

Evaluation of China Aster (*Callistephus chinensis*) Genotypes for Cut Flower Production

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ABSTRACT: China aster [*Callistephus chinensis* (L.) Nees] belongs to the family asteraceae and is native of Northern China. It is grown commercially as cut flower for flower arrangement and interior decoration. A field experiment was conducted to assess suitability of the china aster genotypes for cut flower production with regard to growth, yield and quality parameters at Department of Horticulture, University of Agricultural Sciences, Dharwad during 2019-20. The aim of present experiment was to identify the suitable cut flower genotype for Dharwad condition. The experiment was laid out in Randomized Block Design with three replications of ten varieties (Namdhari Pink, Namdhari White, Arka Kamini, Arka Poornima, Arka Shashank, Phule Ganesh Purple, Phule Ganesh Pink, AAC-1, Miraj Local and Pink Cushion). The results of the study indicated that maximum plant height (63.41 cm) was recorded in variety Phule Ganesh Purple while, Phule Ganesh Pink recorded maximum plant spread (41.72 cm) at 90 days after transplanting. Variety Arka Shashank is early to flower (39.08 days). Maximum flower diameter (7.42 cm), flower stalk length (42.38 cm), vase life of cut flowers (11.30 days) and number cut flower per plant (22.39) was reported in variety Phule Ganesh Pink. The overall study revealed that Phule Ganesh series found promising for cut flower production among the all genotypes evaluated in this zone (Dharwad).

Keywords: China aster, evaluation, varieties, Flower quality parameters, yield parameters.

INTRODUCTION

China aster [*Callistephus chinensis* (L.) Nees] is one of the predominant members of the 'asteraceae' family and is native of Northern China (Navalinskien *et al.*, 2005). The genus '*Callistephus*' is procured from Greek words 'kalistos' and 'stephos' these are symbolizing 'most beautiful' and 'a crown'(flower head) respectively. Cassini narrated *Callistephus hortensis* as china aster. Fore mostly Linnaeus described it as *Aster chinensis* however, Nees subsequently altered to *Callistephus chinensis*.

China aster is one of the most popular annual flower crops cultivated widely due to its myriad colours ranging from violet, purple, magenta, pink and white. Among the annuals, China aster is ranked third for popularity, after Chrysanthemum and Marigold. Small and marginal farmers of Karnataka, West Bengal, Tamil Nadu, Andhra Pradesh and Maharashtra were commercially grown the china aster.

The cut flower is an important floricultural product and refers to a flowering stem ending in a single flower or bearing a number of small flowers radiating from the

base. China aster is grown commercially as cut flower for flower arrangement, interior decoration and loose flower for garland making, worshipping (Munikrishnappa *et al.*, 2013), pot plant and bedding in landscaping.

Angadi *et al.* (2000) studied on performance of china aster varieties. The results revealed that the double type cultivar 'Violet Cushion' was more acceptable for cut flower production.

Experiment was conducted on performance of china aster varieties by Kaushal *et al.* (2014) the results revealed that variety Arka kamini gives maximum cut flower per plot (163.20). However early flowering (103.30 days) and longest vase life (10.14 days) was reported in variety Arka Shashank and Violet Cushion respectively.

Aditya *et al.* (2019) carried out investigation on performance of seven china aster genotypes. Arka adhya registered for maximum flower head circumference (16.12 cm) and flower diameter (5.13 cm) while, Arka Shashank reported longest flower stalk (19.88 cm) and longer duration of vase life (7.70 days) in normal tap water.

An assessment on china aster genotypes for flowering, yield and post harvest life was carried out by Bhargav *et al.* (2019) revealed that the genotype 'IIHRG13' reported maximum flowering duration (34.40 days) and longer vase life (4.42 days). Maximum length of stalk was assessed in IIHRCC39 (49.10 cm) and these two genotypes were considered as suitable for cut flower production.

However there is always a demand of superior and new flowers over the existing cultivars. Therefore, there is need to identify stable genotypes having maximum cut flower yield and post harvest quality. Therefore, an investigation was conducted on assessment of China aster (*Callistephus chinensis*) genotypes for cut flower production.

MATERIALS AND METHODS

The current study was conducted at floriculture unit, university of agricultural sciences, Dharwad during 2019-20. Totally 10 genotypes were collected from different sources and evaluated for growth, yield and quality parameters. Geographical site of experimental fields is located in the Northern Transitional Zone (Zone VIII) of Karnataka state situated at 15°26' North latitude, 75°07' East longitude with an altitude of 678 m above the mean sea level.

The experiment was laid out in Randomized Block Design with three replications. The seedlings of china aster were planted at 30 × 30 cm spacing. Uniform cultural practices were followed to raise the successful crop. Five plants per replication were selected for recording observations. The data on plant height (cm), plant spread (cm), days to flower bud appearance, days to full bloom (days), duration of flowering (days), number of cut flowers /plant, flower diameter (cm), stalk length (cm) and vase life (days). The observations were statistically analysed.

RESULTS AND DISCUSSIONS

The china aster genotypes exhibited significant variation for all the traits studied under Dharwad condition. The genotype Phule Ganesh Purple recorded maximum plant height (59.56 cm) and Arka Shashank recorded minimum plant height (44.71 cm) which was less vigorous in growth (Table 1). Differences in plant height among the cultivars may be due to the varietal character coupled with growing condition. Similar variation in plant height was given by Dharmendra *et al.* (2019) in china aster and in marigold by Singh *et al.* (2004).

