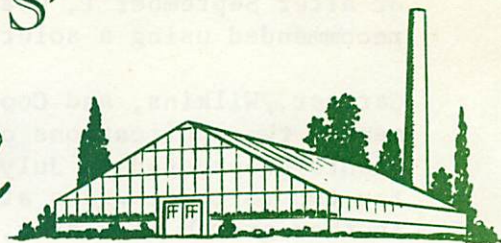




ROY A. LARSON  
DEPARTMENT OF HORTICULTURAL SCIENCE  
N. C. STATE COLLEGE  
RALEIGH, N. C.

# MINNESOTA STATE FLORISTS' *Bulletin*



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Editor, Richard E. Widmer

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## POINSETTIA HEIGHT CONTROL WITH CHEMICALS<sup>1</sup>

R. E. Widmer

The poinsettia (*Euphorbia pulcherima*) is the most popular Christmas pot plant sold in this country. Good, modern cultural practices applied to poinsettias result in tall plants. The public prefers good quality in short plants which range from 10 to 18 inches above the pot rim. Poinsettias grown from cuttings taken late in the season are relatively short, but the colorful red bracts are usually smaller than those produced on taller plants propagated earlier in the summer. In addition, the supply of cuttings available late in the season is not adequate to meet the demand.

Lindstrom and Tolbert (9) in 1960 reported that the application of CCC (2-chlorethyl trimethyl ammonium chloride), now known as Cycocel, to the soil of poinsettia plants resulted in reduced stem elongation. Cathey and Stuart (1), Rogers and Rothenberger (11), O'Shea, Jones, Miller and Kiplinger (10), and Widmer (12) all reported that CCC effectively controlled the height of poinsettias, produced thicker stems and darker foliage color. Various methods of describing the solution concentrations of CCC applied to plants have been used in the literature. For ease of understanding, all work described in this paper refers only to ppm (parts per million) of CCC in the solution applied. Conversion tables are presented at the end of this paper for the reader's convenience.

Additional studies were conducted by many research workers in 1961. Lindstrom (8) reported that the application of CCC to the soil of Barbara Ecke Supreme poinsettia plants in 2½ or 3-inch pots was satisfactory, but that plants grew very rapidly once they were panned unless they were retreated. He suggested early panning followed by treatment one week later when the plants were 6 to 8 inches tall. He advised adding CCC no later than November.

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<sup>1</sup>Paper No. 1153 Miscellaneous Journal Series Agricultural Experiment Station, University of Minnesota.



1. Lindstrom further stated that treatment of plants propagated in May or June, or after September 1, was not practical. In an earlier article Lindstrom (7) recommended using a solution of 3700 ppm. of CCC.

Gartner, Wilkins, and Coorts (3), also working with Barbara Ecke Supreme, recommended two applications of a 3900 to 5200 ppm solution of CCC to the soil of plants propagated in July or early August. The first application was suggested for two to three weeks after potting the cuttings, and the second, 30 days later. Another growth regulator, Phosfon D, provided unsatisfactory results in their tests.

The Society of American Florists and the manufacturer of Cycocel jointly established a nationwide testing program with selected poinsettia growers in 1961. Deems (2) in reporting the results stated that 68 of 77 growers considered CCC beneficial, eight growers withheld judgement and wished to make additional tests and one stated that he would not use CCC in 1962.

A summary of the reports of these growers indicated the following:

1. Effects of CCC were most pronounced and most satisfactory on rapidly growing plants.
2. If single applications were made, the logical times for application were:
  - (a) when cuttings were well rooted in 2½ or 3-inch pots,
  - (b) when plants were well rooted after panning, or
  - (c) when shoots on pinched plants were 1 to 2 inches long.
3. The most widely accepted rate of application called for a solution of 2600 ppm.
4. Application should be no later than October 15 in the North or November 1 in the South.
5. All varieties were responsive to CCC, but in varying degrees. The following response groups were suggested:
  - (a) Very sensitive  
Indianapolis Red and Improved Indianapolis Red
  - (b) Sensitive  
Barbara Ecke Supreme, Improved Barbara Ecke, Henrietta Ecke, Albert Ecke, Improved Albert Ecke (a little less sensitive), Ecke Number 4, and St. Louis
  - (c) Least sensitive (data inconclusive)  
Ecke's Pink and Ecke's White

Widmer (12) in 1962 suggested that Minnesota growers vary the rate of application with the season as follows:



<u>Time</u>	<u>Maximum rate</u>
Through August	5200 ppm
" early October	2600 ppm
" November 15	1730 ppm

He further reported that CCC neither inhibited nor stimulated rooting.

