

# Subirrigating Poinsettia with Bonzi

Do you know what application method is most effective when it comes to applying Bonzi to poinsettias?

By Douglas Cox

Official label approval has been given to a number of innovative methods of applying plant growth regulators

(PGRs). The Bonzi label (paclobutrazol, Syngenta Professional Products) includes a number of "chemigation" methods, including injection through overhead

sprinklers, fog systems, spaghetti tube systems; watering in with dosing equipment; and application by ebb and flow subirrigation systems or saucers. Most of these application methods have not been widely researched despite the existence of permissive labeling.

Growers are looking for means of accomplishing time-consuming and repetitive tasks such as watering, fertilizing and PGR application more quickly and efficiently. Many growers already have subirrigation or other automated irrigation systems in their greenhouses, and these can potentially do all three tasks at once. While Bonzi and other PGRs may be applied by chemigation, it is an option that has not been extensively evaluated for

practical use. The advantages of being able to treat large numbers of similar plants at one time with PGRs while watering and fertilizing are obvious.

In the August 2003 issue of *GPN* I reported the results of a seed geranium study, demonstrating that Bonzi successfully controlled plant growth when applied by subirrigation once or in dilute amounts applied 11 times. In this experiment growth control with Bonzi was not affected by subirrigation stock tank dilution unless it was 60 percent or more. The following article reports the results of another study, funded by a grant from the Massachusetts Flower Growers' Association, that looked at the response of poinsettia to several levels of Bonzi applied by



'Red Sails' treated with Bonzi applied by drench. Left to right: No Bonzi applied, one application, 10 applications. A total of 0.3 mg a.i. per pot was applied to the treated plants. (All photos courtesy of Doug Cox)



'Red Sails' treated with Bonzi applied by subirrigation. Left to right: No Bonzi applied, one application, 10 applications. A total of 0.3 mg a.i. per pot was applied to the treated plants.

Figure 1. Effect of Bonzi treatments on plant height and diameter of 'Red Sails'.

Bonzi level (mg a.i. per pot)	Drench		Subirrigation	
	One application	10 applications	One application	10 applications
<b>Plant height (inches)</b>				
Control (no Bonzi)	13.1		12.6	
0.1	9.6	10.4	9.6	10.2
0.2	8.3	8.8	9.4	9.6
0.3	8.0	8.4	8.0	9.3
0.4	7.9	8.1	8.6	8.5
<b>Plant diameter (inches)</b>				
Control (no Bonzi)	20.9		21.5	
0.1	17.9	18.2	18.4	18.4
0.2	16.9	17.2	18.7	17.4
0.3	16.3	16.3	16.4	17.6
0.4	15.9	15.8	17.0	17.0

## crop cultivation

drench or subirrigation in a single application or in repeat applications at low levels of active ingredient (a.i.).

### BACKGROUND

Rooted cuttings of 'Red Sails'

poinsettia were potted on Aug. 1, 2002 in 6-inch azalea pots. The media used was Fafard 3B soilless mix, to which 20 percent superphosphate fertilizer was added prior to planting. Standard commercial practices, including insect

and disease control, were used to grow the plants. Fertilizer, 250 ppm nitrogen from 20-0-20, was applied at every watering from potting to finish. Plants were pinched on August 20, leaving five or six nodes.

Poinsettia response to Bonzi was studied by applying PGR once or 10 times (at regular intervals over a 4-week period) by drench or subirrigation. Treating 10 times was meant to simulate how PGRs would be applied through spaghetti tube or subirrigation systems. Bonzi treatment

solutions of 0.5, 1.0, 1.5 and 2.0 ppm were prepared for one PGR application in fertilizer solution. For the 10-applications experiment, solutions were diluted to contain Bonzi at 10 percent of the a.i. applied in one treatment. Regardless of method of application (drench or subirrigation) or number of applications (once or 10 times), plants received a total of 0.1, 0.2, 0.3 or 0.4 mg a.i. per pot.

Control plants were drenched or subirrigated with fertilizer solution containing no PGR. The single Bonzi treatments and the



'Red Sails' treated with 0.3 mg a.i. Bonzi per pot in one drench treatment (left) or in one subirrigation treatment (right).



'Red Sails' treated with a total of 0.3 mg a.i. Bonzi per pot in 10 drench treatments (left) or 10 subirrigation treatments (right) over a 4-week period.

Figure 2. Effect of Bonzi treatments on bract diameter and internode length of 'Red Sails'.

Bonzi level (mg a.i. per pot)	Drench		Subirrigation	
	One application	10 applications	One application	10 applications
<b>Bract diameter (inches)</b>				
Control (no Bonzi)	13.1		12.6	
0.1	10.4	10.6	10.0	10.0
0.2	9.4	10.2	10.2	9.9
0.3	9.6	9.9	9.6	10.0
0.4	9.8	9.0	10.1	9.8
<b>Bract internode length (inches)</b>				
Control (no Bonzi)	20.9		21.5	
0.1	1.2	1.5	1.4	1.3
0.2	1.2	1.3	1.2	1.3
0.3	1.2	1.2	1.3	1.3
0.4	1.2	1.2	1.2	1.2

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first of 10 treatments by drench and subirrigation were made September 19 when the lateral shoots were about 3-4 inches long. Plants in all subirrigation treatments were watered from 8-inch diameter plastic saucers. A

volume of 6.8 fl.oz. per pot of PGR solution was applied in all treatments. In every instance this amount of solution was completely retained by the growth medium in the drench treatments or completely absorbed

from the saucers in the subirrigation treatments.

