GROWERTALKS

Features

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# PGRs for Foliage Plants

*Brian E. Whipker & Paul Cockson*

In greenhouse floriculture production, plant growth regulators (PGRs) are part of the grower toolbox to produce top-quality plants. The strategy is primarily centered on preventing unwanted vegetative growth, thus optimizing the number of plants grown on each bench and also maintaining proportionally sized plants.

The popularity of foliage plants has skyrocketed in the past few years and many growers are trying their hand at growing foliage plants in the greenhouse. The use of PGRs with foliage plant production requires a modification of one's philosophy. Foliage plants are similar in many ways to nursery pot production, with "big" being better. The traditional idea of using a PGR to moderate growth isn't a priority. Instead, one needs to consider three primary areas where PGRs will help enhance foliage plant quality: growth promotion, flower promotion, and targeting low-dose applications for short-term holding of plants prone to excessive stretch. Strategies discussed here offer an opportunity for foliage plant producers to enhance plant quality with the use of PGRs.

*Figure 1. Benzyladenine can be used as a foliar spray to promoted additional axillary shoot development in Christmas cactus.*
*Figure 2. Substrate drenches of ethephon at 400 ppm can be used to increase the number of rhizomes produced by sansevieria plants. This will result in a quicker fill of the pot and decrease in greenhouse production time.*
*Figure 3. A root growth comparison of an untreated sansevieria plant (right) and the increase of rhizome growth enhanced with substrate drenches of ethephon at 400 ppm (left).*
*Figure. 4. Benzyladenine (Configure) as a foliar spray of between 50 to 200 ppm enhances flowering of Christmas cactus (right treated and left not).*
*Figure 5. Zebra plant (Aphelandra squarrosa) with excessive internodal elongation that results in weak stems and plants that may be taller than the shipping container. The use of low-dose PGR drenches will tone growth to avoid this situation.*

Most PGRs have flexible-use options based on their "experimental" use label. This will enable you to legally utilize PGRs on foliage plants produced in a greenhouse. There are some restrictions for use of PGRs on outdoor-produced crops, so it will require that you read the label to determine what's permitted for a particular product. The newest addition of the Fine Americas/GrowerTalks PGR Guide for Annuals contains a listing of some active ingredients and initial rates to consider. The listing isn't extensive, because as stated earlier, PGRs haven't been fully utilized to their potential of enhancing foliage plant quality.

## Growth promotion

Large, full-sized plants are the goal for all foliage plants. What PGRs can be used to more quickly help you accomplish this goal? For fuller plants, options include benzyladenine type PGR, benzyladenine + gibberellic acid

(GA4+7) combinations and ethephon type PGRs.

A benzyladenine [BA] type PGR (Configure) can be used as a foliar spray or drench to promote additional axillary shoot development (Figure 1). It's a growth enhancer, which results in fuller plants.

A great example is the use of Configure to enhance "chick" production in sempervivum (see page 68 in the Fine/*GrowerTalks* PGR Guide for Annuals). The key for use is to apply BA early in the production cycle. Applica-tions are typically done after newly transplanted plants have developed sufficient roots and new shoot growth begins. This occurs two to four weeks after transplant. If applied too early, or when plant growth has stalled, it may have diminished effects. Common trial rates for foliar sprays are 50 to 500 ppm and drenches of 25 to 250 ppm.

Combination benzyladenine + gibberellic acid (GA4+7) products such as Fascination or Fresco can also be used to promote fuller plant growth and leaf expansion. Phytotoxicity has been reported on some floriculture species with a foliar spray. Drenches usually have more pronounced effects. Targeting 1 to 3, or as high as 5 ppm, for foliar sprays or drenches would be a good starting point. It's been noted that rates of 10 ppm or higher can lead to excessive plant stretch and upper leaf yellowing, thus those elevated rates should be avoided.

