The Effects of Growth Retardants and Temperature on the Growth and Flowering of Poinsettia cvs. 'Annette Hegg' and 'Eckespoint C-1'[1]

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Abstract. **Two poinsettia cultivars, 'Annette Hegg' and 'Eckespoint C-1', were grown at 60° and 65°F night temperatures, and subjected to growth retardant treatments. 2-Chloroethyl trimethyl ammonium chloride (CCC) soil drenches resulted in the shortest plants, but effective height control was achieved with combination spray applications of CCC and succinic acid 2,2-dimethylhydrazide (SADH), or CCC and N-pyrrolidinosuccinamic acid (F 529) applied once, or 2 foliar applications of CCC applied 3 weeks apart. Date of flowering was not appreciably affected by the growth retardants, but was affected by temperature. Flowering was accelerated at the warmer temperature, but plant heights and bract diam were similar at both temperatures.**

The introduction of the cultivars 'Annette Hegg' and 'Eckespoint C-1' increased the need for research on the chemical control of growth of poinsettia plants because studies (2, 3, 4, 5, 6, 8) on older cultivars were not applicable. Early reports indicated that the new cultivars were naturally slow-growing and height control measures were unnecessary. Some studies (1) stated that the slow-growing new cultivars did not respond to growth retardants effective on 'Barbara Ecke Supreme', 'Elisabeth Ecke', 'Paul Mikkelsen', and other cultivars.

Our studies were conducted in 1969 to determine the effectiveness of several combinations of 3 growth retardants on growth and flowering based on the positive results reported by Shanks (7) with CCC and SADH. Cuttings were taken August 25, 1969 and rooted in BR-8 blocks. The rooted cuttings were planted 3 per 6-inch clay pot, in soil, acid peat moss and sand, (2:1:1 by vol). The fertilizer program consisted of weekly applications of 2½ lbs. soluble 20-20-20/100 gal of water. Osmocote (14-14-14) was also used, applied as a topdressing 1 week after panning (late September) and again in late November, at a rate of 1/3 oz/6-inch pot. Plants were grown under natural day lengths at night temperatures of 60° and 65°F.

There were 10 growth retardant treatments in the study (Table 1) and 4 pots (12 plants) of each cultivar per treatment grown in a completely randomized block. Final plant heights were obtained December 4 to the nearest half-inch from the pot rim to the plane of the primary cyathia along with bract diam. Time of anthesis was determined by the appearance of pollen.

'Annette Hegg'. The average final heights and dates of flowering are shown in Table 1. CCC applied as a soil drench or foliar spray, or in combination with another growth retardant, was most effective in height control. Two CCC foliar applications, applied 3 weeks apart, were no more effective than one application of a CCC + SADH or CCC + F-529 combination treatment. Height differences were not obtained when plants were treated with 2 foliar applications of SADH or F-529, compared to the untreated control plants. No plant injury was observed when most combination treatments were used, but the CCC + SADH + F-529 spray combination resulted in severe foliar damage. The CCC spray treatment resulted in some yellowing of the foliage, but quality was not impaired at flowering. Date of flowering was not affected by the growth retardants but bract diam was less in all the growth retardant treatments (11-14 inches), compared with bracts on control plants (15 inches). All plants were in flower between November 21 and November 23 regardless of temperature or growth retardant treatments.

'Eckespoint C-1'. Contrary to an earlier report (1) this cultivar did respond to growth retardants. Plants treated with CCC spray or drench applications were several inches shorter than control plants. The retardants SADH and F-529 also affected plant growth, but to a lesser extent than CCC. The effects of the various treatments on plant height and date of flowering are shown in Table 1 and Fig. 1.

Bract diam were smaller on treated plants than on controls, but all plants would have been acceptable commercially. The quality shown in Fig. 1 was typical of most plants in the

[1]Received for publication May 25, 1970. Paper No. 3179 of the Journal Series of the North Carolina State University Agricultural Experiment Station, Raleigh.

Table 1. Influence of 3 growth retardants and 2 temperatures on growth of 'Annette Hegg' and 'Eckespoint C-1' poinsettia plants. Final data recorded December 4, 1969.

