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Comparative study of growth, flowering and vase life parameters of different cultivars of chrysanthemum in pot culture under plain zone of Chhattisgarh

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Abstract
This study compares the growth, floral, and vase life characteristics of various pot-grown chrysanthemum cultivars. The study was carried out (during the month of and year) at the Horticulture Nursery and Floriculture Laboratory, Department of Floriculture and Landscape Architecture, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). The study's goals were to look into the vegetative and floral traits of numerous chrysanthemum cultivars and gauge their vase life. The measurements were taken included the plant height, plant spread, number of leaves and branches, flowering characteristics such bud initiation, opening of flower, and flowering length, as well as the number of flowers, flower diameter, average weight, flower output, and vase life. The data obtained from the study provide valuable insights into the performance and characteristics of different chrysanthemum varieties in pot cultivation.

Keywords: Chrysanthemum cultivars, floral parameters, pot cultivation, vegetative parameters

Introduction
Chrysanthemums (*Dendranthema grandiflora*) is one of the most beautiful and important commercial flower crops. They are indigenous to Europe and Asia. Chrysanthemums come in more than 300 different species. Guldaudi, Autumn Queen or Queen of the East are the popular names of the chrysanthemum flower that resembles a daisy. It is grown in area of 344 ha is occupied under Chrysanthemum in Chhattisgarh state during the year 2022- 2023 and production is 1.172 M tonne. Whereas, in Raipur district (5 ha area) 0.04 M tonne production is recorded as per the data of Directorate of Horticulture and Farm Forestry, Chhattisgarh. (Report: Hort. & Farm forestry). The common beautiful flower known as the chrysanthemum is prized for its wide variety of hues and forms. It is widely grown for both the production of cut flowers and potted plants. Choose the best kinds for certain uses for breeder and grower, it is essential to understand the vegetative and floral characteristics of chrysanthemum variations. The objective of this study is to evaluate and contrast the vegetative and floral characteristics of numerous chrysanthemum types grown in pots.

Materials and Methods
The present study entitled “Comparative study of growth, flowering and vase life parameters of different cultivars of chrysanthemum in pot culture under plain zone of Chhattisgarh” in College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, during 2022-2023. The experiment included nine different chrysanthemum cultivars: Aub Pink, Aub Burgundy, Tourmalet, Mount Kenya, Aub Purple, Mount Pleasanta, Aub Apricot, Mount Juno, and Savita with trice replication using complete randomized design. The growth and floral parameters, such as plant height, plant spread, number of leaves and branches, days required for flower bud initiation, first flower opening, days for 50% flowering, number of flowers per plant, flower diameter, average flower weight, flower yield per plant, duration of flowering, and vase life, were recorded at various time intervals.

Results and Discussion
Growth parameters
Plant height (cm)
The plant height (cm) of nine distinct chrysanthemum types throughout various time periods: At 20 days DAP, Aub Apricot had the highest plant height (12.77 cm), followed by Mount

Juno (12.60 cm), and Tourmalet had the lowest (7.49 cm), followed by Aub Pink (9.51 cm). At the 40 DAP stage, Mount Juno (18.43 cm) and Savita (17.13 cm) had the highest plant heights, while Tourmalet (10.17 cm) had the lowest. Mount Juno (20.40 cm) and Savita (26.93 cm) cultivars had the tallest plants at the 60 DAP stage. The Tourmalet variety was significant superior with short plant height (13.50 cm), followed by Aub Pink (16.97 cm). Chrysanthemum cultivars have been observed to vary similarly in terms of plant height Singh *et al*. (2008) [9], Mukhesh, Srilatha *et al*. (2015) [11]. Different factors, including genetic and environmental factors like soil quality, light intensity, nutrition, etc., can affect a plant's height. The variability in plant height may mostly be attributed to genetic character variety as all of the cultivars experienced the identical environmental circumstances during the experiment.

Plant Spread (cm)

To assess the maximum plant spread in Aub Pink (26.60 cm) which is at par with Aub Burgundy (25.53 cm), Tourmalet (25.07). Whereas, Mount Pleasanta (20.73 cm) recorded minimum plant spread which is followed by Savita (21.00). Such diversity in plant distribution between cultivar may be caused by both environmental factors and inherent genetic traits of certain cultivars. Poonam and Kumar (2007) [13] have also reported comparable results, where they examined the connection between plant height and plant spread.