Plant height, plant diameter and bract diameter were measured at the conclusion of the experiment (December 10). Bract internode length was also mea-

sured at the end of the experiment to determine how treatments affected bract spacing.

### RESULTS

**Plant size.** Bonzi treatment resulted in significantly shorter and smaller diameter plants compared to the control (untreated) plants regardless of application method (drench or subirrigation), number of applications (one or 10) or Bonzi level (mg a.i. per pot) (see Figure 1, page 72). Plants were shorter and smaller in diameter as the level of PGR increased. No differences in the degree of growth suppression resulted from applying Bonzi by drench versus subirrigation. Overall, plants treated 10 times with dilute solutions of Bonzi were taller than those treated once with the more concentrated solutions, but the actual differences in height were very small.

**Bract size.** Bonzi-treated plants had smaller bracts than the control plants, with bracts getting smaller as the level of PGR increased (see Figure 2, page 74). The effects of Bonzi on bract size were the same comparing application methods or number of applications. Considering bract internode length, the individual bracts were more closely spaced on Bonzi-treated plants compared to the controls. Bracts were most closely spaced at the highest Bonzi levels. Application method and number of applications had no effect.

### CONCLUSIONS

In this study Bonzi was applied to poinsettia by overhead drench or subirrigation either one time using concentrated solutions or 10 times using very dilute solutions. All Bonzi-treated plants received 6.8 fl.oz. of PGR solution per pot at the time of treatment. At each level of Bonzi, the total a.i. applied per pot was the same whether PGR was applied in one application or after 10 applications. Using this approach to treat the plants with Bonzi, this study showed that Bonzi can effectively be applied to poinsettia in several different ways: a single drench or subirrigation treatment from a saucer or tray or in repeated applications at low levels, as a grower might by

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injecting PGR solution through a spaghetti tube system or adding PGR to the irrigation solution in a subirrigation system.

The degree of growth suppression caused by Bonzi resulted in commercially acceptable plants in all treatments and did not differ greatly due to application method or number of applications. Not surprisingly, growth was suppressed more as the level of Bonzi applied increased, regardless of how the PGR treatments were made.

Some reduction in bract diameter resulted from Bonzi treatments applied in this experiment. However, the reductions in diameter were easier to measure and find statistically significant than they were to actually see. In my opinion, the reduced bract size with Bonzi did not diminish the quality of the plants and was not of practical importance.

Based on my results, desirable plant growth reductions can be obtained by making one drench or subirrigation treatment of Bonzi by applying 6.8 fl.oz. per 6-inch azalea pot of solution using concentrations in the range of 0.5-2.0 ppm. Pinched plants should be treated when the branches are 2½-3 inches long. Similar plant growth reductions can be obtained by overhead watering or subirrigating with dilute Bonzi solutions (10 percent of the concentration used for one application) and applying them at regular intervals (about 10 times) over a 4-week period. The first treatment should be made when the branches of pinched plants are 2½-3 inches long. GPN

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## Bonzi For Garden Mums

Garden mum varieties have very different plant vigor. Additionally, crop schedule, culture and environment are critical factors affecting vigor and size. Crops produced outside are naturally more compact, and crops produced in a greenhouse require increased amounts of PGRs to control growth and tone the plants.

To promote branching, which provides a fuller look with more flowers, garden mums should be kept growing in the early stages with adequate fertilization and irrigation. At this stage, it is often important to use PGRs to make sure plants do not become overgrown. Near the end of the crop, mild drought stress can tone the plants and control size; As an alternative to this intentional stressing, Bonzi is an important tool to prevent overcrowding.

Bonzi is very effective and versatile on garden mums and can be used as a spray at 30-60 ppm or a drench at 1-2 ppm. Inadequate spray volumes or non-uniform spray coverage can result in uneven shoot growth. Sprays should be applied so that stems and shoot tips are covered. Proper spray techniques increase in importance as the plants develop more leaf canopy, since Bonzi is not active through the leaves. Sprays can be applied as needed to the crop, depending on the rate of growth - multiple applications at lower dose rates provide more uniform control; however, some growers with more experience prefer the convenience of using single applications at higher rates.

For drench applications, Bonzi drenches at lower rates early in the crop are very effective. The most important use of Bonzi drenches can be late in the crop cycle to "harden up" the plants while preventing the plants from becoming overgrown. Late applications necessitate higher rates compared to early applications.

Because of the high degree of differences in culture, climate, varieties and desired results for garden mums, users should test Bonzi on a small number of plants to determine the best application procedures and rates for their individual operations.

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