

LILY BULB MATURITY, DORMANCY STUDIED

Recent studies have helped clarify the meaning of lily bulb maturity and separate dormancy breaking responses from those of flower induction. It has long been appreciated that temperatures below 70° F were stimulatory to daughter bulb sprouting and flowering. Only recently, however, has it become obvious that the slow to sprout (dormant), immature, July- or August-dug bulb could be accelerated most readily in sprouting by temperatures near 60° F. Since the average daily temperature in the bulb fields along the coast from July to October is 55 to 58°, it is small wonder that bulb dormancy is nil in most September bulbs and those dug in October are usually sprouting. However, temperatures that most accelerate sprouting are slow to bring about flower induction. Temperatures nearer 40° (vernalization) are most effective in bringing about rapid floral induction.

Recent studies here and elsewhere have shown that daylength influences the speed of flowering in lilies. It has not been clear whether long-day treatment is actually inducing flowering or merely enhancing the vernalization (cold-moist treatment) response. Some have considered the Easter lily to have an obligate cold requirement for flowering.

A study this season seems to answer some of the above questions and throw new light on dormancy and flowering responses in this plant. Bulbs of cultivars 'Croft,' 'Ace,' and 'Nellie White' were harvested in July, August, September, and October of 1968 and potted immediately. A third of each sampling was placed immediately in a greenhouse maintained at 72° F ± 2°, another third was given six weeks of 60° storage, and the remainder six weeks of 40° storage before growing in the 72° house. Half the plants from the above treatments were grown under normal short days until January 1, and then under a modified 8-hour day, while the other half were grown under long-day treatment obtained by a 4-hour night interruption. As soon as buds appeared, the plants were moved to a 60 to 70° holding house to flower.

In all cases, bulbs harvested in July and August sprouted earlier following 60° than 40° storage. Those held continuously at 72° were extremely slow in emerging. However, bulbs harvested in September and October had little or no dormancy left and sprouted most rapidly at 72°.

The influence of bulb maturity (harvest date), temperature, and long-day treatment on flower induction was striking (Table 1). None of the cultivars received sufficient cooling in the field to bring about floral induction when grown at 72° under normal short-day conditions. It is very interesting that some 'Croft' and, to a lesser extent, 'Ace,' but not 'Nellie White' bulbs were sufficiently "mature" and/or had received sufficient field cooling (near 55-60°;) to be induced when followed by long-day treatment. Six weeks of 60° storage was not sufficient to induce

flowering in all bulbs unless the plants received subsequent long-day-treatment. The later the bulb harvest, the greater the number of plants flowering after 60° storage, yet long days were required to achieve 100% flowering. Six weeks of 40° storage was sufficient to induce flowering in bulbs of all cultivars harvested after July. It is apparent that immature bulbs harvested in July require both vernalization and long-day treatment for all to flower in 150 to 250 days. A more detailed analysis of this study will be published later.

Table 1. Lily plants flowering from bulbs harvested in July, August, September, and October and grown continuously under long or short day treatment at 72° F

Cultivar	Harvest date	Grown under short-day treatment			Grown under long-day treatment		
		Continuous 72° F	6 wks. 60° then 72° F	6 wks. 40°, then 72° F	Continuous 72° F	6 wks. 60°, then 72° F	6 wks. 40°, then 72° F
		%	%	%	%	%	%
'Croft'	July	0	0	20	20	60	100
	August	0	20	100	80	100	100
	Sept.	0	40	100	0	100	100
	Oct.	0	60	100	100	100	100
'Ace'	July	0	0	0	0	60	80
	August	0	40	100	20	100	100
	Sept.	0	0	100	0	100	100
	Oct.	0	20	100	20	100	100
'Nellie White'	July	0	0	60	0	20	100
	August	0	0	100	0	80	100
	Sept.	0	0	100	0	80	100
	Oct.	0	0	100	0	100	100

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