

Early PGR Drench Applications On Poinsettias



A new technique to inhibit stem extension of poinsettia is to apply an early, low-dose PGR drench. This article will compare the efficacy of low-dose and early drench applications of paclobutrazol on poinsettia crops.

By Roberto Lopez and Erik Runkle

Believe it or not, it's already time to begin thinking about height-control options for your poinsettia crops. Today's poinsettia growers have many plant growth retardants (PGRs) and application methods to choose from to control height. Many growers wait until their crops are too tall to apply a PGR. Late applications of PGRs to poinsettias can delay anthesis and also reduce bract size. Fortunately, growers now have chemical products that can counteract PGR blunders. Fascination (Valent USA Corp.) and Fresco (Fine Americas, Inc.) can be used to increase plant height and promote bract expansion, especially on plants that have reduced bract size from an excessive or late growth retardant application. However, hopefully PGRs are applied correctly and at desirable rates so stem extension does not need to be promoted.

A new technique to inhibit stem extension of poinsettia is to apply an early, low-dose PGR drench. A PGR drench is the application of a volume of solution to the media so the active ingredient is primarily absorbed by the roots. The chemical moves from the roots to the shoot tips, where it acts to inhibit subsequent stem elongation. PGR drenches have been used on poinsettias for years, and have traditionally been applied late in the crop once plants reach a desirable height. However, a late drench can reduce the size of developing bracts. Dr. Jim Barrett at the University of Florida reviewed the benefits of

drench applications on poinsettias in the August 2004 issue of *GPN* (<http://www.onhort.com/articles/p42Barrett1.pdf>). Drenches can be applied throughout the growing season, can have less of a negative impact on bract size compared to foliar sprays and have a longer period of activity than sprays.

In this article, we compare the efficacy of low-dose and early drench applications of Paczol (paclobutrazol) alone or in combination with a spray application of B-Nine (daminozide) with or without Cycocel (chlormequat chloride). This article presents research-based information generated

from trials we have conducted in the past two years on five popular cultivars and response groups of poinsettias grown under northern U.S. conditions. Our objectives were 1) to determine a desirable early application drench rate during poinsettia production using graphical tracking and 2) to evaluate if early drenches of paclobutrazol reduce bract size or delay time to anthesis.

Experimental Protocol

'Freedom Red', 'Prestige' and 'Orion' poinsettia plants were delivered to the Michigan State University (MSU) floriculture research greenhouses from

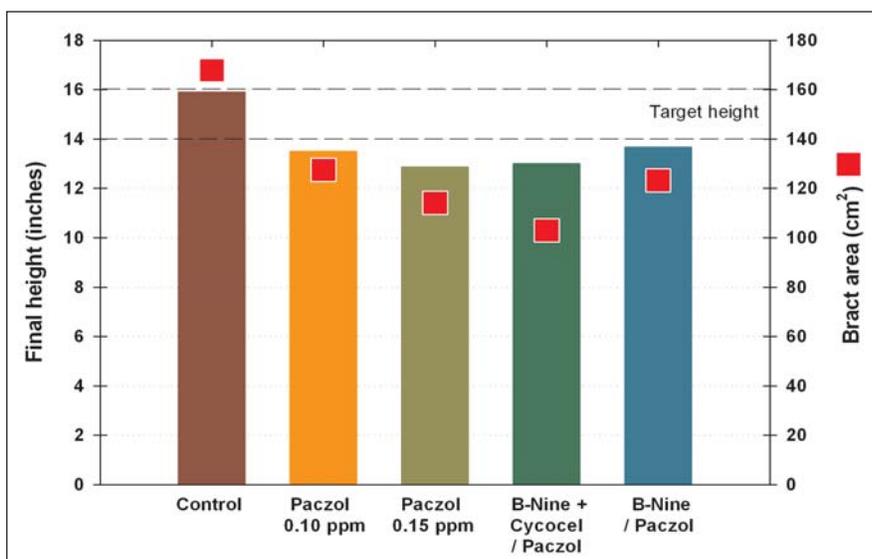


Figure 1. The effects of PGR treatments on plant height and bract area of poinsettia 'Freedom Red' at anthesis. Paczol was applied as a media drench; B-Nine + Cycocel (1,250 + 750 ppm) and B-Nine (2,500 ppm) were applied as foliar sprays and treatments were followed by a Paczol drench at 0.10 ppm.

