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Influence of Plant Growth Regulators on Growth, Flowering and Yield of Chrysanthemum (*Dendrathema grandiflora* Tzvelev) CV. 'IIHR-6'

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ABSTRACT

An experiment was carried out at Floriculture Research Scheme, ASPEE college of Horticulture and Forestry, NAU, Navsari during the *winter* season of the year 2006-07 to study the effect of plant growth regulators on growth, flowering and yield of chrysanthemum cv. 'IIHR-6'. The results revealed that plant sprayed with MH at 1250 mg/l recorded the maximum reduction in plant height with maximum number of branches, plant spread, shelf life and vase life of flowers, whereas it was also found beneficial for delaying and increasing the duration of flowering. However, in case of flower yield per plant and per hectare, the lower concentration of MH at 750 mg/l was found significantly superior as compared to other treatment.

KEY WORDS

Chrysanthemum, MH, PCB, CCC, growth, flowering and yield.

INTRODUCTION

Chrysanthemum is a leading commercial flower crop, grown for cut and loose flowers and also as a pot plant. It is grown in many parts of the world owing to its excelling beauty and economic values. The growth and yield of plants is mainly influenced by two principle factors viz., genetically and cultivation or management factors. In recent year's scientist have given due attention to the idea of regulating plant growth as third most important factor in improving the growth, yield and flower quality with the application of plant growth regulators in various ways. These substances modify the plant physiological processes within the plant, which ultimately affects plant growth and development. Various growth regulators, especially growth retardants are now a day being tried for controlling growth and flowering of chrysanthemum with a view to have compact plants, to stretch-out or retard the rate of plant growth and also to hasten or delay the flowering period. However, the research work on this aspect of agro-technique in chrysanthemum under South Gujarat conditions is lacking and so with a view to this, present investigation was carried out to study the effect of PGR's on growth, flowering and yield of chrysanthemum cv. 'IIHR-6'.

MATERIALS AND METHODS

Influence of Plant Growth Regulators on Growth, Flowering and Yield of Chrysanthemum (*Dendrathema grandiflora* Tzvelev) CV. 'IIHR-6'

The experiment was conducted at Floriculture Research Scheme, Regional Horticultuture Research Station, ASPEE college of Horticulture and Forestry, NAU, Navsari during the *winter* season of the year 2006-07 to study the effect of plant growth regulators on growth, flowering and yield of chrysanthemum (*Dendrathema grandiflora* Tzvelev) cv. 'IIHR-6'. The experiment was laid out in Randomized Block Design (RBD) with ten treatments which were replicated four times. The treatments, comprises three different concentrations of each of Paclobutrazol (PCB) at 0.10, 0.20 and 0.30 ml/l; Cycocel (CCC) at 2500, 5000 and 7500 mg/l and Maleic Hydrazide (MH) at 750, 1000 and 1250 mg/l along with control (water spray). Three weeks old, healthy and uniform suckers were procured from FRS, Navsari and selected for transplanting which was done at a spacing of 40 x 30 cm with 30 plants per gross plot. The foliar application of growth retardants was done after 30 days of transplanting after pinching operation. The observations on growth, flowering and yield parameters were recorded from five randomly selected tagged plants in each plot and the data analysis was carried out statistically.

RESULTS AND DISCUSSION

The results obtained from the present investigation are presented in table 1 and is describe as below.

Table-1

Influence of plant growth regulators on growth, flowering and yield of chrysanthemum cv. 'IIHR-6'

