

Tracking Oriental And Hybrid Lilies

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ORIENTAL and hybrid Asi-florum lilies are increasingly popular as potted crops. Because the plants naturally grow tall, there is a need to monitor height and make informed height-control decisions. In this article, we discuss height-control options and present results on new graphical tracking curves for the Oriental lily cultivars 'Mona Lisa' and 'Stargazer' and for Asi-florum lilies.

Graphical Tracking Curves

Four pieces of information are necessary to graphically track Oriental and Asi-florum lilies. They are 1) the plant emergence date; 2) the flower date; 3) the desired minimum and maximum height at flower; and 4) the stem elongation curve.

Your bulb supplier should be able to give you an estimate of the time between emergence and flower dates given the cultivar, bulb size, and growing temperature. Example times to flower at different average temperatures are shown in Table 1.

Graphical tracking curves for Easter, Oriental, and Asi-florum lilies differ because each group has different basic growth patterns. Elongation in the Easter lily is slower from emergence to visible bud than from visible bud to flower. Oriental lilies elongate more rapidly from emergence to visible bud than from visible bud to flower. Finally, Asi-florum lilies have a more constant growth rate from emergence until flower (see Figure 1).

We simplified the Oriental and Asi-florum target growth curves in Figure 1 to make them easy to calculate. There are three separate target curves: 1) 'Mona Lisa,' 2) 'Stargazer,' and 3) Asi-florum lily cultivars. All of the target curves are easy to draw. Alter-

natively you can track Oriental, Asi-florum, and Easter lilies on your computer using the *UNH FloraTrack for Lilies* program, which costs \$125 (for more information, call 603-862-4525).

We found that the simplified target curves adequately represented growth data across 3 years of experiments at Michigan State University (MSU) and 1 year at the University of New Hamp-

Our exclusive series on graphical tracking continues with a look at tools used for controlling height of Oriental and hybrid lilies.

shire (UNH). This consistency held true under average temperatures from 60°F to 80°F and whether or not plants received a preplant bulb dip in Sumagic at recommended rates. The nine different Asi-florum cultivars we have tested shared a very similar pattern of elongation.

The easiest way to develop the 'Mona Lisa' curve is to assume that

Table 1.

Days from emergence and visible bud to flower for Oriental lily cultivars at different average air temperatures.

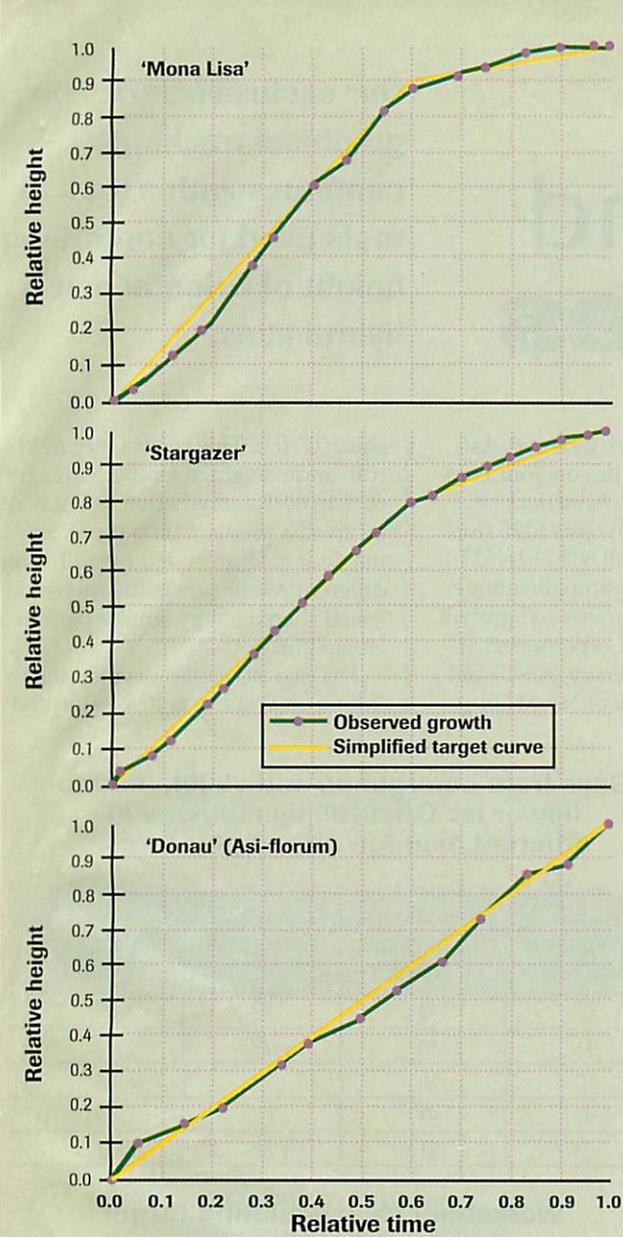
Temperature		'Mona Lisa'		'Stargazer'	
(°C)	(°F)	Emergence to flower	Visible bud to flower	Emergence to flower	Visible bud to flower
15	59	63	48	89	56
18	64	55	40	77	43
21	70	52	36	73	39
24	75	47	33	66	37
27	81	44	31	64	37

Table 2.

