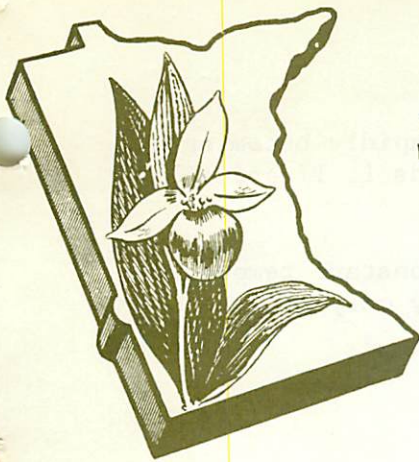


MINNESOTA STATE FLORISTS' *Bulletin*



Agricultural Extension Service
University of Minnesota
Institute of Agriculture
St. Paul, Minnesota

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October 1, 1969

University of Minnesota Easter Lily
Research Report: Paper No. VI¹

Methods and Schedules
for Forcing Easter Lilies - 1970

By H. F. Wilkins and R. E. Widmer

There are essentially four techniques or cultural methods which a commercial forcer of Easter lilies could follow in order to acquire adequately cooled bulbs for Easter 1970. These methods are: I. Cold Frame Cultural Method (Natural Cooling); II. Control Temperature Forcing Method (C.T.F.); III. Self, Case - Cooled Bulbs (Do-It-Yourself); IV. Commercially, Case - Cooled Bulbs.

The first two methods require that the bulbs be potted during or prior to the cold treatment. In the latter two methods the bulbs receive the cold treatment in the packing case.

The first two methods will result in shorter plants which have a higher bud count with longer basal leaves. These plants have excellent "plant picture". If method III is followed, the resulting plants usually will be superior to plants from method IV.

When methods I, II or III are followed the forcer knows precisely how his bulbs have been handled and why they respond as they do. Temperature conditions are rigidly enforced and followed.

¹ Paper No. 7021 Scientific Journal Series, Agricultural Experiment Station, University of Minnesota.

With transportation and commercial cold storage facilities rapidly becoming a critical problem for the classical bulb jobber-distributor, methods I, II and III should be considered.

Note: All temperatures in these schedules and methods are constant temperature for day and night. Separate night and day temperatures apply only after plant emergence.

SCHEDULE I

Cold Frame Cultural Method - Easter 1970 -

Procedure:

- a) Non-cooled bulbs are used.
- b) Bulbs arrive approximately October 15-20, 1969.
- c) Pot immediately; place the bulb deep in the pot with only 1 to 1½ inch of soil at the bottom. This will help delay any possible premature sprouting. Keep pots moist at all times.
- d) Use a well-aerated, porous soil. See University of Minnesota's fertilizer recommendations on page 6.
- e) Place the potted bulbs in covered frames or sheds which are exposed to the naturally fluctuating temperatures. Exact soil temperature records must be kept. Insert thermometers in the soil close to the bulbs and record temperatures daily. Pots should not be allowed to freeze. 'Ace' bulbs should be cooled as near 40°-45°F as possible; 'Nellie White' at 45°-50°F.
- f) If unusually warm or cold temperatures have prevented the 1000 hours of proper cold treatment, bulbs should be given long days at 15 foot candles from 10:00 p.m. to 3:00 a.m. (5 hours). Long days given immediately upon emergence (interrupted nights) can substitute for the cold treatment on a week for week* basis. See University of Minnesota Easter Lily Research Report; Paper No. V.
- g) Bring pots into the greenhouse between December 20 and 24, 1969.
- h) Temperatures should not go much above 65°F until January 15, 1970. Higher temperatures at this stage may delay flowering. Forcing at temperatures above 70°F should not commence until after January 31, 1970. Flower buds are not present until plants are 4 to 6 inches tall, hence until this time temperatures near 70°F and above may delay not hasten 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. IV.*

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SCHEDULE II

Control Temperature Forcing (CTF)¹
- Easter 1970 -

Procedure:

- a) Non-cooled bulbs are used.
- b) Bulbs arrive approximately October 15-20, 1969.
- c) Pot immediately upon receipt of bulbs; place the bulb deep in the pot with only 1 to 1½ inch of soil at the bottom to help delay any possible premature sprouting. Keep pots moist at all times.
- d) Use a well-aerated, porous soil. See University of Minnesota's fertilizer recommendations on Page 6.
- e) Keep temperature at 60°F for three weeks. This temperature allows roots to form. This rooting period is responsible for the high bud counts.
- f) On November 8th, drop the temperature to 40°-45°F for 'Ace', and to 45°-50°F for 'Nellie White'. A 45°F temperature may be the compromise temperature if both clones are cooled in one location. Place thermometers in the soil next to the bulb and record the temperatures daily.
- g) Bring into the greenhouse between December 20 and 24, 1969.
- h) Temperatures should not go above 65°F until January 15, 1970. Higher temperatures at this stage may delay flowering. Forcing at temperatures above 70°F should not commence until after January 31, 1970. Flower buds are not present until plants are 4 to 6 inches tall, hence until this time temperatures near 70°F and above may delay not hasten 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. IV.*

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¹ Recent research and substantiating data are provided in University of Minnesota Easter Lily Research Report: Paper No. III (which covers this technique in detail).