Ethephon (Collate, Florel) also can be used to promote axillary shoot development. Foliar sprays of 75 to 500 ppm are commonly used with floriculture species and offer an excellent starting point for foliage plant trials. Applications should be timed after the transplant has become established in the pot and new growth has begun. Also, because ethephon is a stress enhancer, only apply to plants that aren't under any environmental or nutrient stress. Ethephon substrate drenches also are effective in promoting rhizome production, although the label currently doesn't reflect its use as a drench. Rhizome production was increased dramatically in sansevieria with drenches of 400 ppm (Figures 2 and 3).

If stem elongation is desired, the use of gibberellic acid (GA3) products such as Florgib and ProGibb can be used. Target between 50 to 100 ppm applied to the stems to enhance stem elongation. Multiple applications on a weekly basis may be needed to achieve the desired effect. Avoid too high of a rate, which will result in weak, spindly stems. Additional use tips for GA3 are included in the Fine Americas/*GrowerTalks* PGR Guide for Annuals (page 64).

## Flower promotion

By far, the most common greenhouse industry practice is to apply benzyladenine (Configure) as a foliar spray to enhance flowering of Christmas cactus (Figure 4). Spray rates vary due to cultivar responses. Very responsive cultivars only require around 50 ppm, while 200 ppm is suitable for most other cultivars.

For a number of species, the use of gibberellic acid (GA3) [Florgib, ProGibb] provides some economic benefits. The two most common species in which GA3 is used are calla lilies and spathiphyllum. Trials can be conducted with other foliage plant species to determine if it will enhance flowering.

In calla lilies (*Zantedesia sp.*), GA3 is used to increase flower number, shorten the time to flowering and also control plant height. Most calla lily suppliers already apply GA3 prior to shipping the rhizomes. Rhizome soak rates range from 100 to 500 ppm, while spray rates are between 50 to 100 ppm.

With spathiphyllum, GA3 foliar sprays are used to stimulate flowering. In general, foliar spray rates of between 250 to 1,000 ppm are used.

## Low-dose PGRs to check stretch

A few years ago, Dr. Jim Barrett at the University of Florida promoted the use of low-dose substrate drenches to tempo-rarily check growth of poinsettias. The use of low doses of 0.1 ppm paclobu-trazol (Bonzi, Paczol or Piccolo) were effective for providing a measured, yet time-limited, stall of growth.

In some cases with foliage plants, excessive internode stretch can be an issue (Figure 5). High rates of a PGR would result in long-effects of stopping growth. For foliage plants, the expectation is for the plant to continue to grow and thrive, thus higher drench rates should be avoided. That's where a low-dose drench may prove to be a useful tool for foliage plant growers.

You'll need to conduct your own trials because rates haven't been documented. Based on cost and effectiveness when applied as a substrate drench, the most suitable PGRs to trial would be paclobutrazol (Bonzi, Paczol or Piccolo), uniconazole (Concise, Sumagic) and flurprimidol (Topflor). Suggested test rates to use in your trials would be 0.05 to 0.25 ppm for paclobutrazol, or 0.05 to 0.15 ppm for uniconazole and flurprimidol. Follow the label recommendation to provide a sufficient amount of water to match the pot size. For example, 6-in. pots require the use of 4 fl. oz. of a PGR solution, 10-in. pots need 25 fl. oz. of solution, and 40 fl. oz. are required for larger 12-in. pots.

There's limited published information about suitable PGR rates for foliage plants. The primary information source was published by Dr. R.J. Henny at the University of Florida's Central Florida Research and Education Center in Apopka. Dr. Henny compiled a list of rates trialed in the literature in publication RH-90-10 (mrec.ifas.ufl.edu/foliage/resrpts/rh_90_10.htm).

The use of PGRs in foliage plant production has many opportunities for improving plant quality. With the wide assortment of available PGRs for growth control, flower enhancement and growth enhancement, growers have multiple options for optimizing their production. **GT**

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*Brian E. Whipker is a Professor of Horticulture—Research & Extension at North Carolina State University and Paul Cockson is a former graduate student currently in the Ph.D. program at the University of Kentucky.*