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VARIETAL EVALUATION OF CHINA ASTER (*Callistephus chinensis* L. Nees) UNDER MANIPUR VALLEY AGRO-CLIMATIC CONDITIONS

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ABSTRACT

The field experiment on “Varietal Evaluation of China aster [*Callistephus chinensis* (L.) Nees] under Manipur Valley Agro-climatic Conditions” was conducted at Horticulture experimental field, College of Agriculture, CAU, Imphal, during 2023-2024. The varieties used in the present experiment were ‘Arka Shubhi’, ‘Phule Ganesh Violet’, ‘Arka Aadya’, ‘Arka Shashank’, ‘Arka Nirali’, ‘Arka Kamini’, ‘Arka Archana’ and ‘Phule Ganesh Purple’. The growth parameters were recorded in the interval of 30, 60 and 90 DAT. The maximum plant height (84.73cm), plant spread (E-W) (43.27 cm) (N-S) (41.93 cm), stem girth (13.52mm), stalk length (27.51cm) and diameter of flower (5.39cm) were recorded in the ‘Phule Ganesh Violet’. Maximum number of primary branches (11.07) and secondary branches (90.07) per plant and number of leaves (552.20) are found in the ‘Arka Aadya’. Among flowering attributes, ‘Arka Shashank’ took minimum duration for days to first flower bud initiation (43.73 days) after transplanting, 50 per cent flowering advancement was observed in ‘Arka Shashank’ (60 days) and took limited period (71 days) for first harvest. The maximum flower duration (31.73) is found in ‘Arka Archana’ and the maximum number of flower (89.40) per plant is found in ‘Arka Aadya’. In yield, ‘Arka Aadya’ has recorded the maximum yield (19.59t/ha) followed by the ‘Arka Archana’ (19.25t/ha). The highest vase life (12.83 days) was recorded in the ‘Phule Ganesh Purple’. Thus, the result depicted that ‘Phule Ganesh Violet’, ‘Arka Aadya’ and ‘Arka Shashank’ are the most suitable variety to be grown in Agro-climatic conditions of Manipur.

Key words : China aster, Evaluation, Growth, Yield.

Introduction

China aster [*Callistephus chinensis* (L.) Nees] is one of the most important and demanding winter annual crop. It belongs to the family Asteraceae and is native to China. Later on spread to European countries and other tropical countries during 1731 AD (Desai, 1967). The genus *Callistephus* name is derived from two Greek words “*Kalistos*” meaning most beautiful and “*stephos*” meaning a crown referring to the flower. It is grown commercially as cut flowers for making bouquets, flower arrangements, interior decoration and as loose flowers for making garland and for religious offerings. China aster are half-hardy annuals. Among annual flowers, it ranked next to chrysanthemum and marigold. China aster crop

has a high potential in the market due to its beauty and availability in different colours and sizes. The commercial importance of China aster is increasing in India especially in Karnataka, Tamil Nadu, West Bengal and Maharashtra (Singh *et al.*, 2019). Due to unaware of improved varieties and their performance, the majority of farmers are growing locally available genotypes of China aster viz. local pink, local white etc., which are not only less appealing in terms of shape, size and colour but also gives poor yield. However, improved varieties particularly those from MPKV Rauri and IIHR, Bengaluru are now available for commercial cultivation and are being grown in large areas.

Therefore, present investigation is undertaken for

selection of suitable varieties of China aster based on the performance evaluation for Manipur valley agro-climatic conditions.

Materials and Methods

The present study was conducted at the Horticulture experimental field, Department of Horticulture, College of Agriculture, CAU, Imphal West, during the *Rabi* season of 2023. The experimental site comes under sub-tropical climate located at 24°81'N latitude and 93°89'E longitude at a height of 784 meter above mean sea level. The meteorological conditions prevailing during the experimental period were recorded regularly and the corresponding meteorological data are presented in Fig. 1. Planting material (Seed) were collected from IIHR, Bangalore and MPKV Rahuri. The experiment was laid out in Randomized Block Design with three replications,

Results and Discussion

The data presented in the Table 1 represents the significant variations in growth parameters.