Worksheet for calculating target height curves for lilies.

Point on curve	Calculated by	Example		
		'Mona Lisa'	'Stargazer'	Asi-florum
Emergence date (e):	date set by grower	Jan. 1	Jan. 1	Jan. 1
Flower date (f):	date set by grower	Feb. 22	Mar. 15	Feb. 19
60% time to flower	$e+(f-e)*0.6$	Feb. 1	Feb. 13	N/A
Pot height (p):	height set by grower	6 inches	6 inches	6 inches
Height factor at 60% time (h)	cultivar-specific factor	0.9	0.8	N/A
Minimum height at flower (a):	height set by grower	20 inches	20 inches	20 inches
Minimum height at 60% time:	$p+(a-p)*h$	18.6 inches	17.2 inches	N/A
Maximum height at flower (b):	height set by grower	22 inches	22 inches	22 inches
Maximum height at 60% time:	$p+(b-p)*h$	20.4 inches	18.8 inches	N/A

Figure 1. Observed growth data from UNH 1997, and simplified target growth curves.



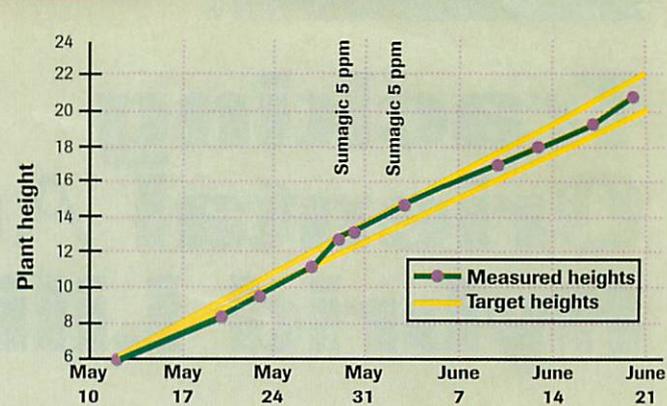
plants have reached 90% of their final height at 60% of the time from emergence to flower. The 'Stargazer' curve is very similar to the 'Mona Lisa' curve, but it assumes that plants have reached only 80% of their final height at 60% of the time from emergence to flower. Elongation tends to be constant for the Asi-florum lilies, therefore a straight line is used from emergence to flower.

Calculating The Curve

To calculate the graphical tracking curve, follow these steps and the worksheet in Table 2.

1) At emergence, make a graphical tracking chart where the horizontal date axis runs from the emergence date to the flower date. The vertical plant height axis should run from the starting height of the pot (around 6 inches) to 2 inches above the maximum finish height. The range in target final heights for a lily crop growing in a 6-inch-diameter pot is often around 20-22 inches, although your final heights may be different. In this example, mark points on the graph above the emergence data at 6 inches and above the flowering date at 20 inches and 22 inches.

Figure 2. An example graphical track for an Asi-florum lily crop.



- 2) If you are tracking an Asi-florum crop, join two lines from the starting height to each of the final heights.
- 3) If you are tracking an Oriental lily, calculate the date which occurs after 60% of the time from emergence to flower, using the formula in Table 2. Calculate the minimum and maximum target heights for the cultivar on this date. Mark the points on the graph above the date at 60% of production time. Join a straight line from the starting height to the target heights at 60% time and at flowering.

Strategies For Height Control

In general, the challenge in Oriental and Asi-florum lily production is to keep plants from growing too tall. Factors that increase elongation of Easter lilies are also important for these species, for example a larger bulb size, positive DIF, low light, and high plant density.

The initial rapid elongation is the biggest challenge to height control of these lilies. In the case of Oriental lilies, traditional growth retardant sprays and drenches are not very effective just after emergence. Sprays do not work because there is little leaf surface to spray, and drenches are relatively ineffective because the plants typically have almost no root growth at and just after emergence.

The alternative we have had considerable success with is a preplant bulb dip. Bulbs are dipped for 1 minute in a solution of Sumagic at about 5 ppm for Asi-florum lilies and about 10 ppm for Oriental lilies. The response to Sumagic does vary between cultivars, however. It is therefore essential to trial different rates of Sumagic on a small number of plants in each cultivar before using this practice on an entire crop. Used at the correct rate, flowering time and bud count are not affected by the bulb dip.

Following a bulb dip, if plant height is above the target curve, growth retardants and negative DIF temperatures are the two primary management options. Before visible bud, spray applications of Sumagic at 5 ppm are effective without excessive height control. Several applications are sometimes necessary, with decisions based on whether crop height is above the graphical tracking curve. We believe negative DIF and spray applications of growth retardants are the safest and most effective way to obtain height control after emergence.

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