Cultivars had significant influence on plant spread. Phule Ganesh Pink recorded highest spread (39.14 cm) and it might be attributed to enhanced number of branches with more internodal length and wider angle between the branches during later period of growth.

Whereas, lowest spread recorded in Arka Shashank (23.54 cm). The differences in plant spread is governed by genetic make up of particular variety. Correspondent variation for spread of plant in china aster recorded by Rai *et al.* (2016); Nishchitha *et al.* (2016).

Days taken for initiation of flower bud is an important character describing the earliness of flowering which is useful for the selection of precocious varieties. Arka Shashank was found early to initiate flower bud (38.24 days) and first flowering (42.91 days) compared to others while, Phule Ganesh series were late (Table 1). This could be because of cultivar characters and enhanced vegetative growth might have influenced on early transformation of vegetative growth into reproductive stage in early cultivars as observed in the present study as well as earlier conclusions by Munikrishnappa *et al.* (2011); Kumari *et al.* (2017) in china aster and Chourasia *et al.* (2015) in tuberose. They reported that food stock in plant that could be related to the growth rate of plants regulating accumulation of requisite level of carbohydrates resulted early flowering.

Phule Ganesh Pink recorded maximum flower diameter (7.31 cm) which was followed by Arka Poornima (6.48 cm) and Phule Ganesh Purple (6.31cm) whereas, Arka Shashank (3.85 cm) recorded minimum flower diameter. Longer flower stalk length (42.26cm) was reported by Phule Ganesh Pink (Table 2). While, Arka Shashank and Arka Kamini recorded minimum flower stalk length (29.04cm and 30.54 cm respectively). The diversity among the different varieties resembles the earlier studies by Srinivasulu *et al.* (2004); Nishchitha *et al.* (2016) in china aster and Sushma *et al.* (2017) in chrysanthemum.

Longer vase life of flowers was recorded by Phule Ganesh Series. Phule Ganesh Pink documented maximum vase life of 10.80 days and it was followed by Phule Ganesh Purple (9.98 days) and Arka Poornima (9.15 days) while, Namdhari White (6.86 days) had minimum vase life. Variation among the different varieties perhaps attributed to inherent composition of these varieties as it has been demonstrated earlier in china aster (Ravimumar, 2002; Chowdhuri *et al.*, 2016; Bhargav *et al.*, 2018) and in marigold (Nandakishor and Raghava 2001).

For the trait number of cut flower per plant(22.39), were found highest in Phule Ganesh Pink compared to all other cultivars in study and suitable for cut flower production in china aster among the assessed cultivars due to longer and thick flower stalk along with maximum vase life and genetic factors also influence the variations among the cultivars. Munikrishnappa *et al.* (2011); Zosiamlina *et al.* (2012) in china aster and Philip *et al.* (2019) in rose.

Table 1: Variation in growth parameters flower parameters of different varieties of China aster (*Callistephus chinensis*).

Varieties	Plant height at 90 DAT (cm)	Plant spread at 90 DAT (cm)	Days taken for bud initiation	Days taken for flowering
Namdhari Pink	55.65	32.72	40.93	45.27
Namdhari White	53.72	30.09	43.66	48.46
Arka Kamini	51.21	28.39	45.62	51.06
Arka Poornima	59.51	33.88	40.36	47.14
Arka Shashank	49.54	26.08	34.58	39.08
Phule Ganesh Purple	63.41	38.61	57.66	64.40
Phule Ganesh Pink	61.51	41.72	55.71	63.39
AAC-1	58.58	36.56	45.94	51.07
Miraj Local	56.94	34.13	49.57	55.04
Local Pink	54.49	31.56	52.63	56.68
S. Em. ±	0.37	0.59	0.33	0.20
C. D. (at 5%)	1.21	1.93	1.06	0.66

DAT: Days After Transplanting

Table 2: Variation in flower quality and yield parameters of different varieties of China aster (*Callistephus chinensis*).

Varieties	Flower diameter (cm)	Flower stalk length (cm)	Vase life (days)	Number of cut flowers per plant
Namdhari Pink	5.17	33.23	7.40	11.30
Namdhari White	4.43	32.22	6.88	9.26
Arka Kamini	4.38	1.13	8.15	13.67
Arka Poornima	6.57	36.31	9.20	18.05
Arka Shashank	3.77	30.03	9.00	6.23
Phule Ganesh Purple	6.42	40.13	10.11	19.04
Phule Ganesh Pink	7.42	42.38	11.30	22.39
AAC-1	5.18	7.11	8.49	10.50
Miraj Local	5.31	39.24	8.06	10.10
Pink Cushion	5.62	4.07	7.62	8.53
S. Em. ±	0.12	0.11	0.08	0.25
C. D. (at 5%)	0.38	0.36	0.26	0.80



Plate 1. Vase life studies in different varieties of china aster.

CONCLUSIONS

The significant variations were observed among the ten genotypes for the vegetative, yield and quality traits. Cut flower yield per plant, vase life and flower stalk length should be given top priority for the direct selection of best cut flower genotype. Among the all evaluated genotypes Phule Ganseh series were performed best under Dharwad condition. The evaluation of distinct china aster genotypes helps for identifying the superior genotype for crop improvement.

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Conflict of Interest. None.

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