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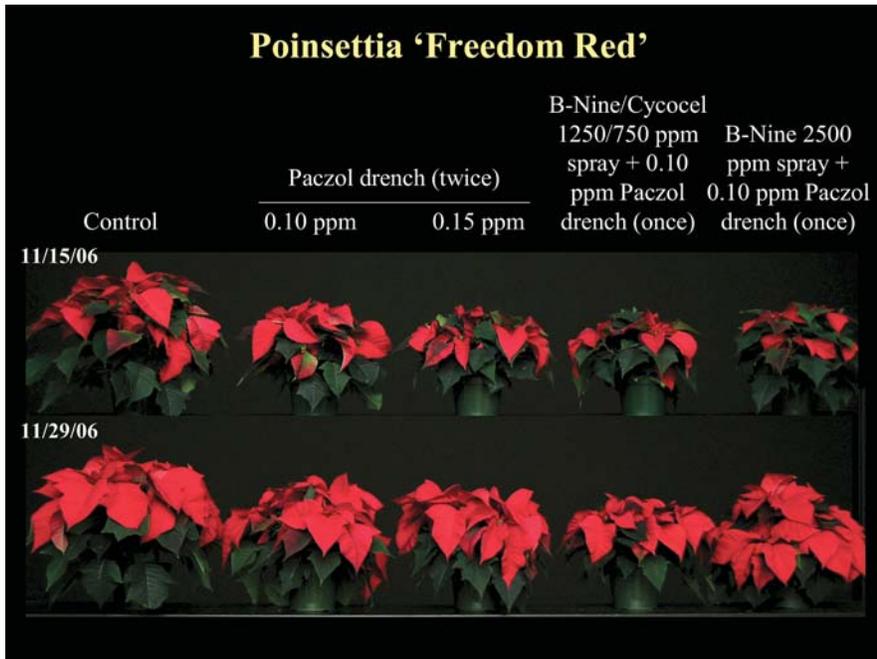


Figure 2. Effects of two early Paczol media drenches, a B-Nine + Cycocel foliar spray followed by a Paczol drench, or a B-Nine spray followed by a Paczol drench on poinsettia 'Freedom Red'. PGR applications were made on Sept. 20, 2006, and Oct. 11, 2006. Short days started on Oct. 4, 2006, and the dates indicate when photographs were taken of representative plants in each treatment.

