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Utilizing PGRs for Height Control and Bulking of Purple Fountain Grass

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During purple fountain grass (*Pennisetum setaceum*) liner production (Figure 1) and finishing, it is common practice for growers to hand prune crops to promote culm (shoot) and tiller development (branching), and overall bulking. This cultural practice is often time consuming, labor intensive, and the resulting wounds may provide an opportunity for disease infection or virus transmittance. Alternatively, plant growth regulators (PGRs) provide growers the ability to control crop growth and development, manipulate plant architecture, and eliminate labor intensive cultural practices. However, for ornamental grasses, PGR recommendations (PGR chemical type, application rate, and method of application) is limited and genera specific. Of the ornamental grasses grown in greenhouses, many growers have inquired about methods to either control height or quickly bulk purple fountain grass. Therefore, our objectives were to evaluate and quantify the effectiveness of 1) pre-transplant liner dips and 2) post-transplant spray applications of Augeo (dikegulac-sodium), Configure (benzyladenine), or Florel (ethephon) to increase the number of culms of vegetatively propagated single-node purple fountain grass 'Rubrum' culm cuttings.

The Experiment

PGR Liner Dips

Purple fountain grass 'Rubrum' plants in a 50-cell liner tray were watered the previous afternoon and dipped the following morning (slightly dry liners) into solutions containing 200, 400, 800, 1600, or 3200 parts per million (ppm) Augeo (dikegulac-sodium; OHP, Inc.), 25, 50, or 100 ppm

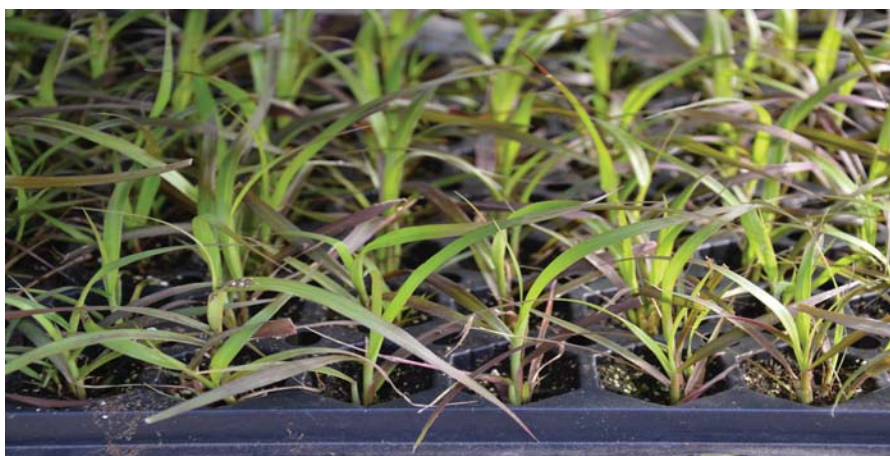


Figure 1. Liner tray of *Pennisetum setaceum* 'Rubrum'.

Summary of Findings

- In general, purple fountain grass plants with fewer culms were taller (post-transplant PGR spray application) while plants with more culms were shorter (pre-transplant dip application).
- Increasing concentration of Augeo generally decreased the number of culms, visible roots, and plant height.
- Purple fountain grass liners dipped into 400 to 800 ppm Augeo had similar numbers of culms and were more compact than those plants that were hand pruned.
- Spray applications of 100 to 400 ppm Florel or 400 to 800 ppm Augeo resulted in plants that were similar in height or more compact than those that were hand pruned.
- Plants that were sprayed with 50 ppm Configure or were hand pruned developed more culms than the untreated control.

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Configure (benzyladenine; Fine Americas, Inc.), 100, 200, or 400 ppm Florel (ethephon; Lawn and Garden Productions, Inc.), or deionized (DI) water (untreated control; UTC) for 2 min or hand pruned 4-in from the substrate surface. The day following the PGR or pruning treatment, liners were transplanted into 5-in diameter plastic containers filled with a commercial soilless substrate (Fafard 2; SunGro Horticulture). Plants were grown in a polyethylene-covered greenhouse at Purdue University. Plants were hand irrigated as needed with 200 ppm N. The average (mean \pm SD) air temperature and daily light integral (DLI) after 6 weeks was 72.4 °F and 17.1 mol·m⁻²·d⁻¹. Six weeks after PGR or pruning treatments, culm number (determined by counting the number of developed culms), plant height (measured from the container rim to the tallest arching leaf blade), and plant dry mass were determined.

