

The lowdown on how bulb size influences lily development

by Nathan Lange and Royal Heins

Don't let Easter lily bulb size make you miss the holiday sales. Bigger bulbs grow faster and flower sooner.

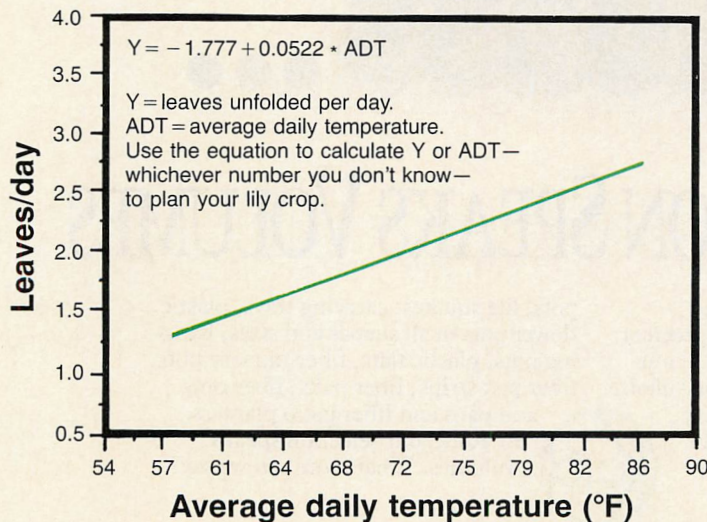
Easter lily bulbs are sold to greenhouse forcers based on bulb size, which is measured by bulb circumference. Bulb size classes vary from 6 to 7 inches (6/7) to bulbs larger than 10 inches (10+). Forcers often select certain-sized bulbs based on their requirements for final flower bud count, height and days to flower. As bulb size increases, bud count and height usually increase, while days to flower decrease.

Laying the basis with temperature

Meriam Karlsson, now at University of Alaska, showed leaf unfolding rate on Easter lilies grown from 8/9 bulbs was linearly related to average daily temperature. If you know the required leaf unfolding rate for a lily crop, you can use the relationship between aver-



Appearance of Nellie White Easter lily plants grown from bulbs of different sizes on March 16. Plants grown from bigger bulbs (10+) unfold leaves faster, bloom sooner and have more flowers. Photo was taken 92 days from the start of forcing.



Leaf unfolding rate on Nellie White Easter lilies grown from 8/9 bulbs is linearly related to average temperature. For example, if you need 1.5 leaves unfolding daily to meet your market date, give plants a 63 F temperature.

age temperature and leaf unfolding rate to calculate average 24-hour temperatures necessary to unfold the required number of leaves per day.

When we validated the leaf unfolding model in several commercial greenhouses, it accurately predicted leaf unfolding based on temperature except in two situations. With one grower, the model consistently over-predicted leaf unfolding rate; with the other grower, it consistently under-predicted leaf unfolding rate. The over-prediction occurred with 7/8 lily bulbs; under-predictions occurred with 9/10 bulbs. All the other trial growers used 8/9 lily bulbs, the same size used in the original research.

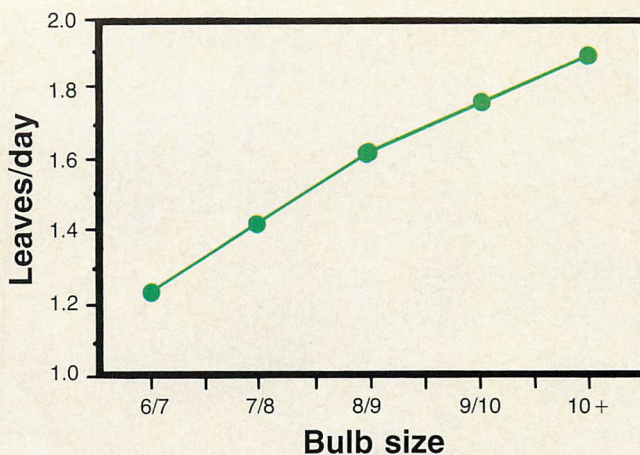
Was bulb size impacting leaf unfolding rate? We conducted an experiment to determine this. The results are described below.

Bigger bulbs grow faster and flower sooner

Leaf unfolding rate increased linearly as bulb size increased from size 6/7 to 10+. Compared to plants grown from 8/9 bulbs at 68 F, leaf unfolding was 0.2 leaves per day slower on plants from 7/8 bulbs and 0.14 leaves per day greater on plants from 9/10 bulbs. Although we don't have any comparative data on plants from different sized bulbs grown under higher or lower temperatures than 68 F, we have no reason to expect the percentage difference in leaf unfolding rates between bulb sizes to change as temperature changes.

Leaf number also increased as bulb size increased. Plants grown from 10+ bulbs had almost 30 more leaves than plants grown from 6/7 bulbs. The larger bulbs with the higher leaf unfolding rates actually flowered earlier than smaller bulbs. In the study, plants grown from 10+ bulbs flowered a full week earlier than plants grown from 6/7 bulbs.

Plant height at flower increased as bulb size increased. Plants grown from 10+ bulbs can be over 8 inches taller than plants grown from 6/7 bulbs. Flower number also increased as bulb



As bulb size increases, leaf unfolding rate of Nellie White Easter lilies grown at a constant 68 F also increases. Does the relationship hold at other temperatures? The researchers say yes.

size increased, from an average of 3.7 to 9.6 flowers per plant.

Leaf yellowing and height control

The results of our experiment explain the difference observed in leaf unfolding rates. At a given average daily temperature, leaf unfolding is greater on large bulbs than on small bulbs.

By forcing large bulbs, you obtain high flower counts but also high leaf numbers, which means higher leaf areas per plant. Since lower leaf yellowing is directly related to plant leaf area per square foot of bench space, growing larger bulbs at the same spacing

as smaller bulbs both will increase leaf area per area of bench and the potential for lower leaf yellowing.

Growing larger bulbs also can create many more height control difficulties if lily plants must be kept short. Growing to a final height of, say, 22 inches, requires progressively more height control efforts—such as implementing a negative DIF or use of A-Rest—as bulb size increases.

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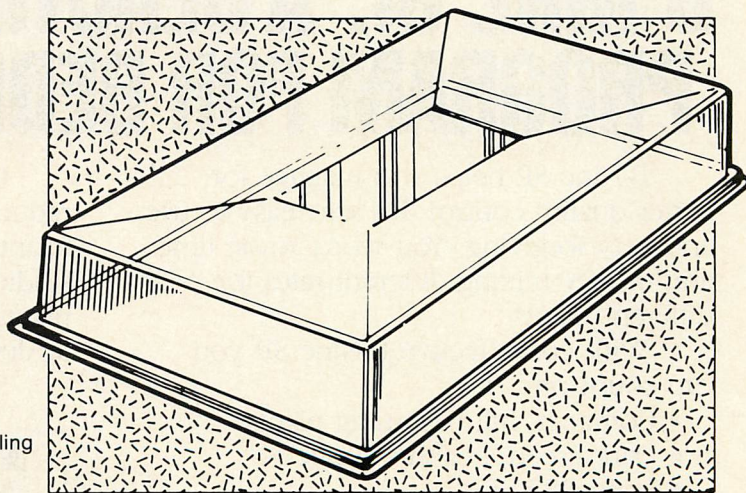
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