

# Using Topflor, Part I: Bedding and Potted Plants

With Topflor on its way to market, you'll soon have another PGR in your tool box. This first of a 2-part series summarizes Topflor's efficacy on bedding plants.

By Brian Whipker, Ingram McCall, James Gibson and Todd Cavins

**P**lant growth regulators (PGRs) are commonly applied to container-grown plants to control stem elongation and produce high-quality, compact plants. Flurprimidol was a molecule discovered more than 20 years ago by Eli Lilly and Company. It was experimentally labeled as EL-500, and initial trials were conducted on poinsettias, pot chrysanthemums and exacum by Jim Barrett, *GPN*'s consulting editor, at the University of Florida and G. McDaniel at the University of Tennessee. Flurprimidol is a "Type 2" PGR, which is similar in its mode of action to A-Rest, Bonzi and Sumagic.

*Single Topflor applications to Duluth. Left to right: control, 10, 15, 20, 25 and 30 ppm.*



*Topflor applied to 'Duluth'. Left to right: control, 25 ppm applied once and 25 ppm applied twice.*



Flurprimidol has been labeled as Cutless for turf use in the United States and commercially introduced as Topflor in Europe for greenhouse crops. Cutless has been trialed extensively by Auburn University researchers on nursery crops such as butterfly bush, holly and Mexican sage with growth control comparable to Bonzi and Sumagic.

Even though the initial Topflor trials were conducted in the United States, the chemical was not introduced to the U.S. market at that time. In Europe, Topflor has been extensively trialed since the early 1990s on a number of greenhouse plants such as pot chrysanthemum, dianthus, osteospermum

*Double Topflor applications to Duluth. Left to right: control, 10, 15, 20, 25 and 30 ppm.*



*Left to right: control, Topflor application of 25 ppm and Bonzi application of 50 ppm to Duluth.*



*Topflor applied to 'Samba'. Left to right: control, 25 ppm applied once and 15 ppm applied twice. (All photos courtesy of Brian Whipker).*



*Topflor applied to 'Noblesse 99'. Left to right: control, 30 ppm applied once and 20 ppm applied twice.*

and streptocarpus. Commercial recommendations for applying Topflor foliar sprays have been developed for more than 20 greenhouse crops in Europe, but the label does not include many of the plants commonly grown in the United States.

There are a number of factors that can influence the efficacy of all plant growth regulators, including Topflor (See Table 1, below). Foremost is the particular species being grown. In addition, rates will need to be adjusted according to the cultivar being grown, the concentration of Topflor being applied and the number of applications made. The optimal concentration (in ppm) of Topflor appears, in most cases, to be similar to Bonzi, although for a few crops' (e.g., pansies) optimal rates were similar to Sumagic.

Topflor is absorbed by the plant through its leaves, roots and stems. From preliminary experiments conducted at North Carolina State ◆

Table 1. Factors Influencing Topflor

|      |                                                             |
|------|-------------------------------------------------------------|
| **** | Species                                                     |
| ***  | Cultivar, Chemical concentration, Application number        |
| **   | Temperature, Light, Irrigation frequency, Development stage |
| *    | Application interval, Fertilizer, Spacing                   |

*Left to right: control, Topflor application of 25 ppm and Sumagic application of 7.5 ppm to Duluth.*



University, Topflor has a significantly greater absorption through the stem than Bonzi.

In Europe, a 1.5-percent Topflor formulation is used, while the new formulation that will be available in the United States is 0.38 percent. This new formulation of Topflor has not been tested under U.S. growing

conditions or on cultivars available in North America. In addition, European growers rely upon multiple Topflor applications at low concentrations to control plant growth, while U.S. growers usually prefer a single application. Also, drench applications of PGRs are not commonly done in Europe, and research is needed to determine optimal drench rates. Research is currently being conducted at a number of universities: North Carolina State, Purdue, Virginia Tech, University of Florida and Cornell. The goal has been to determine optimal application rates for U.S. conditions. These rates, from the Southeast trials conducted at North Carolina State University, should be viewed as a starting point, and growers will

need to determine rates for their particular operation.

