

Special Research Report #437: Postproduction

Preharvest Humidity and Water Status Affects Vase Life of Lilies and Sunflowers

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BACKGROUND

Preharvest environmental conditions, such as water deficit and humidity, can influence the length of vase life of cut flowers and conditions in the last two weeks prior to harvest may be most critical. High humidity during production increases the number of stomata on the leaves. During postharvest, the numerous stomata increases the rate of transpiration and results in increased wilting and bent neck of roses. Slight water stress during production has been shown to increase water uptake during postharvest. However, prolonged water stress decreases stem length, an important quality of cut flowers. The objective of this study was to determine the effect of water stress and humidity during production on the vase life of cut lilies 'Vermeer' (Asiatic hybrid) and 'Dazzle' (LA hybrid) and sunflower 'Sunbright'.

MATERIALS AND METHODS

Studies were conducted during the winter of 2006-07 and 2007-08. Lilies 'Vermeer' (2006-07) and 'Dazzle' (2007-08) and sunflower 'Sunbright' (both years) were subjected to various levels of humidity and water stress. In 2006, six humidity treatments were used: ambient (70%) or high (87%) humidity for the duration of production or for either the last two days or two weeks prior to harvest (Photo 1). In 2006, six water stress treatments were used: no water stress or mild water stress for the entire crop cycle or no water stress except for the last two weeks or two days prior to harvest during which time the plants received either mild or severe water stress. In 2007, four water stress treatments were used: no water stress or mild stress for the entire crop cycle or no stress except for mild or severe stress 2 weeks prior to harvest.

Photo 1. Setup of humidity study with lilies.



Photo 2. Lily 'Dazzle' at the proper stage for harvest.



Lilies were harvested either at fully colored puffy bud stage (Photo 2) or when one flower per stem was open. Sunflowers were harvested when ray florets formed an angle of at least 90° to the flower head and three or fewer rows of disk florets were opened (Photo 3). Flowers were placed at 68±4°F under approximately 200 ftc light for 12 hrs/day and monitored daily to determine the end of the consumer vase life. Lily vase life was terminated when the petals of 50% or more of the flowers had dropped or lost pigmentation. Sunflowers were terminated when 50% of the petals had dropped or were wilted.

Photo 3. Sunflower 'Sunbright' at the proper stage for harvest.



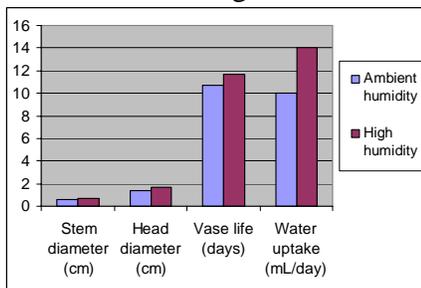
RESULTS

Humidity

Vase life of lilies was unaffected by humidity. However, high humidity increased both stem length and production time, indicating that the humidity was high enough to affect growth. The number of buds produced increased with increasing stem diameter.

Sunflower vase life and water uptake increased with higher humidity (Fig. 1). High humidity also resulted in longer, thicker stems which supported larger flower heads when compared to ambient humidity conditions (Fig. 1).

Figure 1. Effect of humidity on vase life and flower qualities of sunflower 'Sunbright'.



Water stress

Lily 'Vermeer' vase life decreased as water stress increased during the last five days prior to harvest. Vase life

of lily 'Dazzle' was unaffected by water stress. Mild water stress resulted in decreased stem diameter, while severe stress during the two weeks prior to harvest resulted in the thickest stems. Severe water stress was detrimental and increased bud abortion (Photo 4).

Photo 4. Bud abortion of lily 'Dazzle' due to water stress.



Sunflower vase life increased with water stress during the last 36 days prior to harvest (Photo 5). However, water stress reduced the quality of the cut flower by reducing stem length and diameter as well as flower head diameter.

Photo 5. Cut sunflower stems harvested from plants with no water stress, mild stress (note stem is appears short due to breakage), mild stress for last two weeks and severe stress for last two weeks, left to right, respectively. Photo taken 16 days after harvest.



CONCLUSIONS

Humidity levels did not affect the vase life of cut lilies, but high levels improved the vase life and stem characteristics of cut sunflowers.

Vase life of 'Vermeer' was decreased with increasing water stress and that of 'Dazzle' was unaffected. More research is needed to determine the effect of water stress on cut lily vase life.

The vase life of sunflowers increased when plants were subjected to water stress, but flower quality decreased. Growers need to weigh the benefits of flower quality and flower longevity to determine a suitable level of water stress for their growing facilities.

IMPACT TO THE INDUSTRY

The information obtained will benefit the growers of lilies and sunflowers by assisting them to make informed decisions about humidity and irrigation practices needed to produce the highest quality cut flowers with long vase lives.

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