

# Liner Soaks Effective on Vegetative Coleus

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(Read the entire article before using PGR liner soaks. Pay special attention to the thorough irrigation applied prior to soaking. Dry substrates take up 5 times more solution than the amount with irrigated substrates. If you use these listed concentrations with a dry substrate you can have excessive overregulation of plant growth!)

The newer vegetatively propagated annuals are wonderful plants which provide striking flower power and vigorous growth. While vigorous growth in the landscape is desirable, it may difficult to control during greenhouse production. This is especially true when vegetative annuals are used in combination pots. The vigorous plants can overrun the entire planting. One method of controlling these aggressive growers, is to use a preplant, plant growth regulator soak. Liner soaks offer the ability to tame the beast in the plant and make them behave in a combination pot. At North Carolina State University, we have been conducting trials with three plant growth regulators (Sumagic, Piccolo, and Topflor), below are the results with vegetative coleus.

**Summary:** Liner soaks of Sumagic (uniconazole), Piccolo (paclobutrazol) and Topflor (flurprimidol) were used to determine their efficacy on vegetatively propagated coleus, ('Skyfire'). The plants were thoroughly irrigated one hour prior to plant growth regulator (PGR) treatment and then soaked for 2 minutes in the solution. The liner soak solution concentrations used were: Sumagic from 1 to 8 ppm and both Piccolo and Topflor from 4 to 24 ppm.

**Sumagic** soak concentrations of 8 ppm resulted in significantly smaller plant plant heights (20.6% smaller) and concentrations  $\geq 4$  ppm resulted in 16% smaller plant diameters when compared to the untreated control. Plant height was not as greatly affected as plant diameter. For Mid-Atlantic growers, Sumagic concentrations of 1 to 4 ppm should be sufficient to control diameter growth.

**Piccolo** soak concentrations of 24 ppm resulted in only a slight amount (5%) of height control when compared to the untreated control. Piccolo had a greater effect on plant diameter, with plants being 8% smaller with 4 pm of Piccolo and 19% smaller with 24 ppm when compared to the untreated control. For Mid-Atlantic growers, concentrations of 16 to 24 ppm would be required to control plant growth.

**Topflor** soak concentrations  $\geq 8$  ppm resulted in significantly smaller plant plant heights and concentrations  $\geq 4$  ppm resulted in significantly smaller plant diameters when compared to the untreated control. Plant diameter was more drastically affected than plant height. Topflor concentrations of 8 ppm resulted in plants 13.4% shorter and 30% ▶

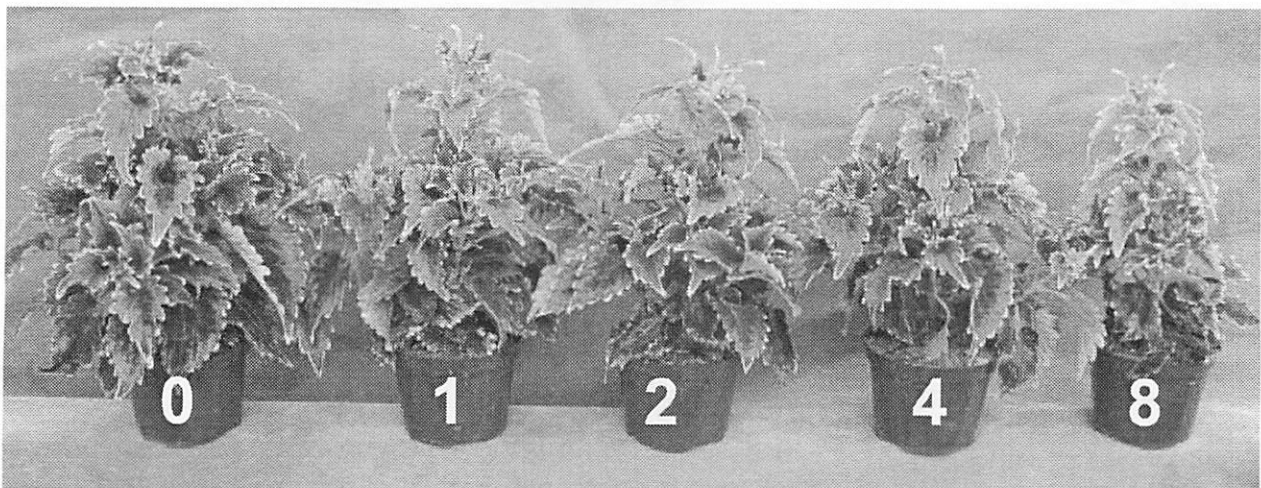


Figure 1. Comparison of Sumagic liner soaks (0 and 8 ppm) on coleus growth.

smaller in diameter than the control. For Mid-Atlantic growers, concentrations of 4 to 8 ppm should be sufficient to control excessive stretch.

