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Effect of fertigation in production of standard and spray chrysanthemum under polyhouse condition

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ABSTRACT

A field study was conducted during 2005-06 at the Experimental Farm, Department of Horticulture, Assam Agricultural University, Jorhat with a view to evaluate suitable fertigation levels in production of Standard and Spray chrysanthemum under polyhouse and in open condition. The treatments included Fertigation 100% (T_1), Fertigation 75% (T_2), Fertigation 50% (T_3) and Conventional method (T_4). The results revealed that in case of standard chrysanthemum, significantly higher plant height (53.33 cm) , early flowering (81.66 days), maximum blooming period (39.66 days), maximum vase life (25.30 days), highest yield /100m^2 (198.36 g) and maximum fertigation efficiency (52.95) was recorded under 75% fertigation (T_2). Similarly, in case of spray chrysanthemum, the highest plant height (60.30 cm), maximum number of leaves (108.66), maximum diameter of flower (7.00cm), maximum vase life (26.33 days), highest fresh weight (2.02g), dry weight (0.34g) and highest yield/100m^2 (87.86 kg) was recorded in 75% fertigation (T_2) which was significantly differed over conventional method.

INTRODUCTION

Chrysanthemum is the one of the most important commercial flower crop of India. Chrysanthemum requires adequate amount of nutrients and water for its proper growth and flowering. Fertigation is the method of applying nutrients along with irrigation water directly at the site of active root zone. Fertigation combines two main inputs required for plant growth and development i.e., water and nutrients. The right combination of water and nutrients is the key for high yield and quality. Fertigation has flexibility, cost effectiveness and the potential for improved seasonal fertilizer application efficiency over traditional fertilizer application methods (Jaynes *et al.,* 5). Accurate supply of nutrients and water will result in better water use efficiency, avoid stress situations and control production (Raviv & Blom, 8). Thus, the objective of the present study was to determine the suitable fertigation level for chrysanthemum plants under polyhouse and in open condition to get higher yield and better quality of flowers.

MATERIALS AND METHODS

A field experiment was carried out during 2002-03 at the Experimental Farm, Department of Horticulture Assam Agricultural University, Jorhat. The soil was sandy loam with pH of 4.90, organic carbon content 0.64 per cent, available N 0.07 per cent and available P_2O_5 and K_2O was 47.52 and 74.25 kg per hectare, respectively. The experiment was laid out in randomized block design with three replications. The treatments include four levels of fertigation, 100% (F_1), 75% (F_2) and 50% (F_3) of fertilizer dose of N & K through drip and 100% (F_0) . Fertilizer dose of N&K as soil application (20 g/m^2 and 25 g/m^2) was done with two varieties, Standard and Spray chrysanthemum. Uniform application of P (10 g/m^2) and $CaCO_3$ (5 g/plant) was carried out per month. Fertigation was applied per week through drip. Observations were recorded on plant height, number of leaves, leaf area, days to first flower emergence, number of days to full bloom, number of flowers, self life of flowers and vase life of cut flowers. The data were analysed statistically and presented in Table 1(a), (b) and Table 2(a) & (b).

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RESULTS AND DISCUSSION

A perusal of the data in Table 1(a) & 1(b) revealed that fertigation was found to have significant influence on vegetative and flower characters under polyhouse condition as compared to conventional method. In case of spray chrysanthemum, plant height (60.30 cm), number of leaves per plant (108.66), minimum days for flowering (77.66 days), flower diameter (7.00 cm) and number of flowers per plant (51.00), vaselife (26.33 days), fresh weight (2.02g) and dry weight (0.34 g) of flower and yield per 100 m^2 (87.86 g) was increased significantly over conventional method with the application of 75% fertigation under polyhouse. Mishra (7) also observed

Table 1(a). Effect of fertigation and drip levels on spray chrysanthemum under polyhouse.

Treatment	Plant height (cm)	Leaf number	Plant spread (cm)	50% flowering	Days to flowering (days)	Flower diameter (cm)	No.of flower /plant
100%	45.33	79.66	36.00	83.00	83.66	6.66	40.66
75%	60.30	108.66	41.66	75.00	77.66	7.00	48.33
50%	60.00	63.00	43.00	77.66	80.33	6.00	51.00
Coventional	51.66	57.00	35.33	80.00	81.66	6.33	42.66
CD at 5%	5.59	14.22	4.96	2.15	3.68	0.91	13.27

Table 1(b). Effect of fertigation and drip levels on spray chrysanthemum under polyhouse.

