

# Effects of CO<sub>2</sub> on Poinsettia

BY K. L. GOLDSBERRY

CO<sub>2</sub> fertilization affects plant species and varieties within species in different ways. The effects of three CO<sub>2</sub> concentrations on poinsettia were observed at Colorado State University during the 1964 poinsettia season.

Poinsettia plants variety Barbara Ecke Supreme were propagated under mist in 2-1/4 inch pots by Park Floral Company, Englewood, Colorado, on September 16, 1964. The cuttings were "watered in" with an 8 oz/50 gal Dexon-Terraclor solution and no supplementary light was given. After rooting they were fed 20-19-19 every 5 days at the rate of 2-1/2 oz/2 gal of water. On October 22, 3 rooted plants were panned per 6-inch clay pot, and 20 pots placed in each of three growing compartments. The com-

partments, described by the author (1), were controlled at 60-62F night, and 70-75F day temperatures. Plants were watered on demand with the standard nutrient solution used at Colorado State University (2).

Three CO<sub>2</sub> levels were established as follows: Treatment 1, low level had no CO<sub>2</sub> added. Treatments 2 and 3, the medium and high levels averaged 492 and 831 ppm respectively. The CO<sub>2</sub> was added during daylight hours from liquid CO<sub>2</sub>.

## Results

**Bract coloring:** Most plants grown in the high CO<sub>2</sub> treatment showed slight coloration of the bracts by November 6. The medium and check treatments had no color change at this time. On November 11 (20 days after planting) every plant in the high CO<sub>2</sub> treatment was showing good color, while progressively less color was present in the medium and low levels. Bract development was delayed in part of the check treatment due to light seepage from another experiment. Only the plants that did not appear affected were considered in the results. Figure 1 shows the bract development of the three treatments on December 8, 47 days after panning.

**Foliage development:** The condition of the foliage in all treatments was similar the first 20 days of growth. After this time foliage in the high CO<sub>2</sub> level gradually developed a lighter green color between the veins. Plants in the medium and check treatments appeared normal. Nine days later, November 27, the foliage of the high treatment showed critical chlorosis, while plants receiving medium CO<sub>2</sub> showed interveinal-yellowing. The foliage color in the check treatment continued good. At this time 1/2 tsp/pot of a complete, low analysis fertilizer was fed to plants in the two higher CO<sub>2</sub> levels. Further development of chlorosis was stopped, but the foliage of plants in the high CO<sub>2</sub> level caused them to be unsalable. The leaves at the top of Figure 1 indicate typical appearance on December 8.

**Flower development:** Flower buds developed first in the high CO<sub>2</sub> level and were all visible by November 11. No buds were showing at this time in the other treatments. Table 1 shows the number of full nectar

Date	Mean CO <sub>2</sub> concentration in ppm		
	317	492	831
November 27	0	0	5
December 3	0	3	11
December 8	0	12	35
December 12	2	41	93
December 16	13	124	243
December 21	49	204	---

Table 1. Dates and numbers of full nectar cups on poinsettia, Barbara Ecke Supreme, grown in three CO<sub>2</sub> concentrations.

cups and the dates they were observed. Most of the plants in the high CO<sub>2</sub> level were past maturity on December 16, the bracts having reached the salable stage December 1.

**Bract size:** The average diameter of bracts was variable before maturity (Figure 1). As the plants matured, bract sizes in the two higher CO<sub>2</sub> levels were nearly equal, while those in the check treatment were slightly smaller (Table 2).

	Mean CO <sub>2</sub> concentration in ppm		
	317	492	831
Ave. plant height at maturity in inches	---	14.6	12.5
Ave. bract diameter at maturity in inches	12.0	13.5	13.5

Table 2. Effects of CO<sub>2</sub> on poinsettia height and bract diameter.

## Conclusions

Increasing the CO<sub>2</sub> concentration of the greenhouse atmosphere during daylight hours from 317 ppm to an average of 831 ppm:

1. Accelerated poinsettia growth and maturity by almost two weeks;
2. Increased nutrient requirements to a degree that damaged the salability of the crop, when fed normal rates;
3. Increased bract diameter slightly; and
4. Decreased plant height slightly at maturity.

## Literature Cited

1. Goldsberry, D. L. 1961. Effects of CO<sub>2</sub> on carnations. Colorado Flower Growers Association Bulletin 138.
2. Holley, W. D. 1958. Feeding greenhouse plants. Colorado Flower Growers Association Bulletin 97.

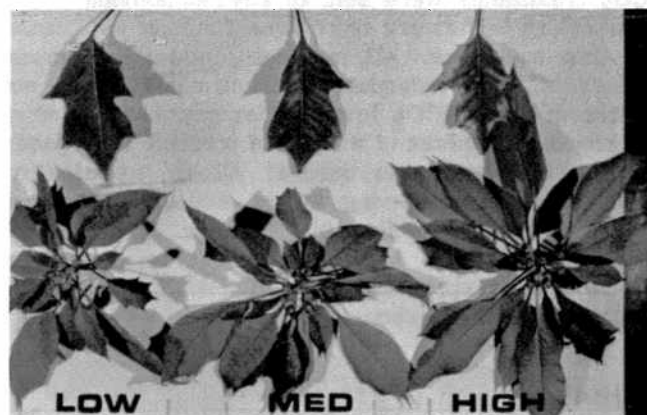


Fig. 1. Leaf, flower and bract development of poinsettia grown in 3 CO<sub>2</sub> concentrations on December 8, 47 days after panning.

*Your editor  
W.D. Holley*