



By Erik Runkle



# Using the PGRs Collate and Florel

For many years, growers have been using the plant growth regulator (PGR) Florel on ornamental crops to abort flowers and flower buds, inhibit extension growth and promote lateral branching. Florel contains the active ingredient ethephon, which releases the plant hormone ethylene. It is labeled for application as a spray, although recent research shows that it can also be effective as a substrate drench. Now, another product that contains the same active ingredient as Florel is available.

Fine Americas Inc. has developed Collate, which contains 21.7 percent ethephon. Florel sold in the United States (Southern Agricultural Insecticides Inc.) contains 3.9 percent ethephon whereas Florel sold in Canada (Bayer CropScience Inc.) is also 21.7 percent ethephon. Collate was introduced to the commercial floriculture industry in January 2013, soon after it had received federal registration. Collate has already received registration from most U.S. states; contact a representative from Fine Americas for a full list of states.

In 2012, research on Collate was first performed at Michigan State University. We compared bedding plant responses to Collate and Florel as a foliar spray and results showed that plants, treated at the same concentrations, responded to the two products similarly. For example, petunia 'Wave Lavender' that was treated with two sprays of Collate or Florel at 250, 500 or 750 ppm had similar growth and flowering responses (Figure 1). Although stem length and leaf size were reduced, the two sprays delayed flowering by nine days (at 250 ppm) and by 13 to 16 days (at higher rates) when grown at 68° F.

Achieving consistent results with Collate or Florel can be trickier than with other PGRs simply because ethylene is a gas. The conversion of ethephon to ethylene can depend on the pH of the PGR solution, the crop, and environmental factors such

as relative humidity. At low pH (pH = 4 or lower), ethephon is stable, meaning that the compound does not decompose and thus, ethylene is not released. However, as pH increases, the rate of ethylene release increases. That's the reason why spray solutions of Collate or Florel should be in the acidic range; if the PGR solution is higher, ethylene will be released before it is applied to crops. Upon application, plants begin to convert ethephon into ethylene since plant tissue pH is higher than 4.0.

Crops vary in their sensitivity to ethephon at least partly because they absorb, translocate and metabolize it differently. In some crops, the leaves break down ethephon quickly and little is absorbed whereas for other crops, more ethephon is absorbed and moved throughout the plant. A high humidity is believed to favor plant uptake, so applications made when the humidity is high (e.g. in the morning) can result in a stronger plant response than when the humidity is low. Plants also vary in their sensitivity to ethylene, so as with all PGRs, appropriate concentrations of Collate or Florel vary among crops. Small-scale trials are recommended before treating an entire crop.

The most common use of ethephon in floriculture is to abort flowers. This is useful to maintain vegetative stock plants so that cuttings are vegetative, and to prevent premature flowering of young plants. Some growers apply Collate or Florel when cuttings are stuck to ensure plants are vegetative. In other instances, the PGR is applied two or three weeks after transplant so that plants fill larger containers before flowering. For flowering crops, it's important to schedule Collate or Florel applications so that there is sufficient time for plants to flower following an application. Finally, regardless of application method, ethephon should not be applied to plants that are under any kind of stress (high temperature, water deficiency, root pathogens, etc.).

**Erik Runkle is associate professor and floriculture extension specialist in Michigan State University's department of horticulture. He thanks Cathy Whitman and Mike Olrich for research assistance and Fine Americas for research support. Erik can be reached at [runkler@msu.edu](mailto:runkler@msu.edu).**

**Figure 1.** Petunia sprayed with Collate or Florel had similar growth and flowering characteristics when the same concentrations were applied. Photo credit: Cathy Whitman, Michigan State University.

