

BULB TEMPERATURE TREATMENTS AND SOIL APPLICATIONS  
OF QUEL DURING FORCING EFFECTIVELY REDUCE THE HEIGHT  
OF "LILIUM LONGIFLORUM", 'ACE', ARAI' and 'NELLIE WHITE'

H. Wilkins, D. Rosacker and H. Kise

Quel is one of the newer plant growth regulators now being widely tested throughout the United States. This chemical is of particular interest because it is active at very low concentrations and is an effective retardant on the perplexing Easter lily. To date, all other plant growth regulators have been ineffective or have caused undesirable growth effects.

The bulbs used in this test were the Japanese 'Arai' ('Georgia') type, harvested in June of 1970 and received in the United States in August. After digging, temperatures experienced by the bulbs were 90° F. in Japan, 110° F. in the freighter, and 65°-70° F. on the California docks. The 7-8 inch diameter bulbs were received in Minnesota on September 18 and potted on September 24. The soil was kept moist during all temperature treatments.

Potted bulbs were placed in one of three temperature treatment categories: One group was placed in a 70° F. environment from September 24 to October 12 (18 days) and moved to 40° F. for 65 days or until December 16. The second group was placed in a 60° F. environment from September 22 to October 13 (21 days) and moved to 40° F. for 64 days or until December 16. We designated this treatment as a form of the Control Temperature Forcing (CTF) technique.

The Third group was placed in a 40° F. environment from September 24 to December 16 (83 days). Plants were moved into a commercial greenhouse and forced along with 'Ace' and 'Nellie White' clones. Solutions of Quel were applied to the soil on January 23, 1971, at the rates of 0, 25, 50, or 100 p.p.m. at 20 ml. (2/3 oz.) per 6-inch pot.

Each treatment consisted of five replicates of 10 bulbs each. 'Nellie White' and 'Ace' clones also were treated with applications of Quel to the soil on February 27 (visible bud stage). These bulbs had received the classical CTF treatment (3 weeks of 60° F., 6 weeks of 40° F.).

### Results

Temperature treatments prior to the 40° F. cold treatment, or a reduction in the total length of this cold treatment dramatically reduced plant height (figure 1, table 1). Plants given the CTF treatment without Quel approached marketable pot plant height (figure 2, table 1). The CTF treatment plants were 14.5 inches shorter than plants from bulbs placed at 40° F. immediately after potting.

Quel was an effective retardant on 'Arai' lilies (figure 2, 3, 4, table 1), but the concentrations used were too high. For future applications, concentrations should be below 25 p.p.m. With southern lily clones, lower concentrations used over a longer period of time and applied at several growth stages probably will be effective.

'Ace' and 'Nellie White' also responded to applications of Quel (figure 5, 6). Concentrations of 12 p.p.m. applied late in the forcing period were effective in reducing the final stretch of the upper nodes below the flower cluster. The need for height control varies from year to year, depending on the innatenature of the bulb, cultural conditions and existing climatic conditions. So applications of Quel for these clones should be delayed until late in the forcing sequence if the need becomes evident.

'Georgia' type lilies should be given CTF temperature sequential treatment to improve plant quality (large lower leaves, more leaves, and generally shorter internodes). These clones, as well as clones with colored blooms, could be forced as pot plants for Easter sale with the application of three or more Quel treatments, one at shoot emergence, one after flower bud initiation, and the others as needed. Undoubtedly, forcers in northern greenhouses must develop their particular techniques and must keep adequate records until the culture of these clones becomes routine.

Table I. Height of Japanese 'Arai' Easter lilies as affected by bulb temperature treatment and application of Quel during forcing.

<u>Quel Treatments</u>	<u>Plant Height (Inches)</u>		
	<u>Temperature Treatment Designations</u>		
	<u>CTF</u>	<u>70°</u>	<u>40°</u>
Control	15.50	18.50	25.00
25 ppm Quel	11.25	12.75	13.50
50 ppm Quel	9.75	8.50	11.25
100 ppm Quel	7.00	7.25	10.50

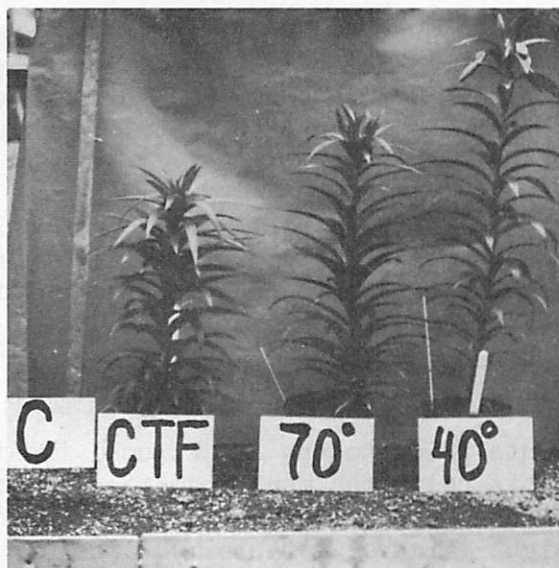


Figure 1. Japanese 'Arai' control (c) plants not treated with Quel. Plants designated "CTF" are from bulbs subjected to 21 days of 60° and 64 days of 40°. Plants designated "70°" are from bulbs exposed to 18 days of 70° and 65 days of 40°. Plants designated "40°" are from bulbs subjected to 83 days of 40°.



