

Postharvest Trials: What Works & What Doesn't!

Frankie Fanelli, Beth Harden, John Dole, Bill Fonteno, and Sylvia Blankenship
North Carolina State University

This has been a busy year for postharvest testing. We evaluated eight cultivars from the ASCFG National Seed and Perennial Cut Flower Trial programs using a commercial hydrator and/or a commercial holding preservative and performed extensive testing on four field and greenhouse species: *Dahlia* 'Karma Thalia', *Linaria marocanna* 'Lace Violet', *Papaver nudicaule* 'Temptress' and *Rudbeckia hirta* 'Indian Summer'. With those species we conducted up to 49 treatments per species using 400 and 600 stems! Our hope is that some aspect of this work will benefit each specialty cut flower grower.

National Cut Flower Trial Postharvest Testing

The sunflower (*Helianthus*) has enjoyed resurgence as a cut flower over the last few years with a flurry of new introductions as well as the re-discovery of some old favorites. We tested four annual sunflower cultivars and one perennial sunflower (Table 1). *Rudbeckia*, another North American native, is also easy to grow and produces a strong, long lived cut flower. We tested three rudbeckia cultivars. Flowers of both the sunflowers and rudbeckias were harvested when the first outer ring of ray flowers were open. After harvest stems were recut and placed into either water or commercial hydration solution. Flowers were then transferred to either water or holding preservative and placed in our postharvest room until stems were terminated. Generally stems were terminated when the ray flowers wilted or the stem collapsed. Humidity control was critical for long storage to prevent fungus that may develop in the center of the flower.

Annual Sunflowers. The best handling treatment for all four cultivars was to cut into plain water and transfer into a commercial floral holding preservative.

'Full Sun' – This traditional appearing sunflower can be tricky to handle due to the very large head.
'The Joker' – The petals discolored and curled

from the tips to the base as the flower aged. The foliage wilted and discolored along with the flower in all treatments.

'Sunny' – The holding preservative caused some petal tip browning.

'Terracotta' – The primary flower expanded and the color deepened as it aged. Side buds opened which may increase the consumer vase life as our testing focus on the main flower.

H. salicifolius 'First Light' – Stems should be cut into either water or hydrator and placed in holding solution. This willow leaf sunflower has multiple 2 to 2.5 inch flowers that open from the base of the



inflorescence. Stems were harvested when one or two flowers were open on a stem and continued to open during testing. The stems may impressive bright yellow sprays when fully open. Stems were terminated primarily due to wilting. No browning was observed in any treatment.

Rudbeckia. All three cultivars had a long postharvest life with 'Prairie Sun' lasting the longest, over three weeks. While the optimum treatments varied with the cultivar, the best vase life was generally obtained with the use of a hydration solution followed by placing stems in a holding solution.

'Autumn Colors' – Cut flowers into a hydration solution and transfer to a holding solution. Powdery mildew developed on the foliage and outer flower petals of some stems as they aged. Botrytis was also observed on some stems at termination.

'Goldie Locks' – Cut stems into a hydration solution and transfer to water. Stems were terminated due to wilting and/or stem collapse. Some botrytis in the flower center was observed on those with the longest vase life.

'Prairie Sun' - All treatments lasted a long time. Cut into a hydration solution and transfer to a holding solution. Browning was not observed.

Comprehensive Postharvest Testing of Dahlia, Linaria, Poppy, and Rudbeckia

Thirty to 49 treatments were conducted on four cut flower species: *Dahlia* 'Karma Thalia', *Linaria maroccana* 'Lace Violet', *Papaver nudicaule* 'Temptress' and *Rudbeckia hirta* 'Indian Summer' to determine the optimum postharvest handling procedures. We looked at the effect of anti-ethylene agents [STS (AVB) or 1-MCP (Ethylbloc)], ethylene (0, 0.1 or 1 ppm), commercial floral hydrators (Floralife Hydroflor/100 or Chrysal RVB Hydrating Solution), commercial floral holding solutions (Floralife Professional and Chrysal Professional 2 Processing Solution), vase substrates (floral foam or water), cold storage, simulated shipping, sucrose (sugar in the vase solution), and anti-microbial agents. The following are the highlights for each species.

Dahlia 'Thalia' from Gloeckner's Karma series is a brilliant rose pink with a nice flower size and long, strong stems. For most experiments fully expanded flowers were harvested and testing conducted from mid June through mid September. The stems were terminated when the browning petals were noticeable when looking directly at the flower head.

