

Special Research Report #428: Postproduction

Optimizing Postharvest Life of Cut Zinnias

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BACKGROUND

Each year a large number of new cultivars and species are made available from plant breeders, propagators, and suppliers. Specific postharvest information must be obtained for these new species as they are made available to the market. Zinnia, although grown for many years, continues to be popular with cut flower buyers and breeders. Two cultivars, Benary's Giant Scarlet (Photo 1) and Sun Gold (Photo 2) were tested to determine the optimum handling procedures to extend postharvest life. Prior trials have shown that zinnia cultivars may respond differently to postharvest handling techniques than many other fresh cut flowers.

Photo 1. Zinnia 'Benary's Giant Scarlet'



Photo 2. Zinnia 'Sungold'.



MATERIALS AND METHODS

Trials were conducted in 2003 and 2004. Zinnia 'Benary's Giant Scarlet' and 'Sun Gold' cut stems were subjected to a range of tests to determine ethylene sensitivity, optimum cold storage duration, and the effect of pretreatments and pulses, vase solutions and substrates, and commercial preservatives. After treatments,

stems were placed at $68\pm 4^{\circ}\text{F}$ under approximately 200 ftc light for 12 hrs/day.

Stems were harvested when at least two rows of petals were expanded. Flowers were monitored daily to determine the end of consumer vase life. This occurred either when the petals curled and began to turn brown at the tips or when the stem collapsed.

RESULTS

Cold Storage/Ethylene

Zinnia cut stems could not be cold stored for one week at 34°F . Both cultivars lost turgidity and exhibited cold damage regardless of being stored dry or wet. Cold storing 'Sun Gold' flowers resulted in flower petal browning and stem collapse, while 'Benary's Giant Scarlet' showed yellow patches on the red petals (Photo 3) and stem collapse. The yellow patches on the petals of 'Benary's Giant Scarlet' were observed a day or two after starting cold storage. Treating the stems with either 0.1 or 1.0 ppm ethylene, 1-MCP, or STS had no effect on consumer vase life. Thus zinnias are not ethylene sensitive flowers.

Photo 3. Cold damage on zinnia 'Benary's Giant Scarlet'.

Pretreatments/Simulated Shipping and Storage

Stems were pretreated with STS or 1-MCP and stored at 41°F for four days dry or wet in either a holding preservative or high quality water. Stems with no pretreatment but stored in a holding preservative had a consumer vase life of 14-16 days, an increase of 2-4 days compared with no preservative. Stems stored dry (Photo 4) regained turgidity and averaged a vase life of 14 days; however, the petals remained slightly twisted and curled after being in the vase for several days.

Photo 4. Boxes of zinnia 'Sungold' prepared for dry storage.

Commercial Solutions

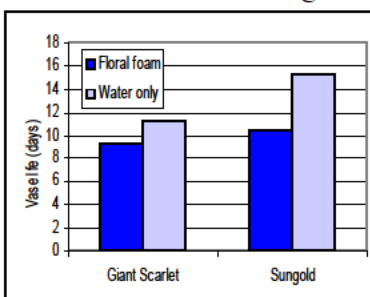
Both zinnia cultivars had a 19-20 day vase life in clean, high

quality water. The use of hydration or holding solutions resulted in a similar vase life of 19-20 days or decreased vase life slightly to 16-17 days.

Sucrose and Floral Foam

A 24-hr 10 or 20 % sucrose pulse decreased the vase life of both cultivars. Stems held in floral foam had a vase life of 9-10 days compared to 12-15 days in water only (Fig. 1). Adding 2% sucrose to the vase when using foam increased the vase life of 'Benary's Giant Scarlet' by 2 to 3 days, while it had no effect on 'Sungold'.

Fig. 1. Effect of floral foam on vase life of zinnia 'Benary's Giant Scarlet' and 'Sungold'.



CONCLUSIONS

Zinnia 'Benary's Giant Scarlet' had a large red flower while 'Sun Gold' was a brilliant yellow gold with a slightly smaller flower (Photos 1 and 2). Both cultivars had a vase life of 19-20 days when held in water only with no commercial hydration or holding preservative. Both cultivars exhibited cold storage damage at 34°F; however, 41°F storage could be used. Stems stored at

41°F with commercial holding preservative resulted in a vase life of 14-16 days. Both zinnia cultivars are suitable for the local or regional retail market.

The optimum handling procedures for cut zinnias are to:

1. cut into clean high quality water,
2. place in 2% sucrose solution, especially if using floral foam,
3. cold store at a minimum of 41 °F for four days or less.

IMPACT TO THE INDUSTRY

As the search for new species continues, improved cultivars of the traditional cut flowers like the zinnia are necessary. Many consumers shopping for cut flowers buy those that are familiar. It is critical to the industry to maintain a constant supply of new cultivars with proper postharvest handling information.

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