Weight of single flower (g)

The maximum weight of a flower (g) was observed in the cultivars PusaAditya (37.06 g) while minimum weight of a flower was recorded in cultivar Thai Chin Queen (22.28 g). However, the cultivars White Prolific (28.58 g), Discovery (27.89 g) and Thai Chin Queen (22.28 g) produced significantly less weight of a flower. The cultivar were significantly at par to PusaAditya in concern to weight of flower. The variation in weight of flower might be due to Variation of weight of flowers per plant due to genotypes has also been reported by Barigidad and Patil., (1997), Saud and Talukdar (1999), and Gantait and Pal, (2011). The variation in flowering duration among the varieties was attributed to genotype of the plant, environmental influence and other management factors.

Table.1 Effect of different cultivars on growth characters of Chrysanthemum

Treatment	Cultivars	Plant Height (cm)	Plant Spread (cm)	Number of primary branches per plant	Length of leaves (cm ²)
T ₁	Discovery	40.55	15.17	7.78	2.46
T ₂	Neelima	43.68	16.46	8.43	3.05
T ₃	White Prolific	41.05	15.94	7.96	2.58
T ₄	PusaKesari	48.05	20.11	9.08	3.27
T ₅	Pusa Centenary	45.47	17.08	8.76	3.08
T ₆	Thai Chin Queen	31.25	14.16	7.31	1.76
T ₇	PusaAnmol	47.58	18.32	8.92	3.19
T ₈	PusaArunima	41.08	16.06	8.42	2.73
T ₉	PusaAditya	50.55	20.12	9.89	3.88
T ₁₀	PusaChitraksha	41.32	16.39	8.43	2.96
SEm_±		2.252	0.846	0.428	0.358
CD at 5 %		6.691	2.515	1.273	1.063

Table.2 Effect of different cultivars on floral characters of Chrysanthemum

Treatment	Cultivars	Days to first bud initiation	Number of flower/plant	Weight of single flowers (g)	Diameter flower (cm)
T ₁	Discovery	36.14	15.26	15.49	4.32
T ₂	Neelima	35.18	27.74	18.71	6.58
T ₃	White Prolific	35.63	15.61	15.88	5.16
T ₄	PusaKesari	30.30	30.80	20.45	8.70
T ₅	Pusa Centenary	35.07	28.42	18.96	6.73
T ₆	Thai Chin Queen	37.08	14.97	14.85	3.64
T ₇	PusaAnmol	34.14	30.20	19.61	7.43
T ₈	PusaArunima	35.47	16.77	16.81	5.58
T ₉	PusaAditya	24.48	32.10	20.59	9.30
T ₁₀	PusaChitraksha	35.44	23.61	17.80	5.86
SEm_±		1.586	3.060	1.567	0.761
CD at 5 %		4.712	9.093	4.655	2.260

Diameter of flower (cm)

The diameter of flower was maximum in PusaAditya cultivars (9.30 cm) while it is recorded minimum in cultivars Thai Chin Queen (3.64 cm), cultivars PusaAnmol (7.43cm) and PusaKesari (8.70cm) were found to be at par with PusaAditya for diameter of flower. The cultivars used in experiment were statistically at par with diameter of flower of variety PusaAditya. The diameter of flowers varied significantly due to genetic influence the cultivars. And their selection under different environment. Similar finding have been also reported previously by Kanamadi and Patil (1993) and Rajashekar *et al.*, (1985) in chrysanthemum.

In conclusion, statistically significant variations in all phenotypic character were observed in this study. Variations of all morphological character are determined by genetic makeup and even it influence of different cultivars performance. From the present study it may be concluded that the cultivar PusaAditya was found significantly superior in reference to vegetative and floral character followed by PusaKesari, and PusaAnmol.

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