GROWERTALKS

Features

1/31/2015

PGRs for NGI

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Impatiens downy mildew is a new reality we're facing. It's changing our perception of bedding impatiens (*Impatiens walleriana*) and the role they play in our greenhouses and landscapes. This may leave many to wonder, "What will grow in these flower beds?" or "What will fill up my greenhouse benches?" Thankfully, there are some potential alternatives on the horizon.

Begonias are definitely receiving some attention, and for good reason, but what other crops may fill the void that bedding impatiens are leaving? New Guinea impatiens (*Impatiens hawkeri*) are another candidate crop. New Guinea impatiens are great plants, but the overwhelming majority of varieties are vegetatively propagated, making them well-suited for 4.5-in. or larger size container production—not the flats that bedding impatiens are traditionally grown in. Seed-propagated New Guinea impatiens varieties, on the other hand, hold potential for production in flats. The lower cost per plant for propagating with seed instead of cuttings definitely improves the economics of flat production. However, producing plants with the appropriate size for a flat can be a challenge.

One of the primary obstacles to producing high-quality flats of seed-propagated New Guinea impatiens is controlling plant height. While reducing or restricting fertilizer and minimizing excess irrigation can help control height of New Guineas, those strategies don't provide the degree of growth regulation needed to produce plants that are appropriately sized in flats. Therefore, the use of PGRs is likely the most effective approach to control size of New Guinea impatiens for production in flats. We have no information on suitable PGRs and recommended concentrations for producing flats of New Guinea impatiens. The objective of our research was to evaluate the effect of PGRs on controlling height of New Guinea impatiens for production in flats.

What we did
Experiment 1

For our first experiment, we wanted to screen the most commonly used PGRs in greenhouse crop production. Seedlings of Divine Cherry Red, Divine Scarlet Bronze Leaf and Divine White Blush grown in 288-cell plug trays were received from a commercial propagator (Wagner Greenhouses—Minneapolis, Minnesota). Seedlings were transplanted into 1801 flats filled with a commercial, soilless growing substrate comprised of sphagnum peat moss and perlite (Sunshine Mix #1, Sun Gro Horticulture).

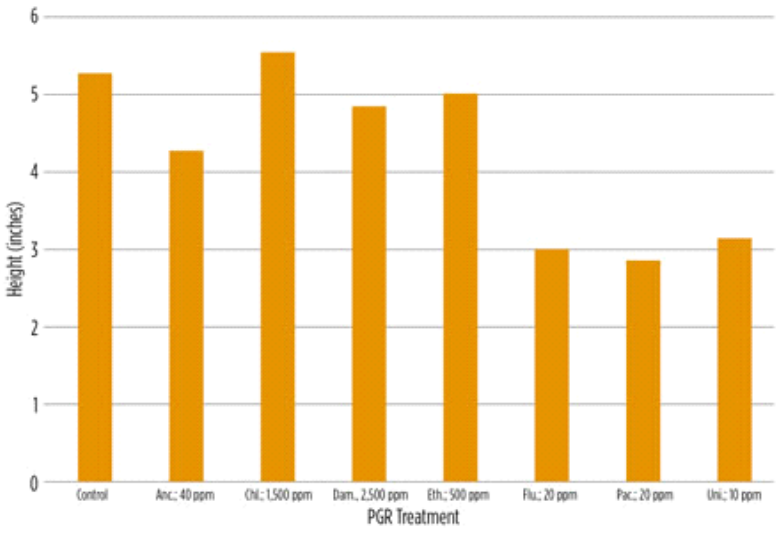
Seven days after planting the seedlings, foliar sprays of solutions containing different PGRs mixed at low,

moderate or high concentrations of ancymidol (20, 40 or 80 ppm, Abide), chlormequat chloride (750, 1,500 or 3,000 ppm, Cycocel), daminozide (1,250, 2,500 or 5,000 ppm, Dazide), ethephon (250, 500 or 1,000 ppm, Collate), flurprimidol (10, 20 or 40 ppm, Topflor), paclobutrazol (10, 20 or 40 ppm, Piccolo), uniconazole (5, 10 or 20 ppm, Concise) or plain water were applied to seedlings. Plants were grown in a glass-glazed greenhouse with radiant hot-water heating and fog cooling. Supplemental lighting from high-pressure sodium lamps was provided when ambient light levels were low. Plants were irrigated as needed using water supplemented with water-soluble fertilizer providing 150 ppm N alternating with clear water.

The flowering date was recorded, as well as the height of the plant from the surface of the substrate at flowering. Time to flower from planting was calculated.

Experiment 2

Seedlings of Divine Cherry Red, Divine Scarlet Bronze Leaf and Divine White Blush were transplanted as outlined in Experiment 1. Seven days after transplanting seedlings into 1801 cells, plants were treated with foliar sprays containing flurprimidol (5, 10, 20 or 40 ppm), paclobutrazol (5, 10, 20 or 40 ppm), uniconazole (2.5, 5, 10 or 20 ppm) or plain water (control). Plants were grown as outlined in Experiment 1 and the same data was
collected.



