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Performance of different varieties of China aster under Nagpur conditions

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Abstract

A field experiment was carried out to study the performance of different China aster varieties at Satpuda Botanic Garden, College of Agriculture, Nagpur from October, 2016 to March, 2017 in randomised block design with 8 treatments comprising of eight varieties of China aster viz., V₁ – Phule Ganesh White, V₂ – Phule Ganesh Purple, V₃ - Phule Ganesh Pink, V₄ - Arka Shashank, V₅ – Arka Kamini, V₆ – Arka Poornima, V₇ – Arka Aadhya and V₈ – Arka Archana replicated thrice. The results revealed that, significantly maximum plant height was registered with the variety Arka Poornima, whereas, leaf area and branches plant⁻¹ were recorded significantly highest with Phule Ganesh White. Similarly, the flower yield plant⁻¹ and weight of a flower were found to be the highest with the variety Phule Ganesh White. Significantly the maximum length of flower with pedicel and blooming period were also registered with the variety Phule Ganesh White, whereas, petals flower⁻¹ were recorded maximum with Phule Ganesh Pink. The earliest first flower bud initiation was recorded with variety Arka Archana.

Keywords: Aster, varieties, growth, flower yield, quality

Introduction

China aster (*Callistephus chinensis* Nees.) is an important commercial flower crop of our country belonging to the family *Asteraceae*. It is a free blooming half hardy, easy growing winter annual crop grown for cut flower as well as loose flower. The bloom type depends mainly upon the relative number of the two kinds of florets and their shapes. The most suitable character for the classification of China aster is the shape of ray florets. In importance China aster ranks next to chrysanthemum and marigold among the traditional flowers. Though the flower yield and quality are primarily varietal characters, they are also greatly influenced by climatic factors, ultimately leading to variation in their performance. China aster is commercially grown by marginal and small farmers in Maharashtra. It has a great demand in local market as cut flower and potted plants. Although, there are sufficient number of cultivars under cultivation but their performance are region specific and varies from place to place, information on best China aster cultivar for loose flower production and cut flower production is lacking under the Vidarbha region of Maharashtra. Hence, the present investigation was designed to determine the best suitable China aster cultivars for quality cut as well as loose flower production under Nagpur (Vidarbha) conditions.

Materials and Methods

The present experiment was carried out to study the performance of different China aster varieties at Satpuda Botanic Garden, College of Agriculture, Nagpur from October, 2016 to March, 2017 in randomised block design with 8 treatments comprising of eight varieties of China aster viz., V₁ – Phule Ganesh White, V₂ – Phule Ganesh Purple, V₃ - Phule Ganesh Pink, V₄ - Arka Shashank, V₅ – Arka Kamini, V₆ – Arka Poornima, V₇ – Arka Aadhya and V₈ – Arka Archana replicated thrice. All plant materials were collected from IIHR, Bangalore (Karnataka).

The experimental plot was brought to fine tilth by ploughing, clod crushing and harrowing. At the time of land preparation, well-rotted FYM @ 15 t ha⁻¹ was mixed uniformly in the soil before last harrowing. The field was then laid out with flat beds of the dimension 1.50 m x 2.40 m. As per the treatment, uniform and healthy seedlings of eight varieties of aster were transplanted in the prepared plots at the spacing of 30 cm x 30 cm. Treatment wise half the dose of 100 kg nitrogen was applied in the form of urea before transplanting of seedlings and the remaining half dose of nitrogen was top dressed after 30 days of transplanting. However, the full dose of 50 kg phosphorus and 50 kg potassium ha⁻¹ were applied in the form of single super phosphate and muriate of potash, respectively at the time of transplanting. All the cultural operations viz., weeding, irrigation, pest control etc. were carried out as and when

required. Various observations on growth, flowering, yield and quality parameters *viz.*, plant height, branches plant⁻¹, leaf area, days for first flower bud initiation, blooming period, flower yield plant⁻¹, weight of a flower, length of flower with pedicel and petals flower⁻¹ were recorded at proper stages and the data was statistically analysed by the method suggested by Panse and Sukhatme (1995)^[4].

Results and Discussion

The data presented in Table 1 revealed that, different varieties of China aster had significant effect on all growth, flowering, yield and quality parameters.

