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## Evaluation of *Chrysanthemum* cultivars for pot mums

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### Abstract

Twelve varieties of *Chrysanthemum*, namely Bidhan Madhuri, Bidhan Purna, HYDC-2, HYDC-4, HYDC-8, Plants and Seeds Choice, Red Gold, Red Stone, Shova, Silper White, Silper Yellow, Bidhan Swapna were evaluated with the aim to identify suitable cultivar for pot mum under Hyderabad conditions during the year 2018-2019 at Floricultural Research Station, Rajendranagar, Hyderabad. The results revealed that in the flowering parameters, the cultivars Red Gold (41.60 days) recorded minimum days for visible flower bud formation whereas, cultivar Silper White (91.00 days) was late to form flower buds. Number of days taken for 50 percent flowering varied from 81.40 days (Red Gold) to 97.8 days (Bidhan Madhuri). Among all cultivars the number of days from planting to flowering was earlier in Bidhan Purna (92.47 days) and number of flowers per plant ranged from Silper White (6.33) to HYDC-2 (23.07). Cultivars HYDC-2 (23.07), HYDC-4 (20.27), Red Stone (19.25), Bidhan Madhuri (17.87) and Red Gold (16.27) recorded appreciable number of flowers.

Among the quality attributes, flower diameter ranged from 2.75 cm (Plants and seeds choice) to 6.35 (Silper White), number of ray florets ranged from 42.00 (HYDC-8) to 255.93 (Red Stone) and duration of flowering ranged from 14.13 days (HYDC-4) to 24.73 days (Bidhan Swapna) and flower longevity on plant ranged from 13.60 days (Bidhan Purna) to 24.87 days (Bidhan Madhuri). Based on the flowering attributes the highest pot presentability score was observed in HYDC-2 (54 out of 60) followed by Red Stone (51 out of 60) and Red Gold (50.33 out of 60).

**Keywords:** *Chrysanthemum*, cultivars, pot mums

### Introduction

Floriculture is a fast emerging competitive industry in India owing to its varied agro climatic conditions suitable for cultivating various flowering crops. It is considered to be an art and knowledge of growing flowers to perfection and is an interdisciplinary science that is both challenging and rewarding. Floriculture crops include house plants, flowering plants, pot plants and cut flowers. Among them pot mums are generally used for garden display and in landscaping.

*Chrysanthemum* ranks 2<sup>nd</sup> in national loose flower market. The genus comprises of huge biodiversity in their growth habitat, flowering behavior, flower and foliage colour, shape and size. Based on the flower head size, it is classified into three major groups viz., large flowered (eight types), small flowered (ten types) and mini Chrysanthemums. The dwarf and compact growing once on the other hand, were suitable for front row planting or as pot mums. The present investigation was therefore initiated to select a stable cultivar for pot mum under local conditions and to obtain clear picture on various characters which affect the quality of pot mum.

### Material and Methods

The present study was conducted at Floricultural Research Station, Agricultural Research Institute, Rajendranagar, Hyderabad. Twelve genotypes of *Chrysanthemum* collected from Floricultural Research Station were evaluated during Rabi 2018 and 2019. Twelve cultivars are Bidhan Madhuri, Bidhan Purna, HYDC-2, HYDC-4, HYDC-8, Plants and Seeds Choice, Red Gold, Red Stone, Shova, Silper White, Silper Yellow, Bidhan Swapna. The experiment was laid out in Completely Randomized Design with three replications. The media used is Soil+Cocopeat+Vermicompost in the ratio of (2:1:1). The rooted cuttings were planted in the pot size of 6 inches at 15cm spacing. Uniform recommended package of practices were followed along with nutritional application and normal irrigation. The data on number of days taken for flower bud initiation, 50% flowering, full bloom, number of flowers per plant, number of flowers for pot, flower diameter, number of ray florets per flower head, flower longevity on plant, duration of flowering and pot presentability. The observations were statistically analysed.

## Results and Discussion

### Flowering Parameters

#### Number of days taken for flower bud initiation

The Cv. Red Gold is the earliest for flower bud initiation but early flowering was observed in Bidhan purna. The cultivars showing lesser time for bud development after formation of flowering would be more desirable for pot culture than those taking longer time. Further, days taken to flowering is a heritable character and depends upon the genotype of the plants (Jong, 1984, Ponnuswamy *et al.*, 1985 and Hemlata, *et al.*, 1992) [7, 3].