PGR Sprays

Except where indicated, greenhouse environmental conditions and plant cultural procedures and rates for PGR liner sprays were identical to those previously described for PGR liner dips. Purple fountain grass 'Rubrum' liners were transplanted and grown for 12 days before receiving a post-transplant PGR spray application or pruning as

previously described. The average air temperature and DLI for 6 weeks was 72.5 °F and 23.6 mol·m⁻²·d⁻¹.

Results

PGR Liner Dips

On average, UTC plant height and culm number 6 weeks after transplant measured 10.2 inches and 67 culms and were statistically similar to those plants that were hand pruned. Similar culm number, plant height, and plant dry mass were observed for plants dipped in 100, 200, or 400 ppm Florel, hand pruned, or untreated. Compared to plants that were pruned, plants dipped in Configure had a reduced number of culms. Although, 100 ppm Configure effectively controlled plant height compared to the other Configure treatments.

In general, 400 to 800 ppm Augeo increased culm number by 16.4% compared to the UTC and were similar to plants that were pruned (Figure 2). Height of these plants was also significantly reduced compared to the UTC. However, Augeo concentrations >800 ppm suppressed culm growth and tillering. It is important to note that we observed increased phytotoxic effects as we increased the Augeo dip concentration from 800 to 3,200 ppm. Plants exhibited

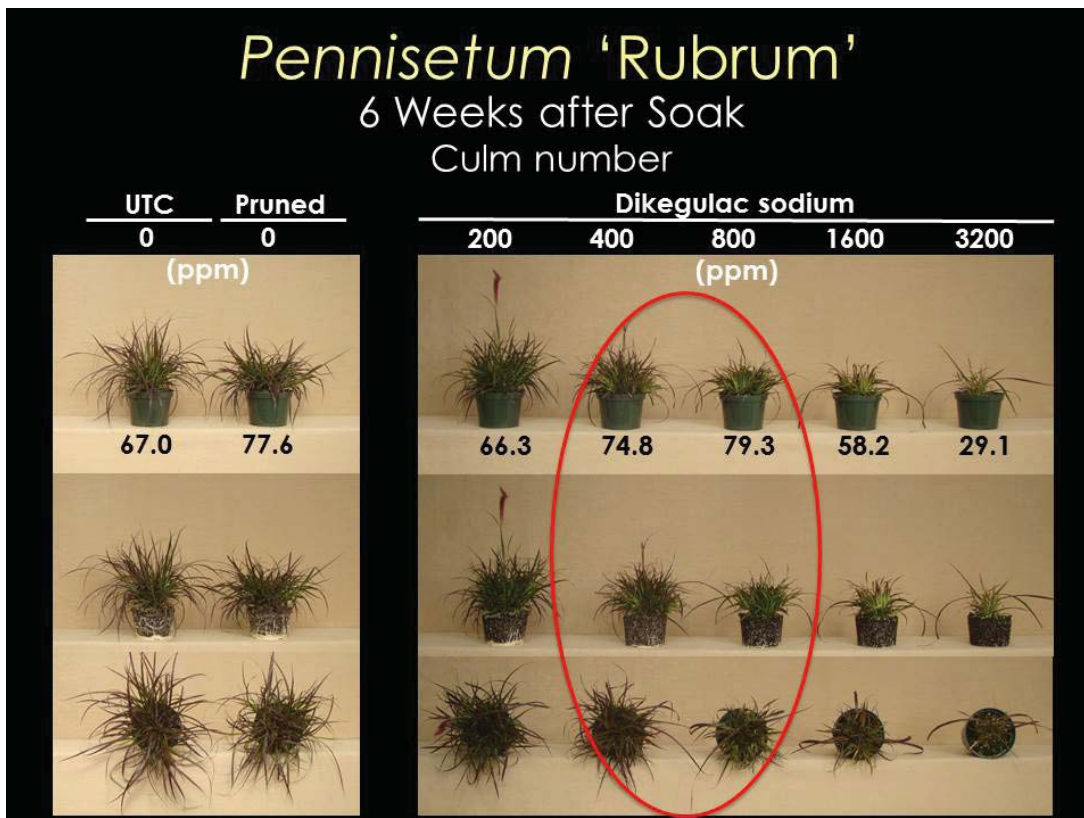


Figure 2. Culm number of *Pennisetum setaceum* 'Rubrum' 6 weeks after 2 min. pre-transplant liner dip application containing 200, 400, 600, 800, 1,600 or 3,200 ppm Augeo or deionized water (UTC) or hand pruned.

chlorosis and necrosis of the foliage and underdeveloped root systems. Additionally, plants dipped in Augeo concentrations of 400 to 1,600 ppm were 38.3% shorter than those that were hand pruned.

