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Study on the performance evaluation of China aster (*Callistephus chinensis* L. Ness) Cultivars in Hyderabad conditions

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Abstract

The present experiment was carried out to study the performance of six genotypes of China aster at Floricultural Research Station, SKLTSHU, Hyderabad during 2016-17 to 2018-19 for three years. The mean results of the three years study revealed that, maximum plant height (42.70 cm) and stalk length (17.62 cm) was recorded in Local Pink cultivar. The least number of days (46.05 days) to 50 per cent flowering was registered in Arka Kamini and highest (66.20 days) in Local Pink cultivar. The maximum flower diameter (7.37 cm) was noticed in Local Pink and minimum in Arka Poornima (5.87 cm). Number of flowers per plant (24.45) and 100 flower weight (392.42 g) was recorded in Local Pink and followed by Local White (21.08 & 371.05 g) respectively without any significant difference. However, the lowest number of flowers per plant (13.40) was observed in Arka Poornima. Maximum vase life (11.00 days) was recorded in Local Pink followed by Local White (8.75 days) without any significant difference, the shelf life of flowers was found non-significant.

Keywords: China aster, cultivars, performance, variation

Introduction

China aster a herbaceous annual plant which belongs to aster family (Asteraceae), commonly called as Annual Aster (*Callistephus chinensis* L. Ness). It is a native species of China grown for wide range of flower colours. There are many cultivars in China aster worldwide in cultivation, varying in height from 20 to 100 cm tall and with flower head diameter up to 12 cm. The flowers colours range from white, pale yellow, pink, rose, red, blue, purple to violet. The most common form is a single row of colourful petals around a yellow central disc. However, there are semi double types with several rows of outer petals and double blooms with yellow centre visible. Due to the presence of lot of variation in flower types, flower diameter and flower colours, evaluation of cultivars for a particular location for commercial cultivation and garden needs is very important, to find out appropriate cultivars for specific purposes. Hence, the present study was formulated to determine the suitable cultivar of China aster for loose flower cultivation and garden display.

Material and Methods

The present experiment was carried at Floricultural Research Station, SKLTSHU, Rajendranagar, Hyderabad for three from 2016-17 to 2018-19. The experimental site comes under semi arid tropical climate with an average rainfall of 615.6 mm, located at an altitude of 542.3 above mean sea level at latitude of 17.90° North and longitude of 78.23° East.

Six cultivars were taken for evaluation under Hyderabad conditions. The experiment was laid out in Randomized Block Design with four replications, 30 plants per each replication were planted at a spacing of 30X30 cm. The study was conducted under open field conditions with all recommended agro techniques. Five randomly tagged plants per replication were used for recording various observations on vegetative parameters viz. plant height, stalk length; floral parameters viz. days to 50 per cent flowering, flower diameter, flowering duration; yield parameters viz. number of flowers per plant, weight of 100 flowers and postharvest parameters viz. vase life and shelf life of flowers. The data recorded was statistically analysed using MSTAT software and the difference of means was compared at five per cent level of significance. The details of the cultivars evaluated (treatments) are given below.

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- 1 Arka Aadhya
- 2 Arka Archana
- 3 Arka Kamini
- 4 Arka Poornima
- 5 Local Pink
- 6 Local White

Results and Discussion

Mean performance of cultivars for Growth Parameters

The data presented in the Table 1 represents the significant variations in growth parameters of China aster cultivars. Among the six cultivars the mean maximum plant height (42.70 cm) was recorded in Local Pink cultivar, which was on par with Local White (42.02 cm) and minimum plant height (25.89 cm) was observed in Arka Poornima. This variations among the cultivars may be due to the genetical makeup of the plant, variation in plant height among different cultivars was also reported by Chavan *et al.* (2010) [1], Teerath and Chaudhary (2016) [2], Chowdhuri *et al.* (2016) [3] in China aster.

The stalk length was maximum (17.62 cm) in Local Pink and was on par with all other cultivars except Arka Poornima (12.72 cm) and Arka Kamini (14.35 cm), whereas Arka Poornima recorded significantly minimum stalk length (12.72 cm). Maynard and David (1987) [4] suggested that availability of congenial environment to express the dominant gene in the genotypes might be the reason for this variation. Similar results were also reported by Krishanswaroop *et al.* (2004) [5], Zosiamliana (2013) [6] and Teerath and Chaudhary (2016) [2] in China aster.

Mean performance of cultivars for flowering Parameters

The cultivars tested showed significant variations for flowering characters as indicated in Table 2. Earliest in 50 per cent flowering (46.05 days) was recorded in Arka Kamini which was on par with Arka Poornima (51.16 days). However, maximum days to 50 per cent flowering (66.20 days) were observed in Local Pink cultivar and were on par with Local White (61.97 days). Number of days taken to early flower denotes earliness or late flowering habit of cultivation. Both habits are helpful in determining the availability of flowers for a longer period (Behera *et al.*, 2002) [7]. As suggested by Singh *et al.* (2014) [8], earliness in flowering reduces the flowering duration and increases the profit. Further, Dhiman (2003) [9] opined that, more dry matter accumulation during favorable climatic conditions might be the reason for earliness in flowering. This kind of variation in days to flowering was also reported by Kumar and Patil (2003) [10], Khangjarakpam *et al.*, 2014 [11] and Teerath and Chaudhary (2016) [2] in China aster.

