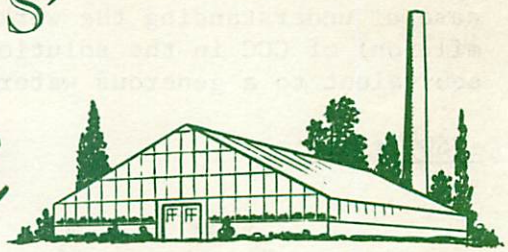
MINNESOTA STATE FLORISTS' Bulletin



Agricultural Extension Service
University of Minnesota
Editor, Richard E. Widmer

Institute of Agriculture
St. Paul 1
April 1, 1962

The following articules are summaries of talks presented at the Minnesota Florists' Short Course which was held in Minneapolis on February 23, 24, and 25.

SHORT POINSETTIAS WITH CCC

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The public prefers short poinsettias. Greenhouse-grown plants propagated in July and August become too tall, unless their water and nutrient intake is kept at a bare minimum. This procedure is not especially desirable as plant quality is adversely affected. Cuttings taken in September produce shorter plants because flower bud initiation requires a short photperiod. Late propagation is not the answer, however as the supply of cuttings would not be equal to the demand.

Lindstrom and Tolbert (1) reported that the application of CCC (2-chlorethyl trimethylammonium chloride) to the soil of poinsettia plants resulted in the development of very short plants with thick stems. Rogers and Rothenberger (3) reported that CCC was the only one of several experimental plant dwarfing materials tried, which effectively reduced the height of poinsettias. O'Shea, Jones, Miller and Kyplinger (2) found that the application of CCC to the soil of poinsettias resulted in plants that were considerably shorter with somewhat smaller red bract size, but that there was little effect on date of flowering.

Detailed trials were conducted in University greenhouses on the St. Paul Campus in 1960 and 1961, to determine the effect of CCC on plant height, bract development and plant keeping quality, and to determine the best rates and methods of application under Minnesota growing conditions.

The variety Barbara Ecke Supreme was used in all trials at the University. Unless otherwise noted, the soil mixture used was a sandy loam with peat moss and superphosphate (0-20-0) incorporated in it. Fertilizer was applied regularly in liquid form, and the soil was analyzed at intervals. No excessive nutrient levels were encountered. The plants were watered normally with no attempt made to limit stem elongation by limiting the water supply.

Miscellaneous Journal Series No. 1109 of the Agricultural Experiment Station, University of Minnesota, St. Paul 1, Minnesota.

Various methods of describing the solution concentrations of CCC applied to the plants have been used by the manufacturer (American Cyanamid Company) and research workers. For ease of understanding the work described in this report refers only to ppm (parts per million) of CCC in the solution applied. Quantity of CCC solution applied per pot was equivalent to a generous watering.

1960 Trials

Stock Plants

Three matched pairs of stock plants in 12-inch pots were selected and a 1600 ppm CCC solution was applied to half of them on July 26, August 2 and 9, 1960. The new growth on the treated plants became a darker green and more compact in habit. In the period between August 18 and September 16, the check plants produced 111 cuttings and the CCC treated plants, 77 cuttings.

A darker green foliage color was evident in plants propagated from treated stock until October 1. The increase in height of plants propagated from treated stock was less than that of plants propagated from untreated stock.

Unrooted Cuttings

Unrooted cuttings were treated by soaking the basal ends, and by complete immersion of the cuttings in solutions up to 16,000 ppm. Three lengths of treatment were used: 5 seconds, 5 minutes and 10 minutes. The cuttings were then rooted in sand under intermittent mist. Rooting was not hindered by any of the treatments. Stem elongation following rooting was most limited where the strongest concentrations were used, but plant response was not uniform enough to be practical. Differences in response to length of treatment were not significant. No plant injury was evident.

Rooted Cuttings

The basal end of cuttings which had been rooted in sand were soaked in solutions of CCC up to 16,000 ppm for periods of 5 seconds and 5 minutes. Plant height decreased with increases in the concentration used, but the 5 minute treatment provided no consistent advantage over the 5 second treatment.

Soil Application

Although treatment of the cuttings before potting required smaller quantities of solution, the results obtained were not as uniform as desired. In addition, dipping the cuttings in a community solution increased the possibility of spreading disease. Treatment of rooted cuttings provided more uniform results, but this method required rooting of the cuttings in sand, rather than directly in soil in 2½-inch pots. All tests described hereafter refer to applications of CCC to the soil.

