

Performance of Chrysanthemum (*Dendranthema grandiflora* Tzvelev.) Genotypes for Yield and Quality Traits under Central Dry Zone of Karnataka

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Abstract An experiment was conducted to investigate on performance of chrysanthemum (*Dendranthema grandiflora* Tzvelev) genotypes for yield and quality traits under central dry zone of Karnataka. Among the sixteen genotypes studied there were wide and highly significant variations observed for various growth, yield and quality parameters. Among all the genotypes, the genotype Lakkundi recorded maximum plant height (69.87 cm). The genotype Chandani recorded maximum number of flowers per plant (692.40), flower yield per plant (830.49 g), plot (24.91 kg) and hectare (41.01 t/ha). The genotype Marigold recorded longest flowering duration (126.67 days), number of ray florets per flower (398.47), shelf life (9.70 days) and vase life (17.33 days). The genotype White Prolific took significantly maximum number of whorls per flower (15.40). The genotype Arka Chandrakanth recorded maximum stalk length (46.80 cm) and girth of the flower stalk (4.35 mm). The genotype White Seventige exhibited maximum flower diameter (6.46 cm) and the genotype Star Pink recorded highest individual flower weight (6.26 g).

Keywords Chrysanthemum, Genotypes, Evaluation, Yield, Quality.

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Introduction

Chrysanthemum (*Dendranthema grandiflora* Tzvelev) is the leading commercial flower crop grown for cut, loose flowers and pot plants. It is commercially known as Queen of East, Autumn Queen and Guldaudi. The genus chrysanthemum belongs to the family Asteraceae includes over 200 species of annuals and herbaceous perennials. It occupies prime position among commercial flower crops which has high demand in both domestic and international market.

The successful cultivation of chrysanthemum depends on selection of suitable variety. In recent years, several new varieties with wide range of colors have been developed, but all of them do not perform everywhere especially, under South Indian conditions where the day lengths are more during most part of year. The present investigation was carried out with a view to identify a suitable genotype with high yielding performance under central dry zone of Karnataka.

Materials and Methods

The experiment was carried out at the college of Horticulture, Hiriya, Karnataka during July 2015 to January 2016. The experimental material consisted of 16 genotypes of chrysanthemum were selected for experimentation viz., T₁ : Pink Cloud, T₂ : Star Pink, T₃ : White Prolific, T₄ : Sharad Mala, T₅ : Marigold, T₆ : Winter Queen, T₇ : Autumn Joy, T₈ : Basanthi, T₉ :

Table 1. Growth, flowering and yield parameters in various genotypes of chrysanthemum.

Genotypes	Plant height (cm)	Duration of flowering (days)	Number of flowers per plant	Flower yield per plant (g/plant)	Flower yield per plot (kg/plot)	Flower yield per hectare (t/ha)
Pink Cloud	31.08	74.33	101.23	84.75	2.54	4.19
Star Pink	53.07	78.67	74.63	466.76	14.01	23.06
White Prolific	43.13	94.33	106.20	233.39	7.00	11.53
Sharad Mala	30.20	85.00	68.17	128.27	3.85	6.33
Marigold	61.27	126.67	90.00	522.00	15.66	25.77
Winter Queen	55.87	41.67	141.40	95.61	2.87	4.72
Autumn Joy	52.60	55.67	151.93	133.47	4.02	6.62
Basanthi	46.80	112.33	206.27	206.36	6.21	10.22
Vasanthika	48.13	77.67	121.30	210.33	6.31	10.39
Chandani	67.73	116.67	692.40	830.49	24.91	41.01
Lakkundi	69.87	68.00	94.80	185.27	5.56	9.15
Bellatti	45.13	90.00	121.70	162.62	4.88	8.03
White Seventige	57.20	80.00	106.67	245.66	7.37	12.13
Arka Pink Star	24.33	84.00	89.60	49.60	1.49	2.45
Arka Chandrika	53.60	101.67	93.93	209.57	6.29	10.35
Arka Chandrakanth	59.73	88.33	104.73	346.60	10.37	17.07
SEM±	1.68	3.55	5.83	9.79	0.40	0.72
CD at 5%	4.84	10.24	16.83	28.28	1.14	2.07

Vasanthika, T₁₀ : Chandani, T₁₁ : Lakkundi, T₁₂ : Bellatti, T₁₃ : White Seventige, T₁₄ : Arka Pink Star, T₁₅ : Arka Chandrika and T₁₆ : Arka Chandrakanth. The experiment was laid out in randomized completely block design (RCBD) with three replications. Terminal rooted cuttings of all 16 genotypes were planted at a spacing of 45 cm × 45 cm. Uniform cultural practices were followed to all the genotypes throughout the experiment. The color of the flower head was recorded using HMTL true color code chart.

Results and Discussion

The chrysanthemum genotypes exhibited significant variation for all the traits are presented in Tables 1 and 2. The results revealed that, among the genotypes, the genotype Lakkundi recorded highest plant height (69.87 cm) but it was on par with Chandani (67.73 cm). Whereas, genotype Arka Pink Star recorded the least plant height (24.33 cm). The variation among the genotypes as well as could be attributed to genetic factors whose performance would be varied over a wide range of environmental conditions of there spective genotype. Similar results were reported by Lakshmi et al. [1] in chrysanthemum and Jamaluddin et al. [2] in chrysanthemum.

