

POSTHARVEST TREATMENT OF SPECIALTY CUT FLOWERS

North Carolina State University Report for 2014

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Every year we conduct vase life studies on promising species and cultivars from the ASCFG National Seed Trials. This year's Trial included 14 cultivars we tested for their postharvest potential.

The marigold has been under much debate here at NCSU. Its merits of high productivity, ease of production, and vibrant colors are outweighed by the pungent, unpleasant odor that some around here experience. The scent is apparent only when stems are being cut and foliage stripped, and soon fades. Some people think they smell good, while others are appalled, and still others don't even notice. We found it interesting that marigold extract is used in many very popular fragrances including Burberry, Dolce and Gabbana, and Obsession by Calvin Klein. Regardless of how you feel about the smell, their vase life is excellent, averaging 16-19 days. Marigolds generally benefit from a holding solution sometimes coupled with a hydrating solution. They are definitely something worth trying if you haven't already.

The Cupcake zinnias have a fun, new look for zinnias, but, unfortunately, were inconsistent in their "cupcaking" or doubling. They were smaller compared to the Queens and Benarys, but would be useful accents in arrangements when used like button mums. Late planting, herbicide damage, army worm munching, and cooler than usual summer temperatures

held them back a bit here, but their vase life was still about 10 days regardless of the preservative treatments.

Finally, of course we trialed three new *Eucomis* cultivars. Eddie Welsh sent us some wonderful new selections from his New Zealand breeding program, and they produced solid stems with great color. 'Tugela Gem' was a favorite with its bronzy-green tones, and 'Tugela Jewel' produced seed pods that are a gorgeous jewel-toned deep red-purple. 'Megaru' is perfect for events that need white-green flowers. Vase life was up to par compared to other *Eucomis* cultivars (30+ days) and the stems don't need preservatives to extend vase life.

The Details

Field-grown flowers were harvested into tap water (0.21 EC, 6.1 pH) at the optimum stage of flower development. Stems were then sorted into 4 equal groups and placed in the treatments below for the specified time, then placed into vases of deionized water.

- Hydrator only (4 hours)
- Holding preservative only (2 days)
- Hydrator for 4 hours followed by holding preservative for 2 days
- De-ionized (DI) water only (as a control)

Floralife Hydraflor 100 was used as the hydrator at 1.0 ounce per gallon and Floralife Professional was used as the holding preservative at 1.3 ounces per gallon (the rates listed on the packaging). After treatment, stems were placed in DI water and held at $68 \pm 2F$ under approximately 200 footcandles of light for 12 hours per day. The vase life for each stem was recorded. Termination point was typically when 50% of the flower(s)/florets on the stem were brown, wilted, drooped over, etc.

What Are Hydrating and Holding solutions?

Some of you may be asking, "What is a hydrating and holding solution?" Floral preservatives can be categorized as either hydrating, holding, or vase solutions. Holding solutions contain a carbohydrate source (sugar) to encourage bud opening and/or flower longevity. They are applied for several hours for up to approximately two days, by either growers or wholesalers, before flowers get to the final consumer. Hydrating solutions are meant to be applied right after harvest, prior to a holding solution, to facilitate water uptake and do not contain a carbohydrate source. Hydrating solutions are usually used for a short time, such as four hours.

Vase solutions are generally applied by the consumer, commonly in those little packets, and contain a higher concentration of carbohydrates than a holding solution. While we do not test the use of vase solutions in these studies, it would be safe to assume that those flowers that perform better with a holding solution would likely last longer for your customers with a vase solution.

One More Thing

Our testing methods tend to produce the maximum vase life, which tells you the potential vase life of each species. We cut and process the stems rapidly, put one stem per jar, and use a postharvest evaluation temperature that is a bit cooler than a typical home in a southern summer. These procedures were set up to provide a consistent environment so that anyone else should be able to repeat our work and get the same results. These factors combined typically add about 1 to 3 days to the vase life of some species compared to what a grower would usually get. It is also important to note that these results do not replace in-house testing as there are many on-farm factors that affect vase life.

The Results

Antirrhinum (snapdragon) 'Calima Deep Pink'

Using a holding solution will add about 2 days vase life to 'Calima Deep Pink', bringing it up to 8 days from plain water. Stems were harvested when 3 florets were open so the sugars in the holding solution help the unopened buds open after being cut. Buds that opened after harvest tended to be a little lighter in color. Also, stems not held in a holding solution tended to lose turgidity and flop over.

Celosia (celosia) 'Celway White'

While floral preservatives did not have a statistical effect on vase life, using plain water had a slightly longer vase life of 31 days compared to using just a holding solution (27 days). As is the problem with many white flowers, the flowers of



'Celway White' look dirty very quickly, not desirable if you needed a clean white for a bridal bouquet.

Celosia (celosia) 'Sunday Yellow'

There were no benefits of using a floral preservative so using plain water is acceptable. The average vase life was 37 days. This yellow hides signs of aging very well and flowers stay well hydrated, contributing to their long vase life. Both celosias were harvested as the lower florets were mature, but before seed development.

Eucomis (pineapple lily) 'Tugela Gem', 'Tugela Jewel', and 'Megaru'

For 'Tugela Gem' using a holding solution increased vase life by 6 days to 38 days compared to plain water (32 days). However, the difference was not significant enough to warrant the use of a holding solution unless it is common practice on your farm anyway. For both 'Tugela Jewel' and 'Megaru' there were no benefits to using preservatives as the plain water resulted in the longest vase life. In plain water, 'Jewel' and 'Megaru' had average vase lives of 38 and 41 days, respectively. 'Jewel' showed a big decline in vase life, decreasing it by half, when both a hydrating and holding solution were used. 'Megaru' was less affected by preservatives. All of the Eucomis were harvested when at least 50% of the florets were open. If you can hold out on harvesting stems until the seed pods start to develop we can promise you won't be disappointed with the beautiful jewel tones.

Helianthus (sunflower) 'Jua Maya'

Using floral preservatives did not affect the vase life of 'Jua Maya', which averaged 12 days. 'Jua Maya' was harvested when the first petals began to lift from the disk. The petals were a beautiful yellow with a dark center; classic sunflower look.

Tagetes (marigold) 'Babuda Gold'

A holding solution improved the vase life of 'Babuda Gold' to 19 days as compared to 13 days for the plain water treatment. This is the same recommendation we gave for 'Babuda Deep Gold' that we trialed last year, which had a similar vase life.

Tagetes (marigold) 'Jedi Deep Gold'

While there was no statistical difference, the averages show that using both a hydrator and holding solution improved vase life to 16 days from 11 days when just plain water is used. However, using just a hydrator or holding solution did not improve vase life, so the benefit is in using them both together.

Tagetes (marigold) 'Optiva Orange'

Using a holding solution offered a slight benefit to 'Optiva Orange' although it was not statistically significant. Stems in holding solution had a vase life of 17 days while those in plain water lasted 14 days. This orange marigold is beautiful and bright! All marigold cultivars tested were harvested when one-half to one-quarter of the petals were fully expanded; they continued to fully expand in the vase making them look more lush and full.

Zinnia (marigold) 'Cupcake Deep Orange' and 'Cupcake Yellow'

Preservatives had no effects on vase life of either cultivar. Both cultivars had an average vase life of 10 days.

Zinnia (marigold) 'Queen Lime' & 'Queen Lime Red'

For 'Queen Lime' there were no differences between the treatments and vase life averaged 8 days. Using a holding solution increased vase life for 'Queen Lime Red' to 9 days compared to the plain water treatment of 7 days.