Number of leaves per plant

Leaves per plant was recorded at the stage of 20 DAP, Tourmalet had the majority of leaves (23.87), followed by Aub Pink (20.53), while Mount Pleasant had the fewest leaves (15.60), followed by Aub Purple (16.07). At the 40 DAP stage, Savita had the most leaves (32.00), followed by Aub Burgundy (31.67), while Mount Pleasant had the fewest (17.20). The cultivar Aub Pink (42.53) had the highest number of leaves at the 60 DAP stage, followed by Savita (40.27). Aub Purple (26.13) had the fewest leaves, which were next followed by Mount Juno (31.73). According to Poonam and Kumar (2007) [13], a comparable conclusion regarding the growth in the total number of leaves per plant has been made. Since genotypes' genetics dictates their vegetative and floral features, variations in the number of leaves per plant may result from genetic variations across genotypes and how they interact with the environment (Suvija *et al*., 2016) [12].

Number of Primary branches per plant

Different cultivars of chrysanthemum produced significant variance in number of primary branches per plant. At the 20 DAP stage, Aub Burgundy had the maximum number of branches (5.53), followed by Aub Pink (5.47), while Savita had the fewest (3.07), followed by Mount Juno (3.67). At the 40 DAP stage, Aub Burgundy had the most main branches (8.47), followed by Tourmalet (8.20), while Mount Juno had the fewest (4.73). At stage 60 of DAP. Mount Kenya cultivar (10.33) has the most primary branches, followed by Aub Burgundy (9.60) and Tourmalet (9.60). Savita (5.80) has the fewest number of main branches, followed by Mount Juno (6.60). The variance in branch production between cultivars may be due to innate genetic characteristics, which may operate differently under various environmental situations.

Number of Secondary branches per plant

Cultivar-specific variations in branch production may result from genetic elements that operate differently depending on the local environmental circumstances. At the 20 DAP stage, Tourmalet had the most secondary branches (10.53), followed by Aub Burgundy (8.67), while Mount Juno and Savita had the fewest (5.27) and Mount Pleasant had the most (6.40). At the 40 DAP stage, Tourmalet had the most secondary branches (12.40), followed by Aub Burgundy (11.60), while Mount Juno had the fewest (7.20). The cultivar Tourmalet (14.67) had the most secondary branches at the 60 DAP stage, followed by Aub Burgumdy (14.27) and. Aub Apricot (10.00) and Mount Juno (10.00) had the fewest secondary branches, which were followed by Mount Pleasant (10.13).

Flowering parameters

Days taken for flower bud initiation and first opening of flower

In The minimum number of days required for flower initiation (47.60) was recorded in Aub Pink. and the maximum number of days required for flower initiation (55.40) was recorded in Mount Juno and Maximum days to first flowering was noted under cultivar Aub Apricot (61.80 days) which is followed by Mount Pleasant (61.47 days) and minimum days to first flowering was recorded in Aub Pink (52.93 days). The reaction of a cultivar to both the establishment of visible flower buds and blossoming is vary. The genotype of plants plays a crucial role in determining the time taken for flowering, which is a heritable trait supported by research conducted by Jong (1984) [6], Ponnuswamy *et al*. (1985) [8], and Hemlata *et al*. (1992) [4]. A key factor that distinguishes between early and late flowering and has an impact on flower supply is the interval between the appearance of the flower bud and the first bloom. Studies on chrysanthemums by Kanamadi and Patil (1993) [7] and Behera *et al*. (2002) [2] suggest that the variation for early or late bloom may be a varietal trait.

Early blossoming may be advantageous for the commercial flower market in the present floriculture sector, while delayed flowering may be harmful. Chrysanthemums reach their initial blooming stage at different times, according to studies by Srilatha *et al*. (2015) [11], and Suvija *et al*. (2016) [12]. However, these studies found considerable variances in these times.

Days for 50% flowering

The least number of days needed for 50% blooming (58.00) was observed in Aub Pink, which was at par with Aub Burgundy (62.87) and Tourmalet (62.87), and the largest number of days needed for 50% flowering Mount Pleasanta (66.47).

Number of flowers per plant

Performance of chrysanthemum cultivars with respect to the number of flowers per plant showed significant in Aub Pink variety had the most flowers per plant (17.73), which was compare to Aub Burgundy (16.07), and Savita had the lowest flowers per plant (9.20). The observations reached by Deka & Paswan (2001) [3] are consistent with all of the cultivars' considerable variability in the number of flowers produced per plant. The current study's findings are consistent with those of research on chrysanthemums conducted by Jayanthi and Vasanthachari (2003) [5].

