LEAFLET 59 SEPTEMBER 1958

Effects of STORAGE *and* FORCING ENVIRONMENT *on* EASTER LILY GROWTH

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THE lily, *Lilium longiflorum,* has long been symbolic of the Easter season. Many varieties are available for use as potted plants and cut flowers.

The most common variety used for pot plants is Croft. It has large, heavy foliage, short height, a fairly high bud count, and large flowers of excellent quality. Unfortunately the variety in use is a mixture of many strains, many of which make inferior plants when forced for Easter. Furthermore, since the plant is grown from a bulb, many of the factors leading to successful growth and flowering are not under the grower's control. In addition, since Easter falls on a different date each year, conditions will differ each year as to storage length, forcing temperatures, and light. Therefore, the southern greenhouse operator is faced with a difficult problem in the culture of the Easter lily.

Experiments were conducted from 1950 through 1955 at the API Agricultural Experiment Station, to determine the influence of some storage and cultural variations on the growth and flowering of the Easter lily for Alabama conditions.

STORAGE LENGTH *and* TEMPERATURE

Commercial varieties of lilies – Georgia, Creole, Croft, and Croft Special (a selected strain of Croft) – were used in these tests. The storage temperatures were 32° F. and 45° F. The storage lengths were 5, 10, 15, or 20 weeks. All plants were forced at 60° F. after potting.

Briefly, results from this phase of the experiment were: Plants from bulbs stored at 45° F. for 5 weeks matured a little earlier than those stored at 32° F. However, the plants were taller and had a higher bud count. Plants from bulbs stored longer matured earlier, were shorter, and had fewer flowers. This was more noticeable at 45° F.

STORAGE CONDITIONS *and* FORCING TEMPERATURES

Croft

Croft lily bulbs were stored at 45° F. in either moist or dry peat moss. These bulbs were potted in a mixture of three parts loam soil and one part

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manure. The plants were forced at a temperature of 50° or 60° F.

At maturity the plants were shorter when forced at 50° F. than at 60° F. Treatment did not influence the number of flowers. The number of leaf scorches (necrotic areas in the leaf along the margin or tip of the blade) was less when the plants were grown at 50° F. Dry storage seemed to be slightly better to prevent the amount of leaf scorch.

Georgia

Bulbs of the Georgia variety of Easter lily were stored at 45° F. Storage treatment consisted of storing the bulbs in moist or dry peat moss. Forcing temperatures were 50° and 60° F. A group of plants was shifted from one temperature to the other when flower buds became visible.

The bulbs that were stored moist began to grow earlier than those stored dry. This difference was more noticeable throughout the forcing period when forced at 50° F. The bulbs stored moist flowered earlier. However, the final height was approximately the same. The number of flowers, also, was approximately the same.

Forcing at 60° F. resulted in a shorter forcing period than forcing at 50° F. or any combination of the two temperatures.

LIGHT, TEMPERATURE, *and* SOIL MOISTURE

Experiments in 1952

To determine the influence of moisture content of the soil, the following treatments were used: (1) normal water; (2) limited water – one-half the frequency as (1); and (3) excessive water – watered every day. The plants were grown in full sun and kept at a night temperature of 60° F. in the greenhouse.

Increasing the amount of water supplied resulted in taller plants at flowering. However, the number of flowers per plant was not influenced. At the same time, the number of leaf scorches increased as the amount of water supplied increased.

Experiments in 1953

During the winter and spring of 1952-1953, Croft lilies were grown using all combinations of the following factors: (1) full sunlight and 50 per cent reduction in light intensity; (2) minimum of 50° and 60° F. night temperatures for forcing; and (3) watered when the soil was dry, and watered at one-half this frequency.

Height of plants was less when the water supply was decreased, but reducing the amount of water supplied to plants did not change the time of flowering or reduce the number of flowers per plant.

The plants grown in full sun were shorter in all treatments, but the number of flowers remained constant. Full sun hastened flowering at a minimum night temperature of 60° F. At a night temperature minimum of 50° F. there was no difference between the light intensities in regard to time of flowering.

Forcing the plants at 50° F. resulted in slower flowering, slightly more flowers per plant, and slightly shorter plants.

Experiments in 1954

The treatments were all possible combinations of various forcing temperatures, light intensities, and moisture supplies. Minimum night temperatures used were 50° and 60° F. Light intensities in the greenhouse were full sun and one-half shade. Soil moisture supplies were: (a) field capacity maintained; (b) dry – water applied at one-half the frequency of (a); and (c) very dry – water applied when the bulbs were potted. From potting until flower

bud initiation began, these plants received water only after wilting occurred. From flower bud initiation to flower, field capacity was maintained.

At lower temperature the plants grew more slowly. The low temperature resulted in more flowers, shorter plants, and fewer nodes per plant. Increasing the light intensity resulted in shorter plants, more flowers, and fewer nodes. Height of the plants and the number of flowers was directly proportional to the amount of water supplied. Keeping the plants very dry initially resulted in fewer nodes per plant. Forcing time was not influenced by the amount of water supplied.

When the plants were kept very dry until flower buds initiated and the plants were kept in full sun, there was little difference in the height of the plants because of temperature. The lower temperature resulted in more flowers per plant.

SUMMARY *and* RECOMMENDATIONS

Storage Treatment

Increasing cold storage length before the Easter bulbs were forced resulted in faster maturity, shorter plants, and fewer flowers. This was more pronounced when the plants were stored at 45° and 32° F. These changes were more noticeable after 10 to 15 weeks of storage. For storage periods of less than 15 weeks, the warmer temperature was desirable to speed maturity. For longer storage periods, the cooler temperature was best for maintaining maximum number of flower buds.

There was no advantage for using moistened peat moss over air-dry peat during cold storage.

Forcing Treatment

The forcing temperature, light intensity, and amount of water supplied the plants influenced quality of the plants. Warmer forcing temperatures resulted in faster maturity than lower temperatures but the quality was poorer. It was best to begin forcing at a cool temperature (50° F.) and to withhold water. The amount of water was increased when the flower buds began to form. The temperature was then increased to 60° F. after growth began.

Any reduction in light intensity resulted in taller plants. Therefore, it was of utmost importance to keep the plants in full sunlight.

Timing

The average number of days for various stages to be completed is given in the table. The flower buds were approximately 0.4 inch in length when they became visible without moving the leaves. At the time the buds bent, they averaged 2.2 inches long. Just before the flowers opened, they averaged 6 inches in length. It is obvious that the flower buds elongated faster daily as they approached full bloom.

DAYS REQUIRED FOR EASTER LILY FLOWER DEVELOPMENT

Temperature	Water supply	Days for various stages of growth				
		Pot to growth	Growth to visible buds	Visible bud to bud bend	Bud bend to flower	Total
50° F.	Normal	27	49	24	16	116
	½ normal	28	54	22	15	119
	Dry	32				
60° F.	Normal	19	46	20	13	98
	½ normal	19	45	22	13	99
	Dry	31				