

# The 'Nuts and Bolts' of Easter Lily Production



John Erwin, Department of Horticultural Science, University of Minnesota



This article outlines the key issues when producing an Easter lily crop. Recommendations are based on experience in working with growers and noticing what works and does not work. Essentially, following the recommendations in this article will take care of almost all of the common issues related to growing this crop.

## Prior to Potting:

Upon arrival, open cases and place bulbs in a 65°F environment. If bulbs are placed at temperatures below 60°F and shipping media is moist, bulbs will start the vernalization process prematurely.

## Potting Bulbs:

Pot Easter lily bulbs 1 inch from the base of a 'standard' 6-8 inch diameter pot. Drench planted bulbs within 2 weeks with fungicides to control *Pythium* and *Phytophthora* spp. and *Rhizoctonia*. We cycle between a Banrot (8 oz/100 gallons) application one time and a mixture of Cleary's 3336 (8 oz/100 gallons) plus Subdue (1/2 oz/100 gallons) the next time. Unfortunately, there is evidence for *Pythium* and *Phytophthora* resistance to Subdue. Do not create your own resistance by applying the same fungicide over and over again—make sure you alternate with fungicides from different families. In addition, there is no documented case of Truban resistance, therefore, always have Truban in your rotation! 'Double drench' potted bulbs to insure that the fungicide reaches the base of the pot where the bulb is located. Last year there was bulb mite outbreak. Because of this, you may consider drenching with a miticide—remember that none are registered for this use!

## Rooting Period:

Place potted bulbs in an environment with a 62-65°F media temperature to optimize root development for 2-3 weeks. Fertilize once

with a calcium nitrate based fertilizer at a rate of 400-0-400 ppm (N-P-K) in the irrigation water. Warmer temperatures (>70°F) will decrease rooting. If the shoot emerges from the media, place in a lighted (fluorescent or daylight only) cooler immediately to inhibit further shoot elongation and to initiate the vernalization treatment.

## Cooling:

Cool Nellie White Easter lily bulbs in a ventilated environment at 42-44°F for 6 weeks (1000 hours). If bulbs are believed to be mature, bulbs can be cooled for less time to increase bud count. Remember that leaf number will also increase! Monitor temperatures using a soil thermometer to make sure bulbs are at the temperature you think they are!

Bulbs must be in moist media to perceive the cooling treatment. Water bulbs the day before placing them in the cooler and in the cooler if drying occurs. Make sure you place pots in the cooler so they are accessible to check whether media drying or early sprouting occurs.

If shoots emerge from the media, inhibit further elongation by 1) lighting with daylight or fluorescent lamps (5  $\mu\text{mol m}^{-2} \text{s}^{-1}$  (25 footcandles) and/or 2) dropping the temperature for a short period of time (3 days at 36-38°F) periodically. Incandescent lamps will stimulate stem elongation and reduce the effectiveness of the vernalization treatment. Of the 2 techniques, addition of lights is preferable to temperature dropping.

## Post Vernalization to Flower Initiation:

Space potted bulbs 'pot-to-pot' after they are brought out of the cooler. Do not hang plants above an Easter lily crop as it reduces light and increases the proportion of far-red light to red light that the crop receives. High far-red light compared to red content reduces flowering and increases stem elongation.

Drench potted bulbs with fungicides for *Pythium* and *Phytophthora* spp. and *Rhizoctonia* within 3 days after removing from the cooler using the before mentioned materials. The next irrigation should contain 400-600 ppm N and K to raise the media fertility to the recommended nutrient levels as quickly as possible.

Easter lily plants initiate flowers during the last 3 weeks of January. The optimal temperature for flower initiation is 63-65°F. Adjust air temperatures to maintain a 63°F media temperature prior to shoot emergence. After shoot emergence, maintain a 63-65°F air temperature to maintain the shoot tip at the desired temperature.