Treatment	Blooming period (days)	Vase life (days)	Fresh weight (g)	Dry weight (g)	Yield/m^2 (g)	Yield /100 m^2 (g)	Fertigation efficiency
100%	36.66	23.00	1.75	0.22	640.35	64.03	-4.68
75%	23.00	26.33	2.02	0.34	878.63	87.86	13.29
50%	30.66	23.00	1.29	0.19	592.11	59.21	19.54
Coventional	18.33	21.66	1.22	0.17	468.40	46.84	-
CD at 5%	3.5	1.75	0.14	0.02	47.80	4.78	-

Table 2(a). Effect of fertigation and drip levels on standard chrysanthemum under polyhouse.

Treatment	Plant height (cm)	Days to flowering	Flower diameter (cm)	Flower/ plant	Self life (days)	Blooming period (days)	Vase life (days)
100%	50.66	87.33	15.16	14.00	23.33	35.00	23.00
75%	53.33	81.66	15.66	17.30	28.66	39.66	25.30
50%	50.33	89.66	15.33	12.00	25.00	34.00	23.00
Coventional	48.66	87.66	14.63	11.33	16.00	33.33	21.00
CD at 5%	2.03	1.96	NS	1.02	2.25	1.65	1.54

Table 2(b). Effect of fertigation and drip levels on standard chrysanthemum under polyhouse.

Treatment	Fresh weight (g)	Dry weight (g)	Yield /100 m^2 (g)	Fertigation efficiency
100%	9.24	1.16	116.42	23.56
75%	12.74	1.36	198.36	52.95
50%	11.84	1.32	127.87	5.91
Coventional	8.93	1.05	82.89	-
CD at 5%	0.92	0.15	16.73	-

significant increase in flower characters under polyhouse compared to open condition.

In case of standard chrysanthemum, significantly higher plant height (53.33 cm), number of flowers per plant (17.30), self life (28.66), blooming period (39.66 days), vaselife (25.30 days), fresh weight(12.74g), dry weight(1.36g), yield/100m^2(198.36g), maximum fertigation efficiency (52.95 %) and early flowering (81.66 days), was recorded under 75% fertigation. Higher numbers of flower per plant under fertigation were also observed by Talia *et al.* (9) in chrysanthemum. Dry matter production by the plant and the flower is significantly in influenced by fertigation. Similar results were also observed by Ashok and Rengasamy (1) in Treder (10) in Oriental Lily.

Krishnappa and Reddy (6) also observed maximum vase life of carnation cut flower at higher level of fertigation. Significant increase in flower diameter, number of flowers per plant might be correlated with higher leaves per plant providing larger photosynthetic area coupled with increased water and nutrient uptake might have resulted in increase production and mobilization of photosynthetes leading to bigger sized flower. Similar results were obtained by Biswas *et al*. (2), Higaki *et al*. (4) in anthurium at higher rates of N and K, Gurav *et al.* (3) and Ashok *et al.* (1) in rose.

REFERENCES

1. Ashok, A.D, Arun, D.S. and Rengaswamy, P. 2000. Effect of nitrogen fertilization at different levels and source on the growth of cut rose cv. First Red under greenhouse conditions. *South Indian Hort*. **48**: 115-18.
2. Biswas, B.R, Chatterjee, T.K. and Islam, J. 1995. Effect of nitrogen and potassium fertilization on production of flowers in Anthurium andreanum. *Harayana J. Hort. Sci.* **24**: 181-84.
3. Gurav, S.B., Singh, B.R., Katwate, S.M., Sable, R.N., Kokade, D.S. and Dhane, A.V. 2005. Influence of NPK nutrients on yield and quality in rose under polyhouse conditions. *J. Ornamental Hort*. **8**: 228-29.
4. Higaki, T., Imamura, J.S. and Paull, R.E. 1992. N, P and K rates and leaf tissue standards for optimum Anthurium andreanum flower production. *Hort. Sci.* **27**: 909-12.
5. Jaynes, D., Rice, R. and Hunsaker, D. 1992. Solute transport during chemigation of level basin. *Transaction ASAE,* **35**: 1809-15.
6. Krishnappa, K.S. and Reddy, N.S. 2004. Effect of cultivars, fertigation levels and floral preservatives in extending vase life of carnation cut flower. *Mysore J. Agric. Sci.* **38**: 314-18.
7. Mishra, H.P. 1999. Evaluation of small flowered varieties of chrysanthemum for Calcareous belts of North Bihar. *Indian J. Hort*. **56**: 184-88.
8. Raviv, M. and J. Blom. 2001. The effect of water availability and quality on photosynthesis and productivity of soilless-grown cut roses. *Sci. Hortic*. **88**: 257-76.
9. Talia, M.A.C., Cristiano, G. and Forleo, L.R. 2003. Evaluation of new chrysanthemum cultivars in soil less culture. *Acta Hortic.* **614**: 223-26
10. Tredar, J. 2001. The effect of light and nutrition on growth and flowering of oriental liles. *Acta Hortic* **548**: 523-28.

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