



Evaluation of Chrysanthemum (*Dendranthema grandiflora* Tzvelve) Varieties for Growth, Quality and Yield Under Northern Dry Zone of Karnataka

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ABSTRACT

Chrysanthemum is a herbaceous perennial flowering plant widely cultivated in India for both cut and loose flower production. These flowers are highly prized for their diverse shapes, sizes, unique forms, and vibrant colours. Due to their early blooming nature, efficient propagation techniques, and ease of cultivation, they offer great potential for commercial farming. Their appealing characteristics make them a profitable choice for growers. A research study was conducted during 2024-25 at the experimental block of the Department of Floriculture and Landscape Architecture, College of Horticulture, Bagalkot. The objective was to evaluate chrysanthemum varieties for loose flower production in the Northern Dry Zone of Karnataka. The experiment followed a Randomized Block Design with three replications, assessing eight chrysanthemum cultivars Poorva White, Poornima White, Poornima Yellow, Solo White, Scent White, Samruddhi White, Scent Yellow, and Aishwarya Yellow, based on growth and flowering parameters. Among the cultivars, Poornima Yellow recorded the tallest plant height (69.33 cm), produced the highest number of flowers per plant (68.33), and yielded the most flowers per plant (620.20 gm). Solo White had the greatest number of primary and secondary branches (19.00 & 17.62) and showed extensive plant spread in both east-west (44.07 cm) and north-south directions (83.70 cm). Scent White recorded the highest individual flower weight (17.46 gm). The earliest flowering, at 50% bloom (88.33 d), was observed in Poornima White, while Aishwarya Yellow had the shortest flowering duration (33.38 d). Aishwarya Yellow also exhibited the longest shelf life (5.74 d), whereas Scent Yellow showed the highest chlorophyll content (62.36 SPAD). Based on the findings, Poornima Yellow, Scent White, and Solo White were identified as the most suitable chrysanthemum cultivars for commercial cultivation in the Northern Dry Zone of Karnataka.

Keywords: Chrysanthemum, Flowering, Quality, Vegetative growth, Yield

INTRODUCTION

Chrysanthemums, or Guldaudi, are a significant floricultural crop in India, with a strong presence in the national flower market. These flowers are widely cultivated for various purposes such as loose flowers, cut flowers, pot mums, and as ornamental garden plants. Chrysanthemums stand out because of their broad range of flower colours, size and shape, which increase their demand in both domestic and international markets (Biralingappa, 2016). The flower is part of the Asteraceae family and has different cultivars suited to various environments. Their cultivation requires understanding the interplay between specific cultivars and the local environment, especially in terms of temperature and photoperiod. The development of chrysanthemums involves careful cultivar selection to meet market demand, which

changes annually as new cultivars are introduced based on consumer preferences (Srilata *et al*, 2015). The regions of West Bengal, Karnataka, Maharashtra, Tamil Nadu, and Andhra Pradesh are key players in chrysanthemum cultivation in India, where factors like soil, climate and growing practices directly influence the success of this floricultural crop. In this context, identifying suitable cultivars for specific regions becomes essential for maximizing yield and meeting consumer demand (Thakur *et al*, 2018)

MATERIALS AND METHODS

The research aimed to assess the performance of eight chrysanthemum cultivars under the climatic conditions of the Northern Dry Zone of Karnataka. The trial was conducted at the experimental field of the Floriculture Department, College of Horticulture, Bagalkot, during the 2024-25 growing season. The

cultivars studied included Poorva White, Poornima White, Poornima Yellow, Solo White, Scent White, Samruddhi White, Scent Yellow, and Aishwarya Yellow. The crop was grown in open field conditions, with an average annual rainfall of 562 mm.

The rooted chrysanthemum cuttings were transplanted at a spacing of 60×45 cm after incorporating well-decomposed farmyard manure (FYM) at a rate of 20 ton per hectare. A fertilization regimen of 120:150:100 kg NPK per hectare was applied using urea, single super phosphate (SSP), and muriate of potash. Nitrogen was administered in three stages initially as a basal dose, followed by subsequent applications at 30 and 45 d after planting. Pinching was performed once the plants reached a height of 15-20 cm, while disbudding was carried out for up to 60 d. Standard agronomic practices, including irrigation, weeding, hoeing and plant protection measures, were implemented as per crop requirements, adhering to established cultivation guidelines (Anon, 2014). Observations were recorded on key growth and flowering parameters, including plant height (cm) canopy spread in North-South and East-West directions (cm) the number of primary and secondary branches per plant, d to attain 50% flowering, flowering duration, flower diameter (cm), total flower count per plant, shelf life, chlorophyll concentration in flowers, and flower yield per plant. The cultivars were arranged in a randomized experimental design with three replications, and five plants were selected per replication for data collection. The recorded data were statistically analyzed using the Randomized Complete Block Design (RCBD).