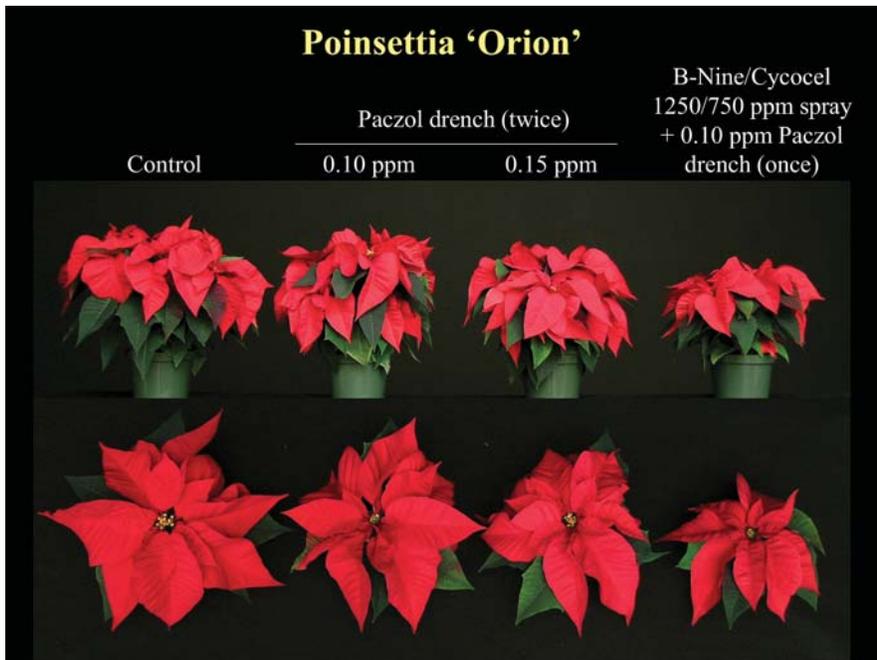


Figure 3. Effects of two early Paczol media drenches or a B-Nine + Cycocel foliar spray followed by a Paczol drench on poinsettia 'Orion'. PGR applications were made on Sept. 7, 2005, and Sept. 21, 2005. Short days started on Sept. 20, 2006, and photographs were taken of representative plants in each treatment on Nov. 18, 2005.

Henry Mast Greenhouses, Byron Center, Mich., on Aug. 31, 2005 (Year 1). In Year 2, 'Freedom Red', 'Freedom Pink' and 'Snowcap White' rooted cuttings were received from the Paul Ecke Ranch, Encinitas, Calif., on Aug. 2, 2006. All plants were grown in 6½- or 6-inch pots and were pinched to the sixth node from the soil level soon after roots reached the container edges. At MSU, plants were grown in a glass-glazed greenhouse with a constant temperature setpoint of 68° F. The plants were grown under a 16-hour photoperiod consisting of natural daylengths with lighting provided from high-pressure sodium lamps until the start of short days (SD). The SD photoperiod was nine hours and was maintained by pulling black cloth over the crop from 5 p.m. to 8 a.m. All plants were spaced on 14-inch centers.

In both years, drench applications of Paczol at 0.10 or 0.15 ppm were applied to the media at a volume of 4 fl.oz. per pot. The single foliar spray application of B-Nine + Cycocel (1,250 ppm + 750 ppm) or B-Nine alone (2,500 ppm) was delivered with a sprayer at a rate of 2 quarts per 100 sq.ft. A surfactant (Capsil) was included in all spray applications to improve chemical contact with the foliage. After the foliar sprays, a 0.10-ppm drench of Paczol was provided if plant height exceeded the graphical tracking curve. PGR treatments and rates used are provided in Figure 4; crop production and PGR application dates are shown in Figure 5. The target finish height for all cultivars was 14-16 inches.

Data Collection

For each treatment, the height of each plant was measured weekly from the base of the pot to the apex of the tallest shoot. When two branches reached visible anthesis (first pollen shed), bract length and width of the tallest two bracts were measured and bract area was determined by using the formula for the area of an ellipse (long axis × short axis × π)/4.

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Treatments	Rate (ppm)
Control	N/A
Paczol drench	0.10
Paczol drench	0.15
B-Nine + Cycocel spray (1st app.) and Paczol drench (2nd app.)	1,250 + 750
*B-Nine spray (1st app.) and Paczol drench (2nd app.)	2,500
*Year 2 only	

Figure 4. PGR treatments and application rates used in Years 1 and 2.

Cultivar	Year	Pinch date	Start of short days	1st application	2nd application
'Freedom Red'	1	Aug. 30	Sept. 30	Sept. 21	none
'Prestige'	1	Aug. 29	Sept. 20	Sept. 14	Sept. 21
'Orion'	1	Aug. 17	Sept. 20	Sept. 7	Sept. 21
'Freedom Red'	2	Aug. 30	Oct. 4	Sept. 20	Oct. 11
'Freedom Pink'	2	Aug. 30	Oct. 4	Sept. 20	None
'Snowcap White'	2	Aug. 30	Oct. 4	Sept. 20	Oct. 11

Figure 5. Dates of pinch, start of short days and PGR applications during Years 1 and 2 for each poinsettia cultivar.

