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## Response of China aster varieties to pinching

**Neha Chopde, AR Palekar and Ommala Kuchanwar****Abstract**

A field experiment was carried out to study the response of China aster varieties to various pinching treatments at the farm of Horticulture section, College of Agriculture, Nagpur from October, 2017 to March, 2018 in factorial randomised block design with 12 treatment combinations comprising of four varieties of China aster as main factor viz., V<sub>1</sub> – Arka Kamini, V<sub>2</sub> – Arka Archana, V<sub>3</sub> – Arka Shashank and V<sub>4</sub> – Arka Adhya and three pinching methods as sub factor viz., P<sub>1</sub> – No pinching, P<sub>2</sub> – Single pinching and P<sub>3</sub> – Double pinching replicated thrice. Single pinching was carried out on 30<sup>th</sup> day and double pinching on 30<sup>th</sup> and 45<sup>th</sup> day after transplanting. The results revealed that, significantly maximum plant height, flowers plant<sup>-1</sup>, flower yield ha<sup>-1</sup>, flowering span and vase life of flower were registered with the variety Arka Kamini and it was statistically at par with Arka Archana and Arka Shashank with respect to plant height and vase life of flower. The earliest first flower bud initiation was recorded with variety Arka Archana. However, branches plant<sup>-1</sup>, flowers plant<sup>-1</sup>, flower yield ha<sup>-1</sup> and flowering span were noticed significantly maximum with double pinching, whereas, plant height, diameter of flower and vase life of flower were noted maximum and earliest first flower bud initiation with no pinching treatment. An interaction effect was found non-significant with respect to all the parameters.

**Keywords:** aster, pinching, varieties, growth, flower yield, quality**Introduction**

China aster [*Callistephus chinensis* (L.) Nees] belongs to the family Asteraceae and is an important commercial ornamental annual grown in many parts of the world for cut flowers. The wide spectrum of colour ranges available in China aster are pink, bluish, violets, purple and white and their long shelf life have made them a popular flower crop. The growing popularity of China aster in most of the major cities in India has laid to its cultivation as a commercial crop for flower production. In view of China aster adopting well to varying soil and climatic conditions, it can be grown successfully under different agro-climatic conditions.

The demand for flowers of China aster is increasing every year in Vidharbha region of Maharashtra state, but flower yield of this crop is not satisfactory in this region. Successful cultivation of China aster depends upon proper selection of varieties. In recent years, several new cultivars of aster with wide range of colours have entered the market but all the cultivars cannot be grown everywhere successfully. Hence, it is necessary to identify the suitable cultivar for commercial cultivation in the region.

In most of the flower crops, flower yield is mainly dependent on number of flower bearing branches which could be manipulated by arresting vertical growth of plants and encouraging side shoot by means of apical bud pinching. But, studies on influence of pinching in China aster on flower yield and quality particularly under Vidharbha region are meagre. Considering the importance of commercial flower crop of China aster studies on effect of pinching on varieties of China aster was conducted to enhance the flower yield in Vidharbha region.

**Materials and Methods**

The present experiment was carried out at Horticulture section, College of Agriculture, Nagpur from September, 2017 to March, 2018 in Factorial randomised block design to find out the most suitable variety and pinching method for increasing growth and flower yield of China aster with twelve treatment combinations and three replications. The treatments comprised of four varieties of aster viz., Arka Kamini, Arka Archana, Arka Shashank and Arka Adhya and three pinching treatments viz., No pinching (control), single pinching and double pinching.

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<sup>-1</sup> was mixed uniformly in the soil before last harrowing.

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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 four 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<sup>-1</sup> were applied in the form of single super phosphate and muriate of potash, respectively at the time of transplanting. Single pinching was carried out on 30<sup>th</sup> day and double pinching on 30<sup>th</sup> and 45<sup>th</sup> day after 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<sup>-1</sup>, days for first flower bud initiation, flowering span, flowers plant<sup>-1</sup> flowers yield ha<sup>-1</sup>, flower diameter and vase life of flower were recorded at proper stages and the data was statistically analysed by the method suggested by Panse and Sukhatme (1995)<sup>[3]</sup>.

### 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 except branches plant<sup>-1</sup> and diameter of flower. However, the effect of pinching on all the characters studied in China aster was found statistically significant.

