

2020 North Carolina State Postharvest Report

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Photo Rachel Lord

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As with many of you, COVID changed how we handled our research in 2020. Initially, all research was shut down, but limited work was allowed just in time for Nathan to be able to conduct some of our normal postharvest trials (hydrator and holding solution test) on 13 cultivars. In addition, John grew a set of all of the Seed, and first-year Perennial Trial plants at his home farmette, allowing him to perform some formal consumer vase life trials on many of the same cultivars, plus 20 more.

Of the species evaluated, marigolds and campanula lasted the longest in both sets of tests, ranging from 10 to 16 days. The quality of cut flower marigolds has improved over the years, and so has the postharvest life. Hopefully, this means the breeders are including postharvest trials in their evaluations. If properly handled, campanula has a reliably long vase life—good news for this distinctive flower.

We noted the shortest vase life from nicotiana ‘Bronze Queen’, with only 4 days in water and possibly up to 8 days in consumer vase solution. Why do we say “possibly”? While the flower food allowed the flowers to look good longer, the stems still bent over, making them appeared wilted. Regardless, this fun filler flower is probably best used for short-term events.

Postharvest Handling Details

Field-grown flowers and foliage were harvested into tap water at their industry standard stage of development. For the full test, stems were sorted into 4 equal groups and placed in the treatments below for the specified time and 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
- Tap 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 tap water and held at $68 \pm 2^{\circ}\text{F}$ under approximately 200 foot-candles of light for 12 hours per day. The vase life for each stem was recorded. Flowers were typically terminated when 50% of the flowers or florets on the stem were brown, wilted, drooped, etc.

For the consumer solution test, we sorted flowers into two equal groups and placed them in either tap water or consumer vase flower food (Floralife Crystal Clear). We topped off the vases with plain water as needed, but otherwise the stems stayed in the solution until we threw them out.

Some of you may be asking, “What are hydrating and holding solutions?” Both are types of preservatives. Floral preservatives can be categorized as either hydrating, holding, or vase solutions. 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 4 hours. Holding solutions contain a carbohydrate source (sugar) to encourage bud opening and/or flower longevity, and are applied for several hours up to approximately 2 days by growers or wholesalers before flowers get to the final customer. Vase solutions are generally used in final arrangements or bouquets sold in vases, or applied by the consumer, commonly in those little packets, and contain a higher concentration of carbohydrates than a holding solution.

Campanula.

‘Champion II Deep Purple’ lasted the longest, 16 days in consumer vase solution, while ‘Champion II Lilac’ lasted 15 days and ‘Champion II Rose’ only ten. Vase life in water averaged 2 to 3 days shorter. Campanula have a lot of buds and flowers foods are necessary for them to open. Also, the new flowers of the dark-colored varieties will have better color when they open if stems are treated with holding or vase solutions.



Photo Misty Moman

Celosia. Three cultivars were tested, and of these, ‘Act Rima’ had the longest vase life—fourteen days—in a consumer vase solution. ‘Cristi Purple’ and ‘Red Ace’ lasted about 12 days. We did not have enough stems to test in only water. From prior work, celosias generally last the longest in consumer flower foods, while results are mixed with hydrator or holding solutions. The best way to maximize vase life of this species is to harvest when around half of the flowers on the plume are open.

Dianthus. All four cultivars were tested in a consumer vase solution. ‘Pink Magic’, ‘Purple’, ‘Red’, and ‘Rose’ all averaged 9 days in water and 12 days in vase solution. Dianthus are known to respond well to flower foods, which help



Photo Misty Moman

buds open, and improve color of new flowers. Knowing when to harvest can be tricky. It’s generally best to harvest early, when only a few florets are open, but everyone wants more color so flowers are often harvested later.

Eucalyptus. We tested three cultivars from the Trial and of these, ‘Funky Monkey’ and ‘Big O’ had the longest vase life with an average of 9.4 and 9.0 days, respectively. ‘Angus’ had the shortest with 7.4 days. We did not find any difference from use of hydrator or holding solution, which fits most previous work. Cut stems into clean water when leaves have matured.