### Experiment

Vegetatively propagated coleus cuttings of the cultivar Skyfire [84 cell size] were thoroughly irrigated 1 hour prior to the PGR root substrate soak application. The cuttings were soaked for two minutes in a Sumagic solution of 1, 2, 4, or 8 ppm, a Piccolo solution of 4, 8, 16, or 24 ppm, or a Topflor solution of 4, 8, 16, or 24 ppm. There were also untreated controls. The plants were then transplanted into 5-inch pots containing Fafard 4P on 5 March. Plants were grown at North Carolina State University, Raleigh, NC, in a glass-covered greenhouse set at 72/65°F day/night temperatures. There were 6 replications of each treatment. The plants were fertilized with 150 ppm N from 13-2-13 Cal-Mag. The plants were visually evaluated for phytotoxicity symptoms after the PGRs were applied. Data for plant height (measured from the soil line to the highest growing point) and plant diameter (measured at the widest point and then turned 90°) were recorded on 15 April.

### Results

Initial Observations After the PGR Applications. Phytotoxicity did not occur with any of the application concentrations used. The application of all three PGRs resulted in a darker leaf color when compared to the control.

#### Final Observations.

**Sumagic:** Plant height was significantly shorter (Figure 1) with liner soak concentrations of 8 ppm. With 8 ppm Sumagic, plants were 20.6% shorter in height compared to the non-treated control. This amount of control appeared to be adequate. Plant diameter was 16% smaller with the application of Sumagic at 4 ppm as compared to the untreated control. Sumagic at 1 ppm also significantly controlled plant diameter by 15%, but the 2 ppm liner soak was not different than the control.

**Piccolo:** Plant height was only marginally affected by the use of 24 ppm of Piccolo (Figure 2). With 24 ppm Piccolo, plants were 5% shorter in height compared to the non-treated control. Plant diameter was 8% smaller with the application of Piccolo at 4

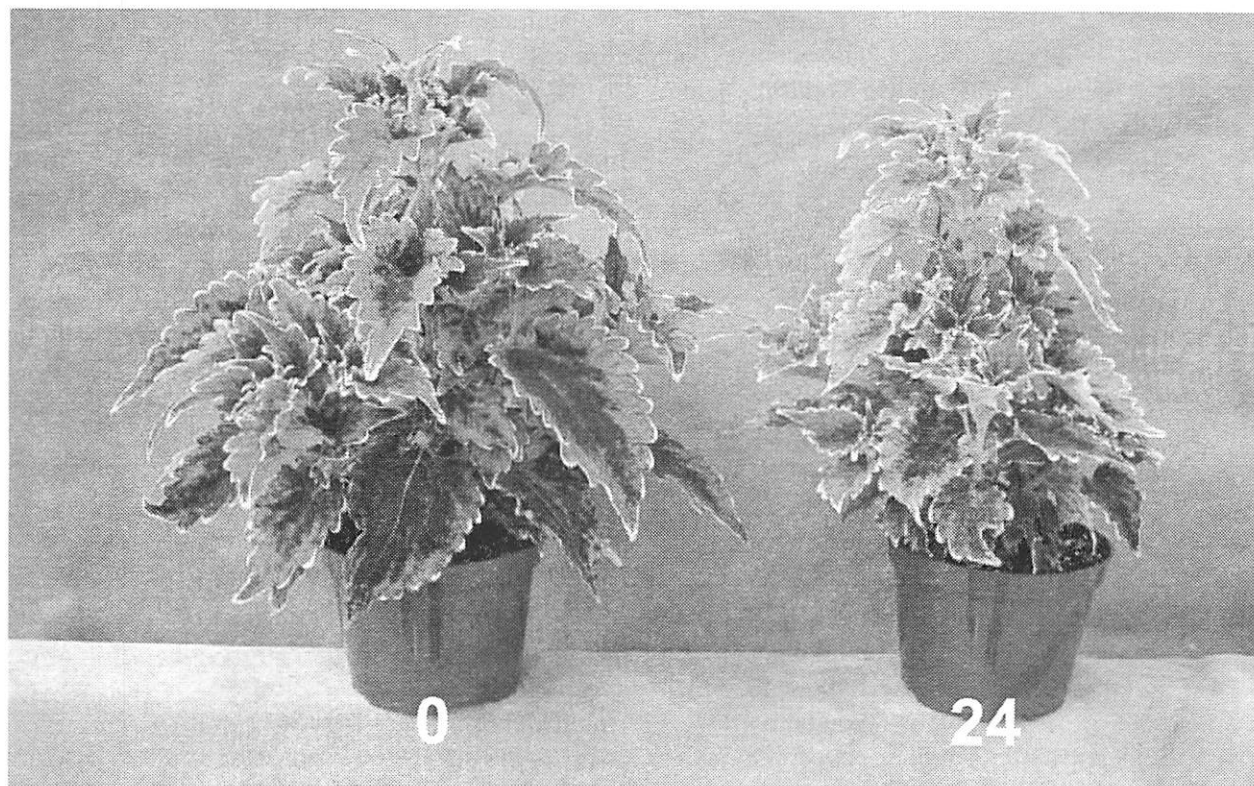


Figure 2. Comparison of Piccolo liner soaks (0 and 24 ppm) on coleus growth.