Figure 2. Plants from Japanese 'Arai' bulbs subjected to CTF (21 days of 60° and 64 days of 40°) treatment. Quel applied left to right at 0, 25, 50, or 100 ppm. Plant height was 15.5, 11.25, 9.75 and 7.0 inches.

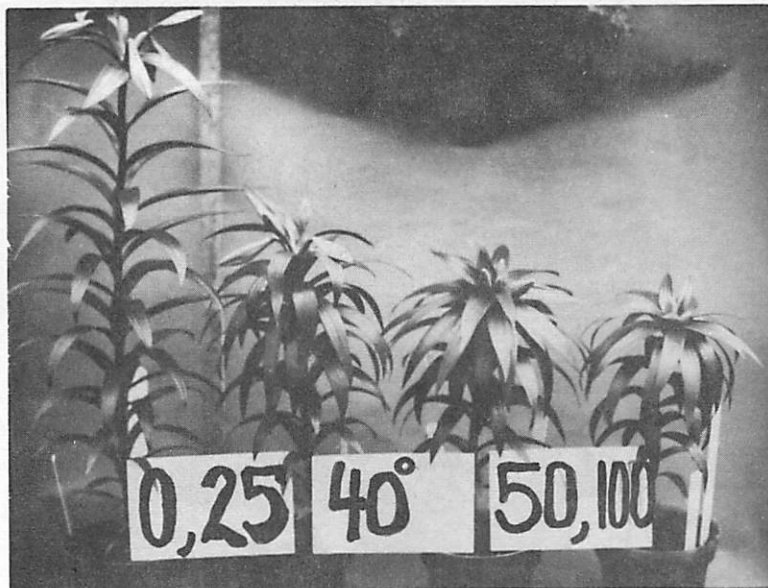


Figure 3. Plants from Japanese 'Arai' bulbs treated with 25 ppm Quel during forcing. Bulb temperature treatments were CTF (21 days 60° and 64 days 40°); 70° (18 days 70° and 65 days 40°); 40° (83 days).



Figure 4. Plants from Japanese 'Arai' bulbs subjected to 83 days of 40° with applications of Quel at 0, 25, 50 and 100 ppm during forcing.

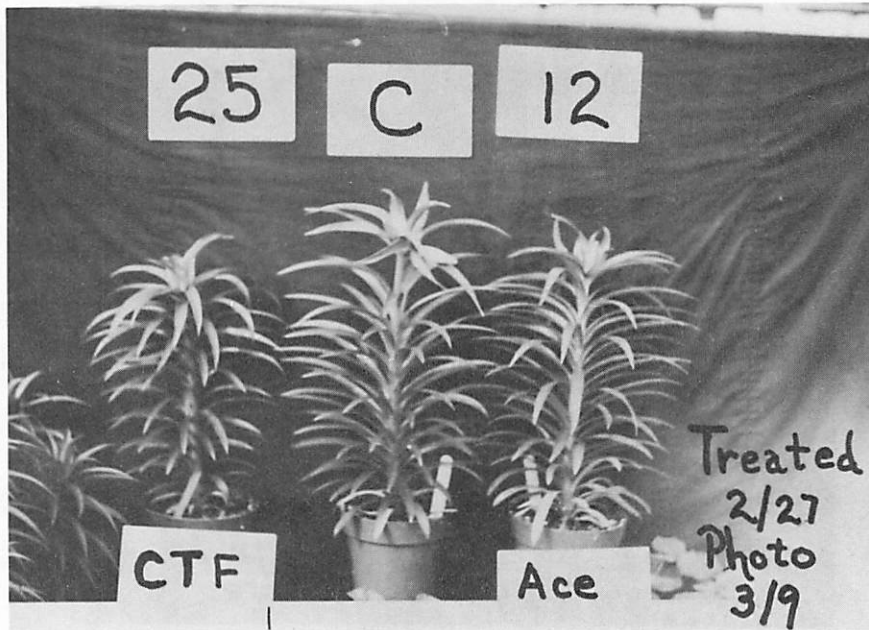


Figure 5. Plants from 'Ace' bulbs subjected to CTF treatments of 21 days at 60° and 42 days at 40°. Plants left to right were treated with 25, 0(Control) 12 ppm Quel on February 27.



Figure 6. Plants from 'Nellie White' bulbs subjected to CTF treatments of 21 days at 60° and 42 days at 40°. Plants left to right were treated with 0, 12 and 25 ppm Quel on February 27.

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