Above: Figure 1. Height of Divine White Blush New Guinea impatiens treated with moderately concentrated solutions of ancymidol (Anc.; 40 ppm), chlormequat chloride (Chl.; 1,500 ppm), daminozide (Dam., 2,500 ppm), ethephon (Eth.; 500 ppm), flurprimidol (Flu.; 20 ppm), paclobutrazol (Pac.; 20 ppm), uniconazole (Uni.; 10 ppm) or plain water (Control).

What we saw

In the first experiment, we observed a wide range in the responses among the three cultivars of New Guineas impatiens to the different PGRs applied (Figure 1). Several PGRs had minimal to no impact on the height of the three New Guinea impatiens cultivars. For example ancymidol, chlormequat chloride, daminozide and ethephon generally resulted in no significant differences in height compared to the untreated control plants, regardless of the concentration (i.e., low, medium or high). While we saw no differences in our experiment, it

should be noted that we were evaluating the effectiveness of PGRs in controlling height of seed-propagated New Guinea impatiens with a single-spray application. For those chemicals that resulted in little to no control, multiple applications may result in control of stem elongation.

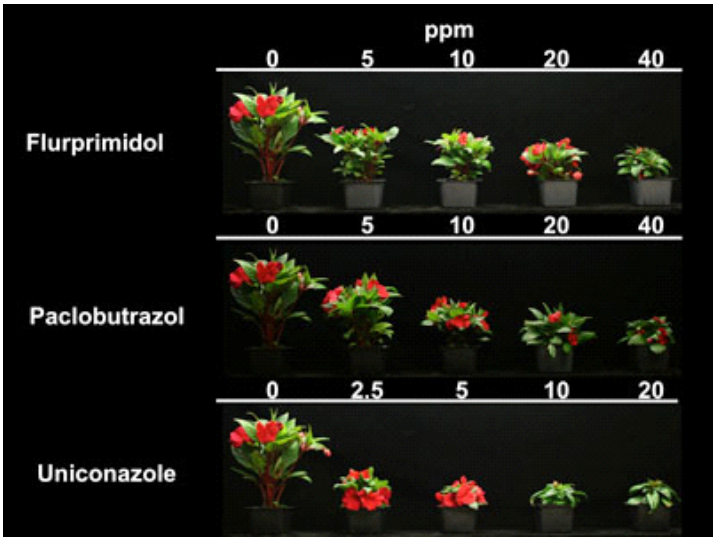
We found that flurprimidol, paclobutrazol and uniconazole resulted in plants that were shorter than untreated plants (Figure 1). Depending on the active ingredient, concentration and cultivar, plant height was 18% to 48% shorter compared to untreated control plants when these PGRs were applied. However, the highest concentration of uniconazole resulted in severe overregulation (Figure 2). Similarly, the highest concentrations of flurprimidol, paclobutrazol and uniconazole caused a delay in flowering for some of the cultivars.



Left: Figure 2. The highest concentrations of some PGRs resulted in overregulation of growth, such as this plant treated with 20 ppm of uniconazole.

Our second experiment evaluated broader ranges of concentrations of the PGRs that we identified as being effective in Experiment 1—flurprimidol, paclobutrazol and uniconazole. As we observed in Experiment 1, the high concentrations of flurprimidol and paclobutrazol (20 and 40 ppm) suppressed the height of plant too much, while solutions of uniconazole that were 5 ppm or greater resulted in too much growth control (Figure 1). For both flurprimidol and paclobutrazol, solutions of 5 to 10 ppm provided the most appropriate amount of height control for production of seed New Guinea impatiens in 1801 flats. For uniconazole, 2.5 ppm provided the most appropriate control of height in our experiment. However, we believe that even lower concentrations of uniconazole than we used in our experiments, such as 1 to 1.5 ppm, may provide adequate control of seed New Guinea impatiens height for production in flats.

Below, Figure 3. Divine Cherry Red New Guinea impatiens treated with flurprimidol (0, 5, 10, 20 or 40 ppm), paclobutrazol (0, 5, 10, 20 or 40 ppm) or uniconazole (0, 2.5, 5, 10 or 20 ppm).



Conclusions and future directions

The Divine series of seed-propagated New Guinea impatiens is a potential option for production in flats. Our research shows that solutions containing 5 to 10 ppm flurprimidol or paclobutrazol or 2.5 ppm uniconazole can suppress height so plants are appropriately sized within the flats. These experiments were conducted in the Upper Midwest, so plants grown in different regions may require different concentrations of PGRs for adequate control. Always perform in-house trials with PGRs to see which concentrations work in your specific growing conditions. **GT**

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