

Calla Lily Height Control with Media Drenches

WITH INCREASED INTEREST IN POT CALLAS, RESEARCHERS ARE EVALUATING THE GROWTH AND DEVELOPMENT OF NEWER CULTIVARS.

By Chad T. Miller and William B. Miller

Calla lilies (*Zantedeschia*) have become a popular greenhouse floricultural crop in the United States, and interest continues to increase for both pot and cut flower production.

Callas have long-lasting, elegant flowers and have been a favorite in wedding bouquets. Breeding efforts have led to many new selections with an increased flower color palette, including near-black cultivars, cultivars more suitable for pot plant production, along with cultivars with increased disease resistance. With an increased interest for potted callas, there is a need to evaluate the growth and development of the newer cultivars, in particular, controlling plant height. Aesthetic appeal is extremely important for marketing floriculture crops and can often be the difference between a sale and plants left on the sales bench.

Several factors affect plant growth and development, including cultivar, temperature, light quality and intensity, and water availability. All of these parameters can be difficult to control, especially for growers who produce several different crop species. Plant growth regulators (PGRs) are another viable mechanism to control growth and development and achieve a quality marketable product and are often more economical.

Table 1. Dutch-grown calla lily cultivars used for PGR studies.

Cultivar	Flower Color	Tuber size (cm)
'Captain Cupido'	White	18-20
'Captain Murano'	Rose-red	18-20
'Captain Reno'	Purple	18-20
'Captain Sonora'	Yellow	20+
'Odessa'	Black-red	18-20
'Mercedes'	Peach	20+
'Rose Queen'	Rose-pink	18-20
'Serrada'	Yellow	18-20

Gibberellins are a plant hormone involved in shoot elongation and stimulating flower development. Calla tubers are typically treated with gibberellic acid (GA) (i.e. GA₃, GA₄₊₇) to increase and stimulate bud break (branching) and increase flowering ability. This GA application can result in an increased plant height. On the contrary, anti-gibberellins, such as paclobutrazol and flurprimidal are regularly used to reduce shoot elongation at a specific stage of growth in some plant species. Media drenches and application at an early stage of shoot growth are often more effective than foliar applications in controlling height, as the PGRs are quickly absorbed and moved throughout the plant. However, if used incorrectly, PGRs can result in non-marketable plants.

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Previous studies have shown PGR media drenches have effectively controlled plant height in hyacinth, tulips, narcissus, oriental lilies, Easter lilies and caladium, producing a more aesthetically pleasing product. Commercial recommendations for PGRs on calla are limited. Recent experiments at Cornell University evaluated the effectiveness of media drenches of flurprimidal (Topflor; SePRO) and paclobutrazol (Bonzi; Syngenta) on height control of several newer potted calla lily cultivars.

Experimental Design

Tubers (18 cm+) of eight cultivars (Table 1) were planted one per

6-inch standard plastic pot with the tuber eyes 1 inch deep in Sunshine LC8 (Sungro Horticulture) soilless potting media, comprised of Canadian Sphagnum peat moss, coarse perlite and vermiculite. PGR drench treatments of 4 fluid ounces per

pot were applied when calla shoot growth reached 1 to 3 inches. Treatments included drenches of reverse osmosis water (control) and 1.5, 3.0, 4.5 and 6.0 mg active ingredient (a.i.) per pot of paclobutrazol or flurprimidal. Plants were grown

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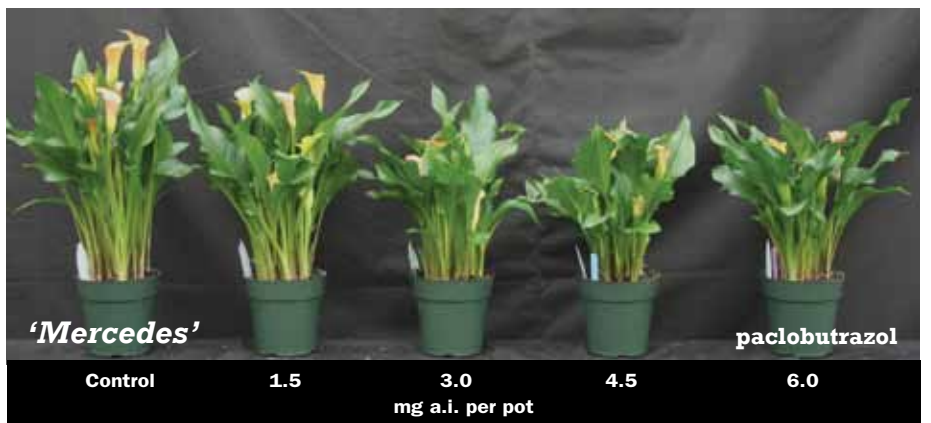
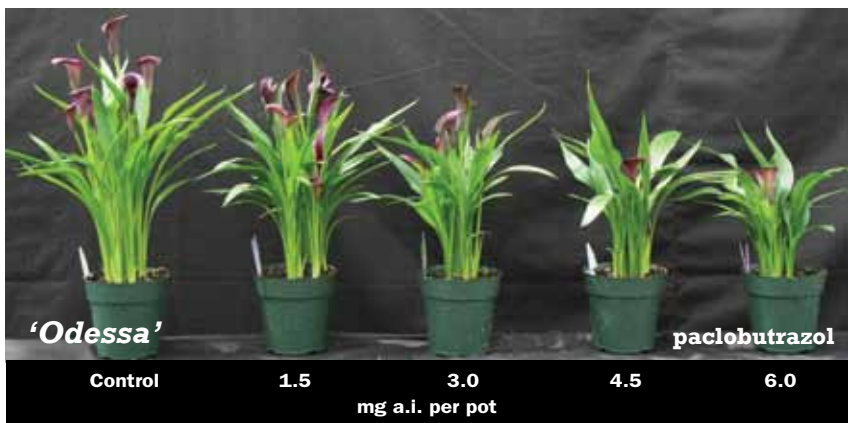
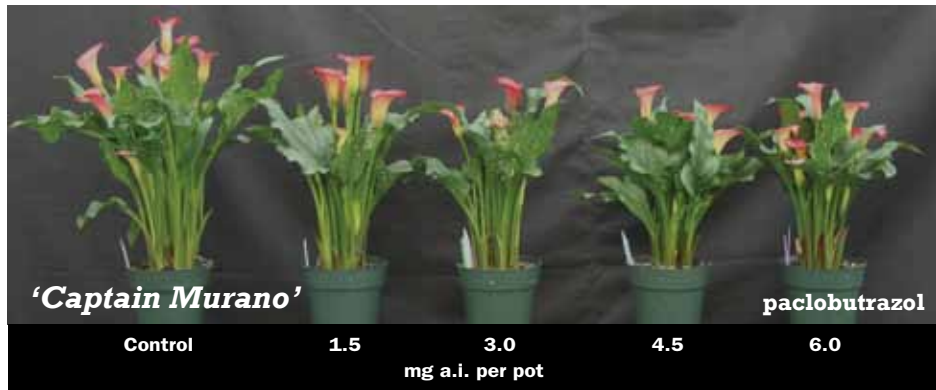