Treatments	Annette Hegg				Eckespoint C-1			
	Avg final height (inches)		Avg bract diam (inches)		Avg final height (inches)		Avg bract diam (inches)	
	Night temperature		Night temperature		Night temperature		Night temperature	
	60°F	65°F	60°F	65°F	60°F	65°F	60°F	65°F
CCC drench (2,950ppm) 10/3 spray (2,950ppm) 10/24	7.0 a[z]	8.0 a	11.0 a	12.5 a	7.0 a	8.5 a	9.5 a	11.5 a
CCC drench (2,950ppm) 10/3	8.0 a	9.5 b	11.5 ab	12.5 a	8.5 b	10.0 ab	11.5 b	12.5 ab
CCC (2,360ppm) and F-529 (7,500ppm) spray 10/3	10.0 b	9.5 b	14.0 cd	13.5 abc	10.0 cd	11.0 bcd	13.0 c	13.0 b
CCC (2,360ppm) and SADH (10,000ppm) spray 10/3	10.0 b	11.0 cd	12.5 bc	14.5 cde	10.5 de	13.0 ef	13.0 c	13.0 b
CCC (1,967ppm), SADH (5,000ppm) F-529 (5,000ppm) spray 10/3	10.5 b	10.0 bc	12.5 bc	13.5 abc	9.5 bcd	11.5 cde	13.0 c	12.5 ab
CCC spray (2,950ppm) 10/3 and (2,950ppm 10/24	11.0 b	11.0 cd	11.5 ab	13.0 ab	9.0 bc	10.5 bc	11.5 b	11.0 a
CCC spray (2,950ppm) 10/3	12.5 c	12.0 d	14.5 d	15.0 de	11.5 ef	12.5 def	12.5 bc	14.0 bc
F-529 spray (7,500ppm) 10/3 and (5,000ppm) 10/24	12.5 c	13.5 e	13.5 c	14.0 bcd	12.5 f	14.0 fg	13.0 c	14.5 c
SADH spray (10,000ppm) 10/3 and (5,000ppm) 10/24	14.0 d	13.5 e	13.5 c	14.5 cde	11.0 ef	13.5 fg	13.0 c	14.0 bc
Control	16.0 e	14.5 e	15.0 d	15.5 e	15.0 g	15.0 g	14.5 d	14.5 c

[z]Values not followed by the same letter within a column are significantly different at the 5% level as determined by Duncan's multiple range test.

experiment.

Slightly taller plants were generally produced at the 65°F treatment than at 60° , and the plants flowered earlier at the warmer temperatures. Plants grown at 65° flowered November 25, while those at 60° flowered November 28.

We conclude for both cultivars that CCC drench treatment was the single most effective height control treatment and 2 spray applications were as effective as 1 drench application. One combination spray application of CCC + SADH, or CCC + F 529, was more effective than 2 CCC spray applications applied 3 weeks apart. Within growth retardant treatments there was little difference in plant height between night temperature regimes of 60° vs. 65°F.

Figure 1. 'Eckespoint C-1' plants grown at night temperatures of 65°F (upper) and 60° (lower). 1, control; 5, CCC spray applications October 3 and 24; 3, CCC drench October 3. Control plants were 15 inches tall at both temperatures. Plants photographed December 19, 1969.

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Effect of Growth Retardants on Growth and Flowering of Broccoli[1]

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Abstract: **The effects of growth retardants succinic acid 2,2-dimethylhydrazide (SADH), (2-chloroethyl) trimethylammonium chloride (CCC) and 2,4-dichlorobenzyl-tributylphosphonim chloride (CBBP) on growth and flowering of *Brassica oleracea* var. italica, cv. 'Waltham 29' (broccoli) were investigated. All 3 compounds reduced plant height. At higher concn SADH reduced the no. of plants flowering in both cold and non-cold treated plants. Neither floral induction nor leaf no. was significantly affected by CBBP or CCC. Leaf no. increased with increasing conc of SADH, as a probable result of the increased inhibition of floral initiation.**

Growth retardants have been shown to inhibit flower formation in photoperiodically induced plants (1, 11, 12, 13). However, floral initiation in cold-requiring plants is not always inhibited by these compounds (7, 10). Broccoli *(Brassica oleracea* L. var italica) is hastened to flower by low temperature treatment (5°C), but growing temperatures of 24° or higher delay or in some cases completely block floral initiation (5). In this study we investigated the effect of several different growth retardants on growth and flowering of broccoli at both high and low temperature.

Broccoli plants, cv. 'Waltham 29' were cultured in a greenhouse held at a constant 24°C until cold treatments were initiated at 5° under a 16 hr photoperiod from fluorescent tubes (50% daylight and 50% warm white) at 350 ft-c. Following cold treatment, plants were returned to the greenhouse for a week before termination of the experiment. Control plants were grown continuously in the greenhouse. General cultural methods followed were the same as reported by Fontes *et al.*, (5).

[1]Received for publication October 13, 1969. Paper No. 592. Department of Vegetable Crops. Cornell University, Ithaca, N. Y.

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