#### Number of days taken for 50% flowering

Number of days taken for 50% flowering was ranged from 81.40 (Red Gold) to 97.8 (Bidhan Madhuri). The minimum number of days required for 50% flowering (81.40) was noticed in Red Gold which was on par with Bidhan Purna (81.73) and the maximum number of days required for 50% flowering (97.8) was recored in Bidhan Madhuri. Minimum number of days required for 50 % flowering are suitable for pot culture. The cultivars like Red Gold (81.40) and Bidhan Purna (81.73) showed minimum number of days for 50% flowering.

#### Number of days taken for full bloom

Number of days required to full bloom was ranged from 92.40 (Bidhan Purna) to 112.80 (Bidhan Madhuri). The minimum number of days required for full bloom (92.40) was recorded in Bidhan Purna and maximum number of days (112.80) required for full bloom was recorded in Bidhan Madhuri.

Minimum number of days required for full bloom are suitable for pot culture. The cultivars like Bidhan Purna (92.40) and Red Gold (95.07) showed minimum number of days for full bloom. The results were similar to (Barigidad and Patil, 1996) [1] whose flowering period was ranged from 50.59 to 132.99 days in *Chrysanthemum* which resulted late and early flowering habits among cultivars. Flowering times in *Chrysanthemum* are affected by varietal characters, habitat and species type (Kim *et al.*, 2014 and Rajashekar *et al.*, 1985) [5, 8].

#### Number of flowers per plant

Number of flowers per plant ranged from 11.27 (Plants and Seeds Choice) to 23.07 (HYDC-2). The maximum number of flowers per plant (23.07) was recorded in cv. HYDC-2 which was followed by Red Stone (19.25), Bidhan Purna (18.93), Bidhan Madhuri (17.87) and the minimum number of flowers per plant (6.33) was recorded in Silper White.

A cultivar producing more flowers per stem is considered good for pot culture. Plants should have a minimum of 15 flowers free from pest and disease and a plant having 20-25 flowers of good quality would be more desirable. Among the cultivars studied, the cultivars HYDC-2 (23.07), Red Stone (19.25), Bidhan Purna (18.93), Bidhan Madhuri (17.87) and Red Gold (16.27) were qualified for pot mum cultivation. Cultivars bearing lesser flowers on a particular stem could only be considered for pot culture if the number of side shoots on a plant are more.

#### Number of flowers per pot

From the data we can observe that the number of flowers per pot ranged from 13.53 (Silper White) to 77.40 (HYDC-2).

The maximum number of flowers per pot (77.40) was recorded in cv. HYDC-2 which was followed by HYDC-4 (62.8) and the minimum number of flowers per pot (13.53) in cv. Silper White.

Optimum flower number should be decided based upon the size of the bloom. For larger bloomed cultivar like Shova, Silper White and Bidhan Swapna even lesser number of flowers per pot may be desirable as compared to those having smaller size blooms.

### Flower quality parameters

#### Flower diameter (cm)

From the data we can observe that flower diameter ranged from 2.75 (Plants and Seeds Choice) to 6.35 (Silper White). The minimum flower diameter (2.75) was recorded in Cv. Plants and seeds choice which was followed by HYDC-2 (3.55) and the maximum flower diameter was found in (6.35) in Silper White. Similar results were found by (Jamaluddin *et al.* 2015) [4] whose flower diameter of the cultivars ranged from 2.8 cm to 17.6 cm.

#### Number of ray florets per flower head

The maximum number of ray florets (255.93) was recorded in cv. Red stone which was followed by Silper Yellow (237.33) and the minimum number of ray florets (42.00) were recoded in HYDC-8.

Flowers with more number of ray florets are recommended for pot culture. Cultivars Red Stone (255.93), Silper White (237.33) and Bidhan Swapna (215.13) were recommended. Similar results were found by (Suvija *et al.* 2016) [9] in which cv. Indira recorded maximum number of ray florets (242.6) followed by Pusa Anmol (223.50).

#### Duration of flowering (days)

The maximum number of days for duration of flowering was observed in (24.73) was recorded in Cv. Bidhan Swapna which was on par with Red Gold (24.13) followed by Silper White (23.60). The minimum number of days (14.13) for duration of flowering was observed in HYDC-4. Similar results were found by (Neil and Esther, 2003) where duration of flowering ranged from 23.3 to 53.3 days among different cultivars.

