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Effect of Cycocel on Varieties of Chrysanthemum for Growth and Flower Yield

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ABSTRACT

The present investigation entitled "Effect of cycocel on varieties of Chrysanthemum for growth, flower yield and quality" was conducted during July, 2016 to February, 2017 in the Farm of Maharaj Bag garden, Horticulture Section, College of Agriculture, Nagpur. The experiment was laid out in Factorial Randomized Block Design (FRBD) with four varieties (Pandhari Rewadi, Shinaton, Piwali Rewadi and Brown) and with four treatment i.e control, cycocel at 1000 ppm, 2000 ppm and 3000 ppm with sixteen treatment combinations replicated thrice. The result reveled that among the different varieties the minimum plant height (cm), maximum number of branches plant^{-1} and maximum plant spread were recorded with the variety Brown. Whereas, maximum stem diameter (cm) was recorded with the variety Pandhari Rewadi. Among the different cycocel treatments, minimum plant height, maximum number of branches plant^{-1}, spread of plant (cm) and stem diameter were noticed with cycocel at 3000 ppm was recorded when sprayed at 30 and 60 days after transplanting. The yield and yield contributing characters viz., number of flowers plant^{-1}, maximum flower yield plant^{-1}, maximum flower yield plot^{-1} and yield ha^{-1} were recorded with the treatment combination of the variety Brown sprayed with cycocel 3000 ppm.

Key words: *Chrysanthemum, Cycocel, Growth and Yield*

INTRODUCTION

Amongst the flowers used for domestic market, chrysanthemum is considered as one of the important commercial flower. "Chryos" means "Golden", "Anthos" means "flower" meaning golden colored flower. It belongs to the family '*Asteraceae'* and is native to Central and South Europe. Among the wide range of commercial flower crops, Chrysanthemum (*Dendranthema grandiflora*) occupies a selective position because of its prettiness, elegance, diverse form and varied attractive color ranges. It has gained considerable importance in flower trade because its flowers are used as loose flowers for garlands, cut flowers for decoration and for preparing bouquets; it is also used for bedding and potting purposes.

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Growth and development of plant is controlled by two sets of internal factors, mainly nutritional and hormonal. Application of nutrients essential for manufacture of food material required for growth. However, utilization of those substances for balanced development of plant body is controlled by certain growth regulators. Growth retardants are the chemicals those are having the property to delay cell division and elongation in shoot tissue without exhibiting any formative effect. Growth retardants are known to produce compact plants, increase the number of flowers and delay or hasten flowering. It is also reported by various research workers that use of growth retardant is very useful in commercial industry of floriculture by regulating desired flowering period, reducing plant height, developing more decorative values of flowering plant, easy in handling and transportation without affecting flower quality in minimum expenses.

MATERIAL AND METHODS

An experiment entitled "Effect of cycocel on varieties of Chrysanthemum for Growth, Flower Yield and Quality" was laid out in the field of Maharaj Bag Garden, Horticulture section, College of Agriculture, Nagpur during July, 2016 to February, 2017. The experimental field will be prepared by ploughing and cross harrowing. The healthy suckers will be transplanted during July 2016 at 45 cm x 30 cm spacing. Farm yard manure as a basal dose will be applied two days prior to the transplanting to each of the plots at the rate 5 tons hectare^{-1} and mixed well in soil.

Layout of raised bed of size 1.80 x 2.40 m^2 will be made in Factorial Randomized Block Design as per treatments. Recommended dose of fertilizer i.e. 100:50:50 kg N, P, K ha^{-1} will be applied. As chrysanthemum plants are slender in nature, in order to have straight frame work, plants will be staked with bamboo sticks. For recording the observations five plants will be selected randomly from each plot. The treatment comprised with four varieties (V_1- Pandhari Rewadi, V_2- Shinaton, V_3- Piwali Rewadi and V_4- Brown) and with four treatment i.e C_1- control, cycocel at C_2- 1000 ppm, C_3- 2000 ppm and C_4 -3000 ppm with sixteen treatment combinations replicated thrice. Cycocel sprayed twice at 30 days interval. The various observations on growth viz. plant height, number of branches plant^{-1}, stem diameter and plant spread and yield parameters like number of flowers plant^{-1}, yield plant^{-1},yield plot^{-1},yield ha^{-1} were recorded at appropriate stage. The data was analysed statistically as per the method suggested by Panse and Sukhatme[4].

RESULT AND DISCUSSION

The data presented in table.1 reveled that, effect of different varieties and cycocel concentrations on growth and yield parameters.

