

## EASTER LILY HEIGHT CONTROL

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Markets are dictating the height of their floral product. For the Easter Lily forcer this is a particular problem because the market wants, and indeed demands shorter and shorter lily plants. Further, there is an economy on box sizes and the number of boxes which fits into a transport. Consequently, the problem of height control has become a concern of great importance.

Height control is a greater problem when plants are forced at high temperatures, above 70°F, especially for early Easters. This fact has been proven/illustrated over and over. Temperature is the single most important aspect of lily height control, as well as for timing the crop. Normal greenhouse light intensities and durations have little to do with height control and control crop timing to an even lesser extent. The problem is compounded because a forcer never knows if they will have height problems and when to apply a growth retardant. The solution to this problem is not simple. The nature of the bulb varies and natural bulb height varies from year to year and indeed heights may vary between bulbs from different sources. Regardless, we do have an effective chemical, A-Rest/Ancymidol, to reduce stem elongation.

Let us now consider the three ways to apply A-Rest, in order to reduce elongation of the lily plant. These are i) soil drench; ii) foliar or plant sprays and iii) bulb dips. Each method has its own pros and cons.

### Soil Drenches

The standard recommendations is 1 pint (16 oz.) of A-Rest in 16 gallons of water. This amount is to drench 500, 6-inch pots (4 oz. of the mixture per pot). This results in application of 0.25 mg (25 ppm) active ingredient (a.i.) per pot. This is an effective manner of height control. However, plants may become too short at this concentration and "palm trees" may develop if applied too late in forcing. If applied too early in forcing, the treatment may result in a plant which is too short, as we do not know "early-on" if plants are or are to be too tall. Regardless, an unattractive plant can result. Solution: Apply the solution as 2 or 3 drenches at lower levels; for example 2 drenches at 0.125 mg a.i./6-inch pot or even 3 drenches at 0.083 mg a.i./6-inch pot spaced over the forcing period as it first becomes evident that height control is needed (Table 1).

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Table 1. The influence of 0, 1, 2, 3, or 5 A-Rest (Ancymidol) drenches on the final height of Easter lily (Lilium longiflorum) 'Nellie White' plants<sup>z</sup>. The sum of 1, 2, 3, or 4 drenches equaled a .25 mg/6-inch pot.

<u>Drench control</u>	<u>Total height</u>
Control	59 cm - 23.25-inches
.125 mg x 30 days after Emergence (E)	49 cm - 19.25-inches
.083 mg x 20, 30 and 40 days after E	48 cm - 19.00-inches
.05 mg x 10, 20, 30, 40, and 50 days after E	49 cm - 19.25-inches
HSD .05%	9.2 cm - 3.25-inches

<sup>z</sup> Bulbs were 8 to 9-inch size, were CTF and forced in a 63°F night/70°F day (17°C night/21°C day) greenhouse.

One drench of A-Rest at .25 mg a.i. per pot reduced plant height by 10 cm when compared to the control. Similarly, five repeated drenches at .05 mg a.i. per pot (sum .25 mg a.i.) reduced plant height by 10 cm (Table 1).

Regardless, when drenches are used, forcers are faced with the problem that drenches may result in the loss of lower leaves. A-Rest has the tendency to intensify any stress that lily plants may be subjected to. These are water stress, nutritional stress, high temperature forcing stress, light stress (plants spaced too closely during forcing, during shipping and display, in sales areas or in the home). Regardless, the potential of lower leaf loss during forcing or during the post-harvest period is increased if any stress is given. We have never seen this problem in our greenhouses.

Of additional concern are the greater amounts of labor required for drenching lilies compared to spraying and in the influences of media type and pH on A-Rest effectiveness. We do know that height control efficiency is reduced in media containing ground barks or in very acid media.

#### Plant Sprays

Usual recommendations call for 0.5 mg a.i. (50 ppm) per plant in 6" pot. Because 1 pint of A-Rest contains 125 mg a.i., 1 pint in 2 or 5 gallons of water will treat 250 plants depending on the size of the plants. If plants are small use 2 gallons to spray 250 plants; if plants are larger, use 5 gallons to spray 250 plants. Whatever volume of water is used (2 to 5 gallons), the entire mixture must be sprayed on the 250 plants. Obviously, the amount of water used will depend on grower preference, sprayer type, nozzle type, pressure, etc. Regardless, the solution must be sprayed evenly over the 250 plants with

adequate coverage and without runoff, because runoff which contacts the growing medium will result in an uneven crop response. This method of application is more expensive in terms of chemical used, but the cost of labor for application is reduced. As with the soil drench, poor plant form or "picture" of the plant may occur if applied too early or too late. Solution: Again, as with drenches, multiple sprays of low application rates may be used. Spraying at 0.25 mg a.i./6-inch pot shortly after emergence and again as needed is practical. Three or more low concentration sprays during forcing is also a possibility, with the sum of A-Rest applied per plant during the forcing season being not greater than 0.50 mg a.i. (Table 2).