#### Flower longevity on plant (days)

The maximum number of days for flower longevity (24.87) was recorded in Cv. Bidhan Madhuri which was on par with Bidhan Swapna (24.40) and the minimum number of days (13.60) for flower longevity was observed in Bidhan Purna.

A cultivar remaining presentable for longest period in the pots is more suitable for the pot culture as compared to those remaining presentable for lesser duration of flowering (24.87 days) in case of Bidhan Madhuri and least in case of Bidhan Purna (13.60 days). The cultivars having pompon and ball type blooms lasts longer than other type of cultivars.

#### Pot Presentability Score

Pot presentability was evaluated on the basis of point system modified after Conover (1986) [2]. The parameters studied and points allotted to each parameter out of a maximum of 60 points, are as follows:

**Table 1:** The parameters studied and points allotted to each parameter out of a maximum of 60 points

b) Flowering	i) Number of flowers for pot ii) Size of flower (cm)		10 10
Sl. No.	Number of flowers per pot	Flower size (cm)	Maximum point
1	>200	2 to 4.0	10
2	>100 to 200	>4 to 6.0	9
3	>50 to 100	>6 to 8.0	8
4	>30 to 50	>8 to 10.0	7
5	30 and below	>10.0	6
c) Colour	i) Flower with good clarity and clear colour ii) No fading or residue present		10
d) Stem and foliage	i) Plant with strong stem ii) Foliage without chlorosis or necrosis		10

Highest pot presentability score among flowering parameters was observed in HYDC-2 (54 out of 60) followed by Red Stone (51 out of 60) and Red Gold (50.33 out of 60). The

lowest presentability score was observed in Plants and Seeds Choice (42.33).

**Table 2:** Number of days taken for flower bud initiation, 50% flowering, full bloom, number of flowers per plant, number of flowers per pot

Cultivars (Treatments)	Days taken for flower bud initiation	Days taken for 50% flowering	Days taken for full bloom	Number of flowers per plant	Number of flowers per pot
Bidhan Madhuri	53.20	97.8	112.80	17.87	54.47
Bidhan purna	46.07	81.73	92.40	18.93	55.67
HYDC-2	51.00	85.33	96.47	23.07	77.40
HYDC-4	53.13	85.80	96.47	20.27	62.8
HYDC-8	50.80	91.60	98.77	13.93	33.60
Plants and Seeds Choice	56.67	95.27	103.53	11.27	31.87
Red Gold	41.60	81.40	95.07	16.27	42.60
Red Stone	46.73	86.53	97.67	19.25	58.87
Shova	42.27	86.07	96.73	13.80	43.00
Silper White	60.73	95.93	106.53	6.33	13.53
Silper Yellow	42.87	86.33	98.07	8.73	19.00
Bidhan Swapna	49.47	88.27	99.20	13.73	31.27
SEm±	0.67	0.68	0.68	0.37	1.03
CD	1.98	1.99	2.00	1.09	3.01

**Table 3:** Flower diameter, number of ray florets per flower head, duration of flowering and flower longevity on plant

Cultivars (Treatments)	Flower diameter (cm)	Number of ray florets per flower head	Duration of flowering (days)	Flower longevity on plant (days)	Pot presentability score (out of 60)
Bidhan Madhuri	4.64	173.93	21.13	24.87	48.00
Bidhan purna	5.30	75.33	19.60	13.60	45.00
HYDC-2	3.55	78.00	20.07	20.80	54.00
HYDC-4	3.97	76.87	14.13	18.40	48.33
HYDC-8	4.95	42.00	20.07	21.33	44.33
Plants and Seeds Choice	2.75	126.47	18.00	17.93	42.33
Red Gold	5.11	149.13	24.13	21.00	50.33
Red Stone	4.70	255.93	21.20	19.20	51.67
Shova	5.48	56.60	21.20	20.67	46.33
Silper White	6.35	237.33	23.60	19.27	41.33
Silper Yellow	5.93	147.33	21.20	18.47	40.00
Bidhan Swapna	5.10	215.33	24.73	24.40	49.00
SEm±	0.07	0.57	0.86	0.30	0.73
CD	0.20	1.67	0.29	0.90	2.15

## Conclusion

On the basis of results obtained from the present investigation, it can be concluded that among 12 cultivars studied, HYDC-2 has highest presentability score (54.00) out of 60 and Red Stone (51.67) followed by Red Gold (50.33). These cultivars are best suited as pot mums.

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