Growth

At 150th days of transplanting, significantly minimum plant height was recorded with variety Brown (44.33 cm) which was followed by varieties Shinaton (47.09 cm) and Piwali Rewadi (52.11 cm). However, significantly maximum plant height was recorded in variety Pandhari Rewadi (54.31 cm). Significantly minimum plant height (44.80 cm) was recorded with the application of cycocel at 3000 ppm (C_4) which was followed by the treatments (C_3) cycocel at 2000 ppm (46.77 cm) and cycocel at 1000 ppm (49.60 cm). Whereas, significantly maximum plant height (53.16 cm) was recorded in control (C_1), at 150th days of transplanting. These results are in close conformity with the findings of Iftikhar *et al.*[2], in Carnation. interaction effect due to different varieties and cycocel on height of plant in Chrysanthemum was found to be non-significant at 150 days after transplanting.

At 150th days of transplanting, significantly maximum number of branches plant^{-1} was counted in the variety Brown (40.78) and it was found statistically at par with the variety Shinaton (40.54) and followed by Pandhari Rewadi (32.75). However, the variety Piwali Rewadi had recorded minimum number of branches plant^{-1} (31.31). Significantly maximum number of branches plant^{-1} (39.43) was recorded with the

application of cycocel at 3000 ppm (C_4) which was followed by the treatments (C_3) cycocel at 2000 ppm (37.18) and cycocel at 1000 ppm (35.16). Whereas, significantly minimum number of branches plant^{-1}(33.61) was recorded in control (C_1) at 150th days after transplanting. the interaction effect due to different varieties and cycocel treatments on number of branches plant^{-1} in Chrysanthemum was found to be non-significant.

At 150th days after transplanting, significantly maximum stem diameter of Chrysanthemum plant was recorded with the variety Pandhari Rewadi (1.02 cm) which was followed by the varieties Piwali Rewadi (0.98 cm) and Brown (0.86 cm), whereas, significantly minimum stem diameter was recorded in the variety Shinaton (0.79). At 150th days after transplanting, significantly maximum stem diameter (0.95 cm) was recorded with the application of cycocel at 3000 ppm (C_4) which was followed by treatment (C_3) cycocel at 2000 ppm (0.92 cm) and (C_2) cycocel at 1000 ppm (0.90 cm). However, minimum stem diameter (0.88 cm) was recorded in control (C_1). the interaction effect due to the varieties and cycocel on stem diameter of the Chrysanthemum plant was found to be non-significant at all the growth stages.

Significantly maximum plant spread (35.78 cm) was recorded in the variety Brown which was followed by the varieties Shinaton (33.04 cm) and Pandhari Rewadi (30.63 cm). Whereas, minimum plant spread was recorded in Piwali Rewadi (28.60 cm). Significantly maximum plant spread (34.86 cm) was recorded with the application of cycocel at 3000 ppm (C_4) which was followed by (C_3) cycocel at 2000 ppm (32.88 cm) and (C_2) cycocel at 1000 ppm (30.98 cm). Whereas, minimum plant spread (29.33 cm) was recorded in control (C_1). the interaction effect due to varieties and cycocel on spread of the plant in Chrysanthemum was found to be non-significant at 50 per cent flowering.

Yield

Significantly maximum number of flowers plant^{-1} was recorded in the variety Brown (225.52) which was followed by the varieties Shinaton (166.18) and Piwali Rewadi (75.52), whereas, significantly minimum number of flowers plant^{-1} was produced by the variety Pandhari Rewadi (68.40). Significantly, maximum number of flowers plant^{-1} (155.28) was recorded with the application of cycocel at 3000 ppm (C_4) which was followed by the treatments (C_3) cycocel at 2000 ppm (142.63) and (C_2) cycocel at 1000 ppm (128.52). However, minimum number of flowers plant^{-1} (109.18) was recorded in control (C_1). The treatment combination of the variety Brown sprayed with cycocel of 3000 ppm (V_4 C_4) was found to be significantly superior over all other treatment combinations and produced the maximum number of flowers plant^{-1} (216.08) and it was followed by the treatment combinations of variety Brown (241.33) sprayed with cycocel at 2000 ppm (V_4 C_3). Whereas, the treatment combination of the variety Pandhri Rewadi in control (V_1 C_1) had recorded minimum number of flowers plant^{-1} (50.73).

Significantly maximum yield plant^{-1} was recorded in the variety Brown (332.63 g) which was statistically followed by the varieties Shinaton (247.60 g) and Piwali Rewadi (234.87 g), whereas, significantly minimum yield plant^{-1} was produced by the variety Pandhari Rewadi (131.14 g). Significantly, maximum yield plant^{-1} (275.71 g) was recorded with the application of cycocel at 3000 ppm (C_4) which was followed by the treatments (C_3) cycocel at 2000 ppm (253.55 g) and (C_2) cycocel at 1000 ppm (225.24 g). However, minimum yield plant^{-1} (191.74 g) was recorded in control (C_1). The treatment combination of the variety Brown sprayed with cycocel of 3000 ppm (V_4 C_4) was found to be significantly superior over all other treatment combinations and produced the maximum yield plant^{-1} (383.79 g) and it was followed by the treatment combinations of variety Brown (354.76 g) sprayed with cycocel at 2000 ppm (V_4 C_3). Whereas, the treatment combination of the variety Pandhri Rewadi in control (V_1 C_1) had recorded minimum yield plant^{-1} (98.35 g).

