Controlling Easter lily growth with temperature

Richard J. McAvoy
Floriculture Extension Specialist

Final Easter lily height is an important consideration for the grower. Lilies which are too tall or too short may not be as desirable to the consumer. Lily height can be controlled effectively by controlling the temperature in the greenhouse. A program of strict temperature control will allow the grower to reduce or eliminate the use of plant growth regulators while still producing a quality crop.

The growth and development of an Easter lily crop can be divided into four stages. The effect of temperature on lily development and the desired production temperature range are not the same for all four stages of growth.

The period from **planting to emergence** of the shoot is the first stage of growth. Moderate temperatures, 60 to 65°F both day and night, are most desirable during this stage of development. Avoid higher temperatures especially those above 70°F. Temperatures lower than 60°F will slow growth, and the shoots will take longer to emerge.

Immediately following emergence is the stage of **flower initiation.** Flower initiation occurs at about the same time that the stem roots are being formed. Temperatures above 70°F will decrease bud count. Temperatures of 55-60 or 60-65°F will favor maximal bud formation.

During the first two stages, growers should only be concerned about getting lilies to emerge and initiate buds. Temperature control of lily height and timing of the crop for Easter will be accomplished during the last two stages of growth.

Stage three is the period from **bud initiation to visible bud.** Higher temperatures will speed lily growth and lower temperatures will delay growth.

During stage four–**visible bud to flowering**–temperature will affect the rate of bud development. Temperatures above 80°F, day or night, can cause bud blast without proper humidity control. Growers can avoid the need to use extreme temperatures at this stage of development by tracking lily development from the onset of stage three. Make adjustments on a weekly basis to speed or slow growth (see 1990 Easter Lily Schedule enclosed).

Temperature effects on lily development can be separated into day temperature (DT) effects, night temperature (NT) effects, effect of DT-NT difference and average daily temperature effects.

Average daily temperature most influences the rate of growth (leaf appearance and flower development). The higher the average daily temperature, the greater the rate of growth and flower development. However, average daily temperatures which are too high (i.e. above 86°F) will decrease the rate of leaf emergence or flower development. Use average daily temperature to control crop timing. Do not use high temperatures to speed growth and development during bud initiation (stage two), as bud count will be adversely affected.

The difference between day and night temperature most influences plant height. Plant height decreases as the difference between day temperature and night temperature decreases. Plants will be shortest when night temperature exceeds day temperature and tallest when day temperature exceeds night temperature. The day-night temperature differential has the greatest effect on lily height during the most rapid stages of stem elongation, i.e. the period just prior to visible bud and the visible bud to flowering period.

Leaf length and flower length are most influenced by the absolute day temperature and the absolute night temperature. The day-night temperature difference has little effect on leaf and flower length. Absolute night temperature affects leaf and flower length more than absolute day temperature. As night temperature increases (i.e. 50 to 85°F), leaf length and flower length decrease.

Obviously the grower can encounter problems using high night temperatures to reduce lily stem elongation during certain stages of growth. Night temperatures which greatly exceed day temperatures may result in small leaves and flowers. The best way to control growth is with moderate day/night temperatures adjusted on a weekly basis as dictated by the stage of lily development, the desired effect and the prevailing weather conditions. Adjust the average daily temperature on a weekly basis so that lily development is on target as the plants approach the visible bud stage. Use equal day/night temperatures during the latter part of stage three and early stage four. Reduce night temperature during the latter part of flower development to increase flower size. Use a low rate of chemical growth regulator coupled with the recommended temperature regimen for the best results.

Reference

Erwin, J.E., R.D. Heins and M.G. Karlsson. 1989. *Thermomorphogenesis in Lilium Longipborum.* Amer. J. Botany. 76(1):47-52.