Lisianthus ‘Echo Purple’. Vase life ranged from 8.3 to 9.5 days. While we did not see a significant effect from the preservatives in this case, holding solutions are recommended to improve bud opening and color of newly-opened flowers in the case of darker varieties. By the way, this cultivar has beautiful striped buds.

Marigold. With another banner year for marigolds in the Trial, we tested 9 cultivars. Vase life for all of them was good, ranging from 10 days for ‘Nosento Lime Green’ to 16 days for ‘Bengal Orange’, ‘Chedi Yellow’, and ‘Mayan Orange’. Hydrator and holding solution did not have much effect this



Photo Jamie Sammons

time for most of the cultivars, but a holding solution appeared to extend the vase life of ‘Bengal Orange’, ‘Chedi Yellow’, ‘Hermant Deep Gold’, ‘Nosento Lime Green’, and ‘Royal Bali Gold’ by one to two days.

In a separate trial, we tested the marigolds with consumer vase solution as well. For most cultivars the vase solution increased vase life by 1 to 5 days, but had no effect on ‘Xochi Orange’. Marigolds have an annoying tendency to root in the vase, which would be great if we were trying to propagate them. However, it can mess up the postharvest data as rooted stems just don’t seem to die. This was most common with ‘Bengal Orange’, but several of the cultivars had a few rooted stems as well.

Overall vase life for each of the cultivars:

- ‘Bengal Orange’ – 16.4 days
- ‘Bindi Gold’ – 15.8 days
- ‘Chedi Yellow’ – 16.4 days
- ‘Hermant Deep Gold’ – 13.9 days
- ‘Janthra Yellow’ – 14.4 days
- ‘Mayan Orange’ – 16.0 days
- ‘Nosento Lime Green’ – 10.3 days
- ‘Royal Bali Gold’ – 14.3 days
- ‘Xochi Orange’ – 11.1 days

Nicotiana ‘Bronze Queen’. This airy filler flower had a vase life of only 4 days in water, with stems bending over and florets dropping. The use of a



Photo Jamie Sammons

vase solution kept the flowers looking good, but the stems still drooped. We determined the vase life to be 8 days in flower food, but not everyone would agree on that. Note that the foliage is sticky, so be careful when harvesting to not set the flowers where they might pick up bits of soil and other debris.

Snapdragon. Both ‘Chantilly Deep Orange’ and ‘Purple Peloric’ lasted about 8 days in water, with the vase solution adding about a day. Snapdragons generally respond well to flower foods, with sugar allowing more buds to open.

Stock. ‘Sahin Anytime’ Mix and ‘Milla Salmon’ lasted 8 days in water

and 10 days in the vase solution. Stock generally responds well to flower foods, allowing more of the buds to open and keeping the foliage from turning yellow.

Sunflower. ‘Marley’ lasted the longest with a vase life of 8-10 days in flower food, while ‘Ziggy’ lasted only 6 days in flower food. We did not have enough stems to compare with water.



Photo Rachel Lord

Most sunflowers respond to flower foods, but not all.

Verbena ‘Purple Haze’. Use of a holding preservative increased vase life by a day from 8.2 to 9.1 days. Note that small florets tend to drop even with the use of flower foods. Luckily there are several florets in each flower cluster, but the dropped florets can be messy.

Zinnia Expt. Orange. ‘Zinnia Expt. Orange’ lasted 7 days in water, and 12 days with a vase solution. Zinnia postharvest handling is the subject of much discussion. Vase solutions generally increase vase life, but not with all cultivars and sometimes not when combined with other hydrators or holding solutions.

If you are interested in seeing more results from previous trials, check out the back issues of *The Cut Flower Quarterly*, or go to NC State’s Cut Flower Extension Website <https://cutflowers.ces.ncsu.edu/>. There you can find production and postharvest trial results by year, species, or cultivar.



Photo Joy Longfellow



Photo Rachel Lord