Treatments	Plant height (cm)	No. of branches at harvest	Plant spread (cm)		Days to first flower openin g	Days to 50 % flowering	Shelf life (days)	Vase life (days)	No. of flowers per plant	Flower yield (t/ha)
			N-S	E-W						
PCB-0.10 ml/l	29.6	5.4	20.1	19.1	80.6	102.0	10.3	11.1	15.5	8.7
PCB-0.20 ml/l	26.6	6.0	24.3	20.8	82.6	105.7	11.5	10.5	17.3	10.2
PCB-0.30 ml/l	23.0	6.5	30.5	32.3	85.1	107.0	11.7	10.3	25.5	16.7
CCC-2500 mg/l	25.4	6.3	27.9	28.8	87.3	110.0	10.5	11.9	27.3	16.9
CCC-5000 mg/l	20.3	6.0	30.9	29.3	88.5	112.5	11.3	12.9	20.3	10.9
CCC-7500 mg/l	22.0	5.5	31.0	30.8	89.8	115.0	12.0	13.8	17.5	9.2
MH-750 mg/l	19.9	8.2	28.8	29.3	92.6	117.7	13.5	16.0	33.3	21.7
MH-1000 mg/l	19.0	7.3	31.5	34.3	95.5	121.2	14.0	16.3	29.3	14.3
MH-1250 mg/l	16.4	6.3	34.0	35.6	98.5	125.2	14.2	16.5	21.3	8.8
Control	31.7	6.2	25.0	29.0	82.2	106.5	10.0	12.5	23.5	10.9
S.Em	1.2	0.4	1.7	2.2	3.8	4.8	0.6	0.7	1.7	0.8
C.D. at 5%	3.4	1.1	4.9	6.5	11.0	13.9	1.8	2.1	4.9	2.4
C.V. %	10.0	11.7	11.8	15.5	8.7	8.6	10.7	10.8	14.8	13.1

PCB: Paclobutrazol, CCC: Cycocel, MH: Maleic Hydrazide

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Effect of growth regulators on growth of chrysanthemum

The data presented in table 1 revealed that, among all the treatments, MH at 1250 mg/l recorded the maximum reduction in plant height (16.4 cm), more number of branches per plant (8.3) as well as greater spread of plants in terms of both N-S (34.0 cm) and E-W (35.6 cm). The reduction in plant height may be due to the fact that MH causes complete suppression of apical dominance by inhibiting the cell division which in terms induces the lateral growth and ultimately also increases the number of branches and thereby plant spread. The results are in complete agreement with the finding of Sharma *et al.* (1995), Dutta and Ramdas (1998), Kumar and Ughreja (1998), Meher *et al.* (1999) in chrysanthemum.

Effect of growth regulators on flowering of chrysanthemum

The data presented in table 1 indicates that the application of MH at 1250 mg/l significantly delayed the flower opening by 98.5 days as well as days to 50 percent flowering by 125.2 days which were statistically at per with MH at 1000 mg/l. The delay due to MH may be due to result of growth inhibition as it is necessary for increasing or decreasing the flower formation and their development. Similar results were obtained by Nagarjuna *et al.* (1988) and Dutta *et al.* (1993) in chrysanthemum and Khandelwal *et al.* (2003) in African marigold.

The significant improvement in shelf life and vase life of cut flowers over control and rest of the treatments was also registered in MH treated plants, where MH at 1250 mg/l recorded maximum shelf life and vase life (14.2 and 16.5 days, respectively) followed by MH at 1000 and 750 mg/l. Increased flowers life with MH might be due to retarded metabolism and respiration. Similar effect of MH on extension of shelf and vase life were recorded by Dutta *et al.* (1993) and Mitali and Talukdar (1997) in chrysanthemum.

Effect of growth regulators on yield of chrysanthemum

The data from the table-1 shows that the significantly maximum number of flowers per plant (33.3) was recorded with the application of MH at 750 mg/l which was at par with MH at 1000mg/l. The same treatment also produced significantly higher flower yield of 21.7 tones per hectare as compared to other treatments. The increased in number and yield of flowers might be due to increased in number of branches and also removal of apical dominance due to MH which ultimately enhanced the flower production. These results are in conformity with the findings of Sharm *et al.* (1995), Dutta and Ramdas (1998), and Moond *et al*. (2006) in chrysanthemum, Aswath *et al*. (1994) in China aster and Khimani *et al*. (1994) in gaillardia.

CONCLUSION

Based on these experimental results, it can be concluded that from economic point of view application of MH at 750 mg/l proved to be best in improving the flower yield and quality of chrysanthemum cv. 'IIHR-6'.

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