

## PLANT GROWTH REGULATORS—SELECTING THE RIGHT ONES

There are several growth-retardant PGRs available in North America. The same active ingredient can often be found under multiple trade names (like with pesticides) and not all PGRs can/should be applied the same way due to absorption rate and site activity. As such, it's important to know which is which and how each active ingredient (a.i.) works best.

Let's break growth-retardant PGRs into two general groups:

**Low-activity PGRs:** Chlormequat chloride (CCC; such as Altercel and Citadel) and daminozide (for example Dazide and B-Nine).

- In general, these have slow absorption times (4+ hours) and higher concentrations of a.i. are required to restrict plant growth appropriately. For example, 500 to 750 ppm or 2500 to 5000 ppm are common ranges at which chlormequat chloride or daminozide would be applied, respectively.
- Daminozide is only absorbed by leaf tissue and applied as a foliar spray. While CCC does have some rootzone activity, it is also predominately applied as a foliar spray on floriculture crops.
- These a.i.s are (generally) more “forgiving” if slightly overapplied. Excessively high rates of daminozide can delay flowering but won't “lock up” plants for the rest of the spring season. Similarly, slight over-application of CCC can cause mild phytotoxicity on the foliage of plants, but tissues can recover from mild damage or new growth can simply cover it up as the crop matures.

**High-activity PGRs:** Ancymidol (like A-Rest and Abide), flurprimidol (TopFlor), paclobutrazol (such as Bonzi, Paczol and Piccolo) and uniconazole (for example Sumagic and Concise).

- Compared to the low activity group, these a.i.s are applied at much lower concentrations to achieve desirable growth restriction (like 5 to 10 ppm as a foliar spray) and absorbed by plant tissues quickly (in about 30 to 60 minutes).
- These active ingredients are absorbed by leaf, stem, and root tissue, and most can be applied as foliar sprays or substrate drenches. Application as a substrate drench also magnifies the effect of growth suppression. For example, a 5-ppm foliar spray and about 1 to 2 ppm substrate drench of paclobutrazol will yield a similar degree of growth restriction.

- If these a.i.s are overapplied—especially as a substrate drench—it may take many weeks for plants to metabolize the a.i. away and grow out of it.
- If you have limited or no experience with PGRs, I suggest you get familiar with how to use a.i.s in the “low activity” group first. Once you are more comfortable with applying these in your greenhouse, you can start to use some of the “high activity” PGRs with confidence.

**Which PGR should I use?**

Not all PGRs are effective at suppressing growth in all crops. For example, daminozide is highly ineffective at suppressing growth of crops like canna lilies, but paclobutrazol and flurprimidol are. Conversely, some PGRs work a little too well on some crops. In begonias, ancymidol, CCC and daminozide can be used to suppress growth appropriately, but even 1 ppm of paclobutrazol, flurprimidol, or uniconazole can completely halt their growth for many weeks (or even months). Be sure to consult technical resources before you decide to use a particular a.i. on a crop that you’ve never applied PGRs to before!

Crop culture sheets from the breeding company your genetics come from are often the best resource. They typically list the best a.i.(s) to use, appropriate concentrations, and application frequency guidelines to give you a starting point of reference. My suggestion is to start with the lowest recommended rate in the range provided and see how YOUR crop responds before increasing the concentration or making repeat applications.

If a crop on your bench does not have a culture guide from the breeder, check out these excellent (and FREE) resources from *GrowerTalks*:

[Annuals PGR Guide \(2025-26 Edition\)](#)

[Perennials PGR Guide \(2024–25 Edition\)](#)

These guides are updated with the latest research-backed information every 2 years and cover a wide range of genera and species of annual and perennial bedding plants.