

A New Height Control Option For Easter Lilies

Flurprimidol drenches have been shown to successfully control height of oriental lilies and Dutch bulbs such as hyacinth, narcissus and tulips, but there is no data that shows how effective flurprimidol drenches are on Easter lilies. Researchers decided to find out.

by **CHRISTOPHER J. CURREY, ROBERTO G. LOPEZ, BRIAN A. KRUG, INGRAM MCCALL** and **BRIAN E. WHIPKER**

HEIGHT control is one of biggest challenges in potted Easter lily production. There are several factors that contribute to the difficulty in controlling Easter lily height, including: year-to-year variation in bulbs, the date Easter falls on and, of course, the weather.

All of these factors work together to make each year's Easter lily



A **WORLD** of
flowers and plants

Straight to your **inbox** weekly

Greenhouse GROWER eNEWSLETTER
BENCHRUNNER
Your Source For Breaking News, Tips and
Vital Information in the Greenhouse Industry

Sign Up Now!
greenhousegrower.com/subscribe

Surfinia[®]

Deep Red

The new true red petunia

From the original, best-selling vegetative petunia series in the world

Excellent garden performance demonstrated in Europe

Easy to grow, maintain and self-cleaning

THE
SUNTORY[®]
COLLECTION

www.suntorycollection.net

Production Plant Growth Regulators

crop a unique challenge. Fortunately, there are several tools available for growers to control unwanted stem elongation. For instance, a warmer night air temperature than day air temperature creates a negative DIF (DIF is day temperature minus night temperature), which has been shown to minimize stem elongation of Easter lilies.

However, with today's high energy costs, it can be cost prohibitive. Therefore, a more practical and economical tool is to control stem elongation using plant growth regulators (PGRs).

While flurprimidol is a PGR that has been available in Europe for more than 20 years as a 1.5-percent formulation, it has been recently introduced into the U.S. market as a 0.38-percent formulation (Topflor, SePRO). Flurprimidol has a similar chemical structure to ancymidol (Abide, A-Rest) and a degree of activity and uptake comparable to paclobutrazol (Bonzi, Piccolo, Paczol) and uniconazole (Concise, Sumagic) in which it can be absorbed by both roots and shoots. As a result, flurprimidol can be applied as a foliar spray, liner dip, bulb dip, and/or substrate drench.

Flurprimidol drenches have been shown to successfully control height of oriental lilies and Dutch bulbs such as hyacinth, narcissus and tulips. However, there is no published information on using flurprimidol drenches on Easter lily. As a result, we wanted to see if flurprimidol drenches would successfully control Easter lily height.

The Experiments

Experiment 1 (North Carolina State). Case-cooled 'Nellie White' Easter lily bulbs (9/10 size) were potted, one bulb per pot, in 6-inch-diameter round plastic pots filled with a soilless substrate. The substrate contained 75 to 80 percent Canadian sphagnum peat and 20 to 25 percent perlite (Berger BM 6; Berger Peat Moss).

Plants were placed in a greenhouse under natural day lengths with day and night temperature set points of 68 and 65°F, respectively. Plants were fertilized weekly with 150 parts per million

Figure 1.
Flurprimidol Substrate Drench



Figure 1. 'Star Gazer' oriental lilies (size 16/18 bulbs) treated with 4.0-fluid-ounce drenches providing flurprimidol at 0.0 to 4.0 mg a.i. per pot. Applying a single drench of 0.5 mg active ingredient (a.i.) per pot or two split applications of 0.25 mg a.i. controlled excessive stretch of Oriental lilies.

Figure 2.
Flurprimidol Drenches



Figure 2. 'Nellie White' Easter lilies (size 9/10 bulbs) treated with 4.0-fluid-ounce drenches providing flurprimidol at 0.0 to 0.24 mg active ingredient (a.i.) per pot at North Carolina State. Flurprimidol drenches between 0.02 to 0.04 mg a.i. controlled excessive stretch of Easter lilies.

