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Studies on the effect of nitrogen and gibberellic acid on growth, flowering and yield of China aster (*Callistephus chinensis* L. Nees)

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Abstract: The experiment on the effect of nitrogen and gibberellic acid on growth, flowering and yield of China aster *(Callistephus chinensis* L. Nees) was carried out at Department of Horticulture, Faculty of Agriculture, Annamalai University during January to May 2001. Four levels of nitrogen (100, 200, 300 and 400 kg ha^{-1}) and five levels of gibberellic acid (No spray, 100, 200, 300 and 400 ppm) were studied in factorial completely randomized design. Significant interactions were observed for plant height at final harvest stage, number of branches per plant, number of leaves per plant, flower diameter flower stem length and single plant yield. The investigation revealed that China aster crop applied with 200 kg N ha^{-1} along with two sprays of 300 ppm gibberellic acid at fortnightly interval commencing from 30 DAT (N200 GA300) produced the highest yield per plant (37.85 g). The response to both nitrogen and gibberellic acid was found to be non linear. *(Key Words: China aster, Nitrogen, Gibberellic acid, Flower yield).*

China aster *(Callistephus Chinensis* L. Nees) is an important commercial flower grown throughout the world and in India. It is cultivated in an area of about 250 ha in Tamilnadu with an annual production of 3546 tonnes (Anon., 1999). Being a short duration flower crop and its wide adaptability to different agroclimatic condition, it is becoming popular among Tamilnadu farmers and flower lovers. It is mainly used in flower bouquets, button holes and garlands. Keeping in view of the commercial importance of China aster, attempts were made to find out the effect of graded levels of nitrogen and gibberellic acid on growth, flowering and yield.

Materials and Methods

The experiment was carried out at Annamalai University, Annamalainagar during January to May 2001 adopting factorial completely randomized design with three replications. Four levels of nitrogen (N100 - 100 kg N ha^{-1}, N200 - 200 kg N ha^{-1}, N300 - 300 kg N ha^{-1} and N400 - 400 kg N ha^{-1}) and five levels of gibberellic acid (GA0 - No spray of gibberellic acid, GA00 - 100 ppm, GA200 - 200 ppm, GA300 - 300 ppm and GA400 - 400 ppm gibberellic acid spray and their factorial combinations comprised the twenty treatment combinations. Observations were recorded on plant height at final harvest stage, number of branches per plant, number of leaves per plant, flower diameter, flower stem length and single plant yield. The data collected were analysed statistically as per Panse and Sukhatme (1967) for understanding the level of significance.

Results and Discussion

Growth, flowering and yield of China aster were significantly influenced by all the treatments. N at 200 kg ha^{-1} along with 300 ppm gibberellic acid spray registered maximum plant height (74.0 cm) at final harvest stage and it was significantly superior over the next best treatment combinations of N300 GA300 (70.17 cm). The increased plant height might be attributed to increased cell division and cell elongation induced by the interaction of nitrogen and gibberellic acid.

The data (Table 1) regarding number of branches per plant, number of leaves per plant and flower diameter (cm) revealed that application of N at 200 kg ha^{-1} along with 300 ppm gibberellic acid recorded maximum number of branches per plant (26.67), number of leaves per plant (97.33) and flower diameter (6.45 cm). It was followed by 300 kg N ha^{-1} along with 300 ppm gibberellic acid spray. Lowest number of branches per plant (8.00), number of leaves per plant (54.33) and flower diameter (5.01 cm) were recorded in 400 kg N ha^{-1} along with no spray of gibberellic acid. This might be due to the fact that nitrogen and gibberellic acid significantly influenced the growth parameter upto certain extent. Beyond which it retarded the growth. This might be due to favourable action of the nitrogen and gibberellic acid in plants which can compensate for the requirement upto a certain extent. Similar results were also recorded by Maheshwar (1977) and Reddy (1988) in China aster.

