

POINSETTIAS STILL RANK as the number one Christmas pot plant. Timing the crop and controlling disease are no longer major problems, but in some years, growers do have difficulty keeping the plants from growing too tall, particularly during warm periods in October and November. Recently the chemical CCC (2-Chloroethyltrimethylammonium chloride) was developed by the industry. This chemical is capable of reducing the height of many plants, and reports from several other experiment stations have shown CCC to be very effective in shortening poinsettias. These trials were conducted at two commercial greenhouses in the San Francisco Bay Area with slightly different growing conditions.

Colma tests

At the Breitner Nursery, Colma, rates used were: $\frac{1}{2}$, 1, or $1\frac{1}{2}$ ounces of 50% active CCC per 3 quarts of water. Two ounces of solution were applied to the soil two days after transplanting from small peat pots to 6-inch pots. Two pinching dates were chosen for the experiment to determine whether the CCC could effectively retard the growth of plants pinched earlier than usual. Normally plants would be pinched about September 10 to 15 to attain the desired height by Christmas (12 to 15 inches above the pot rim). Two varieties, Barbara Ecke Supreme and Ecke No. 4 (reported to be tall in growth habit) were tested.

Tables 1A and 1B show the cultural details for Barbara Ecke and results of the various treatments. Solution concentrations of $\frac{1}{2}$ or 1 ounce of CCC per 3 quarts of water applied to the soil resulted in the highest quality plants of those treated. Although the averages appeared favorable for the $1\frac{1}{2}$ -ounce rate, the plants were not as uniform as those treated with lesser concentrations. The treatments essentially had no effect on the bract diameter, but the height of the treated plants was reduced considerably when compared to the controls. The controls looked too tall and the leaves were spread too far apart. The plants in all cases had about the same number of nodes (leaves) above the pinch.

CCC applications

CCC applied before the plants were pinched (Table 1B) resulted in slightly shorter plants with fewer nodes than when the chemical was applied on the date of pinching (Table 1A). This can be explained on the basis of less time (in case of the later pinch) to develop nodes and consequently shoot length before

The height of poinsettias for pot plant marketing can be effectively reduced by using soil applications of the chemical, CCC, according to tests conducted with the cooperation of growers in San Mateo and Alameda counties. Difficulties in keeping potted plants from growing too tall were solved by using 2 ounces of a solution containing CCC at the rate of $\frac{1}{2}$ to 1 ounce of the 50% material per 3 quarts of water. When applied just before, or immediately after transplanting from the $2\frac{1}{4}$ -inch pots to the 5- or 6-inch pots, the CCC treatment resulted in well-proportioned plants of high commercial quality.

SHORTENING POINSETTIAS

WITH CCC

for better proportioned potted plants

A. M. KOFRANEK · R. H. SCIARONI · T. G. BYRNE

flower buds were initiated (about October 1).

Tables 2A and 2B summarize the data obtained for the variety Ecke No. 4. The treatment which resulted in the highest quality plants was the 1-ounce-per-3-quart rate. The $\frac{1}{2}$ -ounce rate was not considered sufficient for this variety and the $1\frac{1}{2}$ -ounce rate caused the plants to be too dwarfed and they were not well proportioned. The data indicated that CCC might have an important place in the culture of this particular variety since the controls, under normal conditions, grew very tall.

Hayward tests

At the Sunnyside Nursery, Hayward, all concentrations were effective in reducing the height of the poinsettias in spite of the fact that applications of CCC were made 41 days after pinch (Table 3A) in one case and 26 days after the pinch (Table 3B) in the case of the later planting. The grower planted and pinched these plants early (see Tables 3A, 3B). He planned to make a second pinch about early to mid-September. Some of his plants were set aside and treated with the

same CCC concentration (ppm) used at Colma. In this experiment, however, larger amounts of the solution were added to each pot because the roots were well established throughout the pots. Based on the size of the root system, 14 ounces of the final solution were added to each 6-inch pot instead of 2 ounces, as in the case of the small peat pot. This solution was no stronger than that used at the Colma location but the total quantity used was greater. The purpose of this experiment was to determine whether CCC has any dwarfing effects when applied to the soil in which well established plants are growing.

The data in Tables 3A and 3B show that CCC at all concentrations was very effective in reducing height, but the quantities of active material necessary might make late applications impractical. The experiment, however, did show that even if large quantities were applied, the material was not phytotoxic. Perhaps a large part of the material was leached in the first few irrigations after the application. This may have prevented excessive CCC uptake by the plants. Lack of phytotoxicity may also have been due to the larger soil mass undergoing treatment.

Different practices

The growers in both the Colma and the Hayward areas used very different CCC treatments and cultural practices. The Hayward control plants were shorter in general (compare Table 1A with 3A) although the plants were pinched July 28 and the Colma plants pinched August 19. The Colma greenhouses were built low, and the plants were closer to the glass, which caused them to stretch more than those in the Hayward greenhouses. The plants grown in Hayward had more nodes than those grown in Colma because they were pinched earlier. The CCC treatments had essentially no effect on the number of nodes in either location.