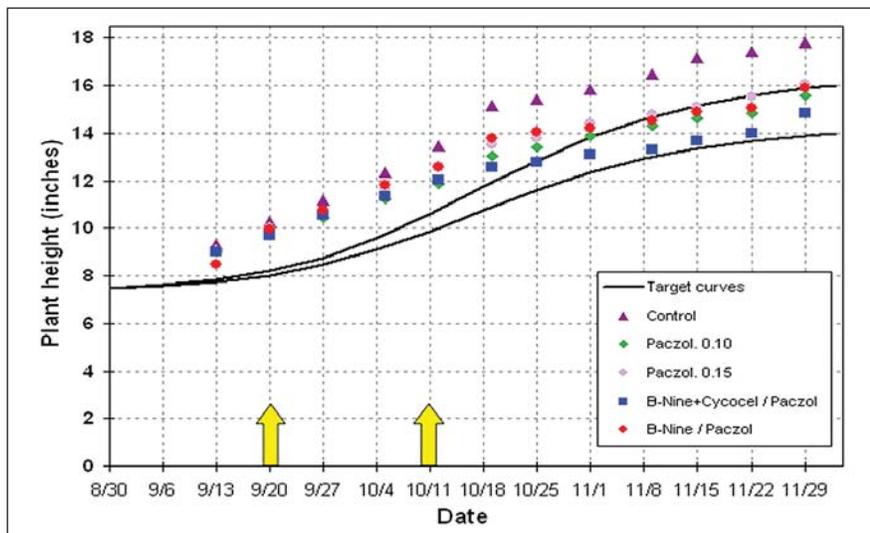


Figure 6. Graphical tracking of poinsettia 'Snowcap White'. Solid lines represent the target curves. PGR treatments were made on Sept. 20, 2006, and Oct. 11, 2006, as indicated by the yellow arrows. Paczol was applied as a media drench at 0.10 or 0.15 ppm; B-Nine + Cycocel (1,250 + 750 ppm) or B-Nine alone (2,500 ppm) were applied as foliar sprays and were followed by a 0.10-ppm drench of Paczol.

Effects on Plant Height

'Freedom Red'. In Years 1 and 2, the final height of untreated control poinsettia 'Freedom Red' plants was 15½ and 15¾ inches, respectively. In the first year, one early drench application of 0.10-ppm Paczol inhibited stem extension and plants finished at 14 inches. In the second year, two applications of 0.10-ppm Paczol provided excessive height control and plants finished ¾ inch shorter than desired (Figures 1 and 2). In both years, two Paczol drench applications at 0.15 ppm produced finish plants that were marginally shorter than the desired height. The spray application of B-Nine + Cycocel with or without 0.10-ppm Paczol resulted in plants that were about 1 inch shorter than the desired height. Plants treated with a B-Nine spray followed by a drench application of 0.10-ppm Paczol produced plants that were 2½ inches shorter than plants that received no PGR application.

'Orion'. Final height of untreated poinsettia 'Orion' was 14½ inches. Plants that received two early drench applications of 0.10-ppm Paczol were at or near the minimum desired market height (Figure 3). Two drenches of 0.15-ppm Paczol suppressed stem extension too much and finish plants were about 1 inch shorter than the desired minimum height. Similarly, a spray application of 1,250-ppm B-Nine + 750-ppm Cycocel followed by a drench application of 0.10-ppm Paczol provided excessive height control; plants were 2-3 inches shorter than the desired minimum target height.

'Prestige'. Poinsettia 'Prestige' did not require any growth regulation because the average control final height was less than 14 inches. Two early drench applications of either 0.10- or 0.15-ppm Paczol suppressed final plant height by about one-third of an inch. The spray application of B-Nine + Cycocel followed by the Paczol drench produced plants that were 2-3 inches shorter than the desired minimum height of 14 inches.

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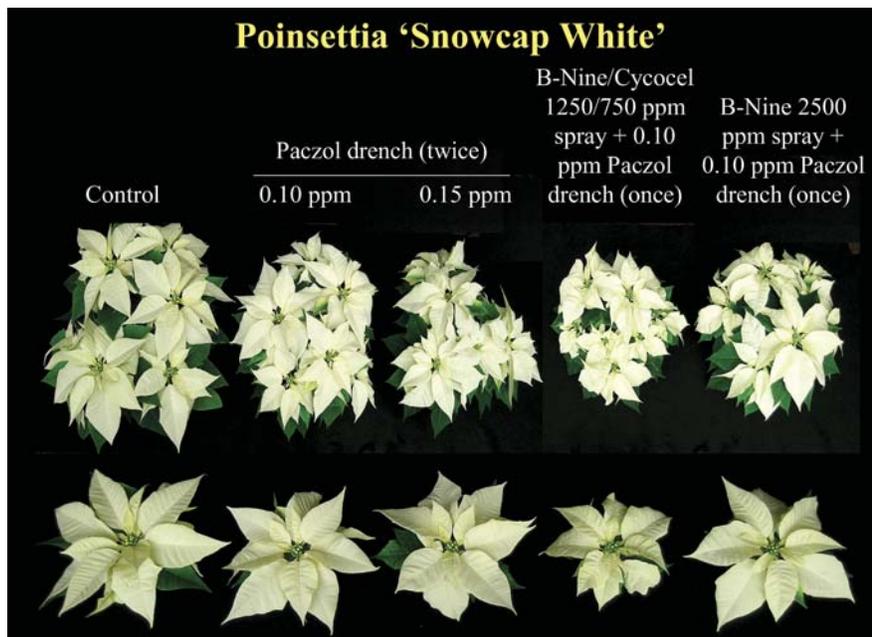