SCHEDULE III

Self, Case-Cooled Bulbs (Do-It-Yourself)¹
- Easter 1970 -

Procedure:

- a) Non-cooled bulbs are used.
- b) Bulbs arrive approximately October 15-20, 1969.
- c) Place the packing case in the cooler immediately. 'Ace' bulbs should be cooled at 40°-45°F, 'Nellie White' bulbs at 45°-50°F. A 45°F temperature may be 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.
- e) Cool for 6 weeks at temperature stated above. Remove on approximately December 1, 1969 and pot immediately.
- f) Place the bulb deep in the pot with only 1 to 1½ inch of soil at the bottom. Use a well-aerated, porous soil. See University of Minnesota fertilizer recommendations on page 6.
- g) From December 1 to December 20 run the greenhouses at 55°- 60°F. Temperatures should not go much above 65°F and never over 70°F. High temperatures at this stage may delay flowering.
- h) From December 20, 1969 to January 31, 1970 force at temperatures between 60°-65°F. Do not permit temperature to go above 70°F until plants are 4 to 6 inches high.
- 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. IV.*

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¹ Bulbs cooled in commercial cold storage facilities are generally subjected to sub-optimum temperatures. Hence, when bulbs are cooled at proper temperatures in the case, quality is increased. See University of Minnesota Easter Lily Research Report: Paper No. III, p7, Table 7.

SCHEDULE IV

Commercially Case-Cooled Bulbs
- Easter 1970 -

Procedure:

- a) Cooled bulbs are used.
- b) Bulbs arrive approximately December 1, 1969.
- c) Pot immediately. If bulbs can not be potted immediately, place the bulbs in a 40°F cooler or area where the temperature does not go over 65°F.
- d) Place the bulb deep in the pot with only 1 to 1½ inches of soil at the bottom. Use a well-aerated, porous soil. See University of Minnesota's fertilizer recommendations on page 6.
- e) From December 1 to December 20, 1969 run the greenhouses at 55°-60°F. Temperatures should never go over 70°F. High temperatures at this stage may delay flowering.
- f) Upon emergence of the long day 'insurance policy' can go into effect as described in University of Minnesota Easter Lily Research Report: Paper No. V.* Use long days immediately upon emergence for 2 weeks at 15 foot candles from 10:00 p.m. to 3:00 a.m. (5 hours).
- g) December 20, 1969 to January 31, 1970 force at a temperature between 60°-65°F. Do not permit temperatures to go above 70°F until plants are 4 to 6 inches high.
- 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. IV.*

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RECOMMENDATIONS FOR EASTER LILIES

Feed Program:

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/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 a build-up of fertilizer, which will result in root burn.

Fertilize weekly (a 6 to 9 day interval depending upon normal needs) starting when lilies are 1/ to 1-1/2 inches high and continuing until buds tip. The last fertilization should be about March 20, 1970.

Disease Control Program:

For control of some root rot organisms, Dexon 70% W.P. (4 oz.) and Terraclor 75% W.P. (4 oz) are used in 100 gallons of water at the first or second watering. Apply 8 oz. per 6 inch pot (5 oz./5 inch pot). Dexon can be applied every 14 to 21 days thereafter as a routine control method.

Insect Control Program:

Systox should be applied as a drench when plants are 1 - 3 inches tall. Vapona, thiodan or dithio may also be used as a spray or fumigant.

General:

To limit plant height, pull back cloth over them at 4:00 p.m. and remove it at 8:00 a.m. starting January 1 and discontinue February 1.

To increase plant height, use mum lights (flashlighting, if you have it) from 10:00 p.m. to 2:00 a.m. until February 1. Lower intensities (3/4 to 1 watt per square foot of bench area) are also effective.

Storing plants at 35°-45°F (in the dark) when buds turn white and puffy will hold the plants in good condition for 10 days but is no substitute for proper timing. Water the plants before placing at low temperature.

The author feels that many lower leaves are lost in the latter part of the forcing period because of improper watering. Plants use a large amount of water at this time and the soil-root mass should never be allowed to become dry.

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