PGR Sprays

Plants that were pruned developed nearly 22.5% more culms and were of similar height to the UTC (Figure 3 and 6). In general, culm number was similar among all Augeo spray treatments and the UTC. However, the culm number of plants sprayed with 3,200 ppm Augeo was 13.3 and 29.2% lower compared to the UTC and hand pruned plants, respectively. Plants that were sprayed with 50 ppm Configure or were hand pruned developed more culms than the UTC plants and they were of similar height to the UTC (Figure 4 and 6). Spray applications of Florel did not result in a statistical change in culm number compared to the UTC and hand pruned plants (Figure 4). Plant height was similar among plants sprayed with 200 to 400 ppm Augeo, 25 to 100 ppm Configure, 100 and 400 ppm Florel, UTC, and those pruned (Figure 6). Plants sprayed with 200 ppm Florel and 800 to 3,200 Augeo were significantly more compact than the UTC or hand pruned plants.

It is important to note that plants in Figure 3 (sprays) were 12 days older and were grown under a higher DLI than plants in Figure 2 (liner dips).

Conclusions

In general, certain pre-transplant liner dip and post-transplant spray applications were effective methods to either increase the number of culms and tillering or suppress plant height of purple fountain grass. For example, we found plants with fewer culms to be taller (post-transplant spray application) while plants with more culms were shorter (pre-transplant dip application). Therefore, growers should consider the desired finish product size prior to conducting a pre-transplant liner dip or post-transplant spray application. As our findings clearly indicate that pre-transplant liner dips may provide much greater height control and result in more tillering than post-transplant spray applications. This may reduce the time to bulk plants and finish containers quickly and allow for more plants to be shipped per cart. However, we suggest that growers use caution with PGR dips as substrate moisture content can affect absorption.

We recommend that growers conduct their own pre-transplant liner dip trials using 400 to 800 ppm Augeo to determine if they observe similar height control and culm number to pruning. Growers interested in post-transplant liner sprays for height control should conduct trials utilizing 200 ppm Florel or 400 to 800 ppm Augeo. Alternatively, multiple spray applications at lower rates may yield similar results.