Significantly longest flowering duration was recorded in genotype Marigold (126.67 days) and it was on par with genotype Chandani (116.67 days). Whereas, the genotype Winter Queen recorded the shortest flowering duration (41.67 days). The variation in flowering duration among the varieties was attributed to genotype of the plant, environmental influence and other management factors. Similar results were observed by Peddi et al. [3], Kumar [4] and Suvija et al. [5].

Significantly maximum number of flowers per plant was produced in genotype Chandani (692.40) which was significantly superior over all other genotypes whereas, the genotype Sharad Mala produced least number of flowers per plant (68.17). The number of flowers produced per plant may be directly related to increase in plant height, more number of branches, greater plant spread and number of leaves and accumulation of more photosynthates, thereby leading to the production of more number of flowers. The similar results were observed by Jamaluddin et al. [2], Suvija et al. [5], Parul et al. [6] and Dhanumjaya and Sushma [7] in chrysanthemum.

The maximum flower yield per plant and yield per

Table 2. Quality parameters in various genotypes of chrysanthemum.

Genotypes	Stalk length (cm)	Girth of the flower stalk (mm)	Flower diameter (cm)	Flower weight (g)	Flower color (HMTL true color code chart)	Shelf life (days)	Vase life (days)
Pink Cloud	25.13	2.27	3.01	0.84	#DB7093	3.43	7.00
Star Pink	34.80	3.20	6.23	6.26	#FFB6C1	3.87	8.60
White Prolific	23.87	2.83	4.38	2.20	#FFFFFF	5.50	9.10
Sharad Mala	24.67	2.71	3.82	1.88	#F5FFFA	5.00	8.93
Marigold	36.00	4.12	5.86	5.80	#FFFF00	9.70	17.33
Winter Queen	28.47	2.39	5.64	0.68	#DO2090	3.03	6.10
Autumn Joy	26.87	2.50	5.90	0.80	#DB7093	2.42	5.20
Basanthi	30.40	2.33	3.50	1.00	#FFFF00	4.53	7.87
Vasanthika	32.73	3.86	4.49	1.73	#8B0000	4.90	9.30
Chandani	36.37	3.95	3.89	1.20	#FFFFE0	6.00	10.50
Lakkundi	31.27	3.36	4.35	1.96	#FFFF00	6.80	11.70
Bellatti	24.00	3.00	4.60	1.32	#FFFFE0	4.93	8.43
White Seventige	42.13	4.05	6.46	2.31	#FFFFFF	4.23	12.30
Arka Pink Star	13.07	1.93	2.54	0.55	#FFB6C1	5.93	9.63
Arka Chandrika	28.27	2.43	5.22	2.24	#FFFFFF	4.80	8.67
Arka Chandrakanth	46.80	4.35	6.01	3.29	#FFFFFF	4.00	12.00
SEM±	1.69	0.12	0.18	0.11	—	0.26	0.43
CD at 5%	4.89	0.34	0.53	0.32	—	0.74	1.25

plot and per hectare was recorded in genotype Chandani (830.49 g/plant, 24.91 kg/plot and 41.01 t/ha, respectively) which was significantly superior over all other genotypes whereas, the genotype Arka Pink Star recorded minimum flower yield per plant (49.60 g/plant, 2.54 kg/plot and 2.45 t/ha, respectively). Higher yield might be due to production of more photosynthates resulting in greater accumulation of dry matter which in turn leads to production of more flower yield per hectare. These results are in line with studies of Jamaluddin et al. [2], Suvija et al. [5] in chrysanthemum.

The quality parameters like maximum stalk length and stalk girth were recorded in the genotype Arka Chandrakanth (46.80 cm and 4.35 mm, respectively). However, the minimum stalk length was recorded in genotype Arka Pink Star (13.07 cm and 1.93 mm, respectively). This might be due to high accumulation of carbohydrates in the stem. These results are in line with the earlier findings of Jamaluddin et al. [2] and Baskaran et al. [8] in chrysanthemum.

Significantly maximum flower diameter was re-

corded in the genotype White Seventige (6.46 cm) and it was statistically on par with genotypes Star Pink (6.23 cm) and Arka Chandrakanth (6.01 cm) whereas, minimum flower diameter was recorded in the genotype Arka Pink Star (2.54 cm). Suvija et al. [5] showed that the flower diameter is directly correlated with weight of individual flower and flower yield per plant. The variation in flower size in these genotypes may be attributed to the inherent genetic characters of the individual cultivars and environmental factors. Similar trend was observed in chrysanthemum by Vetrivel and Jawaharlal [9].

Significantly highest individual flower weight (6.26 g) was recorded in the genotype Star Pink whereas, the genotype Arka Pink Star registered least for flower weight (0.55 g). The variation among the genotypes was mainly because of increased flower size. Similar type of variations were observed by Lakshmi et al. [1], Suvija et al. [5] and Baskaran et al. [8] in chrysanthemum.

Genotype Marigold manifested highest shelf life (9.70 days) and vase life (17.33 days). Whereas, the

least flower shelf life and vase life was observed in the genotype Autumn Joy (2.42 days and 5.20 days, respectively) followed by Winter Queen (3.03 days). Suvija et al. [5] showed that this variation may be due to different genetic makeup of genotypes and influenced by prevailing environmental conditions which affect the physiological processes of flower like cell turgidity, water loss through evapotranspiration and break down of the reserve food which governs the shelf life of the flower. A similar variation has been reported previously by Parul et al. [6], Baskaran et al. [8], Vetrivel and Jawaharlal [9] and Joshi et al. [10] in chrysanthemum.

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