The Hayward plants in general had more breaks per plant than did the Colma plants. However, the Hayward grower pinched higher on the plants, thereby leaving more potential "eyes" to force than did the Colma grower. Treating the soil with CCC at the time of pinching or before pinching may result in a reduction of breaks, but there is no proof of this because of the widely different cultural

practices and different amounts of CCC applied at the two locations.

Applications of similar concentrations but using more final solution per pot can be made to established plants in larger pots, but it seems that this should only be done as a last effort to control the height during very warm days when growth is rapid. It is more economical to propagate plants later and treat the plants when they are still in small pots or soon after transplanting.

Plants treated with CCC have smaller leaves but are darker green and are spaced closer together than those on untreated plants. This adds to, rather than detracts from, the overall quality of the plants, however.

A. M. Kofranek is Associate Professor and Extension Specialist of Floriculture, University of California, Los Angeles; R. H. Sciaroni is Farm Advisor, San Mateo County; and T. G. Byrne is Farm Advisor, Alameda County. Breitner Nursery of Colma and Sunnyside Nursery of Hayward cooperated in this research.

Poinsettia plant to left, labeled 2-19, was treated with 50% CCC at 1 ounce to 3 quarts of water on August 19 and pinched on the same day. Plant to right, labeled 4-19, was also pinched on August 19 but was not treated with CCC.



Table 1A. Average Final Data Recorded Dec. 12, 1961 for the Variety Barbara Ecke Supreme Grown in the Colma Location. The Plants Were Shifted from Peat Pots to 6-inch Pots on August 17, Treated with CCC on August 19 and Pinched on the Same Day

Rate of CCC (50% active material) per 3 qts. of water	Average height (inches)	Average bract diameter (inches)	Number of bracts	Number of nodes
1½ oz.	11.4	10.5	2.6	7.8
1 oz.	13.5	10.1	2.6	7.4
½ oz.	14.2	10.0	2.4	8.4
Control	19.9	10.7	2.4	8.2

Table 1B. Average Final Data Recorded Dec. 12, 1961 for the Variety Barbara Ecke Supreme Grown in the Colma Location. The Plants Were Transplanted from Peat Pots to 6-inch Pots on August 17, Treated with CCC on August 19 and Pinched on September 1, 1961

Rate of CCC (50% active material) per 3 qts. of water	Average height (inches)	Average bract diameter (inches)	Number of bracts	Number of nodes
1½ oz.	12.9	9.4	2.6	7.6
1 oz.	13.9	9.4	2.6	6.4
½ oz.	12.7	10.1	2.8	6.6
Control	19.7	10.1	2.6	6.8

Table 2A. Average Final Data Recorded December 12, 1961 for the Variety Ecke No. 4 Grown in the Colma Location. The Plants Were Shifted from Peat Pots to 6-inch Pots on August 17, Treated with CCC on August 19 and Pinched on the Same Day

Rate of CCC (50% active material) per 3 qts. of water	Average height (inches)	Average bract diameter (inches)	Number of bracts	Number of nodes
1½ oz.	11.3	10.9	2.0	7.4
1 oz.	13.5	9.5	2.2	7.6
½ oz.	16.0	10.6	2.0	8.0
Control	25.0	11.1	2.0	9.0

Table 2B. Average Final Data Recorded December 12, 1961 for the Variety Ecke No. 4 Grown in the Colma Location. The Plants Were Transplanted from Peat Pots to 6-inch Pots on August 17, Treated with CCC on August 19 and Pinched September 1, 1961

Rate of CCC (50% active material) per 3 qts. of water	Average height (inches)	Average bract diameter (inches)	Number of bracts	Number of nodes
1½ oz.	12.0	8.7	2.0	6.8
1 oz.	16.2	9.9	2.0	8.0
½ oz.	17.1	9.3	2.6	7.4
Control	24.6	10.4	2.2	8.8

Table 3A. Average Final Data Recorded Dec. 14, 1961 for the Variety Barbara Ecke Supreme Grown in the Hayward Location. Cuttings Were Taken June 26, Potted into Peat Pots July 18, Pinched July 28, Shifted to 6-inch Pots August 18 and Treated with CCC on September 7, 1961

Rate of CCC (50% active material) per 3 qts. of water	Average height (inches)	Average bract diameter (inches)	Number of bracts	Number of nodes
1½ oz.	9.6	10.5	3.6	14.4
1 oz.	10.2	11.0	2.8	14.3
½ oz.	12.9	10.9	3.2	15.4
Control	18.6	11.3	3.3	16.9

Table 3B. Average Final Data Recorded Dec. 14, 1961 for the Variety Barbara Ecke Supreme Grown in the Hayward Location. Cuttings Were Taken July 12, Potted into Peat Pots August 2, Pinched August 12, Shifted to 6-inch Pots September 2 and Treated with CCC on September 7, 1961

Rate of CCC (50% active material) per 3 qts. of water	Average height (inches)	Average bract diameter (inches)	Number of bracts	Number of nodes
1½ oz.	8.2	10.7	3.8	13.0
1 oz.	9.5	10.4	3.5	12.5
½ oz.	12.2	10.6	4.0	14.1
Control	15.4	10.4	4.0	14.1