

Water and Soil Temperatures Do Not Affect Flowering of Lilium Longiflorum

by
John Mastalerz and H. M. Cathey

Flowering time of Croft and Erabu lilies was the same if plants were watered daily with water at 35, 50 or 130°F when grown at a night temperature of 60°F. Heating soil to 80°F did not hasten flowering in a 60°F greenhouse. Soil temperature of 40°F prevented growth.

Bulbs were planted on January 26, 1952. Eight to ten-inch bulbs were potted in six inch pots or asphalted cans, depending upon the subsequent treatment. The bulbs were grown at 60°F night temperature in an automatically heated and ventilated greenhouse. The day temperature ran 70°F on cloudy days and 75°F on sunny days.

Soil Temperatures

The bulbs were planted in asphalted tin cans provided with drainage, the cans were plunged in a water bath maintained at the desired soil temperature. (Kofranek, 1)

Plants were grown continuously in soil having a temperature of 40, 60, 80°F.

Effect of Soil Temperature on the Flowering of Croft Lilies

Treat.- Constant Soil Temp.	Aver. Height in Inches Days After Start of Treatment				Aver. No. Days to Flower	Aver. Bud Count
	32	45	80	95		
40°F*	0.0**	0.1	1.4	2.5	143***	1.0
60°F	1.8	5.7	14.4	16.5	99.3	2.3
80°F	5.7	9.5	16.7	20.4	103.5	2.8

- * Measured from rim of can to crown of stalk
- ** Average of 10 cans per treatment
- *** Days to first flower opened on plant

Plants at 60 and 80°F flowered at the same time. The number of flowers increased as the soil temperature was increased. Bulbs at 80°F started earlier and grew faster than those at other temperatures.

The plants grown at 40°F soil temperature never developed the full number of buds, the leaves were small, and closely spaced.

Water Temperature

Potted bulbs were placed in a bench on inverted pots. They were surface watered daily with sufficient water to cause a slight drainage from the bottom of the pot.

Water temperatures were (50°F), (130°F) or (35°F). Some of the Erabu lilies were watered with 130, 50, or 35°F water to the time of bud initiation (flower stalk 2 1/2 - 6 inches in height). Then those started with 35°F water were watered with 130°F water, those started with 130°F water were given 35°F water and some first given 50°F water were changed to 35°F and some to 130°F water.

* John Mastalerz and H. M. Cathey, Assistants in the Department of Floriculture working under the direction of Dr. Kenneth Post. Dr. Mastalerz is now at the Waltham Field Station, Waltham, Massachusetts.

Effect of Water Temperatures on Flowering Date and Bud Count

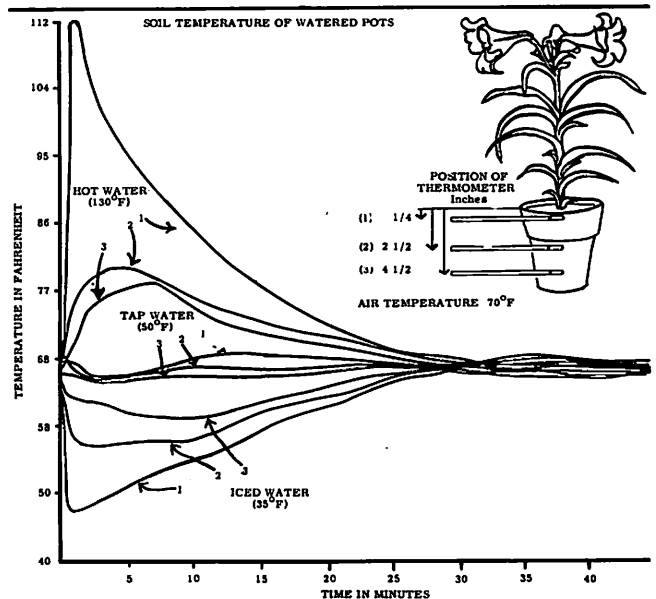
Treatment- Water Temp.	Average Height in Inches Days After Start of Treatment				Aver. No. Days to Flower	Aver. Bud Count
	32	45	80	95		
Variety - Erabu						
35°F*	2 **	5.2	23.3	27.2	102.3***	3.3
130°F	1.5	5.1	23.8	27.8	102.3	4.2
50°F	3.1	8.8	27.4	29.0	97.7	4.1
35°/130°F	1.3	5.2	23.5	28.1	103.8	3.4
130°/ 35°F	1.4	5.3	24.3	28.8	102.1	3.9
50°/ 35°F	3.0	8.8	27.8	30.7	99.0	4.5
50°/130°F	3.2	9.0	29.0	31.6	98.4	3.8
Variety - Croft						
35°F	0.7	3.0	15.1	19.8	107.5	2.1
130°F	0.6	3.2	16.4	20.5	107.9	2.6
50°F	0.8	4.0	16.0	19.7	107.4	2.2

- * Average of 15 pots per treatment
- ** Measured from rim of pot to the crown of flower stalk
- *** Days to first flower opened on plant.

The flowering date was the same regardless of the water temperature on either variety. The initial growth rate was most rapid watered with 50°F water but at the time of flowering, there was no difference in height. The shift from one water temperature to another produced no effect and flowering occurred at the same time on all treatments.

Effect of Water Temperature on Soil Temperature

To determine the actual effect of water temperatures on the soil temperature a six inch pot was drilled



Water and Soil Temperatures-Lilium Longiflorum

with holes at $1/4''$, $2\ 1/2''$, and $4\ 1/2''$ below the soil surface. A soil ball containing a growing lily was placed in the pot. Mercury thermometers were pushed into the ball through the holes. After the pots were watered, readings were made at one minute intervals for the first ten minutes, then every five minutes.

Immediately after an application of either hot (130°F) or iced water (35°F) the temperature increased or decreased at the surface. The temperature did not change so radically lower in the pot.

In twenty minutes, the difference in temperatures were only slight. This shows that water temperature temporarily effects soil temperature but in a twenty-four hour cycle, this small difference would be insignificant. To obtain a definite change in the soil temperature that would last for several hours, large volumes of water would be necessary and the soil would have to be quite dry at the time of watering.

Conclusions

Various watering and soil temperatures used in a normal forcing house of 60°F had no effect on the flowering date of lilies. Apparent differences in growth rate were observed, but there were little or no differences in the flowering dates or bud counts. The temperature of the water applied changed the soil temperature slightly for a short time.

References

1. Kofranek, A. M. Some Physiological Responses of *Anthirrhinum Majus*, *Euphorbia pulcherrima*, and *Lilium longiflorum* to various soil temperatures. Cornell University, PH. D. Thesis 1950.