**Table 1:** Effect of varieties and pinching on growth, yield and quality of China aster

Treatments	Plant height (cm)	Branches plant <sup>-1</sup>	Days for first flower bud initiation (days)	Flowers plant <sup>-1</sup>	Flower yield ha <sup>-1</sup> (q)	Flower diameter (cm)	Flowering span (days)	Vase life of flower (days)
Main factor- Varieties								
V <sub>1</sub> - Arka Kamini	42.34	14.96	59.06	43.87	92.43	5.51	38.35	9.16
V <sub>2</sub> - Arka Archana	39.12	13.20	54.69	40.15	75.89	5.35	33.57	8.70
V <sub>3</sub> - Arka Shashank	42.06	11.52	59.37	36.97	65.72	4.92	36.40	8.62
V <sub>4</sub> - Arka Adhya	33.15	12.79	56.79	34.03	62.12	5.06	33.75	7.62
F- test	Sig.	NS	Sig.	Sig.	Sig.	NS	Sig.	Sig.
SE(m)±	1.25	1.11	0.81	1.08	2.85	0.19	0.68	0.29
CD at 5%	3.66	-	2.39	3.17	8.37	-	2.01	0.87
Sub factor- Pinching								
P <sub>1</sub> - No pinching	49.14	9.73	48.55	30.55	50.72	6.07	29.54	10.35
P <sub>2</sub> - Single pinching	39.66	13.11	57.06	41.50	77.93	5.08	35.78	8.33
P <sub>3</sub> - Double pinching	28.70	16.52	66.82	44.21	93.48	4.49	41.23	6.89
F test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m)±	1.08	0.96	0.7	0.94	2.47	0.17	0.59	0.26
CD at 5%	3.17	2.83	2.07	2.75	7.25	0.5	1.73	0.75
Interaction (VXP)								
F test	NS	NS	NS	NS	NS	NS	NS	NS
SE(m)±	2.16	1.93	1.41	1.87	4.94	0.34	1.18	0.51
CD at 5%	-	-	-	-	-	-	-	-

### Effect of varieties

Significantly maximum plant height (42.34 cm), flowers plant<sup>-1</sup> (43.87), flower yield ha<sup>-1</sup> (92.43 q), flowering span (38.35 days) and vase life of flower (9.16 days) were registered with the aster variety Arka Kamini and it was found statistically at par with the varieties Arka Archana and Arka Shashank with respect to plant height (39.12 and 42.06 cm, respectively) and vase life of flower (8.70 and 8.62 days, respectively). However, significantly the earliest first flower bud initiation (54.69 days) was noticed with the variety Arka Archana which was found at par with Arka Adhya (56.79 days). The significant differences in the plant growth, yield and quality of China aster varieties might be attributed due to the different genetical makeup and varied growth rate among the varieties of China aster. Shailaja and Panchbhai (2014)<sup>[4]</sup> and Shailaja *et al.* (2014)<sup>[5]</sup> also registered the similar findings in China aster.

### Effect of pinching

Significantly the earliest first flower bud initiation (48.55 days) and highest plant height (49.14 cm), flower diameter (6.07 cm) and vase life of flower (10.35 days) were noted with no pinching treatment, whereas, significantly maximum branches plant<sup>-1</sup> (16.52), flowers plant<sup>-1</sup> (44.21), flower yield ha<sup>-1</sup> (93.48 q) and flowering span (41.23 days) were recorded with the treatment of double pinching. The reduction in the plant height in double pinched plant was mainly due to the

removal of apical meristematic tissue which inhibited the apical dominance and diverted plant metabolites from vertical growth to horizontal growth due to which branches plant<sup>-1</sup> were increased and also the yield in respect of flowers plant<sup>-1</sup> and flower yield ha<sup>-1</sup> were increased which might be due to the reason that extra energy divert into the production of more reproductive parts instead of vegetative parts. Similar decrease in plant height and increase in flower yield due to pinching was reported by Badge *et al.* (2014)<sup>[1]</sup> and Meena *et al.* (2015)<sup>[2]</sup> in African marigold.

### Interaction effect

An interaction effect of China aster varieties and pinching treatments on various growth, flower yield and quality parameters studied was found to be non-significant. Similar non-significant effect of China aster varieties and pinching treatments on various growth, yield and quality parameters was found by Shailaja and Panchbhai (2014)<sup>[4]</sup> and Shailaja *et al.* (2014)<sup>[5]</sup>. However, in respect of vase life of flower Shailaja and Panchbhai (2014)<sup>[4]</sup> recorded that, interaction effect of China aster varieties and pinching treatments was significant.

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