# Special Research Report #436: Postproduction

## Effects of Preharvest Temperature and Light Vaselife of Lilies and Sunflowers

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## BACKGROUND

Light and temperature may affect postharvest vaselife of cut flowers through altered sugar levels. Evidence includes changes in vase life due to growing season and to different production areas. As temperature increases, carbohydrate use in growing plants increases faster than total carbohydrate production. Also, carbohydrate production decreases as light levels decrease, while carbohydrate use remains steady. This study evaluates the effect of light and temperature during production on the vaselife of cut lilies 'Vermeer' and 'Dazzle' and sunflower 'Sunbright'.

## MATERIALS AND METHODS

Lilies 'Vermeer' (2006-07) and 'Dazzle' (2007-08) and sunflower 'Sunbright' (both years) were grown under various light levels and temperatures. In 2006-07, two preliminary studies were conducted to determine the importance of light and temperature during the two weeks before cutting. In 2007-08, plants were grown at 50, 59, or 68°F night temperatures under either 0% or 30% shade for the entire crop cycle (production + finishing). In addition, plants were moved to various light and temperature conditions during the two weeks (finishing) prior to cutting (L=low light, H=high light):

50 H→68 H
50 H→68 L
50 L→68 H
59 H→59 L
59 L→59 H
68 H→50 H
68 H→50 L
68 L→50 H

Lilies were harvested at fully colored puffy bud stage with the exception of the temperature study in 2006-2007, when one flower per stem was open. Sunflowers were harvested when ray florets were at least perpendicular to the flower head and three or fewer rows of disk florets were opened. Flowers were placed at 68±4°F under approximately 200 ftc light for 12 hrs/day and monitored daily. Lily vaselife was terminated when the petals of half or more of the flowers had dropped or lost pigment (Photo 1) (2006-07) or when the last flower open began to senesce (2007-08). Sunflowers were terminated when half the petals had dropped or wilted.

Photo 1. Lily 'Vermeer' during postharvest evaluation. Note lighter color of flowers as they approach senescence.

## RESULTS

### *Lilies*

Vaselife of Vermeer (Asiatic hybrid) and Dazzle (LA hybrid) was longest when grown at 50 or 59°F night temperatures, regardless of light conditions. Lilies grown at high night temperatures (68°F) for the entire crop cycle had the shortest vaselife. The highest number of marketable stems were produced when

lilies were grown at low temperatures and high light levels for the entire crop cycle.

Either shade or high night temperatures, 68°F, during production resulted in high bud abortion prior to harvest. Postharvest bud abortion occurred if high temperature plus low light level conditions existed two weeks prior to harvest.

High temperatures during the finishing phase did not decrease vaselife, if the light levels were high.

Table 1. Vaselife and percentage unmarketable stems for 'Dazzle' lily. See "Materials and Methods" for description of selected treatments.

| Growing Conditions | Vaselife (days) | Unmarketable Stems (%) |
|---|---|---|
| 50 H | 14.6 | 24 |
| 59 H | 13.2 | 44 |
| 59 L | 13.0 | 85 |
| 68 H | 10.9 | 74 |
| 68 L | 11.1 | 90 |
| 68 H→50 L | 11.9 | 90 |
| 68 L→50 H | 12.6 | 86 |

### *Sunflowers*

Shade at a 68° night temperature for the entire crop cycle reduced sunflower vaselife, while stems grown for the entire crop cycle or last two weeks in shade at a 50° night temperature and those grown under shade at a 59°F night temperature for the entire crop cycle had a longer vaselife compared to the 59°F night temperature/no shade control.

## CONCLUSIONS

Low temperatures for the entire crop cycle produced the longest vaselife in lilies. High temperatures can occur during the two weeks before harvest, if high light levels are maintained. Bud abortion will occur if night temperatures are higher than 50°F when shade is used to maintain temperature.

With sunflowers continuous shade decreased flower diameter and stem diameter. Thus, lowering temperature and possibly light levels for only the finishing phase may increase vaselife while maintaining acceptable flower size.

Table 2. Vaselife in 'Sunbright' sunflower. See "Materials and Methods" for description of selected treatments.

| Growing Conditions | Vaselife (days) |
|---|---|
| 50 H | 13.5 |
| 50 L | 15.5 |
| 59 H | 13.1 |
| 68 H | 12.3 |
| 68 L | 10.2 |
| 68 H→50 H | 14.4 |
| 68 H→50 L | 14.6 |

## IMPACT TO THE INDUSTRY

If light or temperature is suboptimal prior to harvest, growers will be able to inform wholesalers and florists that the vaselife may be shortened.

Achieving both high light and low temperature is often difficult and requires high amounts of energy, when possible. Unfortunately, for lilies, this combination of environmental conditions produces the longest vaselife and the highest number of marketable stems.

Since the finishing phase is most important for maintaining a long vaselife with sunflowers, we recommend allowing a higher temperature during production, followed by lower temperatures for the last two weeks.

We asked the question, "Is it more important to shade and reduce temperatures or not shade and have higher temperatures?" For sunflower, the answer is to shade and reduce the temperature only during the last two weeks. For lilies, neither shade nor high temperatures produced acceptable vase life or stem qualities. Thus, growers have no acceptable options.

Photo 2. Sunflower 'Sunbright'.

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