Use Temperature to Control the Rate of Easter Lily Bud Development

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Once Easter lily buds become visible, growers can use bud length to track development and to time the crop for Easter. Lily buds typically open when bud length reaches 6 $^{5}/_{16}$ inches or 16 cm. The rate of bud elongation is controlled by average daily temperature. For example, at an average temperature of 59°F (15°C), lilies will take about 40 days to reach flowering from visible bud. As the average daily temperature increases, the time from visible bud to flowering will decrease. As a rule of thumb, each 5°F (~3°C) increase in temperature—in the range of 55° to 75°F (13° to 24°C)—results in a four-day decrease in the time required for buds to elongate and open. As the temperature increases further, up to about 86°F (30°C), cropping time continues to decrease but at a slower rate.

Growers can use lily bud length to track crop timing in the later stages of development, much like they use leaf counting to estimate crop timing in the early stages of development. Ideally, crop development will be close enough to the desired schedule by the time the visible bud stage occurs so that it can be forced to flower with temperatures somewhere between 55° and 70°F. If forcing temperatures outside of this range are required, crop quality may suffer, the cost of forcing may increase (if higher temperatures are required) or the desired forcing temperatures may be difficult to achieve. Regardless, with an early Easter this year (March 30, 1997), growers should reevaluate crop timing as soon as buds become visible. The longer you wait to adjust your schedule, the more difficult it will be.

To estimate the time remaining until lilies in bud open, measure the current bud length. Then, using the information in Table 1, find the measured bud length in the column under the average temperature you are currently running. Follow the row to the left to find the number of days remaining until flowering.

If this time is too short, use a lower average daily temperature. If the interval is too long, use a higher average daily temperature. (The temperatures and bud lengths in Table 1 are presented in degrees Fahrenheit and inches.)

Table 1. Bud length and time (days) remaining until buds open for Easter lilies grown at five different average daily temperatures. Note: Easter lily buds open when buds reach ~ 6 5/16 inches or 16 cm in length.

	Average Daily Temperature (°F)				
	59	64	70	75	81
Days to Open Bud	*Bud Length (Inches to the Nearest 1/16th)*				
40	7/8	–	–	–	–
35	1 1/16	13/16	–	–	–
30	1 3/8	1 1/16	13/16	–	–
25	1 3/4	1 7/16	1 1/8	7/8	–
23	–	–	–	–	13/16
20	2 5/16	1 15/16	1 5/8	1 1/4	1
18	2 9/16	2 3/16	1 13/16	1 1/2	1 3/16
16	2 13/16	2 7/16	2 1/16	1 3/4	1 7/16
14	3 1/8	2 3/4	2 3/8	2 1/16	1 3/4
12	3 7/16	3 1/8	2 3/4	2 7/16	2 1/16
10	3 13/16	3 1/2	3 3/16	2 13/16	2 1/2
9	4	3 11/16	3 3/8	3 1/16	2 3/4
8	4 3/16	3 15/16	3 5/8	3 5/16	3
7	4 7/16	4 1/8	3 7/8	3 5/8	3 1/4
6	4 5/8	4 7/16	4 3/16	3 7/8	3 5/8
5	4 7/8	4 11/16	4 7/16	4 3/16	3 15/16
4	5 3/16	4 15/16	4 13/16	4 9/16	4 3/8
3	5 3/8	5 1/4	5 1/8	4 15/16	4 13/16
2	5 11/16	5 9/16	5 1/2	5 3/8	5 1/4
1	6	5 15/16	5 7/8	5 13/16	5 3/4
0	6 5/16	6 5/16	6 5/16	6 5/16	6 5/16

The relationship between bud length and development time for lilies grown at several different average daily temperatures is presented in Figure 1. (The temperatures and lengths in Figure 1 are presented in degrees Centigrade and centimeters.) The graph of bud development shows that bud elongation is initially slow but increases rapidly during the later stages of development. For example, plants grown at 15°C (59°F), require about 24 days for buds to increase about 5cm (2 inches) in length—from an initial length of ~ 2 cm on day 40 to ~ 7 cm on day 16. However, buds on these same plants only require another 10 days to reach ~ 12 cm in length (an increase of an additional 5 cm or 2 inches). The final bud length of 16 cm is achieved after only six more days. At 27°C (81°F), this whole process from visible bud to flowering requires only 23 days.

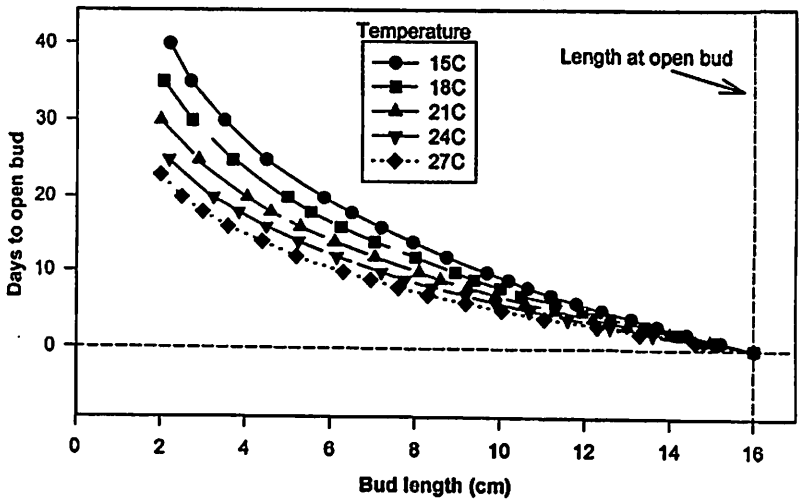

Figure 1. The relationship between bud length and the time required for buds to open for plants grown at five different average daily temperatures. Note: Easter lily buds open when buds reach 16 cm or 6 $^{5}/_{16}$ inches in length.

If lilies are ahead of schedule when they reach the puffy white bud stage, plants can be stored under cool dark conditions to delay further flower development. Move plants immediately to a dark cooler (if light is used in storage, lilies will stretch) and store at 34 to 40°F. Under ideal circumstances, try to time the crop so that lilies require as little cool storage as possible, preferably one week or less. Storage should be less of a concern in 1997 because of the early Easter date than in years when Easter falls on a later date.

If lilies are finished in the greenhouse (without cooling), continue to apply fertilizer until the week before sale. Unlike poinsettias which suffer a loss of postharvest quality if fertilized during the final stages of flower development, lily postharvest quality remains high with continuous feed. However, if soluble salts are high in the consumer environment and lilies are underwatered, a problem can develop. For this reason, use clear water during the final week of forcing.

Lilies ship best when buds are still closed. Sleeve and box lilies one to three days before buds open. If buds are already open, remove anthers before sleeving. Botrytis is a greater problem when lilies are shipped in plastic sleeves than in paper sleeves. Condensation of moisture on the plastic surface is the cause of this problem.

Because of the complex and variable nature of the Easter lily crop, proper timing, careful monitoring of crop development and the ability to both force and delay lily development are essential elements of lily crop production. Use the temperature and bud development charts in this article to help bring your 1997 Easter crop in on time.