Table 1. Effect of graded levels of nitrogen and gibberellic acid on China aster cv. 'Astermix'

Treatment combinations	Plant height at final harvest (cm)	Number of branches per plant	Number of leaves per plant	Flower diameter (cm)	Flower stem length (cm)	Single plant yield(g)
N100 GA0	46.00no	8.001	57.000	5.04g	25,671	7.02no
N100 GAl00	58.00h	12.33h	71.67j	5.81 jk	36.67h	1 3.33jk
N100 GA200	67.00d	19.33d	85.67f	6.0lf	44.67d	21.47ef
N100 GA300	71.17bc	21.33f	92.83c	6.23c	49.00bc	26.97c
N100 GA400	62.00f	15.67f	79.00h	5.92h	41.33ef	17.41hi
N200 GA0	47.00mn	8.66ki	59.00n	5.1 5p	29.67,j	7.56n,
N200 GA100	59.00gh	13.33g	74.001	5.82j	38.67g	14.53j
N200 GA200	68.00d	20.33c	88.00e	6.07e	47.00c	22.59e
N200 GA300	74.00a	26.67a	97.33a	6.45a	51.67a	37.85a
N200 GA400	62.83f	17.67e	82.33y	5.96g	42.33ef	19.20gh
N300 GA0	48.00m	9.00jkl	60.67n	5,190	32.33j	8.70mn
N300 GA100	60.00g	15.0of	75.331	5.861	40.67f	16.861
N300 GA200	70.17c	21.00bc	91.00d	6.1 5d	47.33c	24.63d
N300 GA300	72.17b	21.67b	95.00b	6.36b	50.33ab	31.71 b
N300 GA400	65.00e	18.67d	85.0of	5.98fg	43.33de	20.45fg
N400 GA0	45.000	8.001	54.33p	5.010	22.67m	6.450
N400 GA100	50.001	9.33jk	64.00m	5.26n	33.33j	9.941M
N400 GA200	54.001	10.671	66.671	5,611	35.67hi	11.52kj
N400 GA300	56.001	11.67h	69. 00k	5.77k	36.33h	11 .99kl
N400 GA40	52.00k	10.00ij	65.001	5.33m	34.00ij	10.62im
SEd	0.57	0.47	0.83	0.01	0.94	0.13
CD(P=0.05)	1.17	0.95	1.68	0.03	1.90	0.26

In a column, means followed by a common letter(s) are not significantly different at 1 per cent level by DMRT.

In respect to flower stem length, application of 200 kg N ha^{-1} along with 300 ppm gibberellic acid spray recorded the maximum flower stem length of 51.67 cm as compared to the minimum flower stem length (22.67 cm) observed in N400 GA0. Increase in flower stem length might have resulted from increased cell division and elongation under the influence of gibberellic acid spray at 300 ppm.

Maximum flower yield per plant was recorded by the application of 200 kg N ha^{-1} along with 300 ppm gibberellic acid spray (37.85g) followed by 300 kg N ha^{-1} along with 300 ppm gibberellic acid spray (31.71g). This might be attributed to improvement in nutrient availability influenced by nitrogen and to the presence of gibberellic acid which helped to enhance growth of plant resulting in higher flower yield per plant. The present study was found to be in agreement with the observations of Vijayakumar *et al.* (1988) in China aster.

References

Anon. (1999). Statistical data on horticultural crops in Tamilnadu. Published by Directorate of Horticulture, Govt. of Tamilnadu, Chennai.

Maheshwar, D.L. (1977). Influence of nitrogen and phosphorus on growth and flower production of China aster *(Callistephus chinensis* Nees). cv. Ostrich plume mixed. Ph.D. Thesis, UAS, Dharwad.

Panse, V.S. and Sukhatme, P.V. (1967). Statistical methods for Agricultural workers. ICAR Publication, New Delhi.

Reddy, Y.T.N. (1988). Effect of growth substances on growth and flowering of China aster *(Callistephus chinensis* Nees). *Mysore J. Agric. Sci.* **12**: 526.

Vijayakumar, K.T., Patil, A.A. and Hulmani, N. (1988). Effect of plant density and nitrogen on growth characters and flower yield of China aster *(Callistephus chinensis* Nees). cv. Ostrich plume mixed. *South Indian Hort.* **36**: 318-320.

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