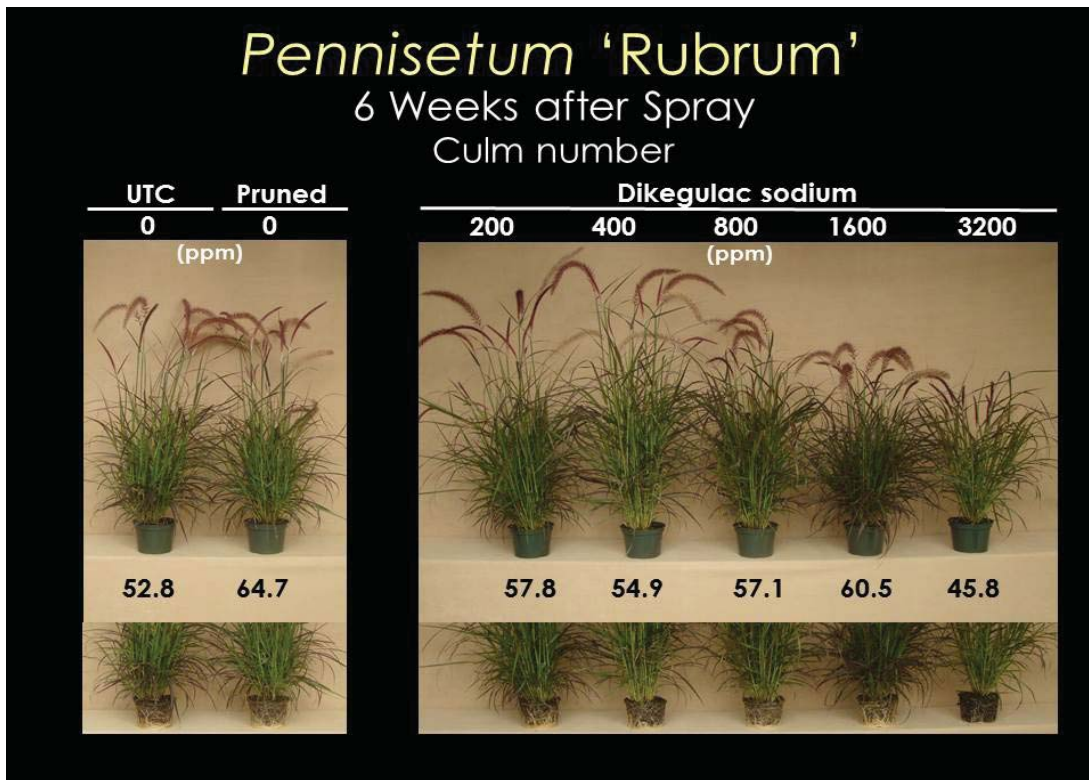


Figure 3. Culm number of *Pennisetum setaceum* 'Rubrum' 6 weeks after post-transplant liner spray application containing 200, 400, 800, 1,600, or 3,200 ppm Augeo or deionized water (UTC) or hand pruned.

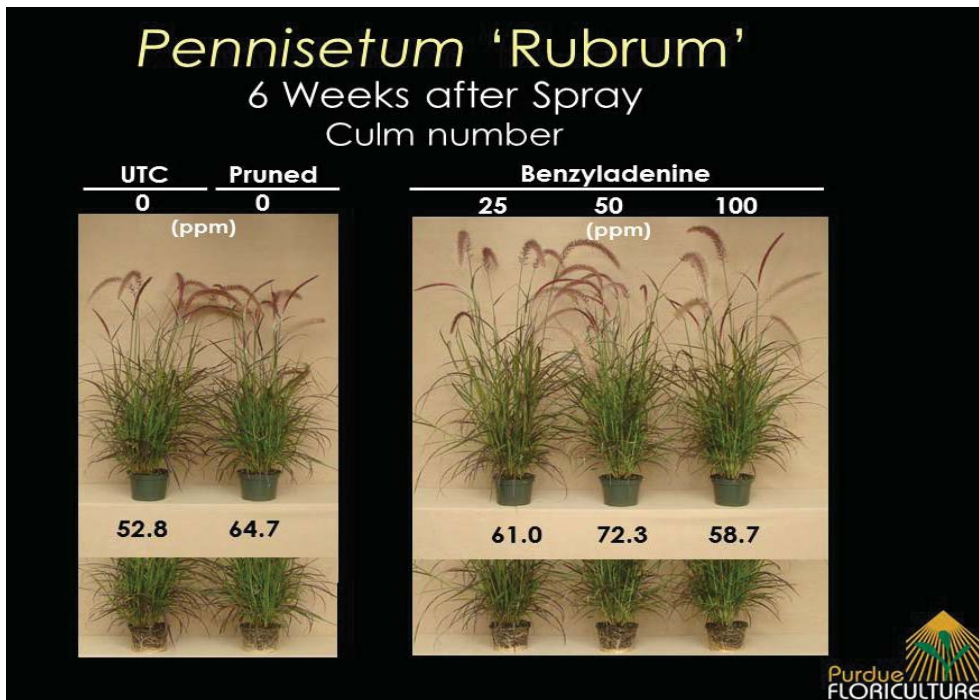
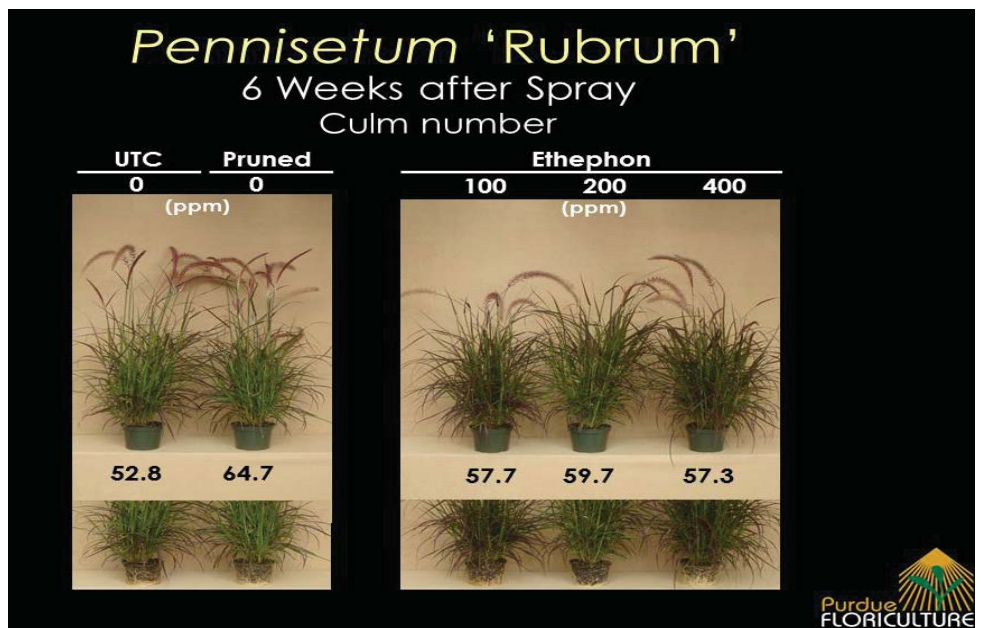