Do not stress plants in any way during the flower initiation process as flower bud count may decrease. In particular, do not apply chemical growth retardants to control stem elongation, water stress plants or expose plants to excessively high temperatures (>80°F).

## Leaf Counting:

Determine the number of leaves that must unfold before flowering as soon after January 27th as possible.

ble (flower initiation). Specifics of how to leaf count are detailed later in this bulletin.

Leaf counting is critical to determine the greenhouse temperatures to grow your crop to insure that it flowers on time. Successfully timing an Easter lily crop is almost entirely dependent on the effective temperature management during the period between flower initiation until visible bud (about March 7-15th this year); there is little flexibility in timing once a crop reaches the visible bud stage.

### Graphical Tracking and Growth Regulators:

An Easter lily crop should be graphically tracked if a desired plant height at flower is necessary or specified by the retailer. Graphical tracking should start when a shoot emerges from the media. A graphical track for the 2002-2003 growing season is shown in the pre-

vious article. The only critical information that you need to modify this graph is the date of emergence, desired finishing date, height at flower initiation, height at visible bud and the final desired height.

Do not apply growth regulators unless you have to. Instead, use temperature control. Drop temperatures (about 5-10°F) during the first 4 hours of the day (at dawn). If you have to apply growth retardants, spray A-Rest (25 ppm), or Sumagic (5 ppm) periodically as needed. Remember that application of growth retardants encourages lower leaf yellowing!

### Visible Bud to Market:

The period from visible bud to market requires a minimum of 24 days (constant 85°F) and a maximum of 42 days. In other words, if your plants are not at visible bud 24 days before Easter (April 20 this year), you will never make it!

Lower leaf loss occurs during this period and is due to either 1) inade-

quate light 2) high soluble salts, 3) water stress or 4) root rot. **Therefore, it is imperative that plants are spaced adequately and that they are drenched with fungicides for *Pythium* and *Phytophthora* spp. and *Rhizoctonia* control at visible bud.** It is also critical that there is good air movement within the crop to discourage prolonged periods when media and foliage is moist. Alternatively, consider spraying Fascination (cytokinins + GA) to lower leaves to inhibit lower leaf yellowing 1 week before and again 1 week after visible bud.

Use the Easter lily bud meter (at the end of the Bulletin, pp. 26) to determine how many days are required until flowering. Note that the meter should be placed at the base of the bud (where the petal meets the pedicel)—not where the bud meets the stem.

## The Most Common Problems in Easter Lily Production

John Erwin, Department of Horticultural Science, University of Minnesota

### Height Control

Height control on Easter lilies is typically a problem later in the production schedule when 1) day temperatures increase and 2) plants are more crowded. Easter lily height is controlled by either applying a chemical growth retardant (A-Rest or Sumagic) or by reducing the difference (DIF) between day and night temperatures that plants are grown at. It is preferable to control elongation by manipulating day and night temperature to reduce DIF. Application of chemical growth retardants can result in some undesirable side effects. A-Rest application can result in increased lower leaf yellowing and loss. In contrast,

Sumagic application can increase non-uniformity in a crop and, in some cases, can result in over application and excessive reduction in elongation.

Solution: Track plant height over time using the enclosed graphical track. Alter the day and night temperature in your greenhouse to maintain plant height between the two lines on the track. Remember, that stem elongation is most sensitive to temperatures during the first 3-4 hours of the day. Drop temperatures at this time (no more than 10°F) to reduce elongation. Increase temperatures at this time to increase elongation. If temperature control is not possible, apply a Sumagic spray.

### Root Rot

Easter lilies are very susceptible to root rot. Root rot is a root disease complex that usually includes both *Rhizoctonia* and *Pythium*. Excessive root rot results in loss of lower leaves, reduced plant height, reduced flower and leaf size. This is most evident later in the crop schedule in March and/or April. In addition, excessive root rot can result in flower bud abortion if it occurs early.

Solution: Control root rot by 1) culturally reducing the likelihood of the disease and 2) drenching with (continued on page 27)