

University of Minnesota Easter Lily
Research Report: Paper No. X

METHODS AND SCHEDULES
FOR FORCING EASTER LILIES - 1972

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Introduction

Easter 1972 falls on April 2, which is moderately early. There are four techniques or cultural methods that the commercial lily forcer can follow to program bulbs for Easter. These methods are: I. Natural Cooling; II. Control Temperature Forcing (C.T.F.); III. Home Case-Cooled Bulbs (Do-It-Yourself); IV. Commercial Case-Cooled Bulbs.

Methods I and II require that the bulbs be potted prior to cold treatment exposure. With methods III and IV the bulbs are exposed to cold treatment while in the packing case.

Plants from bulbs treated under methods I and II have a higher bud count, more leaves on shorter plants, and longer basal leaves. These plants have excellent "plant picture". If method III is followed, the resulting plants will be somewhat superior to plants from method IV. When methods I, II, and III are followed and temperature conditions are rigidly maintained, the forcer knows that the proper temperature treatments have been given. Increased difficulties with transportation and commercial cold storage facilities indicate that methods I, II, and III should be given priority.

SCHEDULE II

Control Temperature Forcing (CTF)¹
- Easter 1972 -

Procedure

- a) Noncooled bulbs are used.
- b) Bulbs arrive approximately October 13-20, 1971.
- c) Pot immediately. Place the bulb deep in the pot in case of possible premature sprouting. Keep pots moist at all times. Potting should be completed by October 23, 1971.
- d) Use a well aerated, porous soil. See University of Minnesota's fertilizer recommendations in this report.
- e) Keep temperatures at 63° F. for 3 weeks. This temperature allows roots to form. Hence, pot as soon as possible upon receipt. It is felt that this rooting period is responsible for the high bud counts produced under this technique.
- f) On November 9th, drop the temperature to 35° - 40° F. for 'Ace' and 40° - 45° F. for 'Nellie White'. Place thermometers in the soil next to the bulb and record temperatures daily.
- g) Bring potted bulbs into the greenhouse between December 20-24, 1971.
- h) Day or night temperatures should not go below 60° F. Nor should day temperatures go above 65° F. until January 22, 1972. Lower temperatures may decrease flower count and root development. Higher temperatures at this stage may delay flowering. Forcing at any temperature above 70° F. should not commence until after February 5, 1972. Flower buds do not develop until plants are 4-6 inches tall and flower buds are formed. Until this time, temperatures near 70° F. and above may delay flowering.
- i) Upon emergence the long day insurance policy can go into effect as described in University of Minnesota Easter Lily Research Report: Paper No. V; December 1969 and Paper No. IX; December 1970, Minnesota State Florists' Bulletin. Use long days immediately upon shoot emergence for 2 weeks at 15 footcandles from 10 p.m. to 3 a.m. (5 hours).
- j) Follow the leaf-counting technique for scheduling temperature forcing of the plants as described in University of Minnesota Easter Lily Research Report: Paper No. VIII; December 1970, Minnesota State Florists' Bulletin.

¹ Recent research and substantiating data can be seen in University of Minnesota Easter Lily Research Report: Paper No. III; October 1969, Minnesota State Florists' Bulletin, which covers this technique in detail.

SCHEDULE I

Natural Cooling Method
- Easter 1972 -

Procedure

- a) Non cooled bulbs are used.
- b) Bulbs arrive approximately October 13-20, 1971
- c) Pot immediately. Place the bulb deep in the pot in case of premature sprouting. Keep pots moist at all times.
- d) Use a well aerated, porous soil. See University of Minnesota's fertilizer recommendation in this report.
- e) Potted bulbs should be placed in covered frames or sheds and exposed to the naturally occurring, fluctuating temperatures. Exact temperature records must be kept. Use thermometers inserted in the pots. Bulbs require 1000 hours (6 weeks) of cold treatment. Record temperatures daily. 'Ace' bulbs should be cooled as near 35°-40° F. as possible; 'Nellie White' at 40°-45° F. Soil should not be allowed to freeze.
- f) If bulbs lack adequate cooling because of unusual weather conditions, the young plant should be given 2 weeks of long days at 15 footcandles from 10 p.m. to 3 a.m. (5 hours). It is now known from research work at the University of Minnesota that long days (interrupted nights) can substitute for the cold treatment on a day-for-day basis. See University of Minnesota Easter Lily Research Report: Paper No. V; December 1969 and Paper No. IX; December 1970, Minnesota State Florists' Bulletin.
- g) Move potted bulbs into the greenhouse between December 20-24, 1971.
- h) Day or night temperatures should not go below 60° F. Nor should day temperatures go above 65° F. until January 22, 1972. Lower temperatures may decrease flower count and root development. Higher temperatures at this stage may delay flowering. Forcing at any temperatures above 70° F. should not commence until after February 5, 1972. Flower buds do not develop until plants are 4-6 inches tall and flower buds are formed. Until this time, temperatures near 70° F. and above may delay flowering.
- i) Follow the leaf-counting technique for scheduling temperature forcing of the plants as described in University of Minnesota Easter Lily Research Report: Paper No. VIII; December 1970, Minnesota State Florists' Bulletin.

