In my 18 years of working with plant growth regulators (PGRs), I have never had a more active research year; we have worked with more potential PGR products this year than ever before and are also seeing a lot of interest in applying old chemistries to ornamentals. Not all of them are making the grade, and it will be years before you, as a grower, are likely to see the ones that do, but it makes my work much more interesting and should be encouraging to you that there will be more options in the future.

NEW PRODUCTS AND LABEL CHANGES

One of the new PGRs that you have seen more of this year is Piccolo, the paclobutrazol growth retardant produced and marketed by Fine Agrochemicals Limited of the United Kingdom. Piccolo has shown excellent activity on herbaceous perennials and other floricultural crops. Figure 1, page 32, shows excellent height control of Alcea and Gaura with no significant differences between treatments of Piccolo or Bonzi at equivalent rates. The height control of Alcea was short-term; the photo, right, taken at two weeks after treatment shows maximum control. The single application of 120 ppm Bonzi or Piccolo had little persistence at four weeks after treatment.

With Fine’s new U.S. subsidiary, Fine Americas, Inc., you can expect to see more sales promotions and technical support for Piccolo in the United States. In fact, Fine Agrochemicals is currently developing a detailed product use guide for Piccolo. Fine Agrochemicals already markets a variety of other PGRs in the fruit market in the Americas and several others in the European ornamentals market that I expect we will eventually see labeled for ornamentals here in the United States.

In other paclobutrazol news, next year, Syngenta Professional Products will be submitting an updated label for Bonzi that puts rate recommendations for selected herbaceous perennials back on the label. Syngenta’s emphasis this year will be on expanding the label and promoting their technical support for Bonzi. There is still discussion about additional paclobutrazol products coming to market. To my knowledge, none are close enough to be available for spring.

Another “new” product that reworks old chemistry is Topflor (flurprimidol, SePRO). It looks like it will finally be available in early 2005 — the trials and tribulations of working with the EPA. As you probably have heard, Topflor was one of the active chemistries we evaluated here in the United States back in the 1980s, along with Bonzi and Sumagic (Valent USA Corp.). However, Topflor was marketed for the ornamental market only in Europe. SePRO obtained the product for the U.S. market and is finally getting it through the labeling process. Topflor is a very active compound, showing a lot of promise on the hard-to-control perennials. It is not as active as Sumagic, but in the perennials we have tested, it has generally been more active at lower rates than Bonzi or Piccolo. However, this is not consistently the case. Perennials do vary in their responsiveness to these different compounds. Lamiastrum ‘Hermann’s Pride’ was not very responsive to Topflor at 60 ppm, but Piccolo at 120 ppm or Sumagic at 30 ppm gave good control up to six weeks after treatment. Monarda ‘Jacob Cline’ was very responsive to Topflor at 75 ppm; actually half that rate, 37 ppm Topflor gave excellent control. Topflor has been widely tested on other floricultural crops, including seed and vegetative annuals, bulb crops and poinsettias, with excellent height control results. With several years of university and grower trials with Topflor, it will be introduced with a significant amount of rate and response information for a wide variety of floricultural crops.

Look for a new Cycocel (Olympic Horticultural Products) label in the near future to include additional tank mix uses with B-Nine (Crompton/Uniroyal Chemical). Olympic is interested in pursuing outdoor uses for Cycocel. That may be further in the future though.

The interest in gibberellins has not subsided. With ProGibb &Co (Valent USA Corp.) receiving an expanded label last year, growers have been testing the effects of gibberellins on a wide variety of crops. Now, Valent BioSciences ♦
Corp. is pursuing an expanded label for Fascination to make it legal for use on a variety of ornamentals to promote growth. Fascination, which uses gibberellins \( \text{GA}_4+\text{GA}_7 \) (along with equal parts benzyladenine, a cytokinin) instead of ProGibb T&O’s \( \text{GA}_3 \), is less potent and therefore, a much more user-friendly product for growth promotion. It is currently labeled only for use on lilies to prevent lower leaf yellowing. Fascination has been tested extensively on poinsettias over the last couple of years and is effective in increasing the growth of short poinsettias and, according to many growers, it increases the whiteness of white cultivars. Fascination can also be used to overcome excessive effects of a gibberellin-inhibiting growth retardant on ornamentals.

We continue to evaluate the gibberellin and cytokinin products for enhancement of branching in perennials. This fall we have seen excellent basal branch enhancement on *Clematis jackmanii* with Fascination or Fresco (\( \text{GA}_4+\text{BA} \), Fine Agrochemicals, Ltd.). There is excellent potential for this use in perennials; however, we may need to follow up with growth retardants to keep the plants in bounds. Due to the growth promotion of gibberellins, there has long been interest in using the cytokinin benzyladenine alone to promote branching. These treatments also have shown good potential this fall on clematis. More on those results next year. But, look for more labeled uses for the growth promotion hormones in the near future.

