



*Impatiens wilt quickly in summer retail settings, but a late surfactant drench will delay the onset. (Photos courtesy of Jeff Million)*

## media surfactant effects on post-production

Research at the University of Florida has shown that media surfactants help alleviate the effects of inadequate watering during post-production handling and sales.

By Jeff Million and Jim Barrett

**G**rowers have little or no control over the conditions their products are exposed to once they leave the production facility. Environmental conditions likely to affect the performance of greenhouse crops during postproduction handling and sales include uneven or infrequent watering, high light levels, wind and extremes in temperature. Also, high levels of fertilizer salts in pots can exacerbate water stress problems when moisture levels in postproduction are less than those maintained in the greenhouse. Poor water relations in postproduction can lead to premature wilting which may result in poor plant quality and reduced sales.

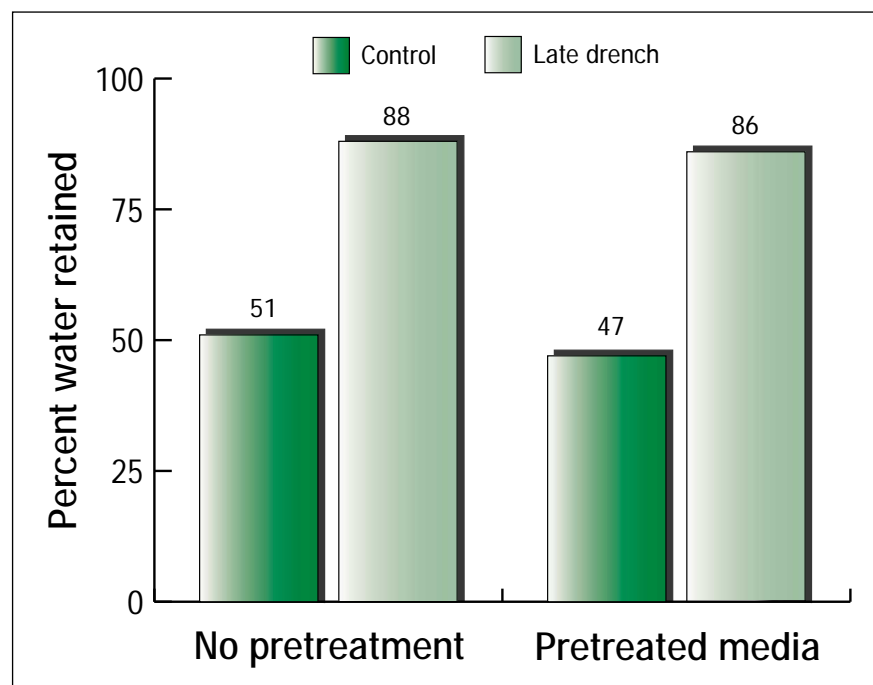
Media surfactants (wetting agents, penetrants, wetters) describe a group of products that aids in the wetting and movement of water in growing media. Media surfactants act by reducing the surface tension of organic components such as sphagnum peat moss and pine bark, which often develop hydrophobic ("water-hating") properties, particularly under low-moisture conditions. While the benefits of media surfactants in wetting media at planting are well established, there is little information on their residual effectiveness after crops leave the greenhouse.

Research conducted at the University of Florida indicates that applications of media surfactant made during production can help alleviate potential wetting problems that arise during postproduction handling and sales, raising the probability of a longer shelf life and greater sell-through. Our experiments indicate that a media surfactant drench prior to shipping can help reduce the stress plants are exposed to in retail display, as well as when consumers do not water adequately.

### APPLYING A LATE DRENCH

We grew out a crop of 4-inch 'Super Elfin Lipstick' impatiens in a peat-based media that had either been pretreated with AquaGro-L (Scotts Co.,

*Figure 1. AquaGroL applied one day before finish improved rewetting of 4-inch 'Super Elfin Lipstick' impatiens in a simulated retail setting. Media rewetting was based upon the retention of 200 ml of water applied after the first wilt.*



Marysville, Ohio) at a rate of 3 oz. per cubic yard or left untreated. The crop was hand-watered with a constant feed of 150 ppm nitrogen fertilizer (20-10-20) solution. At the end of production, plants were drenched with 0 or 600 ppm AquaGroL one day prior to finish. The drench (3 fl. oz. per pot) was applied in the afternoon following a normal morning irrigation. Plants were irrigated again the following morning and placed in a simulated retail sales

setting (outside under clear, plastic cover). Watering was withheld, and plants were allowed to wilt. When a plant wilted, 200 ml of water was applied, and the plant was allowed to wilt again.