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Table 2. The influence of 0, 1, 2, 3, or 5 A-Rest (Ancymidol) sprays on the final height of Easter lily (*Lilium longiflorum*) 'Nellie White' plants<sup>z</sup>. The sum of 1, 2, 3, or 5 sprays equaled a .50 mg/6-inch pot.

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<u>Spray control</u>	<u>Total height</u>
Control	59 cm - 23.25-inches
.5 mg x 30 days after Emergence (E)	43 cm - 17.00-inches
.25 mg x 25 and 35 days after E	48 cm - 19.00-inches
.167 mg x 20, 30, and 40 days after E	45 cm - 17.75-inches
.10 mg x 10, 20, 30, 40, and 50 days after E	49 cm - 19.50-inches
HSD .05%	9.2 cm - 3.25-inches

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<sup>z</sup> Bulbs were 8 to 9-inch size, were CTF and forced in a 63<sup>o</sup>F night/70<sup>o</sup> day (17<sup>o</sup>C night/21<sup>o</sup>C day) greenhouse.

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All sprays (1, 2, 3, or 5 times) reduced plant heights when compared to the control and statistically there were no differences between the various A-Rest spray treatments (Table 2). However, there was a tendency for the several low concentration sprays to be less effective as one singular high dose spray.

We have had several cooperators, in a wide range of locations in the U.S.A., who have gone up to as many as 5 sprays at only .10 mg a.i./6-inch pot. These 5 sprays are equal to the base recommendation of .50 mg a.i./6-inch pot and were spaced every 7 to 10 days apart.

Horticulture recommendations in this case becomes an "art", not a science and the forcer makes critical evaluation as to when to spray and when not to spray. It is our opinion that these repeated, low concentration applications result in a more attractive plant, with evenly spaced and darker leaves. Regardless, sprays historically have not resulted in loss of lower foliage. We are frequently asked, "When is the best time to spray lily plants after emergence?"

All timed A-Rest spray treatments reduced plant height, except for the spray 50 days post E, when compared to the control. There were, however, no differences between A-Rest treatments. Regardless, it appears that the most effective time for a one-time recommended rate would be to spray between the 20th and 30th days after emergence (Table 3).

Table 3. The influence of timing a single A-Rest (Ancymidol) spray at .5 mg a.i./6-inch on final plant height of Easter lily (*Lilium longiflorum*)<sup>z</sup>.

<u>Spray (.50 mg a.i.)</u>	<u>Total height</u>
Control	59 cm - 23.25-inches
10 days past Emergence (E)	47 cm - 18.25-inches
20 days past E	44 cm - 17.50-inches
30 days past E	44 cm - 17.50-inches
40 days past E	48 cm - 19.00-inches
50 days past E	51 cm - 20.25-inches
HSD .05%	9.2 cm - 3.25-inches

z Bulbs were 8 to 9-inch size, were CTF and forced in a 63°F night/70°F day (17°C night/21°C day) greenhouse.

### Bulb Dips

This method of application has been developed in recent years and has received wide attention as a "cure-all" for the problem of lily height control. This bulb dipping technique perhaps has greater validity when growing in a medium containing bark, which is acidic and which has been shown to render the A-Rest inactive when used as a drench. When lily forcers are not under these cultural situations, we encourage them to avoid bulb dips because once applied the forcer has to "live with" the treatment. Further, it has been our observation that emergence and flowering may be uneven and delayed since it is very easy to "overdo it".

If a forcer perennially finishes with a crop which is too tall, a low level A-Rest dip of only 2 oz./gal. for 30 minutes may be more appropriate than a full concentration dip of 6 oz./gal. At emergence, repeated (3 to 5) sprays of .10 mg a.i./6-inch pot may then be used in conjunction with the bulb dip. Regardless, bulb dips apparently do not have any side effects with stress induced loss of lower leaves as do A-Rest drenches.

In our study for some reason, the chemical was inactivated by the Kelthane or Dexon and the Terrachlor solutions as growth retardant dips were not effective (Table 4).

#### Additional Information on A-Rest

A-Rest is the trade name of the chemical ancymidol. A-Rest is sold as a 0.0264% (264 ppm) solution with 250 mg a.i. per quart. Application solutions should be prepared with water and without any additional wetting agent. Even application is essential for uniform growth response; for sprays this means wetting all foliage evenly and avoiding dripping into the potting medium, while for drenches the medium should be uniformly moistened before application.

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Table 4. The influence of a 2, 4, or 6 oz./100 gal. A-Rest (Ancymidol) bulb dip on final plant height of Easter lily (Lilium longiflorum)<sup>z</sup>. A-Rest treatments were applied at the same time and with the fungicidal and miticidal 30-minute bulb soaks.

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<u>Treatment</u>	<u>Total height</u>
Control	59 cm - 23.25-inches
2 oz./100 gal. dip	57 cm - 22.50-inches
4 oz./100 gal. dip	60 cm - 23.75-inches
6 oz./100 gal. dip	54 cm - 21.50-inches
HSD .05%	9.2 cm - 3.25-inches

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<sup>z</sup> Bulbs were 8 to 9-inch size, were CTF and forced in a 63°F night/70°F day (17°C night/21°C day) greenhouse.

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