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in a glasshouse at constant 70° F under natural daylengths. Plants were fertilized with 150-ppm nitrogen using 15-5-15. Data collected included date of first flower, height of first flower, leaf height at first flower, and flower number, taken at the end of the experiment. No fungicides were used in the trials.

Experiment Results

PGR media drenches showed significant effects with the cultivars tested in this study (see figures on pages 26 and 28). Generally, there was little difference between paclobutrazol and flurprimidol and their ultimate ability to reduce leaf and flower height.

Media PGR drenches are an effective way of controlling calla lily plant growth and development.

As would be expected, cultivar differences were observed as to their overall response to PGR drench applications. For most cultivars, as PGR concentration increased, leaf and flower heights decreased. For example, with the cultivar 'Captain Murano', flower height decreased by 31 percent and 43 percent and leaf height decreased by 16 percent and 24 percent at 6.0 mg a.i. for paclobutrazol and flurprimidol treatments, respectively. Similarly, for 'Mercedes', leaf height was reduced by 34 and 40 percent, while flower height was shortened by 22 and 37 percent at 6.0 mg a.i. for paclobutrazol and flurprimidol treatments, respectively. There was not always a significant difference (statistically) between increasing PGR concentrations in paclobutrazol treatments.

Increasing PGR drench rate

had little effect on days to flower, as the time to flower increased slightly (-3-5 days) with increasing PGR concentration. However, it does not appear it is enough to cause concern for a producer to meet a specific market date. PGR treatments, in some cases, reduced flower numbers and in some cases, increased flower num-

bers. Although as can be seen from the photos, the effect was often not noticeable, and there did not seem to be a dose response.

Conclusion

Media PGR drenches are an effective way of controlling calla lily plant growth and development

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and could be economically viable technique. Few differences were observed between flurprimidol and paclobutrazol in their ability to reduce both leaf and flower heights in media drenches. Thus, the choice of which PGR could be based on price and/or which material might already be a part of a grower's greenhouse production practices. In terms of specific concentrations to be applied, the highest rate of 6.0 mg a.i. (paclobutrazol or flurprimidol) most often reduced flower and leaf height by ~20 to ~30 percent and the resulting plant stature appeared to be too short, at least for 6-inch pots. Most of the cultivars tested in this study were bred with the intention to be forced as potted plants, thus genetically inclined to be shorter. Lower concentrations of 1.5 to 3.0 mg a.i. (paclobutrazol or flurprimidol) would be acceptable rates for drenching.

It is also important to be on the lookout for soft rot (*Erwinia carotovora* subsp. *carotovora*) during greenhouse production of callas. Cultivar differences also play an important role in soft rot susceptibility. In our experiments, compared to all other cultivars, 'Captain Murano' and 'Odessa' had increased soft rot infections. Careful observation of tubers before handling and planting, along with careful, sanitary greenhouse practices is essential. This major pathogen can be readily controlled with tuber pretreatment (copper hydroxide), along with careful observation and rouging affected plants during production. If there is a need for widespread control, a fungicide drench can be effective.

Results will vary with greenhouse culture conditions and the grower may have to adjust the application rates accordingly to attain similar results. Careful attention must be paid to the concentrations applied so as not to produce potted callas that would be marginally marketable. As is recommended with all PGR applications, it is advised that a grower test a small sample of a crop and maintain accurate records under their greenhouse conditions before applying to a large crop of calla lilies. ☐

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