The media surfactant drench increased the percentage of water retained by pots of wilted impatiens

from approximately 50 percent to greater than 80 percent (See Figure 1, page 38). The improvement in media rewetting was observed whether or not the media had been pretreated. The improvement in rewetting after the first wilt had a direct effect on the time plants took to wilt a second time. As shown in Figure 2, page 41,

the drench had little or no effect on the time plants took to wilt when first placed in the simulated retail sales setting. However, because the drench helped to overcome the dry media conditions imposed by the first wilt, the drench treatment delayed the second wilt about one day. We have found that media

rewetting and plant wilting will become an even greater problem with each additional wilt. The drench helps to break this "vicious cycle" by improving media rewetting in between successive wilts.

### **TIMING AFFECTS RESULTS**

Chrysanthemum 'Tara' in 5-inch pots with pretreated or peat-based media were drenched one week or one day prior to finish with 600 ppm AquaGroL at 4 fl. oz. per pot. Plants were allowed to wilt and then 450 ml of water was applied.

The media surfactant drench had a greater effect on media rewetting when it was applied one day before finish rather than when applied one week before finish (See Figure 3, page 41). The response was the same whether or not the media had been pretreated.

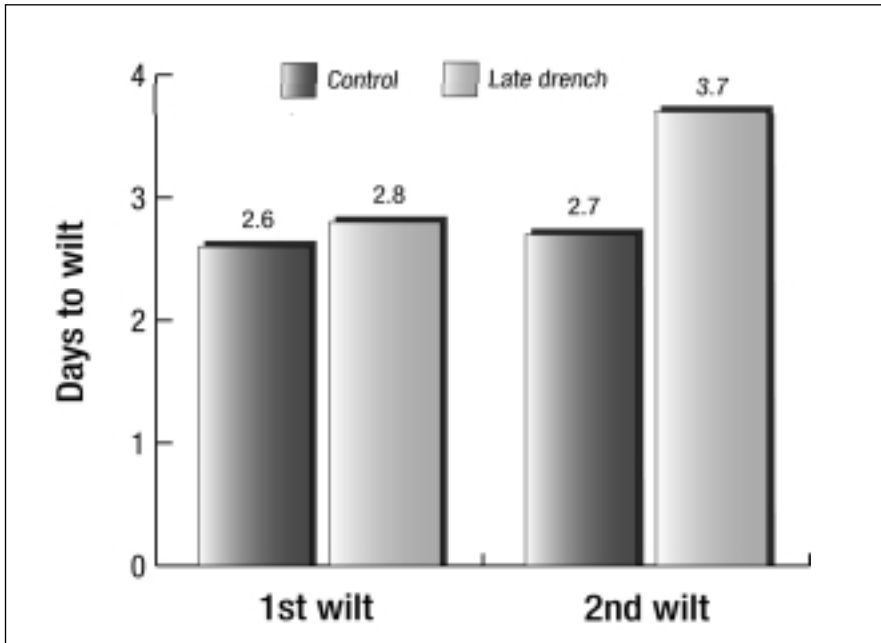
A similar experiment with 4-inch Super Elfin Lipstick impatiens was conducted to see if a higher concentration of media surfactant could make up for the reduced effectiveness of the drench applied one week before finish. Increasing the media surfactant concentration from 600 to 1,200 ppm improved the effectiveness of the earlier application (See Figure 4, page 42), but the results were still not as good as when the drench was applied the day before finish.

A follow-up trial with 4-inch 'Madness Midnight' petunias was conducted to see if media surfactant applied daily in irrigation water during the last week of production would give similar results as a one-time drench. As with the other trials, media rewetting was measured after finished plants were allowed to wilt in a postproduction environment. A daily application of 150 ppm of AquaGroL during the last week of production gave similar improvements in media rewetting as a one-time drench application of 600 ppm of AquaGroL (See Figure 5, page 42). Lower concentrations applied daily gave improvements over the untreated control but were noticeably less effective than 150 ppm.

### **APPLICATION WITH SUBIRRIGATION**

Trials were conducted to see if media surfactant could be effectively applied via subirrigation and if pot size might be an important factor. 'Super Elfin Coral' impatiens were

Figure 2. A late 600 ppm AquaGroL drench delayed wilting of 4-inch 'Super Elfin Lipstick' impatiens in postproduction during the second but not the first wilt.