Dahlia had a vase life of 7 to 9 days that could be

Table 1. Postharvest evaluation of new cutflowers from the ASCFG National Seed and Perennials Trials. For each species, the best treatments are highlighted in bold.

Cultivar	Hydrator + Holding (days)	Hydrator + Water (No holding) (days)	Water (No hydrator) + Holding (days)	Water only (Neither Hydrator or Holding) (days)
<i>Helianthus annuus</i> (annuals)				
Full Sun	6.8	9.0	10.0	8.0
The Joker	6.7	7.1	9.8	6.8
Sunny	15.3	14.5	17.2	14.8
Terracotta	13.4	11.9	14.6	12.2
<i>H. salicifolius</i> (perennial)				
First Light	16.9	7.0	17.9	12.0
<i>Rudbeckia hirta</i>				
Autumn Colors	19.9	14.5	17.6	13.2
Goldie Locks	17.9	23.7	21.0	16.0
Prairie Sun	24.9	22.3	22.4	21.5

increased to 10.1 to 10.8 days using commercial holding solutions such as Floralife Professional or Chrysal Professional 2 Processing Solution. One week of cold storage at 35°F reduced vase life by up to 1.8 days. The longest vase life was obtained with buds cut when at break stage (one petal open) and a minimum of 50% color. The buds required another 3.1 to 4.5 days to fully open and lasted 12.1 to 12.8 days if placed in 2 or 4% sucrose or commercial holding solutions. Many of the buds held in good quality water (control) did not fully open or did not attain the flower size and color of buds held in sucrose or commercial holding solutions. We also harvested 'Naomi' buds but they opened into smaller than usual flowers that lacked the typical strong, vibrant color regardless of treatment. Certainly additional testing of cutting buds is necessary before drawing conclusions.

Linaria maroccana 'Lace Violet', commonly called toadflax, was greenhouse grown from seed. Stems were harvested with one or two florets open and experiments conducted in March 2003. Vases of these lavender to purple spike-like racemes received rave reviews from those that participated in the North Carolina Flower Growers workshop. Stems were terminated when 75% of the florets wilted or the stem collapsed. *Linaria* is indeterminate with flowers opening from the base of the inflorescence to the tip.

Linaria had a vase life of 5 to 7 days that could be increased to 8.9 days using a 10% sucrose pulse for 24 hours or to 10.5 to 12.9 days using a commercial holding solution such as Floralife Professional or Chrysal Professional 2 Processing Solution. One to 3 weeks of wet or dry cold storage at 35°F reduced vase life by 2.0 to 4.0 days. Floral foam, STS, 1-MCP, and ethylene had no effect.

Papaver 'Temptress' produced stems from the end of March through April. The variety of colors ranged from pale pink and yellow to red-orange reflecting the pleasing variability of this seeded annual. The greenhouse-grown flowers were harvested when less than one day old and were either cup shaped or bud tight with the green calyx dropped off. The stems were terminated when the petals wilted or began to drop.

Poppy had a relatively short vase life of 5 to 6 days that could be increased to 7.6 to 7.9 days by using

commercial holding solutions such as Floralife Professional or Chrysal Professional 2 Processing Solution. Stems can be stored for one week at 41°F or used in floral foam with no negative effects. Commercial hydrators, STS, 1-MCP, and ethylene also had no effect.

If you are new to growing poppies, let us warn you that the stems droop when first cut but they perk up quickly as water is taken up. Although we did not record how the calyx cracked on all of the stems, we observed that flowers could be cut sooner when the calyx split from the top down as opposed to those that split from the base up. Those stems where the calyx split from the base up would often not fully expand if cut before the flower had naturally thrown off the calyx. At times about 10% of flowers failed to open no matter what we did to them. Thus, if selling straight bunches, add an extra stem or two in case one doesn't open for the customer.

Rudbeckia 'Indian Summer' postharvest trials were conducted the month of July on field grown stems. *Rudbeckia* is an anchor in mixed bouquets and the cultivar 'Indian Summer' is the star.

Rudbeckia had such a naturally long vase life of up to 36 days that no treatments extended the vase life. Stems could be stored wet or dry at 35°F for up to two weeks with either no decrease in vase life or a 8 day decrease in vase life, respectively. Use of a sucrose pulse was that only treatment that decreased the vase life of this long-lived *rudbeckia*. Floral foam reduced the vase life in half, but thirteen days is still a respectable number of days for a floral arrangement. Interestingly, a few stems of *Rudbeckia* actually formed roots in the vase water. On the other hand, a few stems wilted and died rapidly no matter what we did. These wilted stems should be removed before marketing.

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