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**2005 greenhouse chemical trends**

Top: Monarda didyma ‘Jacob Cline’ at three weeks after treatment with 120 ppm Bonzi, 30 ppm Sumagic or 75 ppm Topflor (left to right). Notice the tighter internodes on the plants treated with Sumagic or Topflor. **Bottom:** *Clematis jackmanii* treated to improve branching: (left to right) control, 1,200 ppm BAP-10 (6-benzyladenine; Plantwise Biostimulant Co.) or 1,200 ppm Fresco (1:1 6-benzyladenine and \( \text{GA}_4+\text{GA}_7 \); Fine Americas), at four weeks after treatment. The BAP-10 appears to induce branching without excessive shoot growth. However, in this crop, the Fresco appears to be increasing the basal branching of the plant instead of increasing lateral bud break. Therefore, when excess top growth is removed for spring trellising, the increased branch number will not be pruned away.
NEW MARKETS AND USES

Another revelation for this year has been the increase in the number of growers using PGRs on herbaceous perennials. In several national talks this year to perennial producers, fully half the people in the audience say that they are now using PGRs on their perennials. As late as last fall, only a few people indicated that they were using PGRs on perennials. This represents a “new” market area for PGRs. However, due to the relatively high rates and/or multiple applications commonly necessary to control the growth of perennials, cost factors will need to be critically evaluated in selecting the PGR for these operations.

Application methods also will be important in the use of these products in high-volume operations.

There is more interest in chemigation or watering-in techniques to more economically obtain the benefits of drench applications. High volume sprays are providing economical applications with more media uptake but do not eliminate the effects of spray applications on flowering of sensitive species.

New application methods are also creating new markets. While establishing rates will still require some testing, liner soaks are extremely effective in providing baseline control of vigorous species of vegetative and seed annuals as well as herbaceous perennials. Perovskia was very responsive to Sumagic applied as a liner dip with good baseline control up to five weeks after treatment with a 1 ppm solution or more long-term control with 2 ppm. In addition, this method allows you to treat the more vigorous species in mixed containers or baskets at planting without affecting the surrounding plants. Media surface sprays just before or after seeding or plug planting also are effective in early control of vigorous crops, providing more of a drench effect than a spray. In addition, these treatments can be effective ways to deal with re-entry intervals.

Tank mixes are providing more uses for PGRs. The retail “cocktail” of 4-6 ppm A-Rest (SePRO) with 1,500-2,500 ppm B-Nine has given good short-term (1-3 weeks) height control of many bedding plants and other floricultural crops for retailers. It has also been effective on a number of herbaceous perennials. Growers also are seeing synergy between A-Rest (5 ppm) and Cycocel (500 ppm) in improving height control and bud set on hibiscus, gardenia and bougainvillea, resulting in florist-quality products from nursery stock. The combination of Sumagic and B-Nine is the PGR of choice for the majority of Paul Pilon’s perennial production at Sawyer Nursery in Michigan (see Paul’s latest “Perennial Solution” on page 71).

<table>
<thead>
<tr>
<th>PGR rate (ppm)</th>
<th>Bonzi</th>
<th>Piccolo</th>
<th>Bonzi</th>
<th>Piccolo</th>
<th>Bonzi</th>
<th>Piccolo</th>
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<tr>
<td>0</td>
<td>9.8</td>
<td>9.4</td>
<td>12.2</td>
<td>12.2</td>
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<tr>
<td>40</td>
<td>8.7</td>
<td>7.9</td>
<td>11</td>
<td>9.4</td>
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</tr>
<tr>
<td>80</td>
<td>7.5</td>
<td>7.5</td>
<td>9.1</td>
<td>8.3</td>
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</tr>
<tr>
<td>120</td>
<td>7.1</td>
<td>6.3</td>
<td>8.7</td>
<td>7.9</td>
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</tr>
<tr>
<td>160</td>
<td>7.5</td>
<td>6.3</td>
<td>6.3</td>
<td>7.9</td>
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</tr>
<tr>
<td>Rate effect</td>
<td>***</td>
<td>***</td>
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<tr>
<td>Bonzi vs. Piccolo effect</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
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<td></td>
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</tbody>
</table>

*** significant at P<0.05 or NS, not significant at P=0.05.
Many growers and researchers alike are testing additional tank mixes looking for that synergy that will give the best control at the lowest rates (and costs) of chemicals. New uses sometimes means just finding additional benefits to a product’s use on certain crops. An A-Rest drench (2-4 ppm) provides height control on hosta and daylily, which is nice, but it also doubles the number of breaks in hosta and doubles the number of flowers in daylily, which is very nice. With its broad use label, we are still seeing significant grower and researcher testing of Florel (Monterey Chemical Co.) on additional crops.

In summary, the climate for PGR use and development is better now than I have ever seen it. We have new products in the pipeline for use on ornamentals. We have more competition among the PGR companies that is generating more research information and technical support for their products. We have expanding areas of use of PGRs on herbaceous perennials and even some of the woody ornamentals, which is expanding the market for PGRs. We have new researchers at additional universities and commercial operations that are adding to the knowledge base about using these PGRs on a broader range of plant materials. Watch for new information and new labels over the next year.

Joyce Latimer is a professor and extension specialist for greenhouse crops in the Department of Horticulture, Virginia Tech, Blacksburg, Va. She can be reached by phone at (540) 231-7906 or E-mail at jlatime@vt.edu.

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