SCHEDULE III

Home Case-Cooled Bulbs (Do-It-Yourself)¹
- Easter 1972 -

Procedure

- a) Noncooled bulbs are used.
- b) Bulbs arrive approximately October 13-20, 1971.
- c) Place the packing case in the cooler immediately. 'Ace' bulbs should be cooled at 35°-40° F.; 'Nellie White' bulbs at 40°-45° F. A 40° F. temperature is the compromise temperature if both clones are cooled in one location.
- d) Insert thermometers into the packing cases at several locations and record the temperatures daily. See procedure h.
- e) Cool for 6 weeks at temperature stated above. Remove on approximately December 6, 1971 and pot immediately.
- f) Place the bulb deep in the pot. Use a well aerated, porous soil. See University of Minnesota fertilizer recommendation in this paper.
- g) From December 6 to December 27, run the greenhouses at 60°-63° F. Temperatures above 65° F. may delay flower bud initiation and flowering. Temperatures below 60° F. may decrease flower count and root development.
- h) Upon emergence the long day insurance policy can go into effect as described in University of Minnesota Easter Lily Research Report: Paper No. V; December 1969, and Paper No. IX; December 1970, Minnesota State Florists' Bulletin.
- i) From December 27, 1971 to February 7, 1972, force at temperatures between 60°-65° F. Do not permit the temperature to go above 70° F. until after February 7, 1972, or until plants are 4-6 inches tall and flower buds are formed.
- j) Follow the leaf-counting technique for scheduling temperature forcing of the plants as described in University of Minnesota Easter Lily Research Report: Paper No. VIII; December 1970, Minnesota State Florists' Bulletin.

¹ It is well known that bulbs are cooled at lower temperatures in commercial cold storage facilities. Hence, when bulbs are cooled at proper temperatures in the case, quality is improved. See University of Minnesota Easter Lily Research Report: Paper No. III; October 1969, Minnesota State Florists' Bulletin, p. 7, Table 7.

SCHEDULE IV

Commercial Case-Cooled Bulbs
- Easter 1972 -

Procedure

- a) Cooled bulbs are used.
- b) Bulbs arrive approximately November 29 to December 4, 1971.
- c) Pot immediately. If bulbs can't be potted immediately, place cases in a cooler or area where the temperature does not go over 60° F.
- d) Place the bulb deep in the pot. Use a well aerated, porous soil. See University of Minnesota's fertilizer recommendations in this paper.
- e) For 3 weeks after potting, run the greenhouse at 60°-62° F. for good root formation. Temperatures should not go above 65° F. High temperatures at this stage may delay flower bud initiation.
- f) Upon emergence, the long day insurance policy can go into effect as described in University of Minnesota Easter Lily Research Report: Paper No. V; December 1969 and Paper No. IX; December 1970, Minnesota State Florists' Bulletin.
- g) Until February 7, 1972, force at a temperature between 60°-65° F. Do not permit temperatures to go above 70° F. until after February 7, 1972 or until plants are 4-6 inches high and flower buds are formed.
- h) Follow the leaf-counting technique for scheduling temperature forcing of the plants as described in University of Minnesota Easter Lily Research Report: Paper No. VIII; December 1970, Minnesota State Florists' Bulletin.

Cultural Recommendations for Easter Lilies

Fertilizer Program

Do not mix any phosphate fertilizer in the potting soil. The first fertilization may be an application of a complete fertilizer. No phosphorus need be applied thereafter. In Minnesota, excellent plants have resulted from applications of one part ammonium sulfate and four parts sodium or calcium nitrate at 1 ounce per 2 gallons of water approximately every 2 weeks. Supplement with an application of a potassium fertilizer in early to mid-February. Apply the liquid fertilizer as you would a normal watering. The pH should be slightly acid to neutral. Soil should be tested before potting and several times during the forcing season to avoid deficiencies or a buildup of fertilizer, which will result in root burn.

Starting when the plants are $\frac{1}{2}$ to $1\frac{1}{2}$ inches high, fertilize weekly at 6 to 9 day intervals, depending upon growth rate and weather conditions. Continue fertilizing until buds tip, with the last application about March 25, 1972.

Disease Control Program

For control of some root rot organisms, drench the soil with a solution of 4 ounces of Dexon 70 percent W.P. and 4 ounces of Terraclor (PCNB) 75 percent W.P. in 100 gallons of water at the first or second watering. Dexon can be applied every 14-21 days as a routine control measure.

Insect Control Program

Systox for the control of aphids should be applied as a drench when plants are 1-3 inches tall. Vapona, thiodan, or dithio also may be used.

General

To reduce lily height, pull black cloth over them at 4 p.m. and remove it at 8 a.m. from January 24 to February 24.

To increase lily height, use mum lights (flashlighting, if you have it) from 10 p.m. to 2 a.m. during the above dates. Lower intensities ($\frac{3}{4}$ to 1 watt per square foot of bench area) also are effective.

Storing at 35° - 45° F. when buds turn white will hold the plants in good condition for 10 days. Soil should be moist during storage.

Many lower leaves are lost at the end of the forcing period because of improper watering. Plants require a large amount of water at the end of the forcing period and the soil-root mass should never be allowed to become too dry. Other causes of lower leaf loss include plant crowding (lack of light), and root loss caused by over-watering (heavy soil), nutrient deficiencies, fertilizer burn, and/or pathogens.