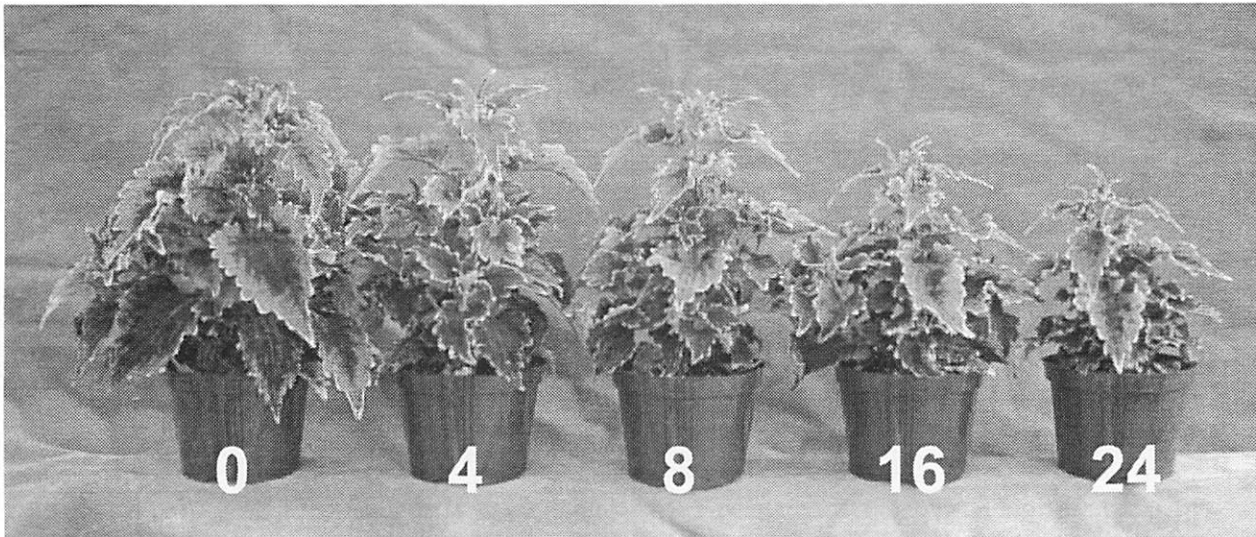


Figure 3. Comparison of Topflor liner soaks (0 to 24 ppm) on coleus growth.

ppm and 19% smaller with the 24 ppm, as compared to the untreated control.

**Topflor:** Plant height was significantly shorter (Figure 3) with liner soak concentrations  $\geq 8$  ppm. With 8 ppm Topflor, plants were 13.4% shorter in height compared to the non-treated control. This amount of control appeared to be adequate. Grower recommended concentrations for the Mid-Atlantic region should be around 8 ppm. Plant diameter was 30% smaller with the application of Topflor at 8 ppm as compared to the untreated control.

#### Recommendations

Based on these results, **Sumagic** liner soak concentrations of 1 to 4 ppm were effective on controlling plant diameter of 'Skyfire' vegetatively propagated coleus grown under North Carolina conditions. 'Skyfire' coleus appears to be a moderately vigorous growing plant. Southern growers may want to use slightly higher concentrations to control growth under commercial settings. Northern growers may find Sumagic concentrations of 0.5 to 2 ppm to be suitable for cooler climates.

**Piccolo** liner soak concentrations of 16 to 24 ppm would be required to effectively control plant growth of 'Skyfire' vegetatively propagated coleus grown under North Carolina conditions. Southern growers may want to use slightly higher concentrations to control growth under commercial settings. Northern growers may find Piccolo concentrations of 8 to 16

ppm to be suitable for cooler climates.

Under North Carolina conditions, **Topflor** liner soak concentrations of 4 to 8 ppm were effective on 'Skyfire' vegetatively propagated coleus. Southern growers may want to use slightly higher concentrations to control growth under commercial settings. Northern growers may find Topflor concentrations of 2 to 4 ppm to be suitable for cooler climates.

#### Conclusions

Liner soaks provide an exciting, low cost new method of controlling excessive growth of vegetative coleus. You should consider experimenting on your own with a few plants to determine optimal concentrations for your greenhouse. Testing will help avoid PGR overdoses! Our trials looked at the effects of a single soak concentration during the entire greenhouse forcing period. Another option is to use half rates to merely slow the explosive growth of the plants and follow up with a foliar PGR application if needed. That way growth control can be customized to the spring growing conditions.

*Also it is important to note that the plugs were thoroughly irrigated 1 hour prior to the PGR liner soak. The irrigation "standardizes" the amount of chemical absorbed by the substrate. Applying liner soaks to dry substrates can increase the PGR dose by 5X, resulting in overdoses if the concentrations listed in this article are used.*