RESULTS AND DISCUSSION

The recorded data on key growth parameters of different chrysanthemum cultivars at the grand growth stage, observed 90 d after planting, includes plant height, canopy spread in North-South and East-West directions, and the number of primary and secondary branches. These findings are presented in Table 1. At the growth stage, Poornima Yellow recorded the highest plant height, reaching 69.00 cm, followed by Scent White at 65.67 cm and Poornima White at 64.00 cm. Regarding plant spread, Solo White exhibited the largest canopy, extending 44.07 cm in the North-South direction and 83.70 cm in the East-West direction. Samruddhi White followed with a spread of 42.87 cm (N-S) and 66.63 cm (E-W), while Scent White measured 53.97 cm (N-S) and 41.07 cm (E-W).

Poornima Yellow demonstrated superior flowering performance, producing the highest number

of flowers per plant (68.83) and achieving the maximum yield per plant (620.62 g). Poornima White required the longest duration to reach 50% flowering, taking 98.62 d, whereas Aishwarya Yellow was the earliest to bloom at just 33.38 d and exhibited the longest shelf life of 5.74 d. Scent Yellow recorded the highest chlorophyll content, with a value of 62.36.

The variation in vegetative growth among different cultivars is primarily caused by genetic differences but can also be influenced by the environmental conditions in which each cultivar is grown, as noted by Prashant *et al* (2020).

An increased number of branches per plant facilitates the formation of more flower buds, thereby enhancing overall flower yield (Singh *et al*, 2019). Similar trends in vegetative growth characteristics have been reported in chrysanthemums by Thakur *et al* (2018) and Thiripurasundari *et al* (2021). Flowering traits and quality parameters, including days to 50% flowering, flowering duration, flower diameter and shelf life are detailed in Table 2. The shortest period to attain 50% flowering was recorded in Poornima White (98.62 d) which was statistically similar to Poornima Yellow (96.40 d) and Scent White (85.64 d). The longest flowering duration was observed in Aishwarya Yellow (33.38 d) closely followed by Samruddhi White (32.45 d) Poornima White (32.36 d) and Poornima Yellow (31.74 d). Conversely, Solo White exhibited the shortest flowering duration of 29.30 d.

The variation in flowering characteristics among chrysanthemum cultivars was influenced by their genetic traits, environmental conditions, and agronomic practices. The prevailing climate included an average night temperature of 18°C a day time temperature of 26°C and relative humidity of 75% alongside extended daylight exposure during planting (Thakur *et al*, 2018) Similar findings have been reported by Srilatha *et al* (2015) Suvija *et al* (2016) Madhumati *et al* (2018) and Thiripurasundari *et al* (2021).

Flower quality and yield characteristics, including flower weight the number of flowers per plant, yield per plant, and chlorophyll content, are summarized in Table 3. Poornima Yellow demonstrated the highest flower production per plant (68.33) followed closely by Samruddhi White (67.00) Solo White (60.67 cm) and Aishwarya Yellow (27.33 cm). The observed differences in flower weight may be attributed to variations in flower diameter (Beeralingappa, 2016), as well as genetic and environmental influences (Suvija *et al*, 2016).

Evaluation of Chrysanthemum (*Dendranthema grandiflora* Tzelve) Varieties

Table 1.Vegetative parameters in different cultivars of chrysanthemum as influenced by the environment.

Cultivar	Plant height (cm)	Plant spread (East West direction) (cm)	Plant spread (North-South direction) (cm)	Number of primary branches	Number of secondary branches
Poorva White	42.00	27.53	36.23	9.07	12.03
Poornima White	64.00	31.13	35.60	13.33	12.40
Poornima Yellow	69.00	32.97	34.77	12.60	14.97
Solo White	61.33	44.07	83.70	19.00	17.62
Scent White	65.67	41.07	53.97	10.47	14.07
Samruddhi White	63.33	42.87	66.63	12.30	7.23
Scent Yellow	55.67	37.67	62.13	10.00	7.20
Aiswarya Yellow	56.00	37.50	41.87	13.38	6.77
S.E.M	2.191	2.183	4.244	0.416	1.282
CD (5%)	6.646	6.622	36.23	1.261	3.890