The maximum plant height was recorded in the 'Phule Ganesh Violet'. While, the minimum plant height was found in the 'Arka Archana'. The increase in plant height is due to the cells that continue to proliferate and differentiate in shoot apical meristems, causing growth in plant height, but the activity of apical meristem also differs from one variety to another. It can be due to their genetic trait or its favourable environmental conditions prevailing in the region (Dali *et al.*, 2023). Similarly, the results showing a remarkable difference in plant height among different varieties of China aster were reported by Sankari *et al.* (2019), Heera *et al.* (2019), Swathi *et al.* (2023) and in China aster and Dali *et al.* (2023) in

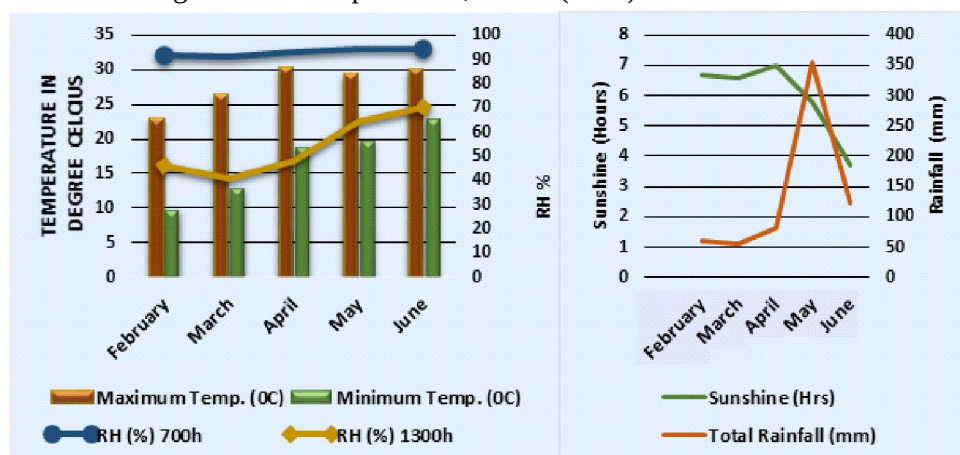


Fig. 1 : Monthly meteorological data recorded during the experimental period (*Rabi* season, 2023) at the experimental site.

comprising of 8 varieties viz., 'Arka Shubhi', 'Phule Ganesh Violet', 'Arka Aadya', 'Arka Shashank', 'Arka Nirali', 'Arka Kamini', 'Arka Archana', 'Phule Ganesh Purple'. The plot size was kept 2m × 1m and seedlings were transplanted with a spacing of 30 cm × 30 cm P-P and R-R. A recommended fertilizer dose of nitrogen @ 90 kg, phosphorus @ 120 kg and potassium @ 60 kg per hectare was applied during field preparation in the form of Urea, SSP and MOP, respectively and top dressing of nitrogen @ 90 kg/ha after 30 days of transplanting (Marak and Kumar, 2022). Five plants were randomly tagged per replication for recording various observations on vegetative parameters viz. plant height, no. of leaves, plant spread (E-W) and (N-S), number of 1° and 2° branches, stem girth; floral parameters viz.; days taken to first bud and flower initiation, days taken to 50% flowering, flower diameter, flower stalk length, flowering duration, yield parameters viz.; number of flowers per plant, yield per plot and yield per ha and vase life of flower were added.

chrysanthemum.

Variety 'Phule Ganesh Violet' recorded the maximum plant spread in both E-W and N-S direction. However, the 'Arka Nirali' recorded minimum plant spread in the E-W and 'Arka Kamini' in the N-S direction. Variation in plant spread can be due to varietal traits, which are determined by the genetic composition and better adaptability of a particular variety to the prevailing environmental conditions, Munikrishnappa (2013). Further Suvija *et al.* (2016) suggested that the difference in plant spread might be due to the additive gene effect. Similarly, the result of variance in plant spread in different varieties were reported by Sankari *et al.* (2019) and (Swathi *et al.*, 2023) in China aster.