(ppm) N using 15-0-15. When shoots were about 3 to 4 inches tall, a single 4-fluid-ounce drench was applied to the substrate surface of each pot providing flurprimidol at 0.02, 0.04, 0.08, 0.16 or 0.24 mg active ingredient (a.i.) per pot or uniconazole (Sumagic; Valent USA) at 0.03 or 0.06 mg a.i. per pot. Untreated controls were also included.

Experiment 2 (Purdue). Case-cooled 'Nellie White' Easter lily bulbs (10/12 size) were potted, one bulb per pot, in 6-inch-diameter round plastic pots filled with a soilless substrate, which contained 80-percent Canadian sphagnum peat and 20-percent perlite (Fafard 1P; Conrad Fafard). Plants were placed in a greenhouse under natural day lengths with a constant air temperature set point of 65°F. Plants were fertilized with 200 ppm N using 15-5-15 at each irrigation.

Continued on page 64 ►

Senetti®

First reblooming Pericallis

Unmatched for winter and
early-season color

Long-lasting flower show with full
series of vividly colored blooms

Ideal for low-energy production
techniques

THE
SUNTORY®
COLLECTION

www.senetti.net

Production Plant Growth Regulators

◀ Continued from page 62

Figure 3.
Flurprimidol Drenches

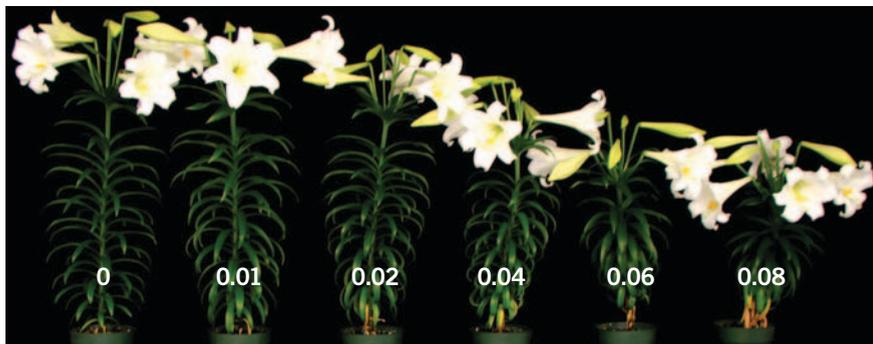


Figure 3. 'Nellie White' Easter lilies (size 10/12 bulbs) treated with 4.0-fluid-ounce drenches providing 0.0 to 0.08 mg active ingredient flurprimidol per pot at Purdue. (mg a.i.)

When shoots were about 3 to 4 inches tall, a single 4-fluid-ounce drench was applied to the substrate surface of each pot, providing flurprimidol at 0.01, 0.02, 0.04, 0.06 or 0.08 mg a.i. per pot. Untreated controls were also included.

What We Saw

Overall, flurprimidol was effective in controlling stem elongation of Easter lily in both experiments, with subtle differences in the results. In Experiment 1 at North Carolina State, as the amount of flurprimidol increased from 0.02 to 0.24 mg a.i. per pot, plant height was 9 percent (2.4 inches) to 59 percent (15.6 inches) shorter than untreated plants (Figure 2). While drenches providing 0.02 to 0.08 mg a.i. flurprimidol resulted in plants of a commercially acceptable height, applying 0.16 or 0.24 mg a.i. flurprimidol provided too much control. When 0.03 or 0.06 mg a.i. of uniconazole was applied to each pot, plant height was 8 percent (2.2 inches) and 36 percent (9.4 inches) shorter, respectively. Neither flurprimidol nor uniconazole drenches had any effect on flower bud number or time to flower as compared to the untreated controls.