Flower diameter (cm)

The measurements of flower diameter were Aub Pink (6.85 cm) had the largest floral diameter, followed by Mount Kenya (6.79 cm), Tourmalet (6.66 cm). While Savita (4.51 cm) and Aub Purple (4.68 cm) was the lowest flowers size, respectively. The blooming diameter of each cultivar showed significant variation, which is consistent with Deka and Paswan's findings. (2001) [3]

Average weight of flower (g) and Flower yield per plant (g)

The Aub Pink plant has the highest average flower weight (4.44 g), followed by Mount Kenya (4.39 g) and Tourmalet (4.20 g) and the smallest blossom size observed with Savita (2.03 g), which is followed by Mount Pleasant (2.58 g). The study's findings showed a relationship between bloom diameter and flower weight per plant. The highest flower diameter and maximum flower weight per plant for the same cultivar were recorded by Aub Pink, whereas Savita's lowest flower diameter and minimum flower weight per plant were reported. The outcomes of the study (2015) are supported by the findings of Negi *et al*. (1978) [14]

Maximum bloom output per plant for Cv. Aub Pink (54.89 g), which was followed to Tourmalet (52.92) and Mount Kenya (52.81). While the Cv. Savita had the lowest bloom output per plant (19.02 g).

Duration of flowering (Days)

The maximum flowering duration was observed in Tourmalet (53.20 days) which was at par Aub pink (50.80 days). While, the minimum flowering duration was recorded in cultivar Savita (35.13 days). The length of blossoming is crucial since it indicates whether the flower will be sold in marketplaces. The genotype of the plant, environmental influence, and other management variables were thought to be the causes of the variance in blooming times across cultivars. Chrysanthemum cultivars have also been shown to vary in flowering time under various environmental circumstances Singh *et al*. (2008) [9]

Vase life (Days)

The cultivar Aub Burgundy had the longest vase life (12.33 days), followed with Tourmalet (11.13 days), Aub Pink (10.60). Savita (8.93 days) and Mount Juno (8.93) recorded the lowest vase lives.

Table 1: Plant height (cm), Number of leaves, Primary and Secondary branches per plant of different chrysanthemum cultivars

Treatments	Plant height (cm)			Number of leaves per plant			Number of Primary branches per plant			Number of secondary branches per plant		
	20 days	40 days	60 days	20 days	40 days	60 days	20 days	40 days	60 days	20 days	40 days	60 days
Aub Pink	9.51	12.33	16.97	20.53	28.13	42.53	5.47	7.20	8.07	8.53	10.87	12.27
Aub Burgundy	10.73	15.73	18.00	19.07	31.67	33.20	5.53	8.47	9.60	8.67	11.60	14.27
Tourmalet	7.49	10.17	13.50	23.87	29.93	38.60	5.20	8.00	9.60	10.53	12.40	14.67
Mount kenya	10.71	15.00	17.93	19.47	30.60	38.07	5.00	8.20	10.33	8.20	10.20	13.00
Aub Purple	11.03	16.39	19.73	16.07	19.07	26.13	4.77	5.40	8.40	6.87	8.53	12.40
Mount Pleasanta	11.30	16.33	18.00	15.60	17.20	32.67	4.00	5.20	8.40	5.47	7.33	10.13
Aub Apricot	12.77	16.26	19.27	17.53	19.47	39.73	4.07	5.47	7.93	6.40	8.67	10.00
Mount Juno	12.60	18.43	20.40	19.60	24.27	31.73	3.67	4.73	6.60	5.27	7.20	10.00
Savita	12.00	17.13	26.93	20.33	32.00	40.27	3.07	4.93	5.80	5.27	7.40	11.00
CD at 5%	1.85	2.48	2.8	3.95	4.01	4.06	1.07	1.65	1.72	1.59	1.59	2.17
SEM±	0.61	0.82	0.93	1.32	1.34	1.35	0.36	0.55	0.57	0.53	0.53	0.72

Table 2: Plant spread, flower bud initiation, first opening of flower, days for 50% flowering, Number of flowers and diameter(cm), Average weight of flower(g) and yield per plant(g) Duration of flowering(days), Vase life(days) per plant of different chrysanthemum cultivars