The maximum number of leaves per plant was recorded in the 'Arka Aadya'. Whereas, the minimum number of leaves per plant was recorded in 'Arka Nirali'. The production of more number of leaves can be due to genetic trait and adaptability to the prevailing environmental condition which leads to vigorous growth,

Table 1 : Performance of China aster varieties for vegetative growth.

Treatments	Plant height (cm)	Plant Spread (cm)		Number of leaves	Number of primary branches	Number of secondary branches	Stem girth (mm)
		(E-W)	(N-S)				
Arka Shubhi	67.40	25.55	24.81	279.73	10.00	32.47	11.49
Phule Ganesh Violet	84.73	43.27	41.93	331.60	5.33	27.53	13.52
Arka Aadya	59.13	35.70	34.03	552.20	11.13	87.07	12.32
Arka Shashank	63.53	30.46	27.77	400.73	10.53	51.80	10.48
Arka Nirali	62.87	22.33	22.52	239.13	5.87	27.07	10.58
Arka Kamini	54.17	22.93	22.16	317.27	7.40	25.40	10.66
Arka Archana	46.07	35.10	31.83	481.87	8.87	69.33	11.12
Phule Ganesh Purple	79.33	38.80	37.87	296.47	5	27.87	12.87
S.Em (±)	2.38	1.17	1.34	15.20	0.49	2.12	0.23
C.D 5%	7.21	3.55	4.08	46.10	1.49	6.43	0.68

Table 2 : Performance of China aster varieties for flowering parameters.

Treatments	Days taken to flower bud initiation	Days taken to flower initiation	50 % flowering (days)	Flower diameter (cm)	Flower stalk length (cm)	Flowering duration (days)	Vase life (days)
Arka Shubhi	69.27	80.00	83.00	4.96	17.92	28.46	9.47
Phule Ganesh Violet	77.60	96.00	97.13	5.39	27.51	28.33	9.30
Arka Aadya	55.27	68.33	69.33	4.98	13.15	29.86	10.60
Arka Shashank	43.73	59.00	60.00	4.45	13.67	31.2	10.17
Arka Nirali	65.73	82.33	84.13	2.03	13.90	23.73	10.20
Arka Kamini	67.07	79.67	80.67	4.74	14.26	25.53	9.73
Arka Archana	53.73	63.00	65.73	5.00	12.62	31.73	10.57
Phule Ganesh Purple	82.73	100.00	101.67	5.16	26.19	28.8	12.83
S.Em (±)	1.55	1.54	1.25	0.09	0.90	0.52	0.31
C.D 5%	4.69	4.68	3.80	0.26	2.72	1.59	0.94

more number of branches and more number of leaves in China aster. (Swathi *et al.*, 2023).

‘Arka Aadya’ recorded maximum no. of primary branches. While, minimum no. of primary branches was recorded in the ‘Phule Ganesh Purple’. The maximum no. of secondary branches was recorded in the ‘Arka Aadya’. However, the minimum no. of secondary branches was recorded in ‘Arka Kamini’. The maximum stem girth was recorded in ‘Phule Ganesh Violet’ and the minimum plant stem girth was recorded in ‘Arka Shashank’ respectively. The variation among the varieties might be due to genetic make-up of a plant and the prevailing environmental condition. Similarly, the result of variation in growth parameters in different varieties was found by Kumari *et al.* (2017) and Nataraj *et al.* (2020) in China aster.

Flowering parameter

The data presented in Table 2 represent the significant difference in flowering parameters of Chian aster varieties. The variety ‘Arka Shashank’ took minimum days to flower bud initiation after transplanting, followed by ‘Arka Archana’ and ‘Arka Aadya’ over all varieties. While, the ‘Phule Ganesh Purple’ took maximum number of days to bud initiation. Dhiman (2003) suggested that supplementary dry matter accumulation during favourable climatic conditions might be the reason for earliness.