Figure 4. Culm number of *Pennisetum setaceum* 'Rubrum' 6 weeks after post-transplant liner spray application containing 25, 50, or 100 ppm Configure or deionized water (UTC) or hand pruned.

Figure 5. Culm number of *Pennisetum setaceum* 'Rubrum' 6 weeks after post-transplant liner spray application containing 100, 200, or 400 ppm Florel or deionized water (UTC) or hand pruned.



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Pennisetum 'Rubrum'

6 Weeks after Spray
Height

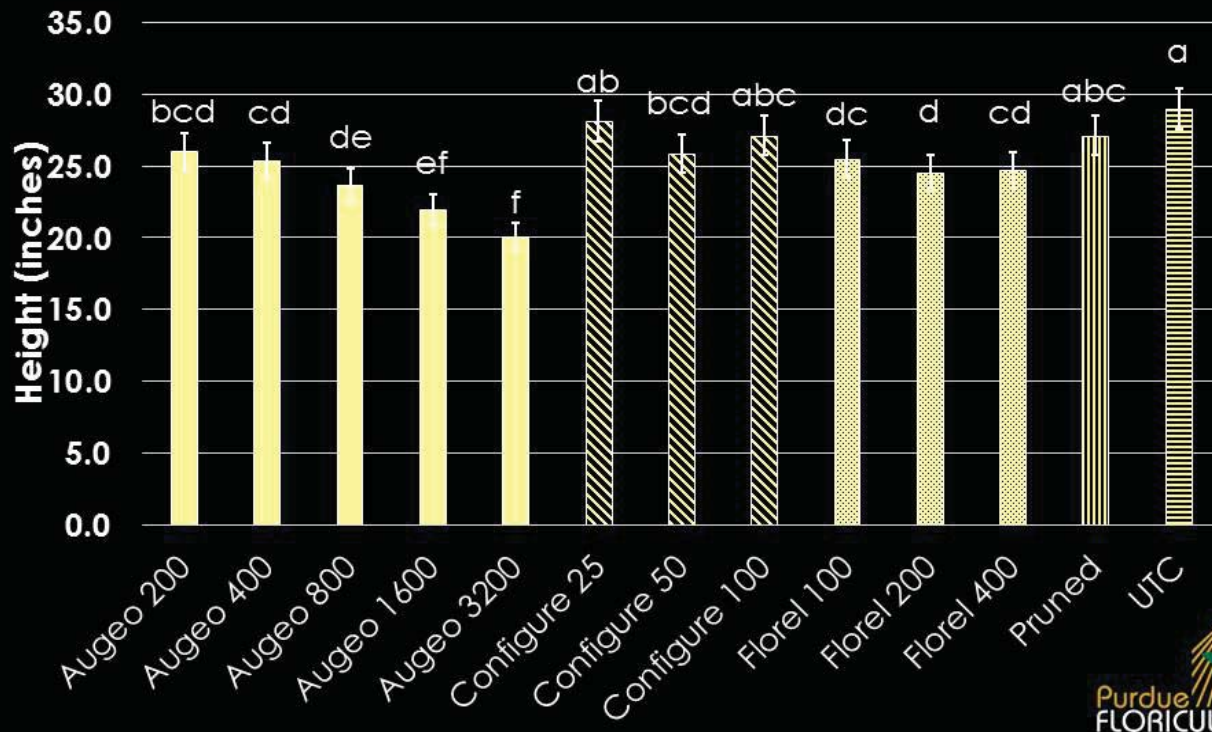


Figure 6. Height of *Pennisetum setaceum* 'Rubrum' 6 weeks after a post-transplant liner spray application of 200, 400, 800, 1,600, or 3,200 ppm Augeo, 25, 50, or 100 ppm Configure, 100, 200, or 400 ppm Florel, or hand pruned or deionized water (UTC).

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