The maximum flower diameter (7.37 cm) was registered in Local Pink, which was on par with Local White (6.94 cm) and minimum flower diameter (5.87 cm) was recorded in Arka Poornima. Remaining genotypes documented intermediate results. This variation in flower diameter among cultivars could be attributed to the inherent genetic and environmental factor. A similar result of variation was also reported by Poornima *et al.* (2006) [12], Bhargav (2014) [13] and Chowdhuri *et al.* (2016) [3] in China aster.

Flowering duration was recorded maximum in Local Pink (38.08 days) and was on par with other cultivars and statistically significant with Arka Adhya (34.52 days) and Arka Poornima. Significantly minimum duration of flowering was noticed in Arka Poornima (27.09 days). Flowering duration is helpful in determining the availability of flowers for a longer period of time (Teerath and Chaudhary, 2016) [2].

The present results are in accordance with the reports of Zosiamliana (2013) [6] and Khangjarakpam *et al.* (2014) [11] in China aster.

Mean performance of cultivars for yield attributes

It is clear from the table 3 that, yield attributes varied significantly among the cultivars of China aster. Maximum number of flowers per plant (24.45) was recorded in Local Pink which was on par with Local White cultivar (21.08), Arka Kamini (20.66) and Arka Archana (20.38). Significantly lowest number of flowers per plant (13.40) was observed in Arka Poornima cultivar. Similarly, Maximum 100 flowers weight of flowers (392.42 g) was recorded in Local Pink cultivar which was on par with Local White (371.05 g), Arka Archana (350.22 g) and minimum was observed in Arka Kamini (270.53 g). Number of flowers per plant is one of the important factors contributing to the yield of plant, it is a genetic trait. Similar results were also reported by Poornima *et al.* (2006) [12], Chowdhuri *et al.* (2016) [3] in China aster.

Mean performance of cultivars for postharvest life

Cultivars showed significant differences for storage parameters (Table 4). Maximum vase life (11.00 days) was recorded in Local Pink cultivar which was significantly followed by Local White (8.75 days) and minimum (7.71 days) was noticed in Arka Poornima which was on par with Arka Kamini (7.77 days), Arka Archana (7.84 days) and Arka Adhya (7.47 days). Similarly, maximum shelf life (2.39 days) was noticed in Local Pink cultivar and minimum in Arka Kamini (1.98 days). Whereas, shelf life was found non-significant in all cultivars. As the vase life was studied in distilled water and shelf life under same temperature and relative humidity, the variation in vase life of cultivars might be due the genetic nature of the cultivar. Similar variations in vase life was also reported by Zosiamliana (2013) [6], Pandey and Rao (2014) [14] and Teerath and Chaudhary *et al.* (2016) [2] in China aster.

Table 1: Mean Performance of cultivars of China aster for growth parameters

S No.	Cultivar	Plant Height (cm)	Stalk length (cm)
1	Arka Aadhya	26.88	16.02
2	Arka Archana	30.92	16.34
3	Arka Kamini	29.58	14.35
4	Arka Poornima	25.89	12.72
5	Local Pink	42.70	17.62
6	Local White	42.02	17.13
	SE(m) ±	2.21	0.80
	CD at 5%	7.05	2.55

Table 2: Mean Performance of cultivars of China aster for flowering parameters

S No.	Cultivar	Days to 50 % flowering	Flower diameter (cm)	Flowering duration (Days)
1	Arka Aadhya	55.84	6.24	34.52
2	Arka Archana	56.71	6.54	37.83
3	Arka Kamini	46.05	6.05	36.48
4	Arka Poornima	51.16	5.87	27.09
5	Local Pink	66.20	7.37	38.08
6	Local White	61.97	6.94	37.24
	SE(m) ±	1.72	0.25	1.34
	CD at 5%	5.48	0.81	4.28

Table 3: Mean Performance of cultivars of China aster for yield parameters

S No.	Cultivar	No. of Flowers/ Plant	100 flower weight (g)
1	Arka Aadhya	18.42	281.58
2	Arka Archana	20.38	350.22
3	Arka Kamini	20.66	270.53
4	Arka Poornima	13.40	288.17
5	Local Pink	24.45	392.42
6	Local White	21.08	371.05
	SE(m) ±	1.55	24.81
	CD at 5%	4.96	79.17

Table 4: Mean Performance of cultivars of China aster for postharvest parameters

S No.	Cultivar	Vase life (days)	Shelf life (days)
1	Arka Aadhya	7.97	1.99
2	Arka Archana	7.84	2.09
3	Arka Kamini	7.77	1.98
4	Arka Poornima	7.71	2.10
5	Local Pink	11.00	2.39
6	Local White	8.75	2.22
	SE(m) ±	0.64	0.17
	CD at 5%	2.03	NS

Conclusion

Based on the number of flowers per plant and weight, Local Pink, Local White, Arka Kamini cultivars are suitable cultivars for loose flower production and Arka Archana is suitable for garden display.

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