For Experiment 2 at Purdue, we observed a similar trend in height in response to flurprimidol to that seen in Experiment 1. For instance,

as the amount of flurprimidol applied increased from 0 to 0.08 mg a.i./pot, stem elongation was suppressed by 25 percent (Figure 3). Similar to Experiment 1, flurprimidol drenches had no effect on flower bud number or time to flower. While we did observe some lower leaf yellowing, this was not due to the PGRs, but to slight overwatering as a result of all treated Easter lilies being on drippers with the same irrigation program.

Using Flurprimidol Drenches On Easter Lilies

Based on what we observed, flurprimidol drenches can be an effective PGR treatment to control Easter lily stem elongation without affecting time to flower or flower bud count. In order to

Figure 4.
Drenches



Figure 4. 'Nellie White' (9/10 bulbs) treated with 0.04 mg active ingredient (a.i.) flurprimidol or 0.06 mg a.i. uniconazole per pot or left untreated. For height control using drench applications, less flurprimidol was required than uniconazole for comparable control. (mg a.i.)

Summer Wave

Bouquet



New Colors for shade

Easy to grow and maintain

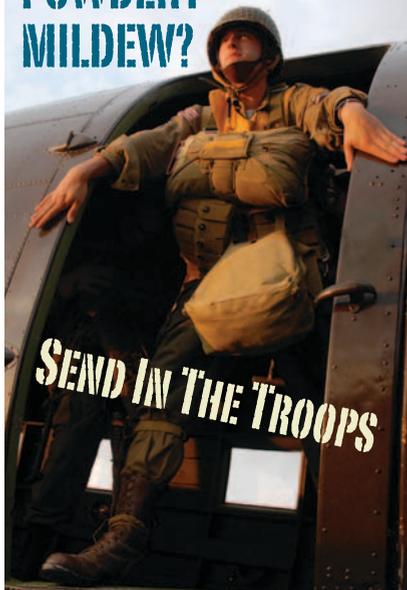
Withstands heat and disease

Self-cleaning, well-branching

THE
SUNTORY[®]
COLLECTION

www.suntorycollection.net

POWDERY MILDEW?



When the mildew horde descends upon your crops, you need an army to fight back. Each treatment of **Actinovate SP** contains millions of spores of the powerful microorganism *Streptomyces lydicus* WYEC 108. Once sprayed in, these microscopic troops use multiple modes of action to seek and destroy fungal pathogens. Alone or teamed up with chemical fungicides, **Actinovate SP** will help you repel **Powdery Mildew** invasions of any size.



ACTINOVATE[®] SP
BIOLOGICAL FUNGICIDE



888.261.4731
www.naturalindustries.com

Actinovate[®] is a registered trademark of Natural Industries, Inc. Not registered in all states. Always read and follow directions before buying or using this product. © 2011 Natural Industries, Inc.

Production Plant Growth Regulators

Academics Dedicated To Sustainability Research

Authors Roberto G. Lopez of Purdue University and Brian Krug of the University of New Hampshire, as well as the University of Maine's Stephanie Burnett and Cornell University's Neil Mattson, established the Floriculture Sustainability Research Coalition (FSRC) three years ago. The FSRC's goal is to provide information to the greenhouse industry about sustainable growing and business practices through multi-state research and Extension activities.

Visit GreenhouseGrower.com/ **January 2012** to learn about some of their collaborative projects, including research on bedding plant production with low or no heat; controlled release fertilizers and organic substrates and fertilizers.

maximize the benefits of a flurprimidol drench on Easter lilies, there are a few key points to remember. First, apply drenches when the growing substrate is moderately dry. In doing so, you won't lose any of the PGR from leaching out of the bottom of the pot.

Secondly, be sure to apply a sufficient volume of solution to each pot. For example, for a 6-inch standard container, 4-fluid ounces is the suggested volume of solution. The amount of active ingredient applied will also depend on the pot size, number of bulbs per pot and bulb size.

As observed in Experiment 2, larger bulbs (i.e. 10/12) may require more PGR than smaller bulbs (i.e. 9/10) to achieve the desired growth control.