Treatments	Plant spread (cm)	First flower bud initiation	Days to first opening of flower	Days for 50% flowering	Number of flowers per plant	Flower diameter (cm)	Average weight of flower (g)	Flower yield per plant (g)	Duration of flowering (Days)	Vase life (Days)
Aub Pink	26.60	47.60	52.93	58.00	17.73	6.85	4.44	54.89	50.80	10.60
Aub Burgundy	25.53	51.93	57.80	62.87	16.07	5.95	2.88	49.32	44.00	12.33
Tourmalet	25.07	50.67	57.87	62.87	14.27	6.66	4.20	52.92	53.20	11.13
Mount kenya	24.93	52.53	58.93	66.13	14.00	6.79	4.39	52.81	48.80	10.27
Aub Purple	22.40	53.13	58.00	63.00	12.80	5.10	3.28	30.37	41.27	9.67
Mount Pleasanta	20.73	53.07	61.47	66.47	11.13	4.68	2.58	28.98	40.73	9.13
Aub Apricot	23.07	53.53	61.80	66.13	10.73	6.03	3.05	31.74	44.93	10.27
Mount Juno	22.20	55.40	60.80	64.40	12.80	4.77	2.79	44.01	43.33	8.93
Savita	21.00	54.60	61.13	63.80	9.20	4.51	2.03	19.02	35.13	8.93
CD at 5%	2.65	2.34	4.38	4.35	2.90	1.28	0.69	4.43	3.91	1.53
SEM±	0.88	0.78	1.46	1.45	0.96	0.43	0.23	1.48	1.3	0.51

Overview of experimental field

Measuring collar diameter (cm)

Measuring vase life (Days

Conclusion

The present study was conducted to investigate the effect of different cultivars on the growth, flowering, and vase life of chrysanthemum. The results showed that there was a significant difference among the cultivars with respect to all the parameters studied. Aub Pink was found to be the most promising cultivar in terms of all the parameters studied, followed by Aub Burgundy and Tourmalet, respectively. It may be concluded that cultivar Aub Pink was significantly superior in vegetative and floral parameters such as plant height (16.97), number of leaves per plant (42.53), plant spread (26.60), number of flowers per plant (17.73), and flower diameter (6.85), Day to first opening of flower (52.93) and flower yield (54.89) was recorded at 60 DAT followed by Tourmalet, Mount Kenya, and Aub Burgundy. They have intermediate values for most of the traits, which means that they could be a good choice for growers who are looking for a more affordable option.

References

1. Baskaran V, Janakiram T, Jayanthi R. Varietal evaluation in chrysanthemum. The Karnataka journal of Horticulture. 2004;1(1):23-27.
2. Behera TS, Sirohi PS, Anand Pal. Assessment of chrysanthemum germplasm for commercial cultivation under Delhi Condition. Journal of Ornamental Horticulture. 2002;5(2):11-14.
3. Deka KK, Paswan L. Growth performance of some standard chrysanthemum (Dendranthema grandiflora Tzelev) cultivars under the agro climatic condition of Jorhat. Research-on-crop. 2001;2(3):364- 367.
4. Hemlata B, Patil AA, Nalawadi UG. Variability studies in chrysanthemum. Progressive Horticulture. 1992;24(1-2):55-59.
5. Jayanthi R, Vasanthachari LH. Varietal evaluation of Chrysanthemum. Indian Society of Ornamental Horticulture; c2003. p. 2-14.
6. Jong JD. Genetic analysis in *Chrysanthemum marifolium* L. flowering time and flower number at low and optimum temperature. Euphytica. 1984;40(1-2):121-126.
7. Kanamadi VC, Patil AA. Performance of chrysanthemum varieties in the transitional tracts of Karnataka. South Indian Horticulture. 1993;41:58-60.
8. Ponnuswamy V, Chezhiyan J, Kadhar B, Thamburaj M. Genetic variability in chrysanthemum. South Indian Horticulture. 1985;33(3):211-213.
9. Singh S, Kumar R. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzevlev) open pollinated seedlings for vegetative and floral characters. Journal of Ornamental Horticulture. 2008;11(4):271-274.
10. Sirohi PS, Behera TK. Genetic variability in chrysanthemum. Journal of Ornamental Horticulture. 2000;3(1):34-36.
11. Srilatha V, Kumar KS, Kiran YD. Evaluation of chrysanthemum (*Dendranthema grandiflora* T.) varieties in southern zone of Andhra Pradesh. Agriculture Science Digest. 2015;35(2):155-157.
12. Suvija NV, Suresh J, Kumar RS, Kannan M. Evaluation of chrysanthemum (*Chrysanthemum morifolium* Ramat.) genotypes for loose flower, cut flower and pot mums. International Journal of Innovative Research and Advanced Studies. 2016;3(4):100-104.
13. Sharam RL, Singh J, Kumar S, Kour D, Sachar A, Poonam, *et al*. Synthesis of quinazolinophanes containing bridgehead nitrogen atoms from quinazoline-2, 4 (1H, 3H)-dione. Journal of Heterocyclic Chemistry. 2007 Nov;44(6):1501-1504.
14. Nault LR, Styer WE, Coffey ME, Gordon DT, Negi LS, Niblett CL. Transmission of maize chlorotic mottle virus by chrysomelid beetles. Phytopathology. 1978 Jan 1;68(7):1071-1074.