The variety ‘Arka Shashank’ was recorded earliest flowering, followed by ‘Arka Archana’ and ‘Arka Aadya’. 50 per cent flowering advancement was observed in the ‘Arka Shashank’, followed by ‘Arka Archana’ and ‘Arka Aadya’. Shete *et al.* (2023) suggested optimum carbohydrate content in plant body

Table 3 : Performance of China aster varieties for flower yield.

Treatments	Number of flowers/ plant	Yield of flowers/ plant (g)	Yield of flowers/ plot (kg)	Yield of flowers/ ha (t)
Arka Shubhi	51.00	188.70	2.69	13.43
Phule Ganesh Violet	45.13	172.83	2.91	14.56
Arka Aadya	89.40	287.47	3.92	19.59
Arka Shashank	59.07	190.33	1.95	9.75
Arka Nirali	40.00	120.13	0.91	4.57
Arka Kamini	50.07	155.85	1.24	6.19
Arka Archana	76.93	244.96	3.85	19.25
Phule Ganesh Purple	40.67	153.03	2.80	13.98
S.Em (±)	2.06	11.87	0.06	0.28
C.D 5%	6.26	36.00	0.17	0.86

directly influences the commencement of flowering can be the reason for earliness.

Significantly, the maximum flower diameter was recorded by 'Phule Ganesh Violet' while, 'Arka Nirali' recorded the minimum flower diameter. The maximum flower stalk length was recorded in 'Phule Ganesh Violet' which was at par with the 'Phule Ganesh Purple'. While, the minimum flower stalk length was recorded in 'Arka Archana'. Maynard and David (1987) stated that availability of congenial environment to express the dominant gene in the plant might be the reason for this variation.

The maximum flower duration was recorded in the 'Arka Archana' followed by 'Arka Shashank'. While, the minimum flower duration was recorded in the 'Arka Nirali'. 'Arka Shashank' took limited period for first harvest. Most probably the health of the plant with respect to sufficient amount of carbohydrates reserves causes the variation of flowering duration. Similar results were recorded by Alfin *et al.* (2020)

The 'Phule Ganesh Purple' recorded maximum vase life followed by 'Arka Aadya'. Whereas, minimum vase life in the 'Phule Ganesh Violet'. Rinu *et al.* (2024) explained that the vase life of flower is total effect of floral as well as vegetative character of flower. The cultivar showing good vegetative growth and flower quality gives better vase life.

Yield parameters

The data presented in Table 3 represent the significant difference in yield parameters of China aster varieties. The number of flowers per plant was recorded maximum in the 'Arka Aadya' followed by the 'Arka Archana'.

However, the minimum number of flowers per plant was recorded in the 'Arka Nirali'. Maximum yield of flowers/ plant was observed in the 'Arka Aadya', while, minimum in 'Arka Nirali'. Yield of plants per plot was recorded maximum in 'Arka Aadya'. However, minimum yield per plot was recorded in 'Arka Nirali'. Maximum yield of flowers per hectare was recorded in 'Arka Aadya', while, minimum yield per ha was recorded in variety Arka Nirali'. Shete *et al.* (2023) stated that the number of flowers produced per plant might be directly related to production of more plant height, plant spread, number of leaves and more number of branches with good no. of developed flower buds on the branch. The variation may be due to storage of food and genetic makeup of individual variety and suitable environmental condition.

Similarly, Variation in flower yield in different variety was found by Swathi *et al.* (2023) in China aster.

Conclusion

Based on the data results, it showed that the variety Phule Ganesh Violet, Arka Aadya and Arka Shashank are found to be best among all the eight varieties in term of growth, flower yield and quality trait for Agro-climatic conditions of Manipur.