Lastly, time your applications correctly. For best results, apply drenches to Easter lilies when the shoots have emerged approximately 3 to 4 inches above the surface of the growing substrate.

Flurprimidol drenches are not only effective at controlling Easter lily stem elongation, they may also be effective in controlling your production costs. If you currently drench your Easter lilies

with uniconazole, you will find a cost savings by using flurprimidol. With the drench rates of the two chemicals being similar for comparable control, a flurprimidol drench application costs 60 to 80 percent less than uniconazole due to the percentage of active ingredient in the formulation and cost of the chemicals (Figure 4).

Other Flurprimidol Application Options

If growers want to continue using foliar sprays, how does flurprimidol compare? Flurprimidol rates of 80 ppm, applied twice, controlled excessive stretch in limited trials conducted in the northern U.S. It must be emphasized that the trial size was small, and further

in-house trialing should be done before that rate is used by commercial operations. At this point, it appears the lower rates of uniconazole may still be the preferred foliar spray option for Easter lily growers.

We have also conducted extensive pre-plant bulb soak trials with flurprimidol on Easter lilies. Easter lilies are extremely responsive to flurprimidol. We found the optimal rate window to be very narrow, so much that the year-to-year variation in bulb lots makes it impossible to provide a consistent optimal rate. At this point, we are reluctant to recommend flurprimidol pre-plant bulb soak for Easter lilies.

Takeaways

Remember, always start with a small-scale, on-site trial in your greenhouse when using new PGR applications to see what works optimally for you and your production methods. This is especially important with Easter lilies that have a great amount of year-to-year variation. Our research results provide a starting point for your in-house trials. You may also want to trial lower drench rates of flurprimidol to provide initial control, and then follow up with uniconazole spray applications as needed to finish off the crop. Flurprimidol drenches clearly control stem elongation of Easter lily and may be a useful addition to your toolkit for controlling stem elongation of Easter lily. **GG**

Christopher J. Currey (ccurrey@purdue.edu) is graduate research assistant and Roberto G. Lopez (rglopez@purdue.edu) is an assistant professor and floriculture extension specialist in the Department of Horticulture and Landscape Architecture at Purdue University, Brian A. Krug (brian.krug@unh.edu) is an assistant extension professor/specialist at the University of New Hampshire Cooperative Extension, Ingram McCall is a research technician and Brian E. Whipker (brian_whipker@ncsu.edu) is a professor and floriculture extension specialist in the Department of Horticulture at North Carolina State University. Lopez and Krug are members of the Floriculture Sustainability Research Coalition and Whipker is a member of the North-South Research alliance. The authors would like to thank the Easter Lily Research Foundation for plant material, Scotts Company for fertilizer, ITML for containers, Fafard for growing substrate and SePRO for chemicals.

Introducing the Effinity⁹³ from Modine, the most efficient unit heater in North America.

With six models available — from 135,000 to 310,000 BTU/hr — all operating at 93% efficiency, the Effinity⁹³ delivers substantial energy savings.

Equipped with our exclusive Conservicore™ technology the Effinity⁹³ is robust enough to handle corrosive environments and outperform aluminum secondary heat exchangers. And with its quick, simple and cost-effective installation, the Effinity⁹³ delivers even greater savings for your growing environment.

The Effinity⁹³ from Modine. It's 93% efficiency from the number one name in greenhouse heating.

Find out what other greenhouse owners discovered last year ... the Effinity⁹³ saves you thousands of dollars. Go to www.modinehvac.com/greenhouse or call 1-800-828-HEAT to learn how much you can save.

93% Efficient

**YOUR EXTENDED FORECAST:
93% EFFICIENCY WITH 100% CHANCE OF SAVINGS.**

Effinity⁹³
with Conservicore™ Technology

MODINE
RAISE YOUR COMFORT LEVEL

MODINE MANUFACTURING COMPANY | 1-800-828-HEAT | www.MODINEHVAC.COM