The application of CCC to the soil of plants in 2½-inch pots on May 3, 1960 provided the following results after 10 weeks.

Treatment	Average Plant Height
Check	19.7 inches
1600 ppm (one application)	16.0 inches
3200 ppm (" ")	10.4 inches
1600 ppm (three weekly applications, The first on May 3)	7.2 inches

A second lot of plants were treated similarly on September 23. Results followed the same trend, but were less spectacular because of the late date of application.

1961 Trials

Unrooted Cuttings

Unrooted cuttings taken on September 8 were planted in 2½-inch pots in a soil mix of 2 parts peat moss, 1 part soil and 1 part sand (with 0-20-0 added) and rooted under intermittent mist. The CCC was applied to the soil immediately after potting. A complete liquid fertilizer was applied to the soil full strength twice a week, after the first week, until the mist was discontinued. There were 36 plants per treatment. Results are shown in Table 1.

Table 1. Effect of CCC applied to unrooted cuttings in soil

		ppm CCC			
Averages for	Check	1730	2600	5200	7800
Height (inches)	11.9	10.5	9.8	8.2	7.7
Bract diameter (inches)	9.9	9.5	9.5	9.2	8.8
Bract crinkling	-	slight	some	objectionable	objectionable
Date pollen showing	Dec. 18	Dec. 18	Dec. 18	Dec. 18	Dec. 18

Data shown in the table indicate that CCC applied in this manner is effective in limiting stem elongation and bract diameter.

Small Pots I

Rooted cuttings were planted in 3-inch pots on July 5. The CCC was applied to the soil on July 6 and repeated in the case of the 1730 ppm rate on August 11 and 28. The plants were grown to maturity in the 3-inch pots and frequent fertilization was necessary. Night temperatures ranged from 60°F. early in the fall to 68-70°F. later in the fall. There were 42 plants per treatment. Results are presented in Table 2.

Table 2. Effect of CCC on plants in 3-inch pots.

		ppm CCC			
Averages for	Check	1730(3x)	2600	5200	7800
Height (inches)	32.6*	28.6	27.9	23.4	20.8
Uniformity of plant height	-	fair plus	fair	very good	very good
Bract diameter (inches)	8.5*	10.4	11.0	12.3	13.4
Bract crinkling	-	-	-	-	-
Date pollen showing	late	Nov. 27	Nov. 27	Nov. 22	Nov. 20

* The check was irregular and late blooming and did not provide a reliable statistic. All measurements were recorded on the same date.

Greater differences in height between check and treated plants were evident during July and August. Although CCC served to limit stem elongation, early propagated plants still become too tall by late November

Small Pots II

Well established plants in 2½-inch pots were treated with CCC on September 7. In the case of the 1730 ppm rate, the application was repeated on September 29. The plants were placed in 6-inch pans, three to a pan on October 4. Night temperatures were 65°F. early in the fall and 68-70°F. thereafter. There were 16 pans or 48 plants per treatment. Results are given in Table 3.

Table 3. Effect of CCC on plants in 2½-inch pots.

	ppm CCC				
Averages for	Check	1730(2x)	2600	5200	7800
Height (inches)	20.5	11.7	10.2	9.4	8.6
Bract diameter (inches)	10.6*	11.2	11.3	11.0	10.5
Bract crinkling	-	some	slight	some	objectionalbe

* Check plants were 7 to 10 days later in blooming than treated plants. All measurements were recorded on the same date.

The data shows that all rates of application were effective in controlling plant height but that the highest rate caused excessive crinkling of the bracts. Treated plants developed fewer new roots following panning than did check plants. Plant quality in general was very good except for the crinkling.

Post Panning Application

Plants from 2½-inch pots were planted three to a 6-inch pan on September 15. The CCC was applied on September 20. Night temperature was 68-70°F. Twenty four pans constituted a treatment. Half of the plants in this group were hand watered and half were watered with the E-Flowmatic system. Results with the two methods of watering were quite similar, so the data were combined as shown in Table 4.

Table 4. Effect of CCC applied after panning.

		ppm CCC			
Averages for	Check	1730	2600	5200	7800
Height (inches)	16.8	11.6	10.4	9.3	8.6
Uniformity of plant height	fair	fair	very good	very good	very good
Bract diameter (inches)	12.4	11.5	12.1	11.8	11.5
Bract crinkling	-	slight	some	objectionable	objectionable
Date pollen showing	Dec. 23	mixed	Dec. 20	Dec. 20	Dec. 20

All rates of application of CCC served to limit plant height, but excessive crinkling of the bracts was evident where the 5200 and 7800 ppm rates were used. The results indicate that plants of a desirable height may be obtained when panning is done early, if CCC is applied to the soil.