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References

- Alfin, S., Anupama T., Sreelatha U., Minimol J.S. and Sankar M. (2020). Evaluation of China aster (*Callistephus chinensis* (L.) Nees.) genotypes in tropical plains of Kerala. *J. Tropical Agricult.*, **58**(2), 269-272.
- Dali, N.M., Salvi B.R., Pawar C.D., Khandekar R.G., Mane A.V. and Dalvi N.V. (2023). Varietal response of chrysanthemum under Konkan climatic conditions. *The Pharma Innov. J.*, **12**(2), 2785-2788.
- Desai, B.L. (1967). Flower description in China aster (*Callistephus chinensis*). In: *Seasonal flowers*. New Delhi, ICAR Publication, pp. 53-56.
- Dhiman, M.R. (2003). Assessment of chrysanthemum germplasm for commercial cultivation under Kullu valley condition. *J. Ornamental Horticult.: New Ser.*, **4**(2), 95-97.
- Heera, L.A., Bhairwa H.L., Mahawer L.N. and Regar A.L (2019). Studies on performance of China aster [*Callistephus Chinensis* (L.) Nees] varieties in southern Rajasthan agro-climatic conditions. *J. Ornamental Horticult.*,

22(1&2), 33-37.

- Kumari, P., Kumar R., Rao T.M., Bharathi T.U., Dhananjaya M.V. and Bhargav V (2017). Evaluation of China aster [*Callistephus chinensis* (L.) Nees] F₁ Hybrids and Parents for Growth, Flower quality, Yield and Postharvest life. *Int. J. Curr. Microbiol. Appl. Sci.*, **6(8)**, 1543-1549.
- Marak, B.S. and Kumar S. (2022). Nutrient dynamics of China Aster (*Callistephus chinensis*) cv. Kamini with organics, inorganic and biofertilizers. *J. Crop Weed*, **18(1)**, 14-19.
- Maynard, G. and David M.O. (1987). *The physiology of plants under stress*. Willy Interscience Publications, New York, USA.
- Munikrishnappa, P.M., Patil A.A., Patil V.S., Patil B.N., Channappagoudar B.B. and Alloli T.B. (2013). Studies on the growth and yield parameters of different genotypes of china aster (*Callistephus chinensis* Nees). *Karnataka J. Agricult. Sci.*, **26(1)**, 107-110.
- Nataraj, S.K., Seetharamu G.K., Srinivasa V., Balaji S.K., Rajiv K., Lakshmana D., Venugopalan R. and Munikrishnappa P.M. (2020). Screening of China Aster F₁ Hybrids for Growth and Yield Characters. *Int. J. Curr. Microbiol. Appl. Sci.*, **9(5)**, 656-666.
- Sankari, A., Anand M., Kavitha M. and Anita V (2019). *Per se* performance of China aster (*Callistephus chinensis* (L.) Nees) varieties for yield under Nilgiris. *Int. J. Chem. Stud.*, **7(3)**, 1649-1652.
- Shete, M.M., Gaikwad S.D., Lohate S.R. and Bhagat A.A. (2023). Evaluation of China aster varieties under Pune conditions. *The Pharma Innov. J.*, **12(5)**, 3266-3268.
- Singh, M.N. and Rao V.K. (2019). Performance of China aster genotypes under *tarai* region of Uttarakhand. *J. Ornamental Hortic.*, **21(3,4)**, 128-134.
- Suvija, N.V., Kumar S.R., Suresh J. and Jawaharlal M. (2016). Studies On Correlation and Path Coefficient Analysis in Chrysanthemum (*Chrysanthemum morifolium* Ramat). *Int. J. Innov. Res. Adv. Stud.*, **3(7)**, 259-262.
- Swathi, G., Nalini N., Shankar A., Neelima T.L. and Kumar K.A (2023). Evaluation of China Aster (*Callistephus chinensis* L. Nees) Cultivars for Growth, Yield and Quality Parameters under Southern Telangana Zone. *Int. J. Environ. Clim. Change*, **13(5)**, 444-450.
- Zosiamliana, J.H., Reddy G.S.N. and Rymbai H. (2013). Study on the performance of some varieties of China aster (*Callistephus chinensis* Ness) in Andhra Pradesh. *Progressive Horticulture*, **45(2)**, 312-316.
- Rinu, Sushila, Kumar S. and Chandra A. (2024). Experimental economic characterization of China aster (*Callistephus chinensis* L.) under Rajnandgaon District of Chhattisgarh. *Int. J. Adv. Biochem. Res.*, **8(2)**, 526-528.