Kofranek, Sciaroni, and Byrne (5) reported that poinsettias frequently grow too tall in California, especially in warm periods in October and November. On the basis of tests with CCC on the varieties Barbara Ecke Supreme and Ecke #4 grown in commercial greenhouses, they recommended the application of solutions of 2600 to 5200 ppm just before or after panning.

Kiplinger (4) pointed out that the manufacturer's suggested dilution rate providing a solution of 3000 ppm may not be adequate for early propagated plants, and that treatment at twice or three times the suggested rate may be desirable.

In almost all studies, the CCC solution was applied in quantities equivalent to a generous watering. Application of excessive concentrations resulted in crinkled bracts, excessively dwarfed plants and in extreme instances loss of foliage. Variations in recommended rates, method and time of application were evident in the literature. Such variations are to be expected because of the wide range of growing conditions throughout the country, of variations in growing methods, and differences in weather conditions in the same location from year to year.

Larson and McIntyre (6) in North Carolina reported good poinsettia height control with another growth regulator, B995, when applied as a foliar spray to plants propagated between August 1 and 15. Little reduction in height was noted in treated plants propagated between August 31 and September 14.

Additional trials were conducted in Minnesota in 1962 to provide further information concerning the most efficient use of growth regulators on poinsettias, and to provide specific recommendations for commercial growers in the Upper Midwest area.

All plants used in the 1962 studies were of the variety Barbara Ecke Supreme. They were rooted under mist, grown in an open, organic soil mixture, fertilized and watered freely and flowered in the natural photoperiod. A new greenhouse with 20-inch glass and no shade was used. Night temperatures were 62°F or higher. In addition to the untreated check, four concentrations of CCC, 1500, 3000, 6000 and 9000 ppm, were included in each test.

Periodic measurements showed that considerable stem elongation occurred in the months of September and October, especially with earlier propagated plants. Average increase was 3 inches in September, 3 inches in October, and 2 inches total for November and December. In some studies stem elongation was much greater.

#### Rooted in Sand

Cuttings taken on August 14 and 27 were rooted in sand and potted in 2½-inch pots on September 6 and October 8 respectively. CCC was applied to half of the plants of each group (exclusive of the check) immediately following potting, and to the other half on September 20 and October 18. The purpose was to determine whether application before root action was established was detrimental, and to determine which method was most effective. Results are presented in Tables 1 and 2.



Table 1. Effect of CCC applied to poinsettias rooted in sand and planted in soil in 2½-inch pots on September 6. There were 11 plants per treatment.

Treatment	Mean plant height (inches)	Increase in	Bract Diameter (inches)
		height (inches) Sept. 6 to Dec. 26	
Check	11.8	6.7	13.9
1500 CCC - Sept. 6	11.3	6.0	13.5
3000 CCC - Sept. 6	11.6	6.6	13.7
6000 CCC - Sept. 6	10.6	5.7	13.5
9000 CCC - Sept. 6	11.5	6.9	12.9
1500 CCC - Sept. 20	13.2	7.7	14.1
3000 CCC - Sept. 20	9.5	4.9	12.8
6000 CCC - Sept. 20	9.0	4.1	12.7
9000 CCC - Sept. 20	8.7	4.0	12.1

Table 2. Effect of CCC applied to poinsettias rooted in sand and planted in soil in 2½-inch pots on October 8. There were 10 plants per treatment.

