

The **GM PRO** Erik S. Runkle on **Growing Trends**

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Tips for growth retardants

Your impatiens are stunted. The salvias have gotten too tall. Petunia flowering is delayed. Sound familiar? You're not alone.

Controlling plant height with chemical growth retardants can be a challenge, especially for new growers.

Applying a growth retardant at too high of a rate, or too frequently, can stunt a plant and delay flowering. In contrast, some crops could finish too tall if growth retardants are not applied, or if used at too low of a rate or applied too late in the production cycle.

There are seven growth retardants commonly used on greenhouse crops in the United States: A-Rest, B-Nine, Bonzi, Cycocel, Florel, Piccolo and Sumagic. Soon, an eighth, Topflor, will likely enter the market. How do you decide which plant growth retardant (PGR) to use, how to use it and when to use it?

PGR effectiveness

Start by choosing a chemical that elicits the desirable response, which in most cases, is an inhibition of stem extension. Think of each PGR as a tool in your height control toolbox. You probably don't want to rely on only one tool. You want to have two to three or maybe more tools in your toolbox. The reason is that there is not one chemical that controls plant height of all crops. So, you need to use the right tool on the right plant.

How can you tell which crops are sensitive to each of the PGRs? There is a substantial amount of information available on product labels in books and trade magazines and on the Internet. You can ask an extension agent or plant specialist. Talk with other growers about their PGR experiences. Finally, don't hesitate to conduct your own trials to determine what works best for you.

Choose a chemical that does not produce an undesirable response. In some cases, a PGR can cause leaf chlorosis, delay flowering or have

too long of an effect. Leaf chlorosis (often a consequence of a Cycocel spray) will often disappear if the chemical rate used was not too high. However, a delay in flowering or persistence of a response, regardless of the chemical, can be a problem.

Photo courtesy of Rita Tobias



Bonzi (paclobutrazol) drenches were made on pansy plugs one day before transplant into finished containers. The photo was taken 40 days after plants were grown at 68°F under 16-hour photoperiods.

Application methods

PGRs are usually applied as a spray, drench or sprench. A sprench could be considered as a heavy spray, in which some of the chemical penetrates the growing medium surface. In most situations, applying PGRs as a spray is safer, as it provides a shorter-term response than a drench.

With some potted plant crops and hanging baskets, a drench that provides a long-term response is often desirable to help prevent the crop from overgrowing the container. However, drenches have drawbacks when crops are to be transplanted into another container (such as plugs), or when crops are to be planted outdoors by consumers (most bedding plants and herbaceous perennials). Increasingly consumers rightfully complain about how their plants never grew when they planted them outdoors. In many of these cases, the plants had been drenched with a PGR.

For example, a Bonzi drench made to pansy plugs just before transplanting can have a strong and persistent effect on plant height, even at rates as

low as 0.5 parts per million. Therefore, use caution when applying a drench, as its persistence can be a major drawback to consumers.

Application timing and rate

Proper timing of a PGR application is critical for desired height control. Chemicals need to be applied during periods of rapid stem elongation. For some crops, such as marigold, chemicals may need to be applied even before seedlings emerge from the growing medium. If an application is made too late,

you've lost the opportunity to control plant height, making it more difficult to produce a desirable finish height with acceptable plant quality.

Determining the chemical rate in parts per million or concentration of the chemical can be a challenge. Product labels and research recommendations often provide a wide range of suggested rates for several reasons.

Responses can vary among species, and even between cultivars.

Generally, rates required to elicit a response generally increase as the crop develops. The rate used on a

plug is usually lower than the rate used on the same species during the finish stage.

Lower rates are generally used if multiple PGR applications are made. Lower rates are needed if other height control strategies are used, such as using a negative DIF, limited phosphorus, water stress or wide plant spacing.

Rates required to control height increase as temperature and light levels increase. This is why growers in Southern states often use higher PGR rates than growers in the North. Also, Northern growers may increase PGR rates on bedding plants as spring progresses and temperature and light levels increase.

It is safer to use multiple PGR applications at lower rates than to make one high-rate application.

Residual effect

The residual effect describes the persistence of a PGR application. B-Nine and Cycocel have a comparatively short residual effect (seven to 10 days), meaning that the response of the chemical is more short term. Other PGRs, including Piccolo and Sumagic, have a longer residual effect (10-21 days). Drenches can have an even longer effect. When a shorter residual effect is desirable, such as with plugs or later in the finish stages, B-Nine, Cycocel or A-Rest might be prudent choices. When a longer period of control is desired, such as with potted plants, or perhaps early in the finish stages of bedding plants, a chemical with a longer residual response may be desirable.

The magnitude of the residual effect depends on the rate you use and how much chemical is applied to each plant. Just be careful when applying high rates of chemicals with long residual responses.

Chemical cost

Don't overlook the cost of a PGR. If more than one product provides a desirable response, then choose the less expensive one. Or, if you are already using a more expensive product, consider trialing other chemicals to determine if there is an effective yet cheaper alternative. Both Bonzi and Piccolo have the same active ingredient (paclobutrazol), so consider trialing them together to see which you prefer.

If there are topics that you'd like addressed in a future Growing Trends column, e-mail runkleer@msu.edu. GM PRO