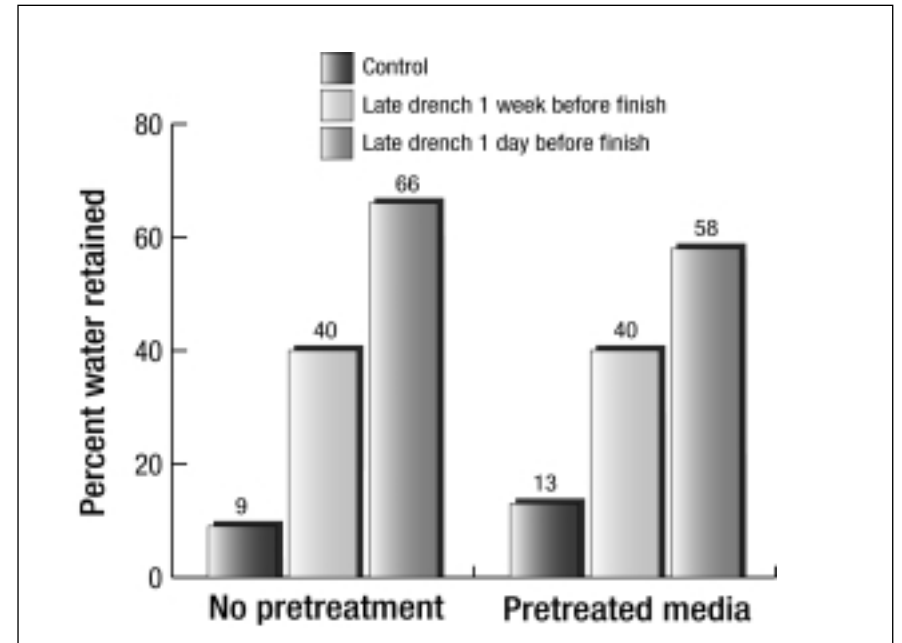


produced in either 4-inch or 6-inch pots using ebb-and-flow subirrigation. At the end of production, one group of pots was allowed to "soak up" 600 ppm AquaGroL by subirrigation. A second group of pots received a 600 ppm AquaGroL

drench. A third group served as an untreated control. Rewetting (200 ml for 4-inch pots and 600 ml for 6-inch pots) was evaluated after plants wilted in a simulated retail environment.

Both the drench and subirrigation applications increased media

Figure 3. Media surfactant applied as a late 600 ppm AquaGroL drench to 5-inch chrysanthemum 'Tara' was more effective when applied one day before finish than one week earlier.



rewetting after wilt (See Figure 6, page 42). The response was similar in both the 4-inch and 6-inch pots. Although the subirrigation soak was slightly less effective than the drench, both methods resulted in greatly improved rewetting.

#### DRENCH VS. MAINTENANCE

We grew hibiscus 'Brilliant Red' in 1-gallon pots containing a peat-based media for three months. One group of pots received a pre-plant drench of 600 ppm AquaGroL. ♦

## growing media

Figure 4. When applied one week before finish, a higher AquaGroL drench improved media rewetting of 4-inch 'Super Elfin Lipstick' impatiens in postproduction.

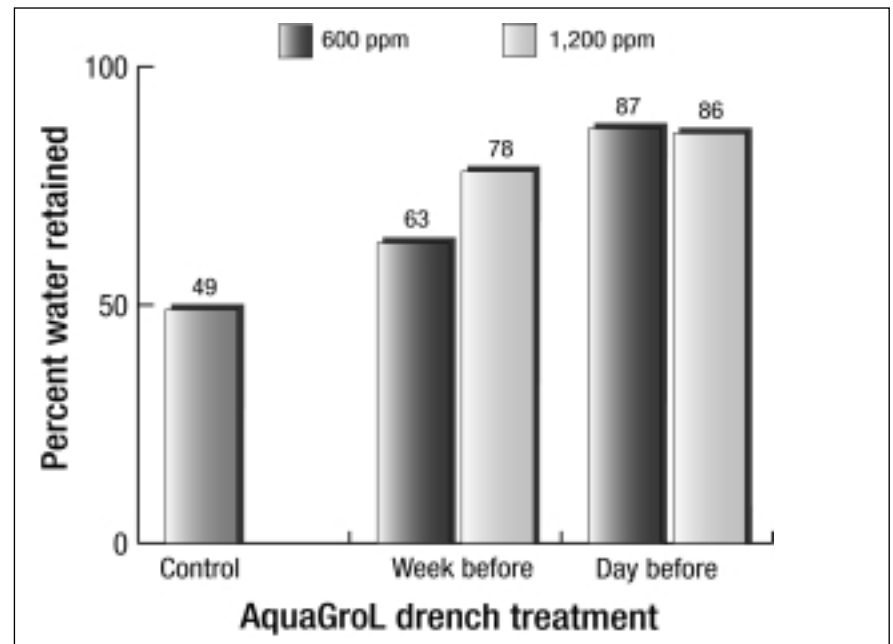


Figure 5. Comparison of one-time and daily applications of AquaGroL in irrigation water during the last week of production of 4-inch 'Madness Midnight' petunia on media rewetting in postproduction.