Significantly maximum yield plot^{-1} was recorded in the variety Brown (9.05 kg) which was statistically followed by the varieties Shinaton (6.73 kg) and Piwali Rewadi (6.39 kg), whereas, significantly minimum yield plot^{-1} was produced by the variety Pandhari Rewadi (3.57 kg). Significantly, maximum yield plot^{-1} (7.50 kg) was recorded with the application of cycocel at 3000 ppm (C_4) which was followed by the treatments (C_3) cycocel at 2000 ppm (6.90 kg) and (C_2) cycocel at 1000 ppm (6.13 kg). However, minimum yield plot^{-1} (5.22 kg) was recorded in control (C_1). The treatment combination of the variety Brown sprayed with cycocel of 3000 ppm (V_4 C_4) was found to be significantly superior over all other treatment combinations and produced the maximum yield plant^{-1} (10.44 kg) and it was followed by treatment combination of variety Brown (9.65 kg) sprayed with cycocel at 2000 ppm (V_4 C_3).Whereas, the treatment combination of the variety Pandhri Rewadi in control (V_1 C_1) had recorded minimum yield plot^{-1} (2.68 kg).

Significantly maximum yield ha^{-1} was recorded in the variety Brown (15.08 t) which was statistically followed by the varieties Shinaton (11.22 t) and Piwali Rewadi (10.65 t), whereas, significantly minimum yield ha^{-1} was produced by the variety Pandhari Rewadi (5.94 t). These results are in conformity with the results obtained by Deepa Isac and Chezhiyan[1]. and Peddi Laxmi *et al.*[5], in Chrysanthemum**.** Significantly, maximum yield ha^{-1} (12.50 t) was recorded with the application of cycocel at 3000 ppm (C_4) which was followed by the treatments (C_3) cycocel at 2000 ppm (11.49 t) and (C_2) cycocel at 1000 ppm (10.21 t). However, minimum yield ha^{-1} (8.69 t) was recorded in control (C_1). The similar results were also reported by Sharifuzzaman *et al.*[6], in Chrysanthemum. The treatment combination of the variety Brown sprayed with cycocel of 3000 ppm (V_4 C_4) was found to be significantly superior over all other treatment combinations and produced the maximum yield ha^{-1} (17.40 t) and it was followed by treatment combination of variety Brown (16.08 kg) sprayed with cycocel at 2000 ppm (V_4 C_3). Whereas, the treatment combination of the variety Pandhri Rewadi in control (V_1 C_1) had recorded minimum yield ha^{-1} (4.46 t). Similar result was shown in the Ganesh and K. Soorianathasundaram[3] in Tuberose.

Table 1: Growth and yield as influenced by varieties of Chrysanthemum and different cycocel concentrations

Treatments A) Varieties (V)	Plant height (cm) 150 Days	Number of branches plant^{-1} 150 Days	Stem diameter (cm) 150 Days	Plant spread at 50% flowering	Number of flowers plant^{-1}	Yield plant^{-1} (g)	Yield plot^{-1} (kg)	Yield ha^{-1} (t)
V_1 – Pandhari Rewadi	54.31	32.75	1.02	30.63	68.4	131.14	3.57	5.94
V_2 - Shinaton	47.09	40.54	0.79	33.04	166.18	247.6	6.73	11.22
V_3 - Piwali Rewadi	52.11	31.31	0.98	28.6	75.52	234.87	6.39	10.65
V_4 - Brown	44.33	40.78	0.86	35.78	225.52	332.63	9.05	15.08
F test	**Sig**	**Sig**	**Sig**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**
SE (m) ±	0.38	0.43	0.01	0.24	1.8	3.5	0.09	0.16
CD at 5 %	1.12	1.24	0.03	0.71	5.2	10.26	0.27	0.46
B) Cycocel (C)								
C_1- Control	53.16	33.61	0.88	29.33	109.18	191.74	5.22	8.69
C_2- CCC 1000ppm	49.60	35.16	0.90	30.98	128.52	225.24	6.13	10.21
C_3- CCC 2000ppm	46.77	37.18	0.92	32.88	142.63	253.55	6.9	11.49
C_4- CCC 3000ppm	44.80	39.43	0.95	34.86	155.28	275.71	7.5	12.5
F test	**Sig**	**Sig**	**Sig**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**
SE (m) ±	0.38	0.43	0.01	0.24	1.8	3.5	0.09	0.16
CD at 5 %	1.12	1.24	0.03	0.71	5.2	10.26	0.27	0.46
C) Interaction (VxC)								
F test	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**
SE (m) ±	0.77	0.86	0.02	0.49	3.6	7.11	0.19	0.32
CD at 5%	--	--	--	--	10.4	20.53	0.55	0.93

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