Pinched Plants

Well established plants in 3-inch pots were treated with CCC on August 21 and soft-pinched on August 28. They were planted three to a 6-inch pan on September 11, at which time the new breaks were ¼ to ½ inch long. The breaks were not pruned or limited in anyway. Night temperatures varied between 60° and 68°F. Eleven pans consitituted a treatment. Results are presented in Table 5.

Table 5 Effect of CCC on pinched poinsettias

Averages for	ppm CCC				
	Check	1730	2600	5200	7800
Length of breaks (inches)	10.8	6.2	6.1	5.4	3.9
No. of breaks per plant	2.7	3.0	2.9	3.1	3.2
Bract diameter (inches)	9.7	7.0	8.9	8.6	8.2

Influence of CCC on stem elongation and bract development was similar to that with single stem plants. The number of breaks with satisfactory bract formation was slightly larger on treated plants. Panning three weeks after treatment did not nullify the effect of the CCC.

Late Application

Cuttings taken on August 30 were rooted in a soil mix of 2 parts peat moss, 1 part soil and 1 part sand (with 0-20-0 added) in 2½ inch pots under intermittent mist. They were planted three to a 5-inch pan on October 4. The CCC was applied at four rates on each of four dates. Night temperature was 65°F. Eight pans constituted a treatment. Results are given in Table 6.

Table 6. Effect of late applications of CCC.

Applic. date	Nov. 1		Nov. 15		Dec. 1		Dec. 15	
ppm CCC	Height (inches	Br.Diam. (inches)	Height (inches)	Br.Diam. (inches)	Height (inches)	Br.Diam. (inches)	Height (inches)	Br.Diam. (inches)
Check	9.8	11.4	-	-	-	-	-	-
1730	8.9	10.9	8.8	11.0	9.3	11.3	9.7	11.0
2600	8.4	10.2	11.3	10.6	9.1	10.9	10.3	11.9
5200	7.7	9.3	9.9	11.3	10.1	11.2	10.4	11.8
7800	8.3	9.0	9.1	9.4	10.3	11.1	10.0	11.4
Average all treatments	8.3	9.9	9.8	10.6	9.7	11.1	10.1	11.5

Plant height and bract diameter were reduced slightly by the November 1 applications of CCC. An application of 1730 ppm CCC on November 1 or 15 improved bract formation with no undesirable side effects. Higher rates of application on November 1 or 15 resulted in objectionable crinkling of the bracts. No objectionable bract crinkling resulted from December 1 or 15 applications. The late season use of CCC did not alter keeping quality under simulated home conditions.

Conclusions and Summary

1. The growth retardant CCC effectively controls the height of poinsettias.

2. None of the treatments used in this study resulted in any injury to the plant material, other than crinkling of the bracts in some instances.

3. Applications of CCC to the soil of unrooted cuttings under intermittent mist, or to the soil of established plants provided satisfactory results.

4. The application of CCC to cuttings did not appear to hinder or stimulate rooting.

5. Cuttings taken early in the season become too tall even if treated with CCC.

6. Single stem and pinched plants respond similarly.

7. Diameter of the bract cluster was reduced and the open area surrounding the actual flowers in the center of the cluster was also reduced in size. The result was a more compact, fuller appearing cluster. Random checks indicated no changes in bract number.

8. Flowering may be delayed up to one week by the higher rates under certain conditions.

9. Single applications of CCC to the soil appeared to present the most practical approach.

10. Undesirable crinkling of the bracts can result from higher rates of applications. Based on the aforementioned studies, the following rates of application are suggested.

Time of application	Maximum rate of application
through August	5200 ppm
through early October	2600 ppm
through November 15	1730 ppm
thereafter	not beneficial

11. Keeping quality of treated plants was not altered.

12. The results reported here apply to the variety Barbara Ecke Supreme only. Other varieties may or may not respond similarly.

13. Uniform application of the chemical is essential for uniform results.

14. Commercial growers who may try CCC in 1962 should treat only a portion of their poinsettia crop. Special care should be taken to insure proper dilution of the stock solution. They should also bear in mind that plant response may differ with variations in soil, temperature and other factors.

15. The proper use of CCC can be a boon to the poinsettia grower.

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