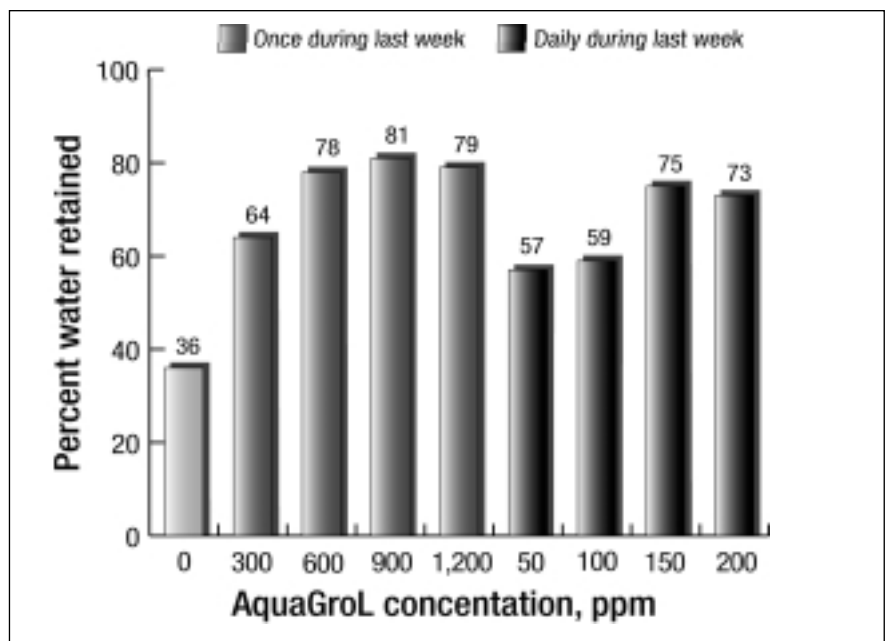
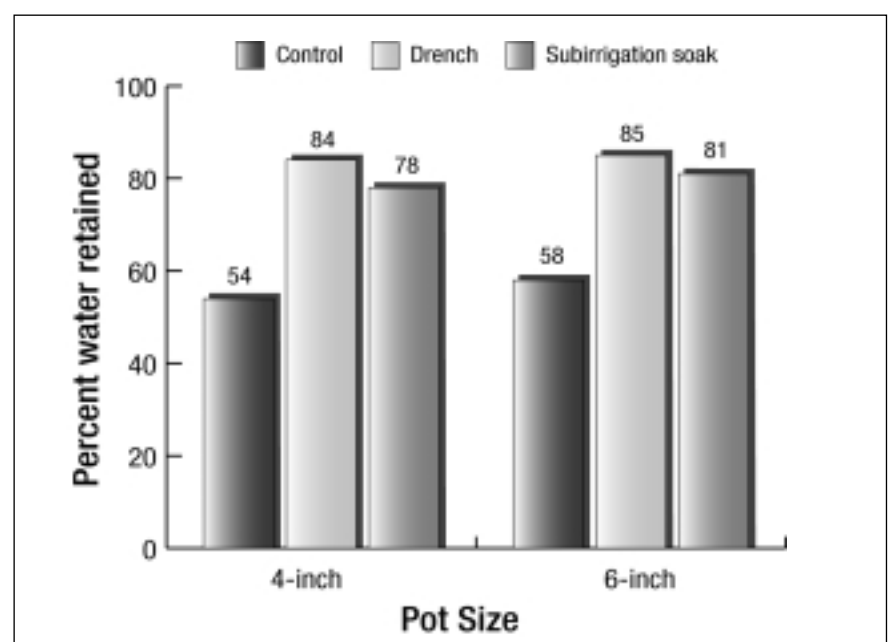


Figure 6. Comparison between drench and subirrigation soak methods for applying AquaGroL at the end of production of 'Super Elfin Coral' impatiens.



(13 fl oz. per pot), a second group received maintenance applications (10 ppm AquaGroL at every irrigation), a third group received both pre-plant and maintenance applications, and a fourth group served as an untreated control. One day before finish, each of these treatment groups received a late drench treatment of 0 or 600 ppm PsiMatric. In postproduction, plants were allowed to wilt, 1,200 ml of water was applied, and the percent retention determined.