Treatment (ppm)	Mean height inches	
	Nov. 1	Dec. 26
Check	8.8	10.1
1500 CCC - Oct. 9	8.5	9.0
3000 CCC - Oct. 9	8.6	9.1
6000 CCC - Oct. 9	8.6	9.0
9000 CCC - Oct. 9	8.5	8.5
1500 CCC - Oct. 18	8.2	9.2
3000 CCC - Oct. 18	8.8	9.2
6000 CCC - Oct. 18	8.3	8.8
9000 CCC - Oct. 18	8.5	9.2

No injury was evident from applying CCC to the soil before the roots were established. The delayed application was more effective, however, as evidenced by the smaller bract diameter and smaller increase in height with the August 14 propagation date. In addition some bract crinkling was evident when 6000 ppm was applied on September 20, but not with the 6000 ppm, September 6 treatment. With the August 27 propagation date, bract crinkling was evident starting with the 3000 ppm treatment when applied on October 18, and with the 6000 ppm treatment when applied on October 9.

#### Rooted in Soil

Cuttings in these trials were rooted in 2½-inch pots in a soil mix of 2 parts sphagnum peat moss, 1 part loam and 1 part sand under intermittent mist. Propagation dates were July 13 and August 6. CCC was applied to half of the pots of each group (exclusive of the check) immediately following potting of the unrooted cuttings. The other half was treated after the cuttings were rooted and removed from the intermittent mist on August 15 and September 5. Objectives were to determine whether any plant injury would result, whether the CCC would be rendered ineffective or leached out of the soil by the mist (as judged by plant response), whether application of CCC after removal from mist is more effective and which rates were



most appropriate. Results are shown in Tables 3 and 4.

No plant injury was evident nor was rooting delayed by the application of CCC when the cuttings were first stuck in the soil mix. Apparently the mist did not leach the CCC out of the soil before it was taken into the cuttings, but delayed application was more effective in limiting stem elongation. The two highest rates of application were the most effective as measured by plant height and to some extent bract diameter. The CCC remained effective in both propagation dates after October 3 and 4 respectively. No bract crinkling was evident and the 6000 ppm rate appeared to be the most efficient rate for both propagation dates.

Table 3. Effect of CCC applied to poinsettia cuttings when potted and placed under intermittent mist as opposed to CCC application after the cuttings are rooted and removed from the mist. There were 30 plants per treatment. Plants were panned three to a 6-inch pan on October 8.

Treatment (ppm)	Mean height (inches)		Height increase
	Oct. 3	Dec. 26	Oct. 3 to Dec. 26(inches)
Check	14.2	24.0	9.8
1500 CCC - July 13	15.1	24.4	9.3
3000 CCC - July 13	12.4	21.2	8.8
6000 CCC - July 13	13.9	21.6	7.7
9000 CCC - July 13	13.3	20.5	7.2
1500 CCC - Aug. 15	15.4	22.1	5.7
3000 CCC - Aug. 15	13.0	21.7	8.7
6000 CCC - Aug. 15	10.2	16.8	6.6
9000 CCC - Aug. 15	9.9	15.7	5.8

Table 4. Effect of CCC applied to poinsettia cuttings when potted and placed under intermittent mist as opposed to CCC application after the cuttings are rooted and removed from under the mist. The October 4 measurements represented 28 plants per treatment and the December 26 measurements 12 plants. Plants were panned three to a 6-inch pan on October 9.

Treatment	Mean height (inches)		Height increase(inches)	Bract diameter (inches)
	Oct. 4	Dec. 26	Oct. 4 to Dec. 26	
Check	13.9	21.2	7.3	14.7
1500 CCC - Aug. 6	15.1	22.4	7.3	14.9
3000 CCC - Aug. 6	13.9	20.4	6.5	14.8
6000 CCC - Aug. 6	13.4	19.0	5.6	14.2
9000 CCC - Aug. 6	13.5	19.8	6.3	15.2
1500 CCC - Sept. 5	14.8	20.3	5.5	15.1
3000 CCC - Sept. 5	13.6	19.7	6.1	14.5
6000 CCC - Sept. 5	10.2	15.9	5.7	15.0
9000 CCC - Sept. 5	9.9	13.4	3.5	15.0

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Times are not so bad as they seem; they couldn't be. (Jay Franklin)