**TRIAL PROCESS**

**Geraniums.** Trials were conducted with the cultivars ‘Samba’ and ‘Noblesse 99’ from Fischer USA. Cuttings were grown in 6-inch pots, and PGR foliar sprays were initially applied two weeks after transplant. Topflor was applied at 10, 15, 20, 25 or 30 ppm, and these rates were compared with Bonzi at 15 ppm and Sumagic at five ppm. For each of the Topflor rates, another group of plants also received a second Topflor spray at the same rate two weeks after the initial application.

Under North Carolina growing conditions, both cultivars required rates of 25-30 ppm applied once or

15-20 ppm applied twice, with the second application occurring two weeks after the first, to adequately control growth. Splitting the applications will allow growers to customize their Topflor applications based on the prevalent weather conditions and crop vigor. These findings are comparable to the 15-30 ppm suggested on the French version of the Topflor label. Rates will need to be adjusted for different locations and cultivars.

**Pot Mums.** In our trials, we used both a short (‘Yellow Blush’) and tall (‘Duluth’) pot mum cultivar. Plants were given the required long-day treatments and pinched two weeks after potting. Four weeks after potting, Topflor was applied at 10, 15, 20, 25 or 30 ppm, and these rates were compared with Bonzi at 50

*PGR comparisons on ‘Majestic Giants Yellow with Blotch’. Top, left to right: control, Topflor five ppm and Bonzi 10 ppm. Bottom, left to right: Sumagic 2.5 ppm, A-Rest 10 ppm and Florel 50 ppm.*



*Single Topflor application to ‘Majestic Giants Yellow with Blotch’. Top, left to right: control, 2.5, 5, 10 ppm. Bottom, left to right: 15, 20, 25 and 30 ppm.*



## crop cultivation

ppm and Sumagic at 7.5 ppm. A group of plants also received a second Topflor spray at the same rate two weeks after the initial application.

Topflor foliar sprays were effective in controlling growth of Duluth, sprayed once or twice. Cultivar differences did occur. A single spray of 25 ppm provided excellent control of Duluth.

**Fall Pansies.** Each year, Southeastern U.S. growers battle plant stretch with fall pansies. German trials indicated that Topflor had a very high efficacy on pansies, and we wanted to determine how well Topflor would do under hot and humid conditions. 'Majestic Giants Yellow Blotch' plants were treated with Topflor foliar sprays at 2.5, 5, 10, 15, 20, 25 or 30 ppm

*Topflor drench of 'Ellen Houston'. Left to right: control, 1 mg a.i., 2 mg a.i. and 3 mg a.i.*



and compared with the other common PGRs used on fall pansies, such as Bonzi at 10 ppm, Sumagic at 2.5 ppm, A-Rest at 10 ppm and Florel at 50 ppm. The PGRs were applied two weeks after transplant.

Topflor is very active on fall pansies, with rates higher than 20 ppm being excessive. Topflor foliar sprays of five ppm provided comparable growth control for fall pansies as Bonzi at 10 ppm, A-Rest at 10 ppm or Florel at 50 ppm. Sumagic at 2.5 ppm provided a greater degree of growth control. Rates will have to be adjusted for cultivar vigor and for plants being grown in other seasons.

**Tuberous Dahlias.** Growth of pot dahlias can be excessive, and PGRs are required for most cultivars. The cultivar 'Ellen Houston' was grown in 6-inch standard pots, and Topflor was applied as a substrate drench two weeks after potting.

Substrate drenches of Topflor were an effective means of controlling tuberous dahlia growth. Southeastern U.S. growers should begin with 1-2 mg active ingredients / pot drenches. Rates may vary by location and cultivar.

### IN CONCLUSION

Based on the results of our trials, Topflor will be an excellent addition to a grower's PGR toolbox. It offers another alternative to Bonzi and Sumagic for the management of plant

growth. Through additional trialing, optimal concentrations will be determined, and growers will be able to compare each of these PGRs based on its efficacy and price to determine which PGR is the most economical option. Look for Topflor research from Joyce Latimer on perennials in next month's *GPN*. GPN

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