Percent retention of the water applied after wilt was increased by the late drench except when both pre-plant and maintenance applications were made (See Figure 7, page 44). The late media surfactant drench had the greatest effect of the late drench when no media surfactant had been applied during production. When either the pre-plant or the maintenance program was followed, the impact of the late drench was reduced. The same experiment was conducted in a bark-based media with similar results, except that media rewetting, in general, was less of a problem in the bark mix.

#### **BENEFITS OF A LATE DRENCH**

Our experience has been that the drier soilless media becomes, the greater the benefit of using media surfactant. In these experiments, we evaluated media rewetting at specific plant wilt stages, which allowed us to measure rewetting at uniformly low media moisture levels. This is because plants will generally draw down media moisture to a given level before wilting. Practically, plant wilt is also the stage at which many consumers or retailers realize that their plants need watering.

Our experiments indicate that media rewetting can be improved with applications of media surfactant made at the end of production. Most media can be rewetted if enough water is applied, but will enough be applied? Too often, irrigation practices in retail or by consumers are inadequate to maintain plants in the best condition. A delay in wilting afforded by the late drench may allow several hours or more of better appearance, but is that enough to make a difference in sales or to maintain them better until the next watering? Media surfactants are not expensive and can be

applied at the end of production via irrigation. Our findings suggest that a late media surfactant application may provide some degree of insurance against potential problems caused by poor watering practices in postproduction.

We used only one product in our research, but we expect that other

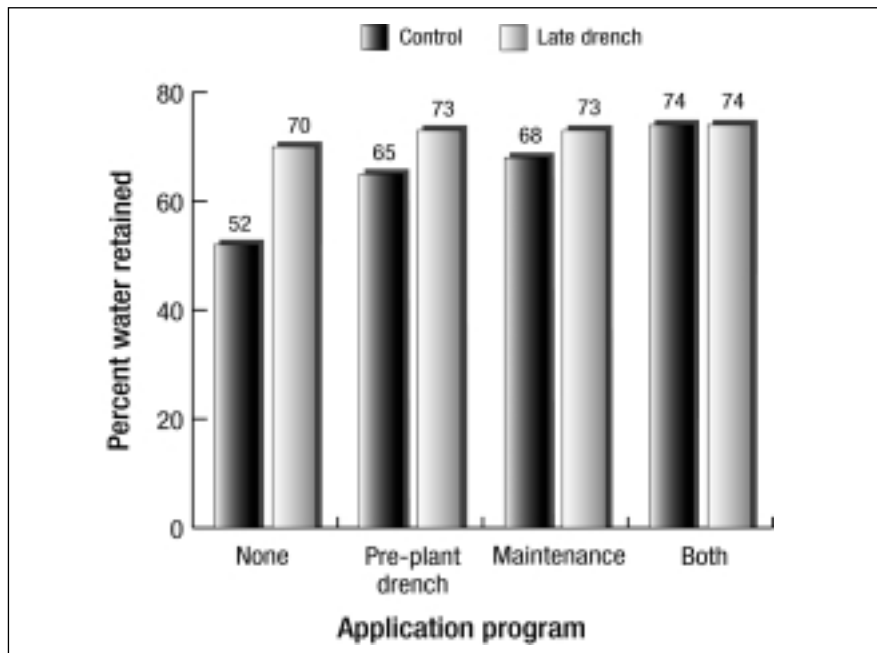
products would also work. AquaGroL was designed for application in irrigation solutions. The performance of other products will depend upon how the products were developed. For example, there are granular products designed to be incorporated or top-dressed, which may have "slow-release"

properties. Strategies for use of granular products will be different than liquid products.

In conclusion, we found that a pre-ship drench of 600 ppm AquaGroL can improve rewetting of soilless media in postproduction. The pre-ship drench was more effective when applied one day prior to

## growing media

Figure 7. The benefits of a late media surfactant drench on media rewetting of 1-gallon hibiscus 'Brilliant Red' were reduced when pre-plant and/or maintenance application programs were followed. The pre-plant drench was 600 ppm AquaGroL, and the maintenance program was 10 ppm AquaGroL constant feed via irrigation.



finish than one week earlier. Media surfactant can be effectively applied via surface or subirrigation. If a maintenance program of media surfactant applications is followed during production, a late drench may not be warranted. We hope this information will aid growers and water managers in their continued effort to maximize water-use efficiency and to improve production. GPN

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