Figure 7. Effects of two early Paczol media drenches, a B-Nine + Cycocel foliar spray followed by a Paczol drench, or a B-Nine spray followed by a Paczol drench on poinsettia 'Snowcap White'. PGR applications were made on Sept. 20, 2006, and Oct. 11, 2006. Short days started on Oct. 4, 2006, and photographs were taken of representative plants in each treatment on Dec. 3, 2006.

'Freedom Pink'. The final plant height of untreated plants was 14 $\frac{3}{8}$ inches, and therefore only one early Paczol drench was applied. One application of 0.10- or 0.15-ppm Paczol suppressed final plant height by about 1 $\frac{1}{2}$ inches. The B-Nine + Cycocel spray produced plants that were 2 inches shorter than the control. A single spray application of 2,500-ppm B-Nine inhibited stem extension by $\frac{7}{10}$ inch compared to the control plants.

'Snowcap White'. Poinsettia 'Snowcap White' is an aggressive cultivar, and finish plant height of plants that did not receive a PGR application was 17 $\frac{1}{2}$ inches (Figure 6). Two early drench applications of 0.10-ppm Paczol inhibited stem extension by about 2 $\frac{1}{2}$ inches. Two drench applications of 0.15-ppm Paczol or a spray application of 2,500-ppm B-Nine and a later drench of 0.10-ppm Paczol produced plants with a final plant height near the maximum desired height. A spray application of B-Nine + Cycocel followed by a 0.10 ppm drench of Paczol produced

plants that were an average of 14 $\frac{1}{2}$ inches in height.

Bract Size and Time to Anthesis

In general, the greatest reduction in bract area was observed in plants sprayed with a combination of B-Nine + Cycocel with or without a drench of Paczol. Bracts of 'Freedom Red', 'Orion', 'Prestige' and 'Snowcap White' were somewhat smaller but still acceptable with an application of Paczol alone or in combination with a spray application of B-Nine (Figures 1, 3 and 7). For example, the two 0.15-ppm Paczol drenches reduced bract area of 'Freedom Red', 'Freedom Pink', Orion', 'Prestige' and 'Snowcap White' by 32 percent, 12 percent, 13 percent, 10 percent and 10 percent, respectively. Paczol did not influence time to anthesis in any of the tested cultivars.

Conclusions

Our results indicate that one or two

early, low-dose drench applications of Paczol can effectively suppress plant height of poinsettia 'Freedom Red', 'Freedom Pink', 'Orion', 'Prestige' and 'Snowcap White' with minimal effects on final bract area. Cultivars such as 'Orion', 'Prestige' and 'Freedom Pink' are less aggressive and may only require one early drench application. In contrast, the more aggressive 'Snowcap White' and 'Freedom Red' may need slightly higher rates or a second early drench application. Based on these results, we suggest growers in the northern United States experiment with early drenches of around 0.10-ppm Paczol for less aggressive poinsettia cultivars and 0.15 ppm for more aggressive ones. Depending on crop spacing and environmental conditions, a second drench application may be needed.

We recommend growers graphically track plant height of all cultivars to determine the appropriate PGR application times. Subsequent drench applications should be applied conservatively, as we found that more than one application may result in final plant height below the desirable market height. Paczol had no effect on time to anthesis in any of the cultivars. GPN

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