Table 2.Flowering attributes in different cultivars of chrysanthemum as influenced by the environment

Cultivar	Days to 50% flowering	Duration of flowering (days)	Flower diameter (cm)	Shelf life (days)
Poorva White	88.49	31.25	4.51	5.73
Poornima White	98.62	32.36	4.44	5.64
Poornima Yellow	96.40	31.74	4.69	4.64
Solo White	91.20	29.30	4.83	4.68
Scent White	85.64	31.43	5.56	4.88
Samruddhi White	94.29	32.45	5.07	5.40
Scent Yellow	89.40	30.74	4.19	4.53
Aishwarya Yellow	95.67	33.38	4.52	5.74
S.E.M	0.643	0.366	1.640	0.209
CD (5%)	1.949	1.111	4.975	0.633

Comparable trends have been documented by Madhumati *et al* (2018) and Thakur *et al* (2018) in chrysanthemum.

Poornima Yellow recorded the highest flower count per plant (238.20) followed by Samruddhi White (67.00) whereas Poornima White exhibited the lowest flower production (22.67). The number of flowers per plant serves as a crucial indicator of genotype vigour in flower yield (Suvija *et al*, 2016). Similar observations were reported by Thakur *et al* (2018) Singh *et al* (2019) and Prasanth *et al* (2020) in chrysanthemum.

A significant variation in flower yield per plant was observed among the cultivars. Poornima Yellow recorded the highest flower yield (620.62 g) followed by Poorva White (434.43 g) while Poornima White exhibited the lowest yield (116.23 g). The differences in flower yield may be attributed to the genetic composition of the variety, its interaction with prevailing environmental conditions, and genotype specific traits (Srilatha *et al*, 2015).

The relationship between the number of flowers produced per plant and the number of primary and secondary branches directly influences flower

yield per plant (Singh *et al*, 2019). These findings are consistent with those reported by Suvija *et al* (2016) and Thiripurasundari *et al* (2021) in chrysanthemums.

In terms of shelf life, Aishwarya Yellow recorded the longest duration (5.74 d) closely followed by Poorva White (5.73 d) Poornima White (5.64 d) and Samruddhi White (5.40 d). Meanwhile, Scent Yellow had the shortest shelf life (4.53 d). The differences in shelf life may be attributed to genetic variations, petal arrangement, and environmental conditions that influence physiological processes such as cell turgidity, water loss due to evapotranspiration, and the breakdown of reserve food, all of which contribute to flower longevity (Beeralingappa *et al*, 2016).

The extended shelf life observed in certain cultivars is primarily due to a slower rate of evaporation and transpiration, along with favorable environmental conditions such as lower temperatures and minimal wind velocity (Suvija *et al*, 2016). Additionally, variations in flower shelf life among cultivars may result from differences in senescence behaviour, particularly the production of ethylene forming enzymes (Thiripurasundari *et al*, 2021).

Table 3. Flower quality and yield attributes in different cultivars of chrysanthemum

Cultivar	Number of flowers per plant	Yield/plant	Chlorophyll content (SPAD)	Flower Weight
Poorva White	24.33	434.43	60.80	17.46
Poornima White	22.67	116.23	53.47	4.29
Poornima Yellow	68.33	620.62	51.63	3.43
Solo White	60.67	234.40	56.12	10.23
Scent White	29.33	145.49	57.61	4.99
Samruddi White	67.00	409.50	56.53	6.78
Scent Yellow	61.67	358.90	62.36	5.82
Aiswarya Yellow	27.33	286.23	53.84	11.46
S.EM	2.817	23.339	0.648	1.668
CD (5%)	8.545	70.792	1.966	5.060

Comparable trends have been noted by Thakur *et al* (2018) in chrysanthemums.

Variation in SPAD values was observed, as presented in Table 3. Among the different cultivars, Scent Yellow exhibited the highest chlorophyll content, recording a SPAD value of 62.36, followed by Poorva White (60.80) and Scent White (57.61). Meanwhile, Poornima Yellow registered the lowest chlorophyll content with a SPAD value of 51.63. These differences may be attributed to the genetic characteristics of the cultivars and the influence of environmental factors. Similar findings have been reported by Aind *et al* (2021), supporting these observations.

CONCLUSION

Among chrysanthemum cultivars screened, cvs. Scent white, Poornima yellow and solo white were found highly suitable for commercial cultivation for the Northern dry zones of Karnataka due high yield and quality of flowers.

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Evaluation of Chrysanthemum (*Dendranthema grandiflora* Tzvelve) Varieties

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