The range for plant height and branches plant⁻¹ among the cultivars was from 27.90 to 49.87 cm and 8.33 to 12.13, respectively. Significantly maximum plant height (49.87 cm) was recorded with the China aster variety Arka Poornima which was followed by Arka Shashank (47.63 cm) and minimum plant height was recorded with the variety Arka Aadhya (27.90 cm). Whereas, branches plant⁻¹ and leaf area were found significantly the highest with the variety Phule Ganesh White (12.13 & 10.65 cm², respectively) and it was closely followed by Phule Ganesh Pink (12.11 & 10.07 cm², respectively) and minimum branches plant⁻¹ and leaf area were observed with Arka Kamini (8.33 & 7.83 cm², respectively). The plant height and number of branches plant⁻¹ are genetically controlled factors. The significant differences in the plant growth parameters of China aster varieties might be attributed due to the differential genetic makeup and varied growth rate among the varieties of China aster. The better performance of variety Arka Poornima in respect of plant height and Phule Ganesh White in respect of branches plant⁻¹ and leaf area might be due to their genetic make-up and better adaptability to the prevailing environmental conditions. These results are in conformity with the results reported earlier in China aster by Naikwad *et al.* (2019)^[3] and Sankari *et al.* (2019)^[5].

In respect of flowering, significantly the earliest first flower bud initiation was recorded with the variety Arka Archana (68.37 days) which was followed by Arka Aadhya (71.27 days), however, the flower bud initiation was found

significantly late with the variety Phule Ganesh Purple (81.70 days). The different period required for the first flower bud initiation in China aster varieties might be due to the varies growth rate and their different genetic make-up. Similar variation due to different varieties have also been observed by Chowdhari *et al.* (2016)^[2] in China aster.

The range for blooming period of flowers among the cultivars was from 62.34 to 75.11 days. The blooming period was registered significantly highest with the variety Phule Ganesh White (75.11 days) and it was closely followed by Phule Ganesh purple (72.99 days) and the lowest blooming period was noticed with the variety Arka Archana (62.34 days). Similarly, in respect of flower yield and quality parameters like flower yield plant⁻¹ (330.09 g) and weight of a flower (2.59 g) were recorded maximum with the variety Phule Ganesh White which was closely followed by Phule Ganesh Purple (310.51 g and 1.99 g, respectively). Also, significantly the highest length of flower with pedicel (2.95 cm) was registered with variety Phule Ganesh White which was closely followed by Phule Ganesh Purple (2.50 cm). The range for petals flower⁻¹ among the cultivars was found from 33.30 to 139.10. Petals flower⁻¹ was counted significantly highest with the variety Phule Ganesh Pink (139.10) which was closely followed by Arka Aadhya (114.67) and the lowest number of petals flower⁻¹ were noted with the variety Arka Shashank (33.30). The yield of flowers produced per plant might be directly related to production of maximum leaf area and branches plant⁻¹ with good number of developed flower buds on the plant, thereby synthesis of more photosynthates resulted in production of good yield of quality flowers on the branches. Also the increased flower yield might be due to increased weight of flower and number of flowers per plant. The similar results were obtained in China aster which are reported by Chavan *et al.* (2010)^[1] and Zosiamliana *et al.* (2012)^[6].

Thus it can be inferred from the present investigation that, among the different varieties of China aster studied, variety Phule Ganesh White was found superior in respect of maximum growth, flower yield and quality parameters under Nagpur (M.S.) conditions.

Table 1: Plant growth, flower yield and quality of flowers as influenced by different varieties of China aster

Treatments	Plant height (cm)	Branches plant ⁻¹	Leaf area (cm ²)	Days to I flower bud initiation (days)	Blooming period (days)	Yield of flowers plant ⁻¹ (g)	Weight of a flower (g)	Length of flower with pedicel (cm)	Petals flower ⁻¹
T ₁ -Phule Ganesh White	29.87	12.13	10.65	77.23	75.11	330.09	2.59	2.95	93.47
T ₂ -Phule Ganesh Purple	37.33	12.11	10.07	81.70	72.99	310.51	1.99	1.47	105.53
T ₃ -Phule Ganesh Pink	42.57	10.00	8.81	81.43	66.19	229.65	1.75	2.50	139.10
T ₄ -Arka Shashank	47.63	10.20	9.60	78.27	71.27	248.53	1.28	1.61	33.30
T ₅ -Arka Kamini	28.13	8.33	7.83	76.43	67.35	147.78	1.00	1.39	70.13
T ₆ -Arka Poornima	49.87	8.93	8.08	82.43	66.39	206.15	1.57	1.41	110.07
T ₇ -Arka Aadhya	27.90	8.80	8.47	71.27	64.34	197.65	1.75	1.70	114.67
T ₈ -Arka Archana	32.90	11.73	9.67	68.37	62.34	281.09	1.94	1.71	108.90
F-test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
S.E (m)±	0.61	0.26	0.07	0.17	0.35	2.10	0.02	0.03	0.22
C.D. at 5%	1.86	0.78	0.21	0.51	1.07	6.36	0.05	0.10	0.67

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