

PGR Trends: New & Novel

This year's plant growth regulator update focuses on post-patent and experimental products as well as the PGR application evolution.

By Jim Barrett

ost-patent products, new experimental products and an evolution in how chemicals are applied are the topics in this year's look at plant growth regulator (PGR) trends. All of our registered growth regulators are older chemicals and no longer patented. Even the newest commercial product, Topflor (flurprimidol), is off-patent. This situation has resulted in the introduction of several new products, and we now have multiple products for most of the active ingredients (see Figure 2, right). In the short term, this is causing a little confusion because it is difficult to keep all of these new products straight and we are not accustomed to referring to PGRs by the active ingredient. Though, the many competing products are causing some reductions in PGR costs.

It is common to get the question about which products a grower should use. Some progressive chemical companies are investing in new product development and new use information and are delivering this information to growers. Some are supporting the industry by sponsoring field days and other industry events. My personal suggestion is to



Figure 1. These are 'Supertunia Royal Velvet' in 6-inch pots. Picture was taken seven weeks after planting. Liners were pinched at planting. The treatments were A, Control; B, paclobutrazol drench at 4 ppm applied day 28; C, daminozide spray at 2,500 ppm day seven and paclobutrazol drench day 28; and D, Florel at 500 ppm day seven and paclobutrazol drench day 28.

| Floriculture Crop PGRs | | |
|-------------------------------------|--|---|
| Active ingredient | Product | Company |
| Anti Gibberellic Acid | | |
| Ancymidol | A-Rest | SePRO |
| Chlormequat chloride | Cycocel Chlormequat E-Pro | OHP Etigra |
| Flurprimidol | Topflor | SePRO |
| Daminozide | B-Nine Dazide | Chemtura Fine Americas |
| Paclobutrazol | Bonzi Downsize Paczol Piccolo | Syngenta Greenleaf Chemical Chemtura Fine Americas |
| Uniconazole | Concise Sumagic | Fine Americas Valent |
| Others | | |
| Ethephon | Florel Brand Pistill | Monterey AgResources |
| Gibberellins A_{4+7} and | Fascination | Valent |
| 6-benzylaminopurine | Fresco | Fine Americas |
| Gibberellic Acid (GA ₃) | Florgib ProGibb | Fine Americas Valent |

Figure 2: This is a partial list of PGRs for floriculture crops. The chemicals are listed by active ingredient.



Figure 3. This is an example of the activity of the liner dip application method. The 4½-inch scaevola on the left was not treated. For the plant on the right, the liner was dipped in paclobutrazol at 1 ppm prior to planting.



These are 'Visions of Grandeur' in 6½-inch pots. The plant on the left received three sprays and a late paclobutrazol drench at 1 ppm. The plant on the right received only three early drenches with paclobutrazol at .1 ppm.



Figure 4. This 'Visions of Grandeur' is an example of the use of Fascination (Cytokinin/Gibberellic acid) to increase poinsettia height. The weekly heights are shown in the graph. The crop was sprayed four times with growth retardants as indicated by the X. As indicated by the F, the crop was sprayed with Fascination at 3 ppm on Nov. 8. The picture is the finished plant.



Figure 5. These salvia are an example of how S-ABA reduces transpiration and delays wilting in plants that are not watered. This picture was taken three days after the last irrigation. The control is on the left, and it wilted after one day. The plant on the right was sprayed with S-ABA at 1,000 ppm, and it wilted after four days.

use the products provided by those companies that are supporting growers and investing in the long-term success of the industry.

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A distinct change in crop production is the movement to short crop times and the use of larger plugs and liners. The need for both compact plants and quick flowering is putting considerable pressure on the use of PGRs to avoid delaying flowering. The petunia example in Figure 1, far left, illustrates how effective drench treatments are at providing size control with little effect on flowering. Florel (ethephon) applied early in the crop is an important chemical that provides branching and size control. However, it can cause too much delay in flowering. For the shortest crops times, the use of Florel should be moved up during propagation to avoid this negative effect.

Dip Versus Drench

In the past few years, considerable information has been generated on the application of PGRs as a liner dip and much of this information has been published in GPN articles (search the article archives at www.gpn mag.com to read past articles on the topic). Many growers, both large and small, report success using this technique, and the effects of a liner dip are shown in Figure 3, left. After using the liner dip, many growers are realizing the benefits of PGR treatments on liners at planting and are now going back and looking at doing the application as a drench rather than a dip. A drench application is easier to mechanize as long as the system delivers solution to all cells.

The relatively new idea of making early drench applications to poinsettias is being tried by many growers with good success. This technique provides excellent control with less total chemical and less effect on bract development, as shown in Figure 4, left. The next step in the evolution of this idea is to extend this strategy to other crops where drenches are easy to apply.

While we are on poinsettias, the other significant change in the use of PGRs on poinsettias is Fascination (cytokinin/gibberellic acid) to promote elongation. Figure 4, left, is an illustration of this effect on a 'Visions of Grandeur' poinsettia crop that was about 2 inches short three weeks before finish. Growers throughout the country have been successful with Fascination. For increased height, the earlier it is used, the better the final plants look. If you add 2-4 inches of growth to a plant, the more nodes it is spread over, the better. For increasing bract size, the strategy is to use Fascination 10 days or so before the crop is finished when there is little increase in height that can occur. Erik Runkle (Michigan State University) and his group published a good article on this topic in the September 2005 issue of GPN (search for it at www.gpnmag.com).



Three PGRs In Development

There are some novel PGRs currently being developed. The first I want to mention is S-ABA, which is the naturally occurring plant hormone that causes stomatal closure and stops transpiration when a plant undergoes drought stress. Valent Biosciences is developing and evaluating S-ABA on floriculture crops. The first application will be to plants at the time of shipping to reduce



Figure 6. The leaves were removed from these unpinched poinsettia plants to show development of the lateral branches. The one on the right was treated with a experimental product that is being evaluated for its ability to promote branching.



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Orthene is a registered to of OMS Investment, Inc. for acephate in Tame is a registered to acephate in Tame is a registered trademark of Valenci USA Con Pased on Whitenes Min. the frequent drought stress that occurs in retail. The effectiveness of S-ABA can be seen on salvia in Figure 5, page 27, where the treated plant went four days before wilting compared to one day for untreated plants.

Prohexadione (GWN-6010) is an anti-gibberellin that is well established in the tree, fruit and turf markets. While we seem to have a glut of anti-gibberellin chemicals, prohexadione is interesting because it is highly mobile in the plant and not active through the media. Thus, it should have the advantages of being easy to use as a spray and not having residue problems. The Gowan Company is evaluating GWN-6010 at three universities, and these trials should give us an idea of how well it fits our needs in floriculture.

The last chemical to mention is an interesting situation. This chemical stimulates growth of lateral branches as shown in the poinsettias in Figure 6, above. There is an obvious need for a product that promotes branching. Because of the competition in the PGR market, the company working on this product does not want to reveal any information during development. It will be registered first for use on woody nursery crops, which may occur in 2007. For herbaceous crops, it has proven more difficult to achieve success